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## **Pagham to East Head Coastal Defence Strategy Consultation Report**

**Appendix B  
Key Responses  
A01**

**September 2008**

Published by:

**Environment Agency**

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## Pagham to East Head Flood Coastal Defence Strategy

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### Document History

Project : Pagham to East Head Coastal Defence Strategy					
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Rev	Date	Description	Orig.	Chk'd	App'd
A01	15/10/08	Key Consultation Responses	RT		

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### **Consultation responses**

Chichester District Council

Manhood Peninsula Partnership – Going Dutch II (as separate file)

Manhood Peninsula Steering Group

Natural England

Save Our Selsey

West Sussex County Council

### **Review of Going Dutch II**

HR Wallingford Review of Going Dutch II proposals for beach recharge

Malcolm Bray Review of Going Dutch II proposals for beach recharge

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**Chichester District Council**



David Lowsley  
01243 534645  
e-mail:dlawsley@chichester.gov.uk

DGL/ BE10/1

14<sup>th</sup> August 2008

Dear Sir or Madam,

**Pagham to East Head Coastal Defence Strategy - Consultation Response**

Chichester District Council has played a full and active part in the preparation and consultation on the above strategy. I have been asked to convey the response of the District Council which results from three formal meetings and various other briefings and tours we arranged specifically for Members and of course the public exhibitions. The formal meetings were as follows:-

Policy Development Committee (special meeting) on 25<sup>th</sup> June  
Executive Board, 7<sup>th</sup> July  
Full Council 22<sup>nd</sup> July

At each stage the Members held detailed discussions on each frontage and added to or amended the recommendations made by officers in the light of the discussions. For clarity and the avoidance of doubt, I set out below in, tabular form, frontage by frontage, the responses I have been authorised to make on the Council's behalf as a result of this democratic process. I have also appended Council Minute no 279 for your records.

Pagham to East Head Draft CDS Consultation 2008  
Environment Agency  
Guildbourne House  
Chatsworth Road  
Worthing  
West Sussex  
BN11 1LD

The Council wished to express their appreciation for all the work put in by the Strategy Team which has enabled the members to understand the issues and reach their decisions from a well informed base. The consultation and engagement with the public has been well received and feedback to members from their constituents has generally been more positive during the second round of consultation.

As a result of the consultation, the level of understanding in general is believed to be far higher than was the case during the initial phase in early 2007. Appreciation was also expressed to the Chichester Harbour Conservancy for its role in bringing the issues to public attention and actively seeking a workable solution, particularly with respect to the West Wittering frontage.

In general terms, the Council supports all the preferred options indicated in the Draft Strategy but has some reservations and has made comment in respect of specific issues on various frontages. These responses are shown in the right hand column of the following table.

Yours sincerely

David Lowsley  
Senior Engineer

## **Pagham to East Head Draft Coastal Defence Strategy 2008**

### **Consultation Response**

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<b>Pagham to East Head Draft Coastal Defence Strategy 2008</b> <b>Response from Chichester District Council</b>	
<b>Frontage / Operating Authority</b> Preferred option from Draft Strategy	<b>CDC Response</b> All costs quoted are over first 20 years (over the 100 year life of the Strategy)
<p> <b>Pagham Beach / Pagham Harbour/ Church Norton</b>  <b>Arun DC/ Environment Agency/Chichester DC (respectively)</b> </p> <p> <b>ADAPTIVE MANAGEMENT</b>– We propose that a management group is established to develop and implement an Adaptive Management Plan. We would expect this group to include the Environment Agency, District Councils, West Sussex County Council, Natural England and key stakeholders such as local landowners and parish councils. This plan would provide a framework for flexible decision-making over the next 100 years, seek to address funding issues and communicate with local residents. Specific actions for the Pagham Adaptive management plan would include:                     <ul style="list-style-type: none"> <li>• maintaining Pagham Harbour as an inter-tidal system at least for the next 20 years, by keeping the harbour entrance open;</li> <li>• defining the management needs for the area’s internationally important habitats;</li> <li>• developing a short term solution to the erosion of Pagham Beach caused by the thinning of the Pagham spit, believed to be caused by accumulation at Church Norton spit;</li> <li>• investigating opportunities for recycling material from the adjacent Aldwick Bay frontage;</li> <li>• considering the need for new inner harbour flood defences to protect against rising sea levels.</li> </ul> </p>	<p> <b>Support this option</b> </p> <p>At estimated cost of £7m (£35m).</p> <p>Council acknowledge the difficulties in respect of obtaining Government funding for future schemes and stated that the public should not be misled in this respect.</p>
<p> <b>Selsey</b>  <b>Chichester DC</b> </p> <p> <b>Hold the Line – Sustain</b> </p> <p>The groynes and sea wall defences would need to be raised to account for the risks from rising</p>	<p> <b>Support this option</b> </p> <p>At estimated cost of £31m (£111m).</p> <p>Council acknowledge the difficulties in respect of obtaining Government funding for future schemes and stated</p>

<p>sea levels over the next 100 years. The most important issue for Selsey is its current low priority status for national funding. Funding from local, public and other sources will therefore need to be explored to implement a scheme at West Beach. If this proves unsuccessful, Chichester District Council will need to develop plans involving potentially affected householders that describe what will be done as the defences fail. Plans to pay for future schemes at East Beach and the Bill will also be needed where national funds are unlikely. While funding is sought, maintenance of defences should continue until their deterioration makes this no longer possible.</p>	<p>that the public should not be misled in this respect.</p> <p>It was noted and appreciated that the change of approach requested by CDC and the public during the initial consultation had been implemented for the Draft Strategy</p>
<p><b>Medmerry / Environment Agency Managed Realignment.</b> Existing shingle ridge not sustainable. Realignment manages the risk of flooding, works with natural coastal process. Reduces costs of future maintenance. Potential for creation of large area of wildlife habitat.</p> <ul style="list-style-type: none"> <li>• long term protection for the road and essential utilities serving Selsey;</li> <li>• the area of realignment has to be large enough to allow the tide to keep the new inlet open to the sea;</li> <li>• the natural shape and height of ground in the area. The higher the existing ground, the smaller the inland banks would need to be;</li> <li>• existing land drainage;</li> <li>• protection of properties at Ham and Earnley;</li> <li>• the need for new coastal salt marsh and mud flat habitats to be created to replace losses across the Solent. Medmerry has been identified as an important area that could be used for creating habitat to replace losses resulting from schemes to manage flood and erosion risk at other sites in the Solent such as Portsmouth. The need for new habitat has the potential to influence the size of realignment and provide payment for the land needed;</li> <li>• the need to work with people and organisations who could potentially be affected through the changes to land;</li> <li>• other key proposals. Bunn Leisure are investigating potential ways to improve coastal defences for their sites. We are happy to consider such proposals in</li> </ul>	<p><b>Support this option</b> At a cost of £10m (£20m) + £6m for Habitat Creation.</p> <p>Fresh water drainage issues need to be fully investigated before finalising location of retreated flood banks.</p> <p>Flood bank alignment should incorporate privately funded defences which offer protection for major local tourism business as well as residential properties at Ham together with their access.</p> <p>The protection of the Grade 2 listed Coastguard Cottages terrace and the access thereto needs to be addressed. Members were concerned that the area fell between the Hold the line Policy for Selsey and the Managed Realignment policy for Medmerry</p> <p>The Council requested that the Environment Agency work with the local community and businesses to achieve the desired outcome.</p> <p>The prescribed method of cost benefit analysis underestimated the benefit of coastal defences to the local economy and community well-being. Members supported this amendment although it was noted that were the cost benefit criteria amended to give greater weight</p>

<p>order to manage flood risk and preserve the benefits to the local economy. We will need to understand how such plans could work with our recommendations, ensure they are environmentally acceptable and do not increase flood risk elsewhere;</p> <ul style="list-style-type: none"> <li>• public footpaths, rights of way and existing heritage and nature conservation sites and species;</li> <li>• possibility of using innovative designs or materials such as recycled aggregate for construction.</li> </ul>	<p>to the local economy, this would not necessarily mean that Selsey would have a higher priority relative to other coastal areas, nationally. It was noted that the caravan site is reliant for it's business in being close to the seaside and members consider that consideration be given to this aspect by Defra. The EA are asked to forward the Council's concern on this issue to Defra.</p>
<p><b>Bracklesham, E Wittering / Chichester DC</b>  <b>Hold the Line –Sustain</b>          Defences would be raised over time to account for the risks from rising sea levels over the next 100 years. The national funding priority is very low for this frontage.          There is very little chance within the foreseeable future of securing national funding for a scheme to renew the defences. Funding from public and private sources will need to be explored. If this proves unsuccessful, Chichester District Council will need to develop plans involving potentially affected householders that describe what will be done as the defences fail. While funding is sought to undertake works to renew defences maintenance should continue until their deterioration makes this no longer possible.</p>	<p><b>Support this option</b>          At a cost of £19m. (£80m)</p> <p>As with Selsey frontages, if funding can be secured.</p> <p>Council acknowledge the difficulties in respect of obtaining Government funding for future schemes and stated that the public should not be misled in this respect.</p>
<p><b>Cakeham /Chichester DC</b>          Defences would be raised over time to account for the risks from rising sea levels over the next 100 years.          The Cakeham frontage is in fair condition with no major works expected to be needed for the next 20 years apart from ongoing maintenance. The amount of shingle drifting along the coast is uncertain beyond the first 20 years of the strategy. In the medium to long term (approximately 20-80 years) it may be better to move defences slightly landward at Cakeham to provide a more smooth coastal alignment. No properties would be affected by this minor realignment.</p>	<p><b>Support this option</b>          At a cost of £3m. (£25m)</p> <p>As with Selsey frontages, if funding can be secured.</p> <p>Council acknowledge the difficulties in respect of obtaining Government funding for future schemes and stated that the public should not be misled in this respect.</p>

<p>Although no major work is required in the short term over the next 20 years, priority for national funding for works needed after this time is likely to be low. Maintenance of the existing defences should continue while this remains possible. The long term changes at East Head will also need to be considered in managing this frontage.</p>	
<p><b>West Wittering/Chichester DC</b> Adaptive management at East Head plus improved flood defences for West Wittering</p> <p>The flood risk affecting West Wittering village will increase as sea levels rise, irrespective of what happens at East Head. To manage this risk we recommend construction of new flood defences close to the village, either in the form of flood bunds adjacent to the existing road or by raising the level of the roads.</p> <p>At East Head Adaptive management must be aimed at preserving the environmental, amenity and socio-economic value of the feature including the management of effects on the wider harbour. We recommend that the East Head Working Group continues to develop a management plan that will include:</p> <ul style="list-style-type: none"> <li>• long term monitoring and analysis to identify evolving issues and to measure success of management activities;</li> <li>• recycling material from the tip for placement at the hinge and the neck;</li> <li>• creation of a breach prevention sill landward of the hinge and the neck;</li> <li>• management of the existing defences at and around the hinge.</li> </ul> <p>Adaptive management of East Head is unlikely to attract national funding and is likely to require local financial support. We hope that this funding issue will be explored by the East Head Working Group. Flood banks at West Wittering are more likely to gain national funding.</p>	<p><b>Support this option</b> At a cost of £2m. (£9m) East Head £1m (£2m) West Wittering</p> <p>Council acknowledge the difficulties in respect of obtaining Government funding for future schemes and stated that the public should not be misled in this respect.</p> <p>The Council supports the continuing discussion in this area through the East Head Working Group and understands this group may evolve into the East Head Coastal Issues Advisory Group.</p> <p>The Council understands that Flood defences for West Wittering may attract grant in aid and would be pleased if the Environment Agency are able to promote and execute such a scheme.</p>

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**Minute of Full Council Meeting 22<sup>nd</sup> July 2008**

**(i) Minute 279 – Pagham to East Head Draft Coastal Defence Strategy 2008 – Consultation Response**

Mr. Montyn introduced this recommendation. He pointed out that a considerable amount of preparatory work had been undertaken by the project team involving the Environment Agency and Chichester and Arun District Councils. A number of workshops had been held and study groups established, the outcomes of which had then been fed into the consultation document. Significant changes had been made to the document compared with the previous consultation document. A number of exhibitions and public meetings had also been held following publication of the draft Strategy. A special meeting of the Policy Development Committee had also taken place to consider this matter in depth. He commented that it was very noticeable that as people's understanding of all the issues increased, the degree of opposition previously expressed during the original consultation had reduced. There was also a greater understanding of the financial constraints. At this stage, it was anticipated that the final strategy would come back to the Executive Board and Full Council for approval in the autumn.

During the debate, Members expressed appreciation to both Mr. Montyn and to Mr. Lowsley for all their hard work and expertise in this area. Similarly, appreciation was also expressed to the Chichester Harbour Conservancy for their input into the document. A member expressed concern about the funding situation. It was clear that funding would not be available for certain areas of the coastline because they would not be of sufficient high priority to attract financial support and he felt that it was important that residents were not misled in this regard.

Responding, Mr. Montyn pointed out that in the most recent consultation document, it had been made explicitly clear that funding would be a major issue. However, in some areas, it was likely funding would be available, for example, flood banks at Medmerry and at West Wittering, but for other areas it would clearly be more difficult to attract central government support. There was no intention to mislead members of the public in this matter. As part of the whole process, it was important to identify the scope of the complete project and the likely costs before moving forward. He also pointed out that some of the proposed work could be spread over a number of years. In concluding, he wished to thank both the officers for all their hard work and the Members for all their support in this project.

A Member referred to the government's cost benefit analysis for determining priorities for funding. He considered that this system gave insufficient weight to the benefits to the local economy and he cited the example of the Selsey caravan park and the economic benefits this brought to the District and the huge impact this would have on the local economy were the park to be adversely affected by rising sea levels. He proposed that the Council's response to the consultation document should also include reference to the fact that the prescribed method of cost benefit analysis underestimated the benefit of coastal defences to the local economy and community well-being. Members supported this amendment although it was noted that were the cost benefit criteria amended to give greater weight to the local economy, this would not necessarily mean that Selsey would have a higher priority relative to other coastal areas, nationally.

**Resolved**

That the Council's response to the Pagham to East Head Draft Coastal Defence Strategy Consultation as set out in the appendix to the report be approved subject to the inclusion of the amendment as detailed above.

## **Manhood Peninsula Partnership – Going Dutch II**

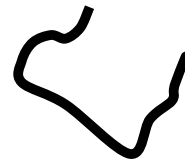
Chairman: Cllr Peter Jones  
Project Leaders: Brian Waters and Carolyn Cobbold

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THE MANHOOD



PENINSULA  
PARTNERSHIP

26 August 2008

Dear Sir or Madam

### **East Head to Pagham Draft Coastal Defence Strategy Consultation Response**

Please find below comments made by The Manhood Peninsula Partnership (MPP) in response to the East Head to Pagham draft Coastal Defence Strategy (CDS).

The MPP is made up of a broad range of constituent bodies each with a duty to their own organisation to develop responses which may in some circumstances be in conflict with others in the Partnership. The following comments therefore will not address specific management options but provides a response in broad terms on the consultation process and findings from the Going Dutch II workshop organised by the MPP. The views expressed represent the views of the Partnership as a whole and not the individual views of the organisations within the Partnership.

The MPP appreciates the level of **public engagement** which has been undertaken at the launch and over the duration of this consultation. The MPP wishes to congratulate the project team on the efforts given to running stakeholder exhibitions across the Manhood and their attendance at numerous meetings giving community members opportunities to discuss and ask questions regarding the draft CDS. This engagement echoes the efforts of the MPP to alert and engage local communities in the issues that affect their local area.

The MPP wishes to highlight the **work of the East Head Working Group** and how this is an excellent model showing how to bring together interested parties and through joint working come to a resolution. Given the success of the EHWG, the MPP suggests that this model is used at Pagham as a way forward with the adaptive management proposal. The model might also be highly appropriate for the managed realignment proposed for Medmerry.

The MPP acknowledges that the draft CDS deals with **Climate Change** issues sensibly, tying in with regional government and educational requirements.

The MPP commends the outcomes of the **Going Dutch II** workshop to the project team and asks that the findings detailed in Going Dutch II report are given serious consideration. The Going Dutch II workshop held from the 22<sup>nd</sup> to 25th June 2008 at Earnley Concourse involved 22 Dutch and British coastal spatial planners, engineers and environmentalists who reviewed the draft CDS alongside four other community proposals:

- No national funding scenario
- Holding the line with hard sea defences
- Off-shore reefs
- Feeding the coast

The Going Dutch II findings emphasise that an integrated approach is required for the Manhood, where coastal defence issues are not considered alone. The suggestions put forward are a good example of Integrated Coastal Zone Management (ICZM) that needs to be given wider consideration by regional and central government. The MPP asks that the project team considers the work undertaken at the Going Dutch II event in regards to the wider Manhood and in particular the funding mechanisms of agencies and councils needing to work together to facilitate the suggestions highlighted. For example, the Going Dutch II report could be used by SEEDA in their Coastal Economic Regeneration document which looks at integrating economics into coastal management.

The integrated approach of the Dutch with regard to inland and coastal issues should be highlighted. The Dutch suggest the CDS does not concentrate only on coastal issues and that it works with natural processes rather than against them. The report highlights the need for local authorities to work with and plan sea defences within the Coastal Strategy framework. Clear reference should be made in the CDS to this wider context.

Yours sincerely

Keith Morgan  
Assistant Director Building & Environmental Management  
Chichester District Council  
on behalf of  
Manhood Peninsula Partnership

Attached

'Going Dutch II towards a safe and sustainable future of The Manhood Peninsula'  
Carolyn Cobbold and Renee Santema. August 2008

## **Manhood Peninsula Steering Group**

## MANHOOD PENINSULA STEERING GROUP

C/O Roland O'Brien  
80 West Street  
Selsey  
Chichester  
West Sussex  
PO20 9AE

Paul Smith,  
PEHCDS consultation,  
Environment Agency,  
Guildbourne House,  
Chatsworth Road,  
Worthing,  
West Sussex BN11 1LD

27<sup>th</sup> August 2008

Dear Paul,

Please find attached the MPSG Draft Coastal Defence Strategy consultation response. I'd be grateful if you could confirm safe receipt on behalf of EA/PEHCDS.

I'd like to take this opportunity to thank you and the members of the Project Team for actively engaging with the MPSG during the Draft CDS consultation process, through a series of meetings and continual exchange of information. I hope you'd agree that the process has been positive, constructive, and informative for all involved.

The MPSG would like to continue engaging in this fashion, during the continued evolution of the Strategy, and of the schemes that are likely to follow from it (including the debate on funding). Meanwhile, we would be most happy to meet again with the Project Team, during the revision of the Draft, to go over any points made in our consultation response.

Yours sincerely,

**Roland O'Brien**  
**Co-Chair, MPSG**



# Manhood Peninsula Steering Group

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## The Pagham to East Head Coastal Defence Strategy

(PEHCDS/CDS)

## Formal Consultation Response

August 2008

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## 1. INTRODUCTION

The Manhood Peninsula (from Pagham to East Head, including the Chichester Harbour area) needs adequate coastal defence, to safeguard the future of the community. Manhood Peninsula Steering Group (MPSG) is a voluntary alliance of residents, businesses and elected representatives jointly chaired by Roland O'Brien and Andrew Tyrie, MP which considers it has a legitimate claim to ownership of this issue and to influence outcomes.

The views expressed here have been agreed by all MPSG members. Members have, though, reserved the right to individually reply to the consultation since they may have specific concerns related to their business/other interests which are not the focus of the wider group.

MPSG remains convinced that it is both economically and socially justifiable to continue a policy of "hold the line" along the Pagham to East Head frontage. However, since change is being forced on us, at the very least it should incorporate the amendments outlined below.

### 1.1. MPSG Contact

All correspondence regarding this submission should be directed to:

Roland O'Brien – Co Chair Manhood Peninsula Steering Group

**Address:** 80 West Street, Selsey, West Sussex, PO20 9AE

**Tel:** 01243 601183

**Email:** roland.angela@tiscali.co.uk

### 1.2. Abbreviations used

CDC – Chichester District Council	CDS – Coast Defence Strategy
DCLG – Department for Communities and Local Government	DEFRA – Department for Environment, Food and Rural Affairs
EA – Environment Agency	MICE – Member of the Institute of Civil Engineers
MR – Managed Realignment	NAI – No Active Intervention
NE – Natural England	NFU – National Farmers' Union
PEHCDS – Pagham to East Head Coast Defence Strategy	PV – Present Value
SMP – Shoreline Management Plan	SEA – Strategic Environmental Assessment
FRM - Flood Risk Management	SEEDA – South East England Development Agency

## **2. THE DRAFT CDS**

### **2.1. Consultation**

The consultation on the Draft CDS has been a great improvement from the earlier Initial Draft consultation. We commend the Environment Agency (EA) team for this improvement, particularly the efforts made to engage with business and community representatives (including the MPSG) through correspondence, meetings and by distributing electronic copies of the CDS and some of the CDS reference material.

### **2.2. Planning for the Future**

The summary document circulated to the public understandably could not give the full details contained in the Draft CDS and SEA. Nevertheless, two key issues were not mentioned which should have been highlighted at the public exhibitions. These are:

- Medmerry – the preferred option (line A) would lead to the loss of 4 homes, without compensation.
- Medmerry Cliffs – the preferred option would lead to the loss of Coastguard Cottages (8 homes) and their access road, without compensation.

The EA should take extra note of any consultation feedback on these issues, as the lack of publicity means that interest in them may be under-represented.

#### **2.2.1. Use of PV Costs**

The document does not make clear that the costs used are “cash” costs as opposed to “PV” costs, which along with the use of the 20-year cost in the public summary but not in the full CDS, made comparing the summary with the full Draft CDS very difficult.

#### **2.2.2. Correct Costs**

The document does not indicate that PV costs for Selsey could be £41m rather than £31m, if more shingle replenishment is needed. The public may therefore underestimate the cost of coast defences by 33%, at a time they are being asked if local funding may be appropriate.

#### **2.2.3. Outcome Measures**

We note that calculations in the CDS have been modelled using Outcome Measures as well as the currently prescribed methods.

We welcome some of the suggestions made by DEFRA in the Draft Policy Statement on appraisal for flood and coastal erosion risk management. In particular, its suggested use of innovative materials and solutions to coastal defence, of widening the scope for third party funding, and the need for public engagement.

We will respond to the consultation on the Draft Policy Statement separately, but will copy this to the Project Team as we believe the comments will provide useful feedback in the context of the CDS.

### 2.2.4. Definition of Realignment Lines

Page 17 of Planning for the Future has an ambiguous graphic which states “land for future habitat creation”. We understand that in a conceptual document such as the CDS the line of the bunds are “indicative only” and that the level of definition is not going to be precise.

However, the implication of the “land for future habitat creation” graphic is that the future (or scheme stage) land take for habitat may be very considerable indeed and differ greatly from the proposed lines. We believe the difference between the potential land take and the situation shown on page 17 could be so great, that the diagram on page 17 becomes misleading and does not make the reader aware of the effects of flooding an increased area, such as

- Altering surface water drainage in North West Selsey
- Increased vulnerability of adjoining areas to erosion
- Potential loss of additional property
- Increased cost of building and maintaining a longer line

With the level of technical knowledge and existing data available to the PEHCDS project team, we believe that this map could have been more precise in highlighting likely land take or could have indicated a ‘land range’ in which the actual bunds would be built, including an idea of the actual land take for future habitat creation.

## **3. METHODOLOGY**

We have serious concerns about the methodology for undertaking the CDS that is prescribed by DEFRA.

### **3.1. The Division of Frontages**

This is undertaken based on coastal processes, without consideration of the socio-economic activity and land use of the immediate and wider hinterland. The resulting decisions can be technically inadvisable, economically damaging and socially divisive.

For example, in the Initial Draft CDS the application of the CBA to three Selsey frontages led to a proposal to let the central frontage, Selsey Bill, erode away. Avoiding end-scour at both adjoining frontages would have been technically challenging and expensive. The economic and social damage of permitting the central third of Selsey's coastline to erode away would have been extreme (although not counted by the CDS). Not only would individual homes be blighted (including some of Selsey's newest social housing), but the entire town would have been blighted by association. Community wellbeing would have suffered, as a result.

We argued that the town should be taken as a whole, and the CBA applied across the single frontage. This has since been done, but not because of the socio-economic perspective that we believe should be used in designating geographical units to which the CBA is applied.

The current approach (dividing the coastline into frontages based on coastal processes) would have failed the community of Selsey and will fail other coastal communities unless it is changed to a more holistic, socio-economic approach. The issue of frontages is linked to that of Social Justice, which is considered in section 3.5, below.

### **3.2. The Cost Benefit Analysis (CBA)**

#### **3.2.1. UK wide perspective**

The UK-wide perspective is unjust. For example, at Medmerry it is accepted by the Draft CDS that Selsey's caravan parks are a major local employer and contribute hugely to the local economy (£50m p.a.), yet the loss of these assets is treated as a "transfer payment" so their benefit is excluded from the CBA.

This is inconsistent with Government policy towards Regional Development and coastal town regeneration in particular. On the one hand, it is considered acceptable that economic output moves away from coastal communities; on the other, public money is invested to increase their economic output and improve community wellbeing.

We consider that the CBA should not exclude transfer payments, so as to realistically assess the socio-economic impact on economic entities such as Selsey Town and the Chichester District.

### **3.2.2. Public Capital**

As a regeneration area with some of the highest levels of deprivation in the District, Selsey has received public investment from Government bodies such as SEEDA. This investment should be treated as public “capital” and should be added to the value being protected when considering the cost/benefit of coast defences.

### **3.2.3. Blight (property directly affected)**

The CBA does not take account of blight on properties “directly affected” by flooding/erosion. The CBA assumes the value of property is only affected when the sea is within 5m (erosion), or when the frequency of flooding is so severe that the building is unusable. In reality, properties threatened by frequent flooding will be difficult if not impossible to sell or let, thus capital/rental values will fall even if the building is theoretically “useable”. Similarly, properties threatened by erosion lose value immediately the threat is apparent – an extreme example is the £1 house at Happisburgh, but in general the effect on value is similar to changing the title from a freehold to a term-certain leasehold (with an expiry date when the occupier has to vacate).

### **3.2.4. Blight (property indirectly affected)**

The CBA does not take account of the more widespread blight which abandonment of coast defences (or lack of public funding to maintain them) entails. Entire settlements may be “tainted” if part of the town is left to erode, as investors avoid the area altogether because of uncertainty: uncertainty over which properties will physically be at risk; over the costs and funding mechanisms for local coast defence; over the damage to community wellbeing (social deprivation; anti-social behaviour) if individual properties or whole neighbourhoods are abandoned to the sea.

### **3.2.5. 100 year timeframe**

The 100 year timeframe is peculiar to coastal planning (it was adopted after the Government's acceptance of sea level rise predictions related to global warming). However, sea level rises cannot be predicted with great certainty over this period. Nor is technology likely to stand still – it is likely alternative measures and technologies for dealing with both global warming and coast defence will be discovered over the coming decades. Consider, for example, whether a coastal plan adopted in 1908 would still be relevant today.

The timeframe is longer than used in any other area of public investment, except nuclear power generation, and far longer than the typical private sector investment horizon. The associated guarantees required by the EA for maintenance of private coast defences for the 100 year period are a severe disincentive to private sector investment in this area (e.g. multi-purpose coast defences incorporating marinas or wind farms).

For these reasons we advocate a return to the 50 year maximum time horizon in the CBA. For indicative purposes the 100 year “do nothing” scenario could be described. However, investment decisions should be based on the 50 year timeframe, which is enough to buy this generation (and their children) coast defences appropriate to their circumstances.

### **3.3. Farmland**

The Government has indicated that food security is a concern, yet this is ignored in DEFRA's guidance on coast defence strategies. DEFRA guidance should be issued on the relative importance of farmland against natural habitat and other land uses.

We support many of the concerns raised in the NFU South East Region's consultation response, which specifically concentrates on farming issues (e.g. loss of farmland, undervaluing of farmland, need to compensate affected landowners and implications of managed realignment on future drainage).

### **3.4. Habitat creation**

#### **3.4.1. Weighting Mechanism**

The EA has pointed out that "there is no formal weighting mechanism to decide the relative importance of natural habitat against houses and other land uses" (initial Draft PEHCDS, Frequently asked questions, March 2007). A weighting mechanism should be formulated by DEFRA in consultation with DCLG, so as to guide the EA in this area.

### **3.5. Social Justice**

CoastNet, technical adviser to The All Parliamentary Group on Coastal Affairs, defines social justice in the context of coast defence as:

A readily understood and open decision-making process, which

1. Sits within a wider policy framework for coastal management, which reflects the wider sustainable development context
2. Acknowledges and quantifies the risks to the community from the inevitable impacts of coastal change
3. Acknowledges that past decisions may have had detrimental consequences
4. Involves the community in issue identification and problem-solving
5. Does not allow mistakes to be repeated by any level of government
6. Protects the community from issues that individuals cannot easily resolve themselves, such as social and market pressures (especially in relation to housing)
7. Encourages the community to take responsibility for its own future

## MANHOOD PENINSULA STEERING GROUP – PEHCDS CONSULTATION RESPONSE

We believe Social Justice should be an integral part of the CDS and all coastal planning. CoastNet considers that translated into policy implications this definition implies the following:

1. A higher level policy framework for coastal management, based on an inclusive vision for the coast to integrate policy through all arms of government
2. An adequately resourced, long-term research programme, its outputs communicated to the public
3. Government accepting responsibility for past decisions
4. Significantly more resources and expertise dedicated to community engagement
5. A compensation mechanism put in place now, with associated spatial policies, which will remove the problem for the future
6. Government intervention where market and other economic and social forces have failed, as they clearly have in this instance, and properly fund the solution
7. The community should themselves acknowledge, as a response to 5 above, the likely future impacts of erosion and flooding, and take responsibility for planning and for making contingency for future change.

## 4. FUNDING

The CDS does not attempt to fully address the funding issue. It notes that out of the estimated £73m PV needed to fund the preferred options, only £11m PV funding is “likely”. Funding will therefore become one of the biggest issues and is deserving of substantial treatment.

We expect to be involved in that debate. Meanwhile, we believe that coast defences (where the B:C ratio exceeds unity), should be considered as public/community infrastructure. Classing them in this way will facilitate funding from the widest variety of sources, including the public, charitable and private sectors (e.g. through planning gain).

## 5. FRONTAGES

### 5.1. In general

We have some overriding comments which relate to most or all frontages and specific comments on each.

#### 5.1.1. Benefit Cost Ratio

The overall B:C ratio for preferred options across all frontages (excluding Pagham) is 2.94:1. Our view is that a B:C ratio of almost 3:1 justifies public expenditure to undertake the works outlined in the Draft CDS.

#### 5.1.2. Exit Strategy

The costs of an Exit Strategy for each frontage, under the No Active Intervention scenario, should be published, in order to properly inform all stakeholders.

Such costs are likely to fall upon the District and Parish/Town Councils and thus ultimately be paid for by local residents. As local authorities and residents are being asked to consider if & how policies should be funded, they need to understand the true cost to them of following a “Do Nothing” scenario.

A poorly conceived Exit Strategy (or reliance on permissive powers to withdraw public funding of coast defences) could lead to litigation on a number of issues, including Human Rights. The likelihood of litigation should be factored into the estimated cost and timescale of the Exit Strategy. The expense of the Exit Strategy cost estimation should be met by the CDS, rather than being left to the individual Operating Authorities.

#### 5.1.3. Adaptive Management

Adaptive Management (AM) is defined in the CDS as a means to “promote flexibility with an emphasis on sequential decision making in the face of uncertainty. It provides the opportunity for improved management as more understanding of the system is obtained over time”. The EA has indicated that it will set up AM Groups, incorporating stakeholders, to oversee AM over the 100 year Strategy period.

We welcome this approach but believe its principles should be followed on all frontages. Firstly, the community has a legitimate claim to ownership of the coastal management issue. Secondly, there is no absolute certainty when it comes to forecasting coastal processes, particularly over a 100 year timeframe, or when a radical change in management practice (e.g. MR) is proposed. AM provides a flexible and inclusive mechanism for dealing effectively with our coastal management over the long term, which should be adopted across all frontages.

#### 5.1.4. Interim Management of Frontages

Operating Authorities should continue to maintain and repair existing coast defences in a timely fashion until such time as alternative policies are executed. Should defences fail during the interim period:

(a) there is the potential for damage to life and property, and

(b) the proposed new policies may cost substantially more to implement, or no longer be technically viable.

## 5.2. Pagham

We support the proposed policy of Adaptive Management but have concerns.

- There is uncertainty in the Draft CDS over the amount of land that will be taken for future habitat creation, on the financial arrangements with landowners that this would entail, on the affects on retained land in terms of agricultural production, and on the access arrangements for the public.
- Whilst adaptive management is a sensible solution, there is considerable concern over future habitat creation, and the involvement of the public throughout the scheme, from planning through implementation and ongoing management & review.
- During the later stages of the strategy period a further defence will be needed to the north of Selsey, to protect the town from extensive flooding via Pagham Harbour (through the gap between the northern end of the Selsey frontage and the eastern end of Bund 4). Details of this defence, including indicative location, cost, and any other relevant considerations, should be included in the full strategy.
- We consider it essential that the Adaptive Management Group is formed before detailed planning has commenced, and includes strong grass-roots community representation from all communities concerned, in the form of town/parish councils and resident groups such as SOS. The communities involved are Selsey, Sidlesham, Hunston, Mundham, Runcton and Pagham (all of whom will require protection by flood bunds). These and the landowners (all whose land could be affected by decisions taken by the AMG) should have representative parity with the other stakeholders.

## 5.3. Selsey

- We support the proposed policy (hold the line – sustain), but unless funding is provided the “do nothing” scenario will occur. It does not make sense to provide public funding for Medmerry in order to preserve Selsey’s £1bn asset value, yet not provide funding for Selsey’s urban coast defences. If blight were included in the CBA (see above) then there would be an economic rationale for public funding of Selsey’s urban coast defences.
- We share the concerns raised by Richard Armfield MICE in his report (attached as Appendix A) that the erosion rates in the Draft CDS may be greatly underestimated, and thus the benefit of defending Selsey’s urban coastline has also been greatly underestimated. The classification of funding for Selsey should be altered to “uncertain” while this remains in doubt and a recommendation made that further analysis be carried out as a matter of urgency.

### 5.4. Medmerry

- An offshore reef has not been costed (only offshore breakwaters), neither has a rock/concrete reef, nor a shingle reef option as suggested by the “Going Dutch II” event. These options should be fully considered before the strategy is finalised.
- The cost of shingle procurement should also be verified as the figure used in the “Going Dutch II” event was far less than the figure used in the Draft CDS. If a significantly different shingle cost emerges it should be run through the CBA calculations for all frontages, including Medmerry.
- The SEA overlooks the environmental advantages of an offshore reef, and of continuing to hold the line.
- There is uncertainty in the Draft CDS over the amount of land that will be taken for future habitat creation, outside the immediate scheme area, on the financial arrangements with landowners that this and procurement of scheme stage land would entail, on the affects of retained land in terms of agricultural production, on the access arrangements for the public.
- We are concerned that managed realignment (MR) is a virtually irreversible option, which increases the length of coastline that needs defending, carries with it considerable uncertainty, conflicts with Government statements regarding food security, may be heavily influenced by the exigencies of the EU Habitats directive, and that under a different decision-making framework alternatives of more benefit to the nation and local community (offshore reef, revetment) might be preferred.
- Even under the current decision-making framework, we believe Adaptive Management is more appropriate for this frontage. MR is a radical change of policy, the development of which is impossible to predict with certainty, carrying a strong possibility that changes of plan will be needed over time. It has the potential to significantly affect people and businesses in the district. The AM approach is the preferable way to tackle these issues effectively.

Medmerry Cont. - Nevertheless, given the framework under which the EA must operate we understand that it is likely MR will be the preferred option. For this reason we have outlined below how we believe an MR scheme could be effectively delivered in such a way as to give maximum benefit to the local community.

- A strong, broadly representative MR Group is vital. Its remit should be to facilitate delivery (and continued management) of a MR scheme that provides flood protection and attempts, where possible, to provide other community benefits. Community involvement is more likely to produce a MR scheme tailored to local needs, thus “adding value” to the public spending on MR and reducing the likelihood of legal challenge & adverse publicity.
- The MR Group must include landowners (those directly affected by flooding and those whose land may be affected by works or future management practices); community groups (Ham Residents; SOS); community representatives (Earnley, Bracklesham, Sidlesham parish Councils, Selsey Town Council). These groups should have equal status with other participants and will be key to identifying potential additional community benefits.
- The MR Group should be formed as soon as the Draft Strategy has been approved by the District Councils, allowing it to facilitate the scheme right from the planning stage. This is so the MR Group has the opportunity to add value to the scheme and by doing so, bring community buy-in. For example, it could promote an emergency vehicle & cycle track on top of the new bunds, which the EA on its own might be precluded from sponsoring because of its internal policies.
- The scheme should recognise the vital part that the caravan parks play in Selsey’s economy and seek to work with these businesses in order to avoid adverse impacts on the local economy and community wellbeing.

### **5.5. East Wittering and Bracklesham**

- We support the proposed policy (hold the line – sustain), but unless funding is provided the “do nothing” scenario will occur.
- The cessation of beach recharge at Medmerry (under the MR option) will lead to a reduction in shingle supply to this and other downdrift frontages. It is normal for “downdrift” effects to be considered when FRM schemes are proposed, and for the costs of any mitigation measures to be set against the cost of the FRM scheme. We therefore believe the cost of future shingle replenishment at this frontage should be set against the cost of the Medmerry scheme and funding for Medmerry should include downdrift frontage shingle replenishment.

### **5.6. Cakeham**

- We support the proposed policy (hold the line – sustain, or minor realignment after 20 years), but unless funding is provided the “do nothing” scenario will occur.
- The argument in section 5.5 regarding shingle replenishment costs applies to this frontage, too.

### 5.7. West Wittering & East Head

- We support the proposed policy of Adaptive Management (AM) but have concerns.
- It is essential that the AM Group includes strong grass-roots community representation from all communities concerned, in the form of parish councils and resident groups such as West Wittering Residents' Association. These and the landowners (all whose land could be affected by decisions taken by the AMG) should have representative parity with the other stakeholders.
- The hold the line policy proposed for Cakeham frontage should be extended from Cakeham frontage up to Groyne 21 (the start of East Head). AM proposals at East Head are calculated to preserve its amenity value, but this will be negated unless there is continued defence of the car park and its access road, in order that the public can continue to have vehicular access to the area.
- The favourable conservation status of the SPA may require a continuation of hold the line policies. In the absence of an "overriding public interest" argument, NE's preferred policy of preferring natural processes may lead to a contravention of the requirement to protect SPAs.

### 6. RELATIONSHIP OF CDS & SHORELINE MANAGEMENT PLAN (SMP)

The North Solent SMP is the higher level coastal plan for the Manhood Peninsula. Currently the new North Solent SMP is in the early stages of its preparation. In theory the SMP should be completed, then lower level Strategies and Schemes can be defined which follow its policies. In practice these lower level plans will be in place before the SMP is completed and will, in the EA's words "inform" the SMP.

This reversal of roles in the case of the PEHCDS suggests that SMPs are in some cases by-passed, and we question whether large sums of public money should be spent on developing such SMPs. Guidance should be issued permitting a less expensive, abridged form of SMP to be created in such cases as the North Solent SMP, where its policies will already have been partly determined by CDSs.

## 7. CONCLUSION

The policies proposed for the majority of frontages are supported by MPSG. However, without interim maintenance followed by scheme funding, these policies will not be put into practice. Community engagement is essential in dealing with the funding issue.

A more inclusive approach will also permit the input of local knowledge and expertise, resulting in more sustainable management measures, and wider public acceptance of the schemes that emerge.

We continue to have serious concerns regarding DEFRA's guidance for undertaking Coast Defence Strategies, which we have outlined above, in order that it can be passed on to the relevant section of DEFRA for consideration.

We look forward to continued engagement with the EA as the CDS is finalised and planning of underlying schemes commences, and wish to be kept fully informed of developments.

## APPENDIX A - SELSEY DAMAGES UNDER NO ACTIVE INTERVENTION

(written by Richard Armfield MICE, August 2008)

We are concerned that the No Active Intervention (NAI) damages assessment for Selsey does not adequately reflect:

- The current knowledge on the rate of erosion in the event of failure of the sea walls.
- The impact of failure of the East Beach Outfall.

As a result the amount of damage is underestimated with a corresponding reduction in the Benefit Cost Ratio promoting the conclusion that funding is unlikely.

Whilst it is appreciated that a Strategy Study takes a broad brush type of approach it is a concern that subsequent more detailed scheme assessment may either:

- not take place (e.g. CDC officers/councillors conclude it would be fruitless and therefore not worthy of public expenditure),
- or will be overturned on application to the EA because it does not tally with the assumptions in the Strategy Study.

In addition the town will continue to suffer an unnecessary level of blight.

Our comments on the damages assessment are summarised below.

### **Erosion Rate**

It is a matter of factual record that after the failure of the section of sea wall last year on West Beach the sea eroded 15m landward in 3 days. During this 3 day period the sea also managed to start undermining adjacent sections of the sea wall such that they also began to fail. During the 3 day period, and for some time after, CDC and their contractor fought to stabilise the situation.

The Strategy recognises these facts.

Under the NAI option the Strategy Study makes two assumptions about the residual life of the West Beach seawall. 1. That the Breached Section would fail again within 1 year and that 2. The remainder is failing now but is given a 5 year life. The Strategy also notes that once a section of wall has failed the adjacent ones will quickly unravel.

From this position the Strategy goes on to assume that on failure of a section of the sea wall the ground will erode landward at 3m per year for 5 years (=15m) and thereafter at 1.34m per year. The result is the loss of the sea wall and 5 houses in the first twenty years.

Conversely CDC's recent erosion assessment for the sea wall breach repairs concludes that erosion would be nearly 30m in year 1 slowing to 1.34m per year by about year 5. Adding in a buffer strip (when houses are presumed unsafe to occupy) leads to the loss 4 or 5 houses in the first year alone. Many more houses are lost over the following few years as the sea wall progressively collapses.

The CDC model seems a reasonable extrapolation of the facts surrounding the breach whereas the Strategy extrapolation would appear to be a gross underestimate.

We have done our own assessment of houses lost due to erosion along the whole West Beach frontage based upon the rates used by CDC and failure of the remainder of the sea wall at the end of year 5 (the residual life given in the Strategy). In summary for the length between the coastguard station and the east end of the car park off Hillfield Road 4 houses would be lost at year 1, 20 by year 5, 66 by year 10 rising to 210 by year 100.

In geographic terms all the seafront houses would be lost by years 6 or 7 and those on the landward side of Clayton Road by year 30. By year 100 all properties on a line running from approximately the junctions of West Road/Vincent Road, Vincent Road/Warner Road and Seal Road/Seal Square would be lost.

The above model gives damages of approximately £25 million when calculated using the £270k average house value and discount rates quoted in the Strategy. Obviously the houses on the seafront are worth considerably more than £270k and so the calculated £25m is an under estimate. Regardless, the calculated £25m loss for West Beach alone compares with the total erosion loss for the whole of Selsey quoted in the Strategy of £16 million.

The Strategy purports to use the same basic type of erosion loss model for parts of the Bill and East Beach which are protected by sea walls, although the erosion starts on failure of the first part of the wall in year 20. Whilst the 20 year assumption could be seen as reasonable the same type of erosion model with limited initial erosion will be similarly flawed as the high land will regress quickly in the first few years after wall failure as was seen at West Beach last year. As such it is not unreasonable for us to consider that the East Beach erosion losses are also underestimated in the Strategy. Of course this is compounded by the actual property value of the sea front houses.

### **East Beach Outfall Failure**

It is understood that the East Beach outfall is in a poor state of repair with only 1 flap valve providing protection against tidal intrusion.

Prior to the construction of the sea wall and the outfall the land which comprises the car park, pond and a large tranche of surrounding housing was a marsh. Once the wall and outfall were built the land was drained and the housing foot print extended. The ponds were extended to accommodate the increased runoff from the recent housing to the north east of Selsey.

If the outfall or landward pipe work were to become blocked then under the NAI option the low land will once again flood leading to the loss of a number of houses. This scenario would be compounded by the regular sea wall overtopping that occurs along this section of East Beach. Given that the water would have no real way out the depth of the water trapped could be quite significant leading to flooding over a significantly greater footprint than the original marsh.

## MANHOOD PENINSULA STEERING GROUP – PEHCDS CONSULTATION RESPONSE

The Strategy makes no mention of the outfall or its poor condition. It is entirely conceivable that the outfall could fail long before the Strategy assumed sea wall breach at year 20 resulting in early and increased damages.

Even if the outfall lasted the 20 years it is equally conceivable that a sill would be formed by the foundations of the failed sea wall which would also cause an artificially high trapped water level again increasing the damages both in quantum and at an earlier time in the life of the Strategy.

## Natural England

7 August 2008  
Our ref: Pag-East Head2/consultation comments  
Your ref:

Joe Pearce  
Environment Agency  
Guldebourne House  
Chatsworth Road  
Worthing  
West Sussex BN11 1LD

Dear Joe

**Solent Maritime Special Area of Conservation (SAC)**  
**Chichester & Langstone Harbours Special Protection Area (SPA)**  
**Chichester Harbour Site of Special Scientific Interest (SSSI)**  
**Pagham harbour Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI)**  
**Bracklesham Bay Site of Special Scientific Interest (SSSI)**  
**Selsey East Beach Site of Special Scientific Interest (SSSI)**

#### **Pagham to East Head draft Coastal Defence Strategy consultation**

Natural England has been working closely with the Environment Agency throughout the preparation of this document and welcomes the opportunity to comment on the draft of this strategy. We wish to make comments on the following frontages in this strategy as follows:

**East Head:** Chichester Harbour is designated as an Area of Outstanding Natural Beauty for its natural landscape character. It is also nationally and internationally important for its nature conservation interest. This is for a number of reasons but the most relevant to the CDS are:

- East Head is important for its shifting dunes with marram grass and for its active geomorphology.
- The geomorphological formation of the estuary system as well as the habitats and wildlife within it form part of the international interest of the SAC.
- The intertidal habitats (mudflat and saltmarsh) are notified features of both national and international importance.
- The fields and creek behind the seawall at West Wittering are also within the SSSI and SPA for the over wintering and breeding birds that they support.

Having worked closely as part of the East Head Working Group we welcome the principle of adaptive management that is recommended for this frontage. This is on the understanding that adaptive management here is primarily concerned with facilitating the natural evolution of East Head by natural processes, while reinforcing the hinge with a natural sand recharge which will prevent a permanent breach in this location and allow continued public access here. An important component of this is that the recharge should be of an appropriate height so that it overwashes during severe weather events and 'rolls back' rather than 'cliffing' on the front edge. In this way the breadth of the dunes at the base will be preserved and the recharge will perform its primary function of preventing a permanent breach more efficiently. It is also important that the breastworks and associated groynes/ gabions are removed once they are truly redundant and their function is being carried out by the new recharge, and that the original rock recharge (now buried under a sand dune) is removed once it becomes exposed.

We do not consider that adaptive management here is likely to have a significant effect on the North Solent SAC, Chichester & Langstone Harbours SPA or Chichester Harbour SSSI, at least as far as the actions currently proposed are concerned. Due to the inherently uncertain nature of this new management option, particularly over the longer term, it is not possible to say for certain that there will be no impact in the future. Therefore we have concluded that no appropriate assessment is required at this stage, but it is important to recognise that future proposed actions triggered by the adaptive management principles could result in the need for an appropriate assessment in the future if they are deemed to have a likely significant effect on the internationally designated areas. This has been addressed more fully in the Appendix 11, completed earlier.

**Selsey:** we acknowledge that the preferred option of holding the line on this frontage is the only realistic option considering the infrastructure that would be at risk by not doing so. The physical access to Selsey East Beach SSSI (notified for its geological sediments on the foreshore) is likely to be affected by coastal squeeze resulting from sea level rise in the future, although the timing of this is not currently clear. It is important that the policy of hold the line on this frontage does not cause immediate loss of any of the geological exposure, for example by extending the footprint of any future works so that they directly cover the exposures.

**Medmerry:** We support the preferred option of managed realignment for this frontage and appreciate that the actual extent of this will be determined at scheme stage, with the present line being indicative. This will result in changes to Bracklesham Bay SSSI, with the grazing marsh feature likely to become intertidal mud and saltmarsh. We consider this to be an acceptable change to the SSSI as it will be as the result of allowing this section of coastline to become more naturally functioning and sustainable in the face of sea level rise and climate change. However, every effort should be made to compensate for the change of grazing marsh to intertidal habitat, through the recreation of grazing marsh behind the new landward boundary of the realignment. The vegetated shingle interest feature of this SSSI is likely to improve as a result of these changes (it is presently unfavourable due to the frequent coastal defence works carried out).

We have no objections, in principle, to private defence being utilised to provide continued protection to the Bunn Leisure complex, providing that it is compatible with the overall objectives of this strategy, does not impact on coastal processes on adjacent coastlines and does not have a significant effect on the interest features of Bracklesham Bay SSSI (in this instance geological exposures on the foreshore and vegetated shingle). We are working with the owners and others to see how this can be achieved. At present we do have concerns with the preferred option, particularly with the potential direct impact on the geological interest of the site. We hope that this can be resolved at the planning stage, but we must reserve the right to object to this private defence proposal if we feel that it will have a significant effect on the SSSI.

In the extreme west of the frontage we would wish to work with the Environment Agency and others over the exact line of any realignment so as to maximise the future physical access to the geological exposures in this area.

**Pagham Harbour:** We welcome the principle of adaptive management that is recommended for this frontage. One of the proposed actions under this option is to '*maintain Pagham Harbour as an intertidal system for the next 20 years by keeping the harbour entrance open*'. Our interpretation is that this is to allow a better

understanding of how coastal processes are operating in this frontage and how things may change in the future. We agree with the principle of this but feel it may be better to be less specific about timescales and say something like '*one of the proposed actions is to maintain Pagham Harbour as an intertidal system at least in the short term by keeping the harbour entrance open while we gain a better understanding of how coastal processes are operating on this frontage and how things may change in the future*'.

We do not consider that adaptive management here is likely to have a significant effect on Pagham Harbour SPA/SSSI, at least as far as the actions currently proposed are concerned. Due to the inherently uncertain nature of this new management option, particularly over the longer term, it is not possible to say for certain that there will be no impact in the future. Therefore we have concluded that no appropriate assessment is required at this stage, but it is important to recognise that future proposed actions triggered by the adaptive management principles could result in the need for an appropriate assessment in the future if they are deemed to have a likely significant effect on the SPA. This has been addressed more fully in the Appendix 11, completed earlier.

**Cakeham and East Wittering:** we acknowledge that the preferred option of holding the line on this frontage is the only realistic option considering the infrastructure that would be at risk by not doing so. The physical access to this part of Bracklesham Bay SSSI (notified for its geological sediments on the foreshore) is likely to be affected by coastal squeeze resulting from sea level rise in the future, although the timing of this is not currently clear. It is important that the policy of hold the line on this frontage does not cause immediate loss of any of the geological exposure, for example by extending the footprint of any future works so that they directly cover the exposures.

We hope that these comments are helpful and we do congratulate the Environment Agency on production of this draft strategy, which has certainly been the most complex and controversial that I have worked on. Please do contact me if you have any queries regarding any of these comments.

Yours sincerely

Jon Curson  
Coastal Policy and Ecology Advisor

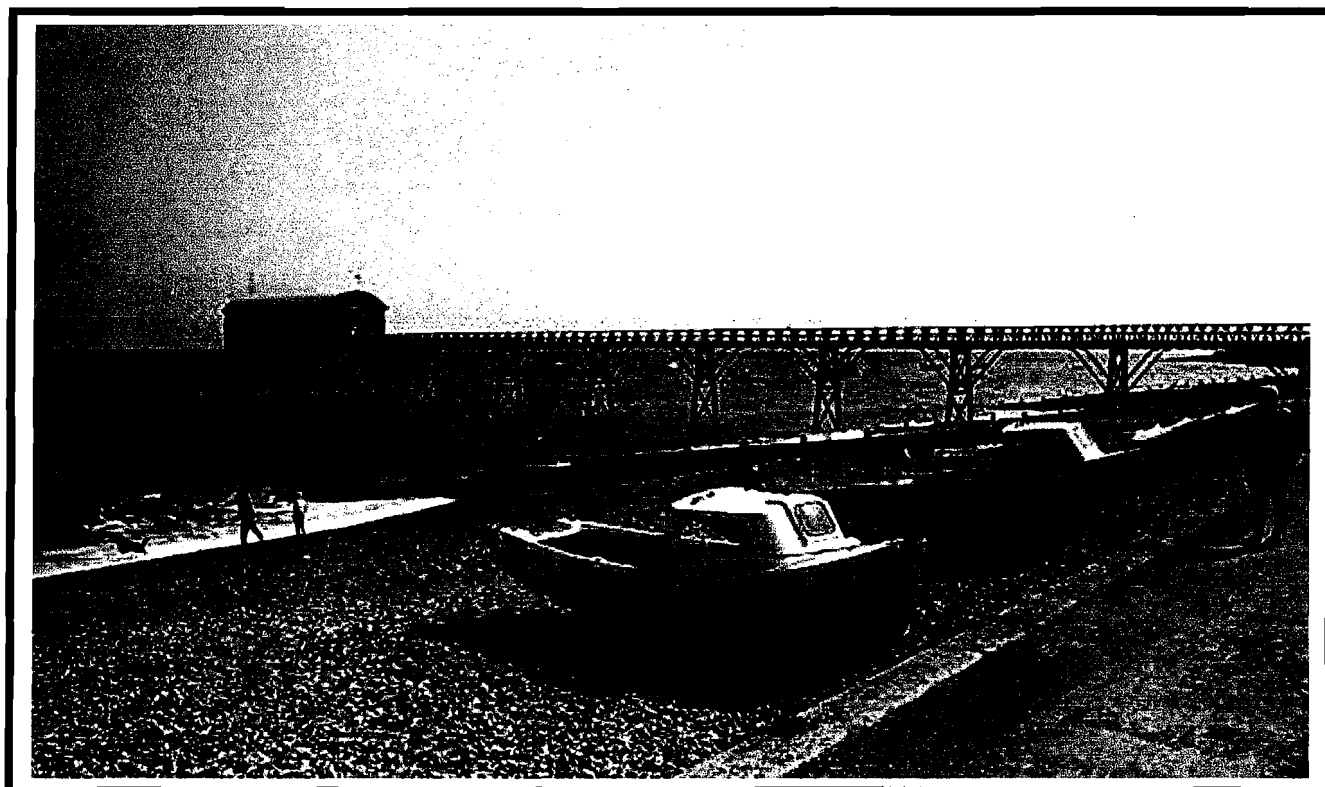
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Direct dial: 01273 407944

## Save Our Selsey

**Save Our Selsey**  
(Campaign for Coastal Protection)  
[www.saveourselsey.org](http://www.saveourselsey.org)



## **PAGHAM TO EAST HEAD COAST DEFENCE STRATEGY 2008**



**SAVE OUR SELSEY**

**FORMAL CONSULTATION RESPONSE**

**Pagham to East Head Coast Defence Strategy 2008 (PEHCDS)  
Formal Consultation Response**



## About Save Our Selsey

Save Our Selsey (SOS) was formed in January 2007 in response to public concerns regarding the long term future of sea defences around urban Selsey and the surrounding and interconnected coastal frontages.

The group exists to act as a public voice in consultation with the planning authorities (for sea defences) and now represents over 1,450 residents or members of the community with a legitimate claim to the subject.

Since its inception SOS has:

- Increased awareness of the subject in the wider community
- Carried out extensive and thought provoking research into the issue
- Supported the election of two independent district councillors on this subject matter
- Supported residents whose homes are already affected by a lack of maintenance of existing sea defences
- Supported planning applications for individuals and business to provide their own defences
- Engaged with the planning authorities directly and indirectly to affect the contents/policies of the PEHCDS
- Worked with other coastal groups to understand the national issue of coast defences
- Assisted the authorities in the consultation by providing regular press/public comment on the PEHCDS as it has been drafted
- Also publicising the consultation window and asking for responses
- Represented the residents of Selsey on the Manhood Peninsula Steering Group (MPSG) and at other community based events/consultations which are relevant to the issue of coast defences
- Met with and canvassed opinion from businesses, farmers and interlinked parishes to provide a rounded view
- Continuously canvassed opinion from Selsey residents to ensure we represent their overriding feelings

Through our activity and interaction with the community the committee of SOS believes the group still represents the majority view of the local community on this subject and can therefore submit the following response to the 2008 public consultation.

We would like to take this opportunity to thank the PEHCDS project team and the Environment Agency (EA) for continuing to engage SOS during the drafting and consultation and for allowing us to provide literature to residents as part of the 2008 consultation events.

## Save Our Selsey – Overriding Policy

Our overriding policy for coastal defences anywhere in the UK is '**Hold the Line**' **SUSTAIN** where homes, businesses and farms are at risk. We believe that any realignment of the UK coastline inland is dangerous and will be difficult, maybe even impossible, to reverse.



## **Selsey's Urban Frontages – East Beach, West Beach and Selsey Bill**

SOS welcomes the decisions in the draft strategy to combine all 3 'frontages' into a single unit and to adopt the policy of **Hold the Line - Sustain**.

However, we believe that the beach from the Coastguard Tower to Bunn Leisure, known as 'The Medmerry Cliffs', should be included as part of the urban frontages. A policy of 'no active intervention' here will lead to:

- Continued erosion along the bank resulting in the loss of the coastal footpath
- An increased threat to the Coastguard Cottages and houses on West Street
- Ultimately expose the rest of Selsey.

By protecting this area, the Site of Special Scientific Interest (SSSI) is also saved for the future.

We are also concerned by the reduced likelihood of funding for the proposed policy and what a policy without funding will mean for the residents of Selsey as this does not appear to have been properly addressed in the Planning for the Future document.

### **Medmerry**

Despite the fact that with Selsey's £billion asset value, Medmerry will attract a high score on the CBA, the proposed option of realignment is the cheapest option available. We fundamentally disagree with realignment anyway but even more so when 'done on the cheap'. The conclusions reached only highlight the inadequacies of Government policies for coastal management. We expect Government to pay for top specifications for our navy, army and air force procurements for defence but we get the cheapest option for coastal defence. We urge the EA to report this failure to Government.

### **Loss of Houses**

We are extremely concerned that the EA's current summary document "Planning for the Future" makes no reference to the loss of houses (9 under the preferred option for Medmerry realignment and 8 under Medmerry Cliffs' "no active intervention") with **no compensation** payable. This lack of transparency may mislead the residents of Selsey as they are not in possession of the real facts.

### **Capability of the Proposed Policy**

We still doubt that realignment will create a stable tidal inlet given the ferocity of the seas at Medmerry during a south westerly storm. Alternative schemes seem to have been dismissed after casual consideration, on vague assumptions that they may have detrimental effects. Even the recent "Going Dutch II" recommendations have all but been ignored despite the £10,000 of public money used to fund the event. The realignment of Medmerry would also add another 6 to 8 km to the coastline which will need monitoring and maintaining at a cost to the taxpayer.

### **Food Shortages**

It is predicted there will be a world-wide shortage of food in the near future with an ever increasing pressure on farmland for crop production. Now is not the time to abandon valuable farmland and risk saline intrusion of the hinterland behind a realignment scheme.



**Medmerry - Conclusion**

The reality is that to try and adopt a different policy which would not attract government funding would simply mean Medmerry's defences are left to erode further and introduce uncontrolled flooding of the surrounding area, exposing Selsey's urban western flank.

SOS could therefore be encouraged to support realignment at Medmerry if, and **ONLY IF**:

- The landowners and the community agree with it
- Any loss of land/property is fully compensated (guaranteed)
- The community/landowners are fully involved in the design/specification/siting of the defences
- There are assurances regarding the long term maintenance of any defences for the policy timeframe of 100 years.
- The community must also be allowed freedom of access to the area when realignment is complete.



## **Funding**

We are appalled by the conclusion that central Government funding for Selsey's urban frontages is deemed 'unlikely' and it is clear that the key issue for any policy here will be MONEY and where it comes from.

### **Taxation**

As citizens of the UK we fully accept that our taxes have been used to protect and develop other regions of the country and have also been used overseas to 'protect' the inhabitants of other countries.

As residents of the Chichester district we also accept that local taxes raised from individuals and businesses are used in other parts of the district to the benefit of the district community.

However, we do NOT accept central government's policy of abandoning the defence of coastal communities such as Selsey on a matter of cost alone.

Defending and defining the coastline of Great Britain is a national issue which must attract national funding. Selsey and the surrounding area have a massive part to play in 'UK PLC' and should therefore enjoy a nationally funded programme of coast defence.

### **Value for Money**

The EA **MUST** look closely at its procurement costs for coastal defence materials as recent discussions have shown some current costs to be unacceptably and unnecessarily high meaning better options for coast defences (especially at Medmerry) have been overlooked due to their perceived high cost.

### **Habitat Creation/Social Justice**

The present Government policy that is likely to grant money to the realignment of Medmerry because of habitat creation, but is unlikely to grant money to sustain the urban frontages of Selsey indicates that wildlife habitats are still more important in Government circles than communities, people, homes and businesses. This is wrong and must be reviewed before more of our valuable land is turned over to habitat, forcing people and business to abandon. A scheme/policy which puts social justice at the forefront of any decisions must be adopted.

### **Interim Funding**

It is very important that Chichester District Council (CDC) increases its funding for coastal defence maintenance as the urban frontages are now showing signs of deterioration and must be suitably maintained in the interim period prior to the new Coast Defence Strategy coming into force.

### **Funding Consultation**

It is vital that there is comprehensive community involvement in the discussions over future funding of Selsey's coastal defences and SOS looks forward to participating, along with other local associations and councils.

**West Sussex County Council**

**Deborah Urquhart**  
Cabinet Member for Environment and Economy

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Pagham to East Head Draft Strategy Consultation 2008  
Environment Agency  
Guildbourne House  
Chatsworth Road  
Worthing  
West Sussex  
BN11 1LD

**Date:** 29<sup>th</sup> August 2008

Dear Sir

### **PAGHAM TO EAST HEAD COASTAL DEFENCE STRATEGY**

West Sussex County Council welcomes the opportunity to comment on the Draft Coastal Defence Strategy, which we are pleased to see, has incorporated many of the changes that we suggested in response to the previous consultation in 2007. In particular we welcome the decision to combine all of the Selsey urban frontages into a single policy unit.

We continue to be very concerned about the funding situation that you have outlined, which appears to leave communities like Selsey, unlikely to receive funding. However we recognise that without an agreed strategy in place, there is a much reduced chance of funding being forthcoming for any areas.

Our key detailed points are:

#### **From Draft to Implementation**

In addition to the funding issues that we have highlighted we also have concerns about the current situation with plans and strategies that determine flood and coastal erosion policy. For too long the coastline in this area has been without an agreed strategy that reflects the urgency of the situation and we urge you to work with DEFRA to avoid a repeat of the common situation where draft strategies are left incomplete or not approved because of subsequent changes to the national guidance or policies.

#### **Medmerry as a case study for Integrated Coastal Zone Management**

In developing the Strategy we ask that you carefully consider the findings of the Going Dutch II conference that we jointly funded and was organised by the Manhood Peninsula Partnership (MPP). Since the draft Strategy was circulated for consultation in 2001, the work of the MPP has been very important in raising awareness of the issues that we face, and developing collective community

solutions. The Going Dutch II conference was an excellent example of this and we acknowledge the role that the Agency and District Council played in facilitating it without influencing the outcome.

The Dutch coastal experts provided a useful insight into the different approach that they employ when re-designing coastlines to work with natural processes and truly integrate the other social, economic and environmental aspects into the management of the coastal zone. The Pagham to East Head Strategy has very far reaching implications on the entire Manhood Peninsula community; a community that is now at the sharp end of the realities of climate change and which has done more than almost any other to develop an understanding of the issues and begin to formulate a vision for their future.

We have concerns that the national processes and funding mechanisms for flood and coastal erosion risk management that the Environment Agency work within, don't facilitate Integrated Coastal Zone Management.

A clear example of this is the coastline at Medmerry, where the need to realign the defences to a more stable position inland is becoming better understood by the community. Such a policy would result in a major new landscape feature in the form of a new harbour similar in nature to Pagham Harbour but despite the engagement and visioning work that has been done by the community over the years, including the Going Dutch conferences, it would appear that the indicative alignments of the new defences are based around ensuring the cheapest and shortest new structures to achieve the highest cost-benefit ratio.

A new harbour in this location has the potential to have a very positive impact on the area for generations to come. However for the residents and businesses of the area to adopt the dramatic changes to their landscape and community that now seem necessary, it is essential that they are involved in shaping a vision for how their area will look and could be used, and how such a new feature will be integrated into their landscape and fit alongside their existing facilities and infrastructure.

The MPP's Going Dutch and ESPACE funded work has been an attempt to do exactly this. Although the panel of experts agreed with the need to realign the defence inland at Medmerry, many of the workshops expressed concern about the engineered structures being imposed on the landscape, and not working with the contours and existing features. Not only would a sensitively designed feature be more acceptable to the community, it is much more likely to function effectively on a geomorphological and ecological level, thus truly fulfilling the principle of 'working with natural processes.'

Alongside other members of the community and the CDS geo-morphologists and engineers, the County Council would be very keen to offer its Landscape and Heritage expertise to ensure the design of the new feature takes full account of the character of the Manhood Peninsula, which is described in detail in the Land Management Guidelines Sheet SC2. (West Sussex Character Assessment 2003). As part of this process we would also expect our Rights of Way team to be engaged to identify and design the most appropriate locations for new and relocated Rights of Way to maximise the benefits to the community of new routes and, where feasible, ensuring access for all.

## **Pagham**

The County Council welcomes the recommended preferred policy of 'Adaptive Management' for Pagham in line with our earlier comments where we expressed concern about an engineering solution being imposed on a very dynamic and rapidly evolving situation. In our opinion, the key to good decision making for this frontage is a much better understanding of the coastal processes that are so dominant in this area. It would be very easy to react quickly to short term changes and expose the residents of Pagham to greater flood risk if the geomorphological processes that are operating are not properly understood. Having said that, this is a high priority because decisions will need to be made quickly to ensure a satisfactory standard of defence is maintained at Pagham Beach. As managers of the Local Nature Reserve we will continue to assist in providing expertise and advice to the management group that has now been established to produce an Adaptive Management Plan.

## **Cakeham, East Wittering, Bracklesham, Selsey**

The County Council supports the proposed 'hold the line' policies at Cakeham, East Wittering and Bracklesham, and at Selsey.

## **West Wittering**

We also welcome the proposals to protect the properties at West Wittering, and the developing consensus for adaptive management at East Head. However we would not wish to see the retention *in situ* of the most westerly East Head car park impede the solution that is proposed to ensure that East Head remains attached to the mainland. In the longer term it seems possible that the natural formation of mobile sand dunes around the hinge area could result in the most stable connection of East Head to the mainland, and in these circumstances we would support any changes to the car parking facilities that may be necessary.

## **Strategic Environmental Assessments**

The dynamic and eroding environment of Selsey Bill has produced a number of significant archaeological discoveries over the years, including those documented by the antiquarian Heron-Allen in the early years of the 20th century. Scientific investigation in more recent years has added to our understanding of the settlement of Selsey in prehistoric and later times. Archaeological sites have also been exposed by eroding cliffs near Selsey with successive winter storms.

In the Strategic Environmental Assessments that are carried out on the Strategy or as part of any scheme design, we would expect to see potential impact on historic environment assets and palaeo-environmental/ geo-archaeological deposits thoroughly investigated and any impacts mitigated. Where protection *in situ* is not feasible we would wish to see measures taken to record before destruction by marine incursion or coastal erosion. I would also refer you to the

English Heritage guidance published in 2003 "Coastal Defence and the Historic Environment".

We look forward to hearing from you.

Yours faithfully

A handwritten signature in black ink, reading "Deborah Urquhart". The signature is written in a cursive style with a large, sweeping initial 'D'.

**DEBORAH URQUHART**  
**Cabinet Member for Environment and Economy**

**Review of Going Dutch II proposals**

**HR Wallingford Review**

# **Coastal Defence: Selsey Bill to East Wittering**

**Review of “Going Dutch II” proposals for beach recharge**

**Technical Note DDM6319/TN01**



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## 1. *Introduction and Terms of Reference*

This Technical Note summarises a review of recent proposals made for the management of coastal defences along the western side of the Selsey Peninsula in West Sussex. These proposals were developed partly in response to an Environment Agency report, published in May 2008, on the coastal defence strategy for the frontage from Pagham Harbour to East Head. This envisaged that the present operations to maintain the barrier shingle beach between West Beach Selsey and East Wittering would be terminated, and that this beach would eventually breach, leading to a new inter-tidal area to the north and west of the Bunn Leisure caravan site. Concerned about this proposal, a group of local interested people, the Manhood Peninsula Partnership, organised a workshop in late June 2008 to discuss alternative coastal management options for the Selsey Peninsula. This workshop was entitled "Going Dutch II" and involved a number of planners and ecologists from The Netherlands.

Of particular interest to the local community was an alternative proposal for coastal defence along the West Selsey to East Wittering. This idea was put forward by the "Feeding the Beach" team, one of the four groups that contributed to the final report from the workshop. In July 2008, Chichester District Council commissioned HR Wallingford to undertake a brief review of this aspect of that report. Chichester District Council was aware of a relevant previous investigation carried out by HR Wallingford, summarised in their report EX 643 of 1974. This study considered a similar proposal made by the Sussex River Authority who had become concerned about the high cost of maintaining the same barrier beach at Medmerry. The Council requested that this present review should build upon HR Wallingford's experience of subsequent coastal investigations along this frontage, and elsewhere, and to include consideration of the effects of climate change on managing this coastline.

The Terms of Reference for this review were:

- To provide an overview of the issues relevant to the long-term management of the beaches between Selsey Bill and East Wittering;
- To comment on the proposals both for beach recharge using shingle deposited close inshore by dredgers and the creation by this method of nearshore shingle reefs, with a summary of the merits, or not, of such ideas; and
- To provide considered views on whether such proposals are worthy of further investigation.

## 2. *Background and relevant issues*

The shingle beaches on either side of Selsey Bill have been eroding for many centuries. The coastline and low cliffs east of Selsey Bill, for example, experienced erosion rates of about 7m per annum between 1932 and 1951 (see Duvivier, 1961; Millward and Robinson, 1973). The rates of recession of the beaches west of the Bill have also been substantial, with the report produced by HR Wallingford in 1974 stating that the mean annual rate of recession between 1672 and 1932, based on an analysis of Tithe Maps and Ordnance Survey maps, was estimated to be between 1.0m and 1.4m per annum.

The reason for this is that the low cliffs of glacial till that form the Selsey peninsula, formerly an island, have no great resistance to wave action. This coupled with rising sea levels has resulted in substantial erosion of the cliffs, producing a mixture of gravel, sand and finer sediments that are then reworked northwards along the coastlines either side of the Bill. While some extra beach sediment also arrive from various gravel banks on the nearshore seabed, often assisted by "kelp rafting", the rates of longshore transport along these coastlines has exceeded the rate at which fresh sediments are added to the beaches. The triangular plan shape of the peninsula has been maintained by the hard ground just offshore, with the Mixon reef just off the Bill, which modifies the waves as they approach the beaches.

In simplified terms, at every point along the coastline on either side of the Bill, at least as far as Pagham Harbour to the east and along the whole Medmerry frontage, not only is there a net northwards sediment transport but the transport rate increases as the distance from the Bill becomes greater.

It is this variation in longshore drift that results in the recession of the beaches, and of any cliffs behind them.

The rates of longshore drift are modest, but a recent study for Bunn Leisure of coastal processes along the Medmerry coastline in front of the West Sands Caravan Park indicates an increase in drift rate of about 14,000 cubic metres per annum over a length of frontage of about 1.5 kilometres. It would therefore follow that artificially adding this volume of sediment annually to that section of beach would result in little change in the position of the shoreline. Extending this concept over the longer length of coastline towards East Wittering, where beach changes are much slower, suggests that the drift rate might increase from zero near Selsey Bill to about 25,000 to 30,000 cubic metres approaching East Wittering. This is in agreement with the recharge rates suggested in the "Feeding the Beach" team contribution to the workshop's final report.

However, the retreat of the beaches, and particularly the barrier beach between the West Beach at Selsey and East Wittering, is not due solely to the changes in longshore transport. The glacial till shore platform to seaward of the toe of the beaches will itself be eroding, and while this process may yield some beach sediments, the net effect of this process on the coastline is deleterious. As the shore platform erodes, the water depths at the toe of the beach increase, allowing larger waves to approach and break on the beaches. This gradual increase in wave heights, together with increasing sea levels, will result first in greater wave-run up on the existing beach which in turn carries shingle further up the beach face, gradually increasing the crest height of the beaches. Some of the shingle is then carried over the crest of the barrier beach, resulting in a landward recession of its front face. It is likely that as part of the same process, the toe of the beach will also move landward, revealing a portion of the underlying shore platform which will then be exposed to marine erosion and gradually become lower. This process will result in barrier beaches gradually moving landward even without any erosion due to changes in the net longshore drift along the shoreline.

That said, in common with most coastlines around the world, reducing or eliminating the adverse effects of the increasing longshore drift rate along the beaches either side of Selsey Bill is the primary aim of intervention to reduce beach recession. This has been the basis of past coastal defence measures along the Medmerry frontage in particular, with substantial expenditure in the past on building and maintaining groynes to reduce drift rates and in importing and /or recycling shingle to the eroding sections of beach closer to Selsey Bill. The practice of beach recycling, i.e. collecting beach sediments

from the healthier sections of beaches near East Wittering and transporting it back to Medmerry, reflects similar operations elsewhere along the South Coast of the UK, for example in Kent where such operations have been carried out for in excess of 50 years in some places.

The failure of the groynes through age and their eventual removal from the Medmerry frontage, in advance of the most recent coastal defence strategy study, should not prejudice the consideration of future beach management methods for this part of the coastline, although arguably it has limited the options now available.

Turning to the future, it is entirely reasonable to investigate the long-term management of coastal defences along the coastline of England and Wales. The tiered, "top down" review process, i.e. defining coastal cells and then carrying out Shoreline Management Plans followed by Strategy Studies and finally the design of defence schemes, has much to recommend it. In this context, it is of course not surprising that the protection of people and property at East Wittering, for example, is given a higher priority than for defence of the low-lying and partly reclaimed land between there and Selsey. Given a desire to reduce, or at least not increase, the amount on public money spent on coastal defence, it follows that it is most unlikely that central Government funding will be provided for defending the whole coastline of the Selsey peninsula.

Coastal defence strategy plans are also influenced by environmental concerns, and the national targets for creating new inter-tidal areas, particularly in areas which have been reclaimed from the sea for agriculture, probably influences those plans.

Unavoidable difficulties arise, however, because such coastal defence strategies will always result in frontages where the policy is "hold the line" alternating with those where there will be less active defence management, e.g. minimal intervention. Unless great care is taken, particularly at the locations where the defence policy changes, this approach will result in the same piecemeal, parochial and unsatisfactory type of coastal defence that gave rise to the need for a national "top down" approach in the first place.

These problems are then accentuated because, once a strategy has been drawn up and the defence policy for the various "management units" established, there is often little future consideration of the evolution of the coastline where the policy is minimum intervention. Because of this, the management of those sections of coast where the policy is "hold the line" tends not to consider, and hence take account of, the potential benefits of defence scheme options on adjacent sections of coast for which a different policy option has been set. This can lead to missed opportunities for defending a greater length of coastline as the same cost as for a shorter length, especially when options such as periodic beach recharge or recycling are involved.

Given the predictions of sea level rise as a result of climate change, and at least the possibility of more stormy conditions in the future, the chances of preserving the barrier beach between Selsey and East Wittering might appear slim. This will be particularly difficult at the junction with management units, where the policy is to "hold the line" as defined in the coastal defence strategy plan. However, it must also be realised that barrier beaches have proved remarkably resilient to sea level and climate change over the last few centuries so that the eventual formation of a self-maintaining tidal inlet is by no means certain either.

Whatever management of the barrier beach between Selsey and East Wittering is chosen, thought will need to be given to the effects of this on the adjacent frontages. For example the formation of a tidal inlet would obviously affect the feasibility of

recycling shingle from the East Wittering frontage back to the beaches closer to Selsey Bill. Similarly, the coastal realignment following the development of a tidal inlet might result in at least a reduction of shingle transport towards East Wittering from the south and east, and possibly even a reversal of the present drift direction, i.e. with shingle in front of East Wittering travelling both towards the mouth of the new tidal inlet. Under this scenario, the East Wittering frontage might become, in due course, a drift divide similar to those at Selsey Bill and at Eastoke on Hayling Island.

This all suggests that a long-term vision for the desired evolution of the whole coastline between at least Selsey Bill and East Wittering needs to be developed and worked towards. It would not be wise to simply concentrate on defence options for the sections where the coastal policy is to “hold the line” and not plan to manage the changes along the coastline between these.

### 3. *Shore-face recharge*

An important suggestion made in the final report of the “Going Dutch II” workshop envisages the improvement of beaches between Selsey Bill and East Wittering by dredging shingle, i.e. a mixture of sand and gravel, from the offshore seabed and depositing it in shallow water just offshore of the beach. This technique is sometimes referred to as “shore face” or “indirect” beach recharge.

The advantage of such a technique over more conventional beach recharge schemes, where the sediment that is delivered is placed directly on the beach on and above the inter-tidal beach face, is that the costs of shore face recharge can be much lower. Rather than the dredger having to pump out its cargo of shingle through a pipeline into barges that can deliver the sediment close inshore, or through a long pipeline that stretches between the beach and some offshore mooring point, the cargo is deposited through doors in the underside of the dredger’s hull into shallow water. The rate of unloading the cargo is greater and the costs, as well as the wear and tear associated with delivery through pipelines, are reduced. This was appreciated by the Sussex River Authority, as early as in 1972, when they commissioned HR Wallingford to investigate its possible use for the Medmerry frontage. In retrospect, this was very advanced thinking given that the first large scale recharges in the UK (at Portobello, Edinburgh in 1972 and at Bournemouth in 1973 and 1974) were still to be carried out.

In fact, large-scale shore face recharge does not seem to have been carried out until about 1993 at Terschelling in The Netherlands. There have been two subsequent shore face recharge schemes in The Netherlands (at Noordwijk and Egmond) and also schemes in Belgium, Germany and the USA, apparently all involving the placement of sand rather than of shingle.

A very recent paper by Ojeda, Ruessink and Guillen (in press) suggests that the three schemes in The Netherlands have not appreciably advanced the beach face. Rather they have reduced the rate at which sand was previously transferred from the beach face to nearshore sand bars which then move offshore. These schemes, therefore, while apparently worthwhile do not provide a clear demonstration of the success of a proposed shore face recharge using shingle along the coastline west of Selsey Bill, where there are no nearshore bars.

The study reported in 1974 by HR Wallingford sought to directly demonstrate that shingle placed on the seabed just offshore would travel ashore. This seemed a good

possibility since stones and pebbles placed onto a solid shore platform should be easily mobilised by waves and tidal currents, and the asymmetric water speeds caused by the waves, having a stronger and sharp landwards movement compared to a slower and more prolonged seawards flow, should result in heavy particles moving landwards.

In order to test this idea, experiments were carried out with "artificial pebbles" deposited from a boat at two locations well offshore from the Selsey peninsula. The two chosen offshore release points were about 4km offshore and in about 4m and 15m of water at lowest tide respectively. Despite prolonged searches, none of the "tracer" pebbles were ever found on the beaches. At about this depth, there are a number of gravel banks that have remained offshore from Selsey for an indefinite period, so perhaps the apparent lack of onshore shingle movement is not, in retrospect, so surprising.

A second set of experiments involved releasing shingle in much shallower water, comparable with the suggestions made in the "Going Dutch II" report, i.e. at about the low water mark of spring tides. Six such deposition sites were chosen, and onshore movement of the shingle from just two of these was detected. The shingle at the other four sites apparently remained where it was placed, because it became buried in sand on the seabed. Over the relatively short period of the experiments, the shingle at the other two locations moved both onshore and eastwards, this latter tendency being presumably due to waves approaching from a direction to the west of the beach normal. As at the other four sites, however, once the pebbles reached the sand fillet at the base of the beach, it came to a halt.

This part of the experiment does suggest that shore-face recharge might be at least partially successful along this stretch of coastline, especially where the nearshore seabed is not covered by sand. However, as the original investigators concluded, the observed rate of onshore movement of the shingle was very slow. It should also be noted that these experiments used just pebbles and not a mixture of sand and stones that would be delivered by a dredger. Such a mixture would probably be less mobile than loose pebbles.

As a part of the present review, informal discussions were held with marine aggregate dredging companies on their likely reaction to being asked to deliver shingle into shallow water close to a coastline as envisaged in the "Going Dutch II" report. It seems that they would not be keen to use their existing dredgers to attempt shore face recharge, not least because these vessels are fully utilised delivering marine aggregate to their various wharves in the region. In any case their vessels would not be able to discharge in water depths of less than 6-8m, i.e. well seawards of the low water mark even at high tide. At such depths, the onshore movement of shingle would be much slower than reported in the 1974 study so that the cargoes would form low banks that would persist for a considerable time. While these might partly reduce wave action on the beach, their sheltering effects would be small at high tidal levels. In addition, their presence would make it difficult and potentially dangerous for a dredger to return to the same location to deliver a second load.

These practical considerations suggest that specialist vessels would be needed to deliver into the shallow water depths suggested. There seem to be two possibilities, the first being small dredgers such as the Sospan or Sospan Dau, both of which are operated by Westminster Dredging and can discharge through a pipeline mounted over the bow of the vessel, delivering sediment inshore by the so called "rainbow method" (see Plate 1). This technique has already been used to recharge shingle beaches on Hayling Island and at the Embassy Club, Medmerry.

The second option is to employ split-bottom barges that can be loaded at sea by a primary dredger and then deliver the sediments to the beaches at high water. This technique has been used for over 30 years and is often supported by land-based plant such as drag-lines and bulldozers that, at low tide, collect and redistribute the sediments delivered by the barges. This type of technique may be limited along the western flank of the Selsey peninsula, however, because of the damage it would cause to the exposed Bracklesham Beds that form the nearshore platform. Their geological interest has led to large areas in the lower inter-tidal zone being designated as a Site of Special Scientific Interest.

## 4. *Conclusions and recommendations*

This review of the final report and recommendations of the “Going Dutch II” workshop has been brief and represents only an initial view of the feasibility of the approach to coastal defence that has been suggested. In this light, the following conclusions and recommendations should be treated as preliminary.

### 4.1 CONCLUSIONS

In general, the idea of periodic recharge of beaches along the western side of the Selsey peninsula, supported by a combination of recycling and perhaps groynes, seems entirely feasible. This approach also appears sustainable, in the senses that first such a scheme could be modified or abandoned without prejudicing the options available to future generations of coastal managers, i.e. a “no regrets” option, and secondly that there appears no reason to believe that such operations could be carried out for many decades without exhausting the supplies of shingle on the seabed off the South Coast on England. In addition, such a technique could be adjusted to cope with the consequences of climate change for example altering the recharge rate to match changes in longshore drift rates and adding extra shingle to allow beaches to respond to increasing tidal levels.

This option might allow the maintenance of adequate coastal defences along the whole frontage from West Beach, Selsey to East Wittering, although it is likely that the standard of performance of the defences in front of the low-lying land north and west of the West Sands caravan park would be lower than at each end of this frontage.

The main concern about this approach is its affordability, and this is always a contentious issue. To that end, there would certainly be good reason to investigate how the costs of managing the coastal defences along this coastline could be reduced or shared, so reducing the demand for funding from central Government.

The technical option suggested by the “Going Dutch II” workshop, namely shore face recharge is probably not as cost-effective as the methods that have recently been used at Eastoke on Hayling Island and at Medmerry, i.e. using a small dredger to pump sediment directly onto the beaches by the “rainbow method”. This is because of the need for more vessels, and for double-handling of the dredged sediments as well as the problems of damaging the inter-tidal foreshore associated with shore face recharge. In addition, a much greater certainty can be placed on the shingle that is delivered increasing the volume of the beaches that form the main coastal defence.

## 4.2 RECOMMENDATIONS

In any proposal to maintain adequate coastal defences along the western side of the Selsey peninsula, it is vital that the costs of such defences are compared to the benefits that would arise. Critically, the comparative costs, and benefit-cost ratios, of maintaining defences by shingle recharge and /or recycling along the two end sections of this frontage need to be compared with those of defending the whole frontage.

If periodic shingle recharge was anticipated as being part of the coastal defence management scheme for either or both of the end sections, then the marginal costs of expanding such operations may well be worthwhile in terms of the extra benefits arising.

Reviewing the detailed coastal defence strategy study report in this light, and if necessary obtaining extra information on the likely costs of a periodic beach recharge programme, as opposed to one-off operations, would be a logical first step in such an investigation.



**Plate 1 Sospan Dau “rainbowing” shingle onto the beach at Hayling Island  
(Photograph by courtesy of Westminster Dredging Ltd)**



**Review of Going Dutch II proposals**

**Malcolm Bray Review**

**University of Portsmouth**

# **Selsey to East Head : Review of “Going Dutch II” proposals for shore recharge**



**Open Report to:  
Chichester District Council**

***Malcolm Bray  
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***August 2008***



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Portsmouth**

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## 1. INTRODUCTION

This report aims to provide a preliminary analysis of the general feasibility and governing issues related to aspects of the proposals reported by “Going Dutch II” (Manhood Peninsula Partnership 2008). Its objectives are to undertake an independent review of the following:

1. *Review of “Going Dutch II” proposals for beach recharge* by Alan Brampton (HR Wallingford Technical Note DDM6319/TN01).;
2. The “Feeding the Coast” option (Section 3.5) and shingle reef breakwater option (part of Section 3.4) contained within the Going Dutch II analysis (Manhood Peninsula Partnership 2008);
3. Any relevant issues or opportunities omitted from the two items above.

The author declares an interest relating to much of the relevant background information having been a participant/contributor of numerous previous studies including the East Solent SMP (HR Wallingford, 1997); the previous Coastal Defence Strategy (Posford Duvivier, 2001); the SCOPAC Sediment Transport Study (Bray et al, 2004) and the Beachy Head to Selsey SMP 2 (Halcrow, 2004). Those inputs primarily involved provision of scientific information and interpretation; they did not involve decision-making on coastal defence options. The opinions here are given freely by the author, without any fee, in the same spirit of independence as those contributing to the Going Dutch Workshops in 2001 and 2008.

## 2. REVIEW OF TECHNICAL NOTE DDM6319/TN01 (BRAMPTON , 2008)

The report addresses clearly its brief and is based on considerable relevant expertise and experience. Detailed comments relating to content are presented below in sections 2.1 to 2.3, whereas additional comments and considerations relating to the Going Dutch proposals are presented in Section 3.

### 2.1 Background and relevant issues

1. Shore replenishments function to increase the quantity of sediment on a given shoreline and hence improve wave dissipation so that protection is afforded to the backshore. It can be a highly successful technique, but it depends upon being able to: (i) achieve an appropriate distribution of sediments and (ii) control losses within “acceptable” limits. Both of these critical factors are dependent upon the sediment transport dynamics of the target coastline and to an extent upon any introduced sediment management techniques. Defining “appropriate” sediment distribution and “acceptable” losses depends upon the desired standard of protection and the amount of funding that can be justified. Both the draft coastal defence strategy plan and the Going Dutch report conclude that for the Medmerry frontage the justifiable standard of protection and the amounts of funding are likely to be relatively modest. Consequently, the sediment transport dynamics and effects of any introduced sediment management are therefore critical in determining the feasibility or otherwise of any replenishment dependent option;
2. Bracklesham Bay is a swash-aligned coastline, meaning that it is orientated at a right angle to the dominant wave approach direction so that net littoral drift is minimised in the long term. Any deviations in wave approach direction away from this average condition will result in drift in one direction or the other (gross or total drift). Since wave approach directions are highly variable in the short term, gross drift can be considerable, but if the directions are well balanced net drift is small. It is therefore

critical that gross drift as well as net drift is considered when designing any replenishment. It would mean that a larger fill volume might be required than would otherwise be thought based on assessment of net drift alone.

3. Other aspects of sediment transport also need to be defined carefully in the context of the type of replenishment proposed and its potential losses and redistribution. Sand is transported some 15 to 25 times more efficiently than gravel. Total transport occurring across the full active profile may need to be considered and not just the drift occurring on the beach (because a shoreface replenishment is proposed). Assessments need to be based on *potential* transport, whereas some past estimates have been based on *actual* rates, which have been considerably lower due to shortage of sediments and the effects of groynes. Replenishment fill would be subject to crossshore as well as longshore transport and significant temporary storage (storm related or seasonal) or more permanent losses to the nearshore could occur. Strong tidal currents flow a relatively short distance offshore and these could act in combination with wave generated currents at the bed to increase the mobility of sandy sediments. These uncertainties mean that the potential loss rates of say  $15,000\text{m}^3\text{a}^{-1}$  or even  $30,000\text{m}^3\text{a}^{-1}$  inferred in DDM6319/TN01 may be rather low estimates in the case of a mixed sand and gravel shoreface replenishment. They may be rather better loss estimates for gravel placed directly on the beach without additional control structures.
4. Beach retreat and the problems of shore platform loss are well stated on page 2 paragraph 4 or Alan Brampton's report. It means that either the beach must migrate landward to expose fresh shoreface or that more sediment is retained on the shoreface. The shoreface is depleted at present and has narrowed significantly over the past 100 years. It means that a potentially very large quantity of sediment would need to be added and maintained if the aim were to significantly improve the dissipative qualities of the shoreface. The alternatives are: (i) maintain a sufficiently wide and high upper gravel berm or (ii) allow the gravel barrier to retreat so that new shoreface is continually exposed.
5. Groyne provision and maintenance (or lack of) are very important considerations and historically groynes have prevented full potential drift rates from being achieved on the mid and upper foreshore.
6. Medmerry is the largest and one of one of the most favourably specified candidate sites for creation of new intertidal habitats in the Solent region (Cope et al, 2008). It would appear to be the comfortably the largest potential realignment site available in the Solent mainland region.
7. I agree that interfaces between static and mobile defence options are invariably problematic (page 3 paragraph 4 of Alan Brampton's report).
8. Previous assessments tend to concur that a breach and permanent new tidal inlet **would** be likely to form in the near future where the present barrier is backed by Broad Rife (ABP Mer 2004).
9. A new tidal inlet is likely to result in the formation of an ebb tidal delta (seaward of inlet) and a smaller corresponding flood delta of sediment within the new estuary. These would store very large quantities of sediment estimated at up to  $650,000\text{m}^3$  by ABP Mer (2004). This scale of sediment demand from the beach and adjoining areas would need to be allowed for in any replenishment scheme i.e. any replenishment fill could become stored in these deltas and would not start to benefit the shoreline to the west for several decades until the deltas have formed and natural processes of downdrift sediment bypassing have developed. Furthermore, as the ebb delta develops it would afford shelter immediately to the west so that a small-scale drift reversal (west to east drift) could develop between Bracklesham and the new inlet. This would create a drift divide in the vicinity of Bracklesham as suggested at the top

of page 4 of Alan Brampton's report. The drift divide at Pagham beach immediately downdrift (east) of the Pagham Harbour inlet is a useful analogue.

## **2.2 Shore Face Recharge**

1. The potential advantage of a shoreface replenishment is for a given cost being able to deposit a greater quantity of sediment than could be possible with a direct beach recharge. As mentioned on page 4 paragraph 4 of Alan Brampton's report it has been quite widely applied along the SE coast of the North Sea, especially in the Netherlands. My own brief review of the literature concerned did not provide direct comparisons for the rather different conditions occurring to the west of Selsey Bill. However, it could be that a more detailed search is required as increasing expertise in replenishment is being developed. For example, a modelling study has suggested that linear (longshore distribution) rather than point source (or mound) shoreface replenishment could be a more beneficial technique, diffusing more slowly and tending to result in greater shoreward movements (Van Leeuwen et al, 2007).
2. A very interesting example of shore face replenishment occurred at Bournemouth in 1974/75 when some 1.4 million m<sup>3</sup> of sand was added along an 8.5 km frontage (Bray et al, 2004). Just over half of the sand was placed in nearshore dumpsites, whereas the remainder was pumped onto the beach. Some, but not all sediment moved onshore and some was lost longshore. The beach functioned well for around 10 years and the replenishment was considered exhausted after 12 years. Although there was no clear criticism of shoreface recharge, it may be significant that the subsequent replenishments in 1988/89 (1 million m<sup>3</sup> along 8.5km frontage) and 2005/07 (1.8 million m<sup>3</sup> along 13km) focussed upon placing sediment on the beach rather than in the nearshore. Dr David Harlow of Bournemouth Borough Council has been heavily involved in the design and monitoring of these schemes and could be contacted for additional insights.
3. The Bournemouth example indicates also that sand replenishments require proportionately more material per frontage length with between 1 and 1.4 million m<sup>3</sup> being required along a 8.5km length that is similar to the full Medmerry/Bracklesham frontage. The latter frontage of course has a significantly wider tidal range which would tend to widen the profile envelope and potentially further increase the amount of fill required. It may be therefore that sand only replenishment as suggested by Cobbold and Santema (2001) would not be feasible on the scale likely to be required for Bracklesham Bay.
4. The HR Wallingford tests reported on pages 4 and 5 suggest that some gravels could move onshore from shoreface dumpsites, but they do not give confidence that a major proportion would, or that there would not be significant losses. Indeed, the 1976-80 Medmerry replenishment was eventually designed to use gravel obtained from inland gravel pits and delivered by truck to build the berm. It was preferred to dredged marine gravels that could be deposited on the lower foreshore because Hydraulics Research (1974) were unable to confirm that sufficient material would move onshore.
5. The record of replenishment at Medmerry is also of interest and a minimum of 500,000m<sup>3</sup> has been added to the beach over the period 1976-2004 (equivalent to around 200,000 every 10 years (ABP Mer 2004). Even that quantity was sufficient to provide only a modest standard of defence and major barrier migration and potentially permanent breaches have only been averted by intensive beach management activities. It suggests that even if gravel is added directly to the barrier beach, considerable quantities well in excess of historical recharge rates would be required

to maintain a relatively stable profile without requirement for intensive scraping, recycling and emergency repair.

## **2.3 Conclusions**

1. I agree with Alan that replenishment is potentially a suitable technique in technical terms, but there are constraints relating to processes operating at Medmerry and within Bracklesham Bay. The result is that effective replenishment would almost certainly require considerably more material than allowed for by the Going Dutch II proposals. It may be possible to reduce required volumes by employing gravel recharge directly to the upper beach, but even then the quantities required could raise serious affordability issues.

## **3. REVIEW OF GOING DUTCH “FEEDING THE COAST”**

The following concluding statements are assembled to provide direct responses to the Going Dutch proposals. These are preliminary assessments to provide a feel for the issues and would benefit from more detailed evaluation:

1. Several interesting and potentially attractive proposals were made in the workshop report by Manhood Peninsular Partnership (2008). Especially important are the needs to think long-term, link shoreline management with land use planning and also consider social and economic health. Another potentially useful concept explained most clearly by Cobbold and Santema (2001) is that of widening the coastal defence zone to provide for a buffer against extreme events. Since advancing the line is unlikely to be feasible this would necessarily involve applying land use planning, perhaps in conjunction with future compensation to set back existing land uses and create a modest buffer strip.
2. The aims and objectives of the “feeding the coast” option are not defined sufficiently to determine the intended purpose of any replenishment. Is it to improve standards of defence? If so, to what standard? Improve habitat creation? or improve amenity? These questions are important as they would govern the quantities, qualities and distributions of the replenishments required and hence the likely technical and economic benefits and constraints.
3. Sand only replenishment could provide amenity benefits, but is likely to be problematic at Medmerry due to the high mobility of sand, large tidal range and depleted shoreface. It would require large volumes perhaps of the order of 1 to 2 million m<sup>3</sup> in order to provide significantly improved standards of defence and would require repeat operations every 10 years. Ideally, formation of a narrow linear dune backshore would also need to be encouraged (storm surge buffer) and space and sediment for that would be required.
4. Gravel is likely to be preferable for coastal defence functions because it is the natural material of the upper beach, forming the major part of the barrier that would withstand swash run-up and overwashing. Typically, a given standard of protection is achievable using smaller volumes of gravel than if sand were used.
5. Shoreface replenishment on balance would be a more uncertain or “risky” operation, due to the high potential for losses, than placing material on the beach. Furthermore, the examples from the literature suggest that shoreface mounds perform a sheltering function on the shoreface before dispersal, without necessarily migrating onshore. It is likely therefore to be difficult to quantify the likely gains in standards of defence and

thus be difficult to justify this technique in favour of beach recharge where the profile maintained can be more easily related to a desired standard of defence.

6. The notion of allowing the existing defence (barrier beach) to function as a “sill” so that a brackish flood plain develops behind may require significant management to achieve. That is because the feature in question is a mobile barrier beach that is likely to breach and form a permanent new inlet. Without management, inundation of the land behind would be abrupt and tend to lead to maritime mudflats and saltmarsh development, with brackish conditions only at the headwaters of those creeks/channels having freshwater inputs. Porlock Bay is a useful analogue here demonstrating how the then brackish back-barrier marsh reverted to an intertidal lagoon some 6 years following discontinuation of active beach management.
7. On several occasions replenishment is discussed as being an “experiment.” Whilst academic researchers such as myself would welcome and support a well-designed approach of this type, most funders of coastal defences require a reasonable degree of confidence that the intended benefits are likely to be delivered. Although adaptive management might be considered to have an “experimental” element it is almost certainly easier to monitor and “adjust” a beach recharge than a shoreface replenishment.
8. Considering all factors of sediment mobility, future storage within ebb and flood tidal deltas and the performance of past beach recharges at Medmerry and elsewhere within the region it is considered that the Going Dutch estimate of 300,000m<sup>3</sup> of fill being required every 10 years is significantly too low – it would not do much more than maintain the existing situation! Furthermore, it was unclear what shoreline configuration and standard of defence those proposals were intending to maintain which of course very significantly affects the volumes required and the affordability.
9. The option of shoreface replenishment to create nearshore (submerged?) shingle reefs (Manhood Peninsular Partnership, 2008 – see p19) is interesting, but in my experience largely untested. As the tidal range is quite high, rather a large quantity of fill would be required to maintain sufficiently shallow water depths that could dissipate waves during extreme storm surge water levels. Other potential constraints concern the rate of dispersion and the fates of dispersing sediments. The occurrence of strong tidal currents offshore and a known local tendency for kelp rafting of seabed pebbles might lead to more rapid than anticipated dispersal, although the latter mechanism could supply gravels to beaches. Other constraints might involve impacts upon navigation and fisheries.
10. My recommendation would instead be to consider carefully targeted gravel beach recharge in conjunction with control structures and necessary monitoring and adaptive beach management, but only at critical locations. This would be supported by the greatly improved monitoring data from 2003 onward from the Channel Coast Observatory. It may be that improved control structures, monitoring and beach management can increase the longevity of recharge schemes and possibly reduce some costs for some areas.

#### **4. OTHER OPPORTUNITIES**

Below I offer a little creative thinking that could perhaps supplement some of the “Going Dutch” ideas:

Perhaps there could be an opportunity to consider the possibility of developing a surf reef at the Witterings? The Hayling Wave Buoy record demonstrates a quite unusual exposure to swell waves suggesting that perhaps this area has more potential than Boscombe where surf

reef construction is currently in progress (<http://www.bournemouthsurfreef.co.uk/>). It is understood that West Wittering is already acknowledged as a good (relatively!) surf location. However, any such reef would probably only have a modest coastal defence benefit.

Another possible alternative would be to investigate the potential economic benefits of habitat creation. Landscape enhancements and bird-watching opportunities could boost tourism as identified by Cobbold and Santema (2001), however, the habitats themselves could have economic value. The idea would involve habitat “banking” - that is setting out to create intertidal habitats that have high conservation value, but which are under increasing pressure in southern and SE England i.e. saltmarsh. Blocks of created habitat could then be sold to organisations seeking to offset the effects of their activities elsewhere. Potential customers could include developers, port authorities and coastal defence authorities. Schemes of this type have operated successfully in the USA over the past 15 years, especially around San Francisco Bay. The European Habitat Regulations mean that there is a demand for compensatory habitat, but to date it has proven very difficult to release land for creation on the south coast of England. Medmerry is the largest and best specified site for habitat creation in the region.

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