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Adroddiad

Ymchwiliad a agorwyd ar 20/06/06
Ymweliad â safle a wnaed ar 28/06/06

Report

Inquiry opened on 20/06/06
Site visit made on 28/06/06

gan/by Clive Nield BSc, CEng, MICE, MCIWEM

Arolygydd penodwyd gan Cynulliad Cenedlaethol Cymru

an Inspector appointed by the National Assembly for Wales

Dyddiad/Date 07/09/06

INTERIM PROCEDURES FOR A GOVERNMENT VIEW

(published in 1998 and amended in June 2002)

In connection with an application to the Crown Estate for a Licence for the Extraction of Marine Aggregates by Dredging

Area 373, Helwick Bank, Bristol Channel seabed, off the Gower peninsula

Cyf ffeil/File ref: APP/B6855/X/05/514765

CONTENTS

File Ref: APP/B6855/X/05/514765

Site address: Area 373, Helwick Bank, Bristol Channel seabed, off the Gower peninsula

- The application was made in accordance with the Interim Procedures for a Government View 1998 (as amended in June 2002) on 30 October 2000.
- The application is made by Llanelli Sand Dredging Limited to the National Assembly for Wales.
- The Government View is sought in connection with an application to the Crown Estate for a licence for the extraction of marine aggregates by dredging.
- On the information available at the time (13 February 2006), the following were the matters on which the National Assembly for Wales particularly wished to be informed for the purpose of its consideration of the application:
  - national policy on marine aggregates dredging, including continuity of supply (IMADP);
  - physical impact on Helwick Bank itself in relation to its designation objectives as part of the SAC;
  - potential impact of dredging at Helwick Bank on:
    (a) Carmarthen Bay and Estuaries SAC, Carmarthen Bay SPA
    (b) coastal features including beaches (Rhossili, Port Eynon, Three Cliffs Bay, Oxwich and Mewslade)
  - potential cumulative impact of dredging for aggregates (taking into account any decision on proposed dredging at Nobel Banks);
  - fisheries – conflict between fishing interests and proposed aggregates dredging;
  - monitoring strategy and appropriate conditions to be attached if a favourable Government View is recommended;
  - appropriate assessment.
- The inquiry sat for 10 days on 20-23 June, 27 June, 29-30 June, 4-5 July and 7 July 2006.

Summary of Recommendation: A favourable Government View be given in part (for a licence of limited extraction rate and period).

Preamble

1. This report includes descriptions of the site and nearby coastline, the dredging operations proposed, the application and consultation procedures carried out, the gist of the Applicant Company's case, details of objectors and the gist of the representations made (particularly by the Countryside Council for Wales, the City and County of Swansea and the Gower Coalition), possible conditions for the licence, and my appraisal, conclusions and recommendations. Document references are shown in brackets, and in my conclusions the numbers in square brackets indicate relevant paragraphs of the report. Comprehensive lists of people who took part in the Inquiry and of Documents are attached at the end of the report.

Procedural Matters

2. Licences for offshore dredging of sand are granted by the Crown Estate subject to the provision of a "favourable Government View". Thus, in parallel with the submission of an application to the Crown Estate, an application is made to the National Assembly for Wales (NAW) for a Government View. The procedures to be followed in this respect are detailed in a booklet published in 1998 (and amended in 2002), known as the Interim Procedures for a Government View. (Document LSDL/C2)

3. That booklet specifies several stages: Stage 1, comprising the initial application and the scoping and preparation of an Environmental Statement and Coastal Impact Study (Documents LSDL/B1 and B2 respectively); Stage 2, comprising wide consultation on the application, Environmental Statement and Coastal Impact Study, attempts to resolve concerns, and the preparation of a report summarising the consultations and discussions and

including a supplement to the Environmental Statement describing how those concerns have been addressed (Document LSDL/B3); Stage 3 when confirmation is sought from consultees that their concerns have been resolved; Stage 4 when the NAW carries out its assessment for determination of the application; and, finally, Stage 5 when a Government View letter is issued to the Applicant. The Applicant, Llanelli Sand Dredging Limited (LSDL), has undertaken Stages 1, 2 and 3 in consultation with appropriate NAW contacts.

4. The Interim Procedures for a Government View include provision in Stage 4 for a public inquiry or informal hearing to be held where issues remain unresolved. In this case, it was decided to hold a public inquiry, and the matters on which the NAW particularly wished to be informed were detailed in the Planning Inspectorate's letter of 13 February 2006 (Document LSDL/A4). These are listed in the bullet points above. All consultees were notified of the planned public inquiry (and pre-inquiry meeting) and invited to appear and present evidence. A pre-inquiry meeting was held on 28 March 2006 to facilitate arrangements for the public inquiry.

5. Most of the local objectors to the application organised themselves under the umbrella of the Gower Coalition, and this enabled them to be professionally represented at the public inquiry. The Gower Coalition served as a vehicle for the Gower Society, the Gower Save Our Sands campaign, the National Trust and the Penrice Estate (both major landowners along the Gower coastline), the Community Councils of the Gower peninsula, the Campaign for the Protection of Rural Wales, the Hawk and Owl Trust, and a large number of individual local residents. It was reported that the Gower Coalition had organised a substantial petition to be presented to the NAW some months before the public inquiry.

6. At the start of the public inquiry the Countryside Council for Wales asked for an adjournment or a rearrangement of the inquiry timetable as their barrister was ill (see Document 6). In considering this request, I was aware that the NAW was keen for the case to be progressed and had imposed the date for the inquiry on the applicant company, despite repeated requests for a later date. All participants had made particular arrangements to make their teams available, and adjournment of the inquiry would have caused considerable inconvenience to them and would have caused completion of the inquiry to have to be rescheduled until later in the year. Consequently, I did not consider adjournment to be a viable option.

7. Rearrangement of the inquiry timetable was considered. However, the applicant company would have been disadvantaged if it had not been able to present its case as a whole in the early part of the inquiry. Consequently, I refused CCW's request, and throughout the first week of the inquiry CCW was represented by one of its senior officers rather than its barrister. The barrister attended the inquiry during the second week, and CCW's case was presented during that period. The barrister was unable to attend the third week of the inquiry for a quite different reason, and CCW was again represented by a senior officer over that period. Whilst far from ideal, I consider this course of action was the fairest to the inquiry participants as a whole, and I do not consider CCW to have been disadvantaged to an unacceptable degree.

8. On a non-sitting day during the second week I carried out an unaccompanied site visit to the South Gower coastline. At the request of the Gower Coalition I visited the beaches at Langland, Caswell, Oxwich, Port-Eynon, Mewslade and Rhossili Bays (see map at Plan A).

Site and Nearby Coastline (Documents LSDL/B1 & B2)

9. The Area 373 application site covers an area of some 3.7 sq km, reduced from 5.4 sq km in the original Environmental Statement (see clarification of area in Document 12.2), and is located off the south-west corner of the Gower peninsula (see Figure 1.1 of Document

LSDL/B1, reproduced for convenience as Plan B). At its closest the area lies some 2-3 km off Tears Point and straddles both the East Helwick and West Helwick parts of the sand bank (separated by a slightly deeper area known as Helwick Swatch).

10. The seabed sediments of the Helwick Bank area are uniform medium-fine sands. Water depths vary from about 32 metres below chart datum (approximately the level of the Lowest Astronomical Tide) along its southern edge to about 5 metres below chart datum over the crest of the bank. To the south the seabed is generally flat, and to the north of the Bank the seabed falls away to a relatively shallow, flat area before rising again to the coast.

11. The site lies within the Carmarthen Bay and Estuaries Special Area of Conservation (SAC) and close to the Gower peninsula, a designated Area of Outstanding Natural Beauty. Within the SAC Helwick Bank itself is one of the designated features. The whole of the coastline in this part of Gower is a designated Site of Special Scientific Interest and a Heritage Coast, and some parts are also a National Nature Reserve (see Figure 4.1 of Document LSDL/B1, reproduced for convenience as Plan D). The nearest popular beaches are at Mewslade Bay and (beyond Worms Head) Rhossili Bay immediately to the north of the site. The other South Gower beaches lie further to the east (Plan A).

12. Dredging has been carried out on the Helwick Bank for some years. A 4 year licence was granted to previous owners in 1993 for a maximum annual extraction rate of 100,000 tonnes, and that was extended for a year until 1998. In 1998 a five year licence was granted for a maximum annual extraction rate of 150,000 tonnes, and in 2003 that licence was extended for 2 years at a rate of 107,000 tonnes per annum (representing unused tonnage). Since 1993 the actual amounts extracted have varied from 51,000 to 119,000 tonnes per annum, though up to 142,000 tonnes has actually been dredged in a single 12 months period (Document 11.1).

13. It is relevant to note that the Welsh Assembly Government has recently given a favourable Government View in respect of an application by the same company for a licence to dredge sand in Area 476, Nobel Banks, some 18 km south-west of the Gower peninsula. That approval was for the extraction of up to 300,000 tonnes per annum for a 10 year period.

Proposed Dredging Operations (Documents 11.1 & LSDL/B1)

14. The current application is for the extraction of up to 300,000 tonnes (equivalent to approximately 200,000 cubic metres) of sand per year over a period of 15 years. Initially, the application before the inquiry was for a maximum annual extraction rate of 150,000 tonnes in the first year, 200,000 tonnes in the second year, 250,000 tonnes in the third year, and 300,000 tonnes in the fourth and subsequent years. However, during the course of the inquiry, the Company revised that proposal and now seeks approval for maximum rates of 150,000 tonnes in the first year, rising in annual increments of 25,000 tonnes to 300,000 tonnes in the seventh and subsequent years.

15. Sand extraction would be carried out by a trailer suction hopper dredger towed along the seabed at a speed of 1-3 knots. Sand and water would be sucked up leaving a shallow furrow some 0.2-0.3 metre deep and approximately 1.5 metres wide. The sediment would be passed over a screen to exclude coarse material, which would be discarded back into the sea. The sand and water mix would then be stored in a large hopper where, as the sand settled, the water would overspill and be discarded back into the sea in the same area.

16. The size of vessel used would be similar to the “Sospan” as illustrated in Figure 2.4 of the Environmental Statement (Document LSDL/B1). It is anticipated that extraction of 300,000 tonnes per year would involve about 286 trips, each comprising about one hour of dredging. Operations would be carried out at around the low water period of a tidal cycle, and only one

cargo would be obtained each tide. 2 to 3 dredging campaigns would be anticipated each year, each of 7 to 11 weeks duration. The dredger would operate from the Company's base at Burry Port where the dredged sand would be pumped ashore and stockpiled.

Application and Consultation Procedures (Document LSDL/B3A)

17. The procedures specified in the Interim Procedures for a Government View have been followed. At the scoping stage of the project WAG prescribed 35 consultees, and copies of the Environmental Statement and Coastal Impact Study were issued to these for comment. All 35 responded, and comments were also received from another 17 individuals or organisations as a result of direct contacts with the Company, press advertisements or the placement of documents at Council offices. These are listed in Table 7.1 on page 18 of Document LSDL/B3 Volume 1, and in the same document Table 7.2 provides a summary of the issues raised and an explanation of how they were addressed in the Supplementary Environmental Statement. Table 7.3 summarises the same data by subject, and copies of the correspondence are also included in Volume 2 of that document.

18. The Environmental Impact Study has been carried out in accordance with the guidance contained in Annex 3 of the Interim Marine Aggregates Dredging Policy for South Wales (Document LSDL/C6). It includes the Environmental Statement, Coastal Impact Study, and the Consultation Summary and Supplementary Environmental Statement (Documents LSDL/B1, B2 and B3 Volumes 1 & 2) and meets the requirements of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999.

Case for Llanelli Sand Dredging Limited

The material points are:

19. LSDL's case is summarised in terms of the particular matters on which the NAW indicated it wished to be informed. All matters have been explored in detail at the public inquiry, which has served to demonstrate the compelling case in favour of a positive Government View for this proposal. Although there has been debate about how the precautionary principle should be applied, there has been no criticism of the scope of the Environmental Statement or the information provided. Information has been produced at all stages of the process whenever requested, and there is no reluctance on the part of LSDL to provide any information, subject only to an explanation as to why it is needed and opportunity to provide it.

National Policy on Marine Aggregates (Documents 20.1, 20.3 & 54)

20. National policy is contained in Minerals Planning Policy Wales (MPPW), published in December 2000, Minerals Technical Advice Note 1, Aggregates (MTAN1), published in March 2004, and Interim Marine Aggregates Dredging Policy, South Wales (IMADP), published in November 2004. MPPW and MTAN1 establish basic principles, including sustainability, and MTAN1 confirms that in South Wales there is a unique dependence on marine aggregates to provide sand. Some 85% of recorded sand and gravel production is from marine sources, with limited land-based production mainly from West Wales.

21. It is important to note that the definition of sustainability in the adopted national policy encompasses not only protection of the environment and prudent use of natural resources, but also social progress and the maintenance of high and stable levels of economic growth. The provision of an adequate supply of minerals is an important factor in achieving development for economic growth and social progress.

22. All parties agree that IMADP is the principal policy document against which the application should be considered and, although some people disagree with parts of it, there is no dispute

that it provides an up to date and comprehensive set of policies. It is described as "Interim" only in the sense that it complements the Interim Procedures for a Government View. IMADP was published in draft form in 2001, and the final 2004 document was informed both by comments from a wide range of consultees (including all the main objectors to the current proposal) and by the results of the 2002 report on the Comparative Impact Assessment of Land and Marine Sand & Gravel (known as the "Symonds report", Document LSDL/C3). Whilst not a policy document itself, the Symonds report does serve to demonstrate that the adopted policy is based on sound evidence and sustainability principles.

23. Paragraph 1.2.2 of IMADP says *"IMADP forms the basis for decisions with the objective being to guide aggregates dredging towards preferred areas."* and *"The policies provide the marine aggregates industry with greater certainty, assisting with medium to long-term planning and investment decisions, while protecting environmental quality and biodiversity."* Further, paragraph 1.2.3 describes the fine aggregate dredged from the Bristol channel to be of high quality and acknowledges the findings of the Symonds report that *"it is unlikely in the foreseeable future that the marine dredged sand could be substantially replaced from other sources without raising the cost and reducing the quality of construction"*, which would have *"definite adverse economic consequences for the region and would not be justified on sustainability grounds"*. With these in mind, paragraph 1.3 describes the objective of IMADP as making provision to identify areas where dredging for marine aggregates is likely to be acceptable whilst, amongst other things, protecting the marine and coastal environment and controlling the impacts to acceptable levels.

24. Policy SP1 identifies the overarching objective to continue the use of marine dredged sand and gravel for the foreseeable future but only where this remains consistent with the principles of sustainable development. Subject to the same caveat, Policy SP2 establishes the intention that, over the next 10 years, aggregates dredging will progressively become focused in areas offshore and to the West of the Bristol Channel. This reflects the conclusions of the Symonds report. In line with this, paragraph 2.2.2 of the IMADP clearly states the intention that in the long-term only a minor proportion of sand should be sourced from the Severn Estuary and Inner Bristol Channel, where most dredging is currently carried out (see Figure 2.5 of Environmental Statement, Document LSDL/B1, which is reproduced for convenience as Plan C). Area 373 Helwick Bank lies in the Outer Bristol Channel Area, and a licence for dredging would be in line with that aim, which is expressed in IMADP Policy SP5.

25. There has been some debate at the public inquiry about the use of the word *"and"* in the phrase *"in areas offshore and to the West of the Bristol Channel"*. It has been suggested that both requirements have to be met. However, it is clear from supporting text that that was not the intention. Paragraph 2.2.1 of IMADP refers to *"a gradual shift of dredging operations from inshore areas to other areas further offshore and/or further west"*. The Symonds report also expresses its conclusions in similar terms, and it is noteworthy that advice given to the Environment Minister when IMADP was published in November 2004 (see Document LSDL/D8) indicated that the intention was for dredging to be focused in some areas offshore and others to the west. That same document advised *"in the long term, if the westward strategy is to be effected, then production from Helwick may well need to increase"*.

26. The particular interpretation placed on the phraseology used in Policy SP2 is less important than the policy intentions, which are that sites should be specifically assessed against the principles of sustainability. Area 373 meets all of these tests.

27. Section 2.3 of IMADP describes the categories of sediment environment that have been designated for the Bristol Channel (see IMADP Map 4), and Area 373 falls within sediment environment OBC11, a Category 2 sediment environment where *"the Assembly will adopt a*

precautionary approach". This falls between the Category 3 sediment environments immediately along the coastline where *"The Assembly is very unlikely to look favourably on dredging"* and the Category 1 sediment environments in the deeper waters along the middle of the Bristol Channel where *"The Assembly will look favourably on dredging for aggregates"*. The current application is in line with this precautionary approach.

28. It has been alleged at the public inquiry that a small part of the proposed licence area falls within the Category 3 sediment environment OBC12 immediately to the north (see IMADP Map 3). Due to a cartographic error the boundary has been incorrectly shown in the Supplementary Environmental Statement (see Figure A3.1 of Document LSDL/B3A), which was prepared in parallel with the work carried out by others to establish the sediment environment areas. It is clear that the real boundary between OBC11 and OBC12, which have quite different characteristics, runs along the northern edge of the proposed licence area. Therefore, it is appropriate to consider the application as for a Category 2 sediment environment. This clarification is further explained in Document 16.3.

29. Whilst the precautionary approach clearly applies to all licence applications in Category 2 sediment environments, it is noticeable that for new areas (i.e. areas in which dredging has not previously been carried out) IMADP draws particular attention to the need for research and baseline measurements to establish the sensitivity of the environment to dredging. Policy SP10 also addresses this. Dredging has been undertaken at Helwick Bank for many years, and there is a considerable bank of data on its effects. Notwithstanding the precautionary principle, this substantial body of information allows fully informed decisions to be taken with far less uncertainty than for a new area. It is an established legal principle that scientific certainty is not required for decision-making, rather that risks should be identified and taken into account. In this case, that has been done by means of exhaustive surveys and assessments and by employing the best expertise available. In addition, it would be proposed to put in place a legally enforceable framework of monitoring and review, which would prevent those risks from materialising.

30. There was debate at the public inquiry on the application of the precautionary principle. The European Commission has provided advice on that in its "Communication from the Commission on the Precautionary Principle", dated February 2000 (Document LSDL/D1). It advises *"The precautionary principle should be considered within a structured approach to the analysis of risk which comprises 3 elements: risk assessment; risk management; and risk communication. The precautionary principle is particularly relevant to the management of risk."* Further advice is provided by the UK Government's Interdepartmental Liaison Group on Risk Assessment (ILGRS) in its paper on "The Precautionary Principle: Policy and Application", dated September 2002 (Document LSDL/D4). Paragraph 9 states *"The definition makes it clear that where there is scientific uncertainty the precautionary principle establishes an impetus to make a decision that seeks to avoid serious damage if things go wrong"*.

31. IMADP policies SP3 and SP4 deal with the maintenance of an adequate supply of aggregates. Policy SP3 seeks to maintain a licensed capacity of up to 2 million tonnes per annum within Welsh waters for the construction market. Policy SP4 seeks to maintain licensed dredging reserves at between 5 and 15 years supply. These are important policy aims on account of the heavy market reliance on dredged aggregates in South Wales. Analysis shows that the proposed licence at Helwick would make an important contribution towards achieving these policy aims.

32. The most up to date assessments against these policies are contained in the Statement of Common Ground with CCW (Document 8.3). Table 4 is applicable to Policy SP3 though, as

Denny Shoal and Culver Sands are mainly in English waters, the figures have to be corrected to omit those licences. Consequently, the current position is a licensed capacity in Welsh waters of 1.1 million tonnes per annum (tpa), representing a 45% shortfall on the policy aim. By 2008, if full provision is made for a licensed capacity of 300,000 tpa at Nobel Banks (notwithstanding the uncertainties attached to that new area for dredging), the shortfall will be slightly reduced at 37 %. However, by 2010 (only 4 years hence), with the cessation of dredging at Nash Banks, the licensed capacity will fall to 0.65 mta, a shortfall of 67%. Even if Denny Shoal and Culver Sands were included in the analysis, the shortfall in 2010 would be 60% of the 2 mta figure provided for in Policy SP3.

33. Table 5 (of Document 8.3) provides the analysis relevant to Policy SP4 and includes the imminent licensed reserve of 3 million tonnes for Nobel Banks. If Denny Bank, Culver Sands and Helwick Bank were omitted from the calculation, the effective licensed reserves would amount to 7.8 million tonnes by January 2007. This would be equivalent to 6.66 years supply at the Welsh landing rate of 1.17 mta. An alternative calculation could be made by including the Denny Bank and Culver Sands areas and dividing the total by the landing rate for the Bristol Channel as a whole. In that case, the supply would become only 5.76 years by January 2007. Whichever is used, the current reserves are close to the minimum sought by Policy SP4. If a licence were granted for the full amount sought at Helwick Bank, these reserves would be increased to some 12.1 and 8 years respectively, much closer to the middle of the 5-15 years supply sought by the policy.

34. Some parties have argued that the current application should not be granted until an application for another site has been determined. That refers to an application for 1.8 million tonnes per annum in a new area, Area 486, in deep water to the west of Nobel Banks. Although that lies in a Category 1 sediment environment, it is understood that the application is at a very early stage of preparation and that the Environmental Impact Assessment has yet to be done. It will be some years before that proposal comes forward for a decision and, bearing in mind the importance of maintaining an adequate supply of aggregates to the market, it would be unwise to delay the current proposal on that account. Helwick Bank is a proven, high quality resource and represents a necessary and important addition to licensed dredging reserves. LSDL has had to refuse clients in recent years and has no doubt that the increased capacity provided by both the Helwick Bank and Nobel Banks licences would provide an early benefit to the market. Although there is some overlap, the materials from the two sources are not the same and, together, they would enable the efficient and sustainable exploitation of reserves.

35. The proposal is consistent with Policy SP5 to reduce dredging in the Severn Estuary and Inner Bristol Channel areas. The Environmental Statement and the evidence have considered possible cumulative and in-combination effects, particularly of the Helwick Bank and Nobel Banks licences, and have not found any effects on environmental capacity. This conclusion has not been disputed, and the proposal clearly complies with Policy SP6 in this respect. It is LSDL's contention that all other policies would also be met. A complete analysis of the proposal against all of the policies in IMADP is contained in Appendix IMG3 of Document 20.3.

36. Policy SP7 warrants particular consideration. It states *"A favourable Government View within a Precautionary Sediment Environment would normally support a licence for between three and seven years, in a Favourable Sediment Environment for up to 15 years."* Although the current application is for 15 years it is not considered to be out of step with this policy. The stated term of 3-7 years for a Category 2 sediment environment has to be read in the context of paragraph 2.9.1, which emphasises that the period of time for which a positive Government View is given is site-specific and that the criteria used to classify sediment

environments constitute guidance. In this case, the area has been previously dredged for some years and there is an abundance of technical and monitoring information available. The overall aim of the policy is to provide certainty and enable long-term planning, and it would be perverse to treat the Helwick Bank site the same as if it were a new one. The current application for a 15 year licence would be strongly controlled by detailed monitoring and regular review, which would include provision for dredging to be suspended should unforeseen outcomes occur.

37. The ministerial advice given in October 2004 in connection with the publication of IMADP (Document LSDL/D8) explained the reasoning behind shorter licence periods for Category 2 sediment environments. Essentially the reasons were: to encourage the move to more environmentally acceptable areas; to avoid compensation payments if a licence had to be revoked; and to ensure that conditions were kept up to date. With regard to the first, it has been shown that the current proposal is environmentally acceptable and, in any case, provision would be included in conditions to safeguard against unforeseen effects. The proposed conditions would also provide adequate safeguards against the other reasons. Consequently, there is no reason in this particular case to adhere to a shorter period than requested.

38. It is noted that the City and County of Swansea has suggested a 2 year licence be granted. That would be quite unjust bearing in mind the length of time and the costs involved in making the application. Furthermore, little more data would be gathered during such a short period to assist in making any future decisions for a further licence. Swansea's suggestion seems to be based on LSDL carrying out far more wide-ranging research during that period than is appropriate in connection with such a licence. IMADP makes it clear in paragraph 2.7.5 that applicants should not be required to produce regional research in support of their dredging activities.

39. In conclusion, the essence of objectors' cases with regard to national policy is that Helwick Bank is in a precautionary environment and that the proposal should be rejected on account of uncertainties with regard to the supporting information. However, policy emphasises the need for a site-specific approach and for the industry to be driven by sustainable development principles. There is no basis for any claims that the current proposal is not consistent with sustainable development principles or would offend interests that policies set out to protect, such as the Special Area of Conservation (SAC) or the coastal features. National policy provides strong support for the proposal.

40. The City and County of Swansea has made reference to policies contained in the West Glamorgan Structure Plan, the Swansea Local Plan, the Minerals Local Plan and the deposit draft Unitary Development Plan. It is agreed in the Statement of Common Ground with Swansea (Document 8.2) that the presumption in regard to the development plan is not applicable in this case. In so far as policies aim to safeguard the Gower AONB and the various environmental features and designated sites, they may be a material consideration in the event of demonstrable harm arising. However, no such harm would occur.

Physical Impact on Helwick Bank in relation to its Designated SAC Objectives
(Documents 13.1, 15.1, 19 & 54)

41. There is little real dispute over the general patterns of sediment movement in the Bristol Channel off the coast of South Wales. They have been the subject of many studies in the past, including one in 1992 by Professor Pethick, the CCW's witness on this topic, and Dr Alan Thompson of the Symonds Group ("Some Aspects of the Geomorphology and Sediment Dynamics of the Coast of South East Wales", April 2002 – see item JP2 of Document Bundle 22.4), which reviewed previous papers and reports.

42. Sand on the surface of the seabed in Area 373 is regularly mobilised by tidal currents and this mobility is enhanced by wave action. The seabed is a dynamic sediment environment, and any furrow dredged is quickly refilled with no noticeable long-term effects. The annual bathymetric surveys have shown no sign of dredged furrows persisting. Sand arrives from the east, travelling parallel to and offshore from the southern face of the Helwick Bank, and from the north-west. The latter sediment transport pathway is supplied partly by sand travelling offshore and to the south of Helwick Bank, which is then diverted into a clockwise circulation around the western end of the Bank and thence on to its northern face, and partly by sand leaving Carmarthen Bay. There is also a westerly transport of sand away from the western end of Helwick Bank, which contributes to the transport pathway across the face of Carmarthen Bay, past the Pembrokeshire coastline and into the deeper waters of the Celtic Sea. Thus, Helwick Bank is an open system with sediment continually coming and going. Sand dredged from the Bank is replaced by sand arriving along these sediment pathways, and the result of dredging is likely to be a reduced rate of transport in a westwards direction away from the Bank. (Document 13.1)

43. It is not disputed that Helwick Bank is subject to natural variations in sand volume as a result of tidal currents and wave action or that occasional major storm events have a significant effect on sediment deposition on the Bank. Thus there are periods when the Bank naturally gains in volume and others when it loses sand, and these trends may occur over periods of several years. Since 1993 LSDL has carried out regular bathymetric surveys as a condition of the various dredging licences, and the results of these are conveniently summarised (in terms of volumes of sand above certain contour levels) in Table 01 of the Helwick Bank Links Report of January 2005 (Document LSDL/B12). In addition, the volumes in the higher levels of the Bank are detailed on page 9 of Document 22.1, and this includes the most recent 2005 survey data. (Document 15.1)

44. On the basis of this data CCW argues that the Bank is in a state of decline and that, although this is mainly attributable to natural variation, dredging activities would be likely to exacerbate this and should be discontinued. The relative stability of the bank is an important factor in assessment of the integrity of this feature of the SAC. However, that argument is seriously flawed.

45. CCW's argument is based on a linear regression analysis of the bathymetric survey data over the period 1993 to 2005 (i.e. a method of drawing a trend line through a series of scattered points on a graph). Initially CCW suggested that extrapolation of that data gave an indication of serious long-term reductions in volume. However, it withdrew that argument at the public inquiry. Consequently, even if CCW's analysis of the data were correct, all it would show is a decline in volume over the period of the data, and all parties accept that this is likely to be due to natural cyclical variations. The consequence is that such a conclusion would not justify withholding a dredging licence on that account, as conditions comprising a regular monitoring and review regime coupled with specified actions in the event of triggers being reached would provide adequate safeguards to avoid dredging adversely affecting the volume or topography of the bank. Such conditions would allay all reasonable doubts that dredging would adversely affect the integrity of the SAC. On this basis, there is little need to deal with the complex technical and scientific arguments raised by CCW. However, when properly addressed, they further reinforce the Company's case and are worth more detailed consideration.

46. There is no credibility in the arguments put forward by CCW, who have deliberately avoided taking into account any earlier survey data or variations in the nature of that data and, even in the analysis that has been carried out, use an inappropriate statistical analysis method. Earlier surveys were carried out in 1886, 1939 and 1988 and provide useful data to illustrate the

variable nature of the Bank. It is difficult to determine how comparable the 2 earlier surveys are with modern data as they were carried out for a quite different purpose and by different methods. However, there is no reason why the 1988 survey data should not be taken into account, and at the public inquiry CCW acknowledged the comparable nature of this data. Nevertheless, they argued that it should not be used as it was not part of a continuous sequence of data at regular time intervals.

47. CCW put forward misplaced evidence to support this argument (Document 23.1). However, further investigation of the same source document has shown such an interpretation to be incorrect (Documents 18.1 & 18.2). Furthermore, it was demonstrated at the public inquiry that CCW's expert witness has used a similar statistical analysis on discontinuous data in some of his previous work (Document 14.2). Consequently, it is entirely reasonable to include the 1988 survey data in any such analysis. If that is done, the variability in Bank volumes at various depths becomes clearly apparent, as illustrated by Figure R1 in Document 19. This shows a general increase in volume from 1988 to 1995, a sudden plunge between 1997 and 1998, and a variable but generally rising trend since 1998. This does not show a Bank in decline but rather one subject to natural variation, and there is no evidence that dredging operations have caused any harmful effect.

48. It is pertinent to be aware of important differences in the nature of the surveys when used for like-for-like comparison (see Document 15.1). The 1988 survey was carried out for navigational charting purposes and comprised a combination of N-S and E-W lines. The surveys of 1993-1997 were intended to measure the crest line of Helwick Bank for wave modelling purposes and were taken along N-S lines. Since 1998 the surveys have been taken along a network of both N-S and E-W lines, as specified by the regulator, specifically for the purpose of monitoring the sandbank surface. This change in methodology is taken to be a contributory reason for the sudden fall in measured volumes between the 1997 survey and the 1998 survey, rather than it being purely due to an actual reduction in physical volume (Document 19). Consequently, it is likely that the comparison of Bank volumes shown on Figure R1 is more favourable than is apparent from the raw data.

49. A further criticism is made of CCW's statistical analysis, and that relates to the suitability of the use of linear regression analysis to data of this sort. Examination of the fit of the Bank volumes to such a model shows a high proportion of data points outside the 75 percentiles of the regression line. Such a high proportion of outlying data points raises questions about the reliability of applying linear regression to such data and the assumptions about the distribution of data inherent in that method (Document 18.1). This aptly illustrates the inability of the method to predict dynamics caused by occasional large-scale events such as storms, which all parties agree have significant effects on the sediment regime of the Bank. It is completely inappropriate to base arguments on such a simplistic linear model, which is based on the assumption that the physical processes remain constant with time, when in this case the physical forces and patterns of erosion and deposition vary with changes in the volume itself. (Document 19)

50. In addition to this flawed evidence there are many other inconsistencies in the case put forward by CCW. The first relates to its perception that the Bank is in decline. CCW's expert witness accepts that he has a different opinion on the stability of Helwick Bank than when he co-authored a major report on sediment dynamics along the South Wales coast in 2002 (Item JP2 in Document Bundle 22.4). He says that is because he relied at that time on earlier studies carried out by HR Wallingford. However, the report set out to test the results of that and several other studies, and closer examination of the report shows he considered detailed coastal processes, including the effects of storms on Helwick Bank and their intermittent nature, and was well aware that the Bank did not have a stable volume. The report also

confirmed that sediment availability was greater in the western part of the Bristol Channel than the east and that Helwick Bank (and the Gower beaches) were far more robustly buffered against changes imposed by dredging than sites further to the east because of lower rates of sediment transport and much greater sediment availability (with major sediment stores in the Nobel Banks and Carmarthen Bay). That report fully supported the propositions now put forward by the Company.

51. That same expert witness provided advice to CCW in November 2004 (updated in March 2005) based on LSDL's monitoring reports up to that date (see Item JP1 of Document Bundle 22.4). At that time he acknowledged the periodicity of the data (i.e. its periodical nature due to occasional storm events) and, whilst drawing attention to a statistically significant decline in the Bank volume, admitted that it was difficult to determine the reasons. His conclusion was that the suggested aggregates extraction rate may have a significant impact on the integrity of the designated SAC feature. In his evidence to this inquiry he now says that it would have an impact on the integrity. CCW acknowledges that the only additional information available since March 2005 is LSDL's 2004/05 monitoring data. However, that actually shows an increase in Bank volume and so cannot justify the witness' change in position since 2005.

52. That reliance on the 2004/05 monitoring data is even more inconsistent when CCW's own actions are considered. In May 2005 CCW provided advice to WAG (letter dated 6 May 2005 – see Tab 4.3 in Document LSDL/Bundle D), which was set out in more detail in its letter of 9 August 2005 (Document 14.1). That letter recommended that an appropriate assessment be carried out in respect of the SAC features and advised that CCW considered the Bank to be in long-term decline. However, notwithstanding that, CCW advised that the Bank feature was considered to be in favourable status and that dredging would be able to continue provided the Bank volume was monitored against the 2001-2005 dataset. That advice was provided long after CCW had received its expert's report and even quoted from that report. There can be no logic in CCW now changing its position on the basis of the 2004/05 monitoring data, which shows an increase in Bank volume, and saying at the public inquiry that Helwick Bank is now considered to be in unfavourable conservation status.

53. Although withdrawn at the public inquiry, it is important to note that CCW's expert witness included in his statement of evidence (Document 22.1) references to extrapolation of his statistical analysis to illustrate the consequences should the alleged decline of the Bank continue. That suggestion no doubt led to CCW's conclusion that dredging on the bank would hasten its decline. As the suggestion of continued decline has now been abandoned, CCW must surely accept that its previous position of allowing further dredging to take place, subject to an appropriate monitoring regime, is the only justifiable one.

54. Taken as a whole, LSDL's conclusions with regard to the physical impact on Helwick Bank are summarised as follows. The Bank's volume is cyclical rather than linear due to significant storm or wave events, and this is well illustrated by the modern survey data (1988 onwards). That data is not well suited to linear regression analysis on account of its nature and the differences in methodology over different periods of time, and extrapolation of that analysis is particularly inappropriate. However, if such an analysis is used, the 1988 data is a useful addition to the more recent data.

55. There is no logical basis for CCW's recent change in position with regard to the decline of the Bank or its unfavourable conservation status. Helwick Bank is well buffered by large quantities of sand in the Nobel Banks and Carmarthen Bay areas and has remained morphologically stable in a location that has been consistent over the whole period of modern data collection. In view of these conclusions, it has been demonstrated beyond any reasonable

doubt that Helwick Bank, as a sand feature of the SAC, is subject to natural cyclical variation and that there is no evidence of its long-term morphological decline. Thus, it would be consistent with application of the precautionary principle to conclude that the proposals for further dredging would not adversely affect the integrity of the SAC feature.

Physical Impact on Coastal Features, including Beaches (Documents 13.1, 15.1 & 54)

56. There is a stark difference between the evidence put forward by many local objectors, based on local knowledge, experience and their own visual impressions that there has been a loss of sand from certain beaches over recent years, and that of LSDL (and to some extent the C&C of Swansea) based on objective evidence and surveys to the contrary. The only exception is Port-Eynon beach where it is common ground that the beach configuration and morphology have been very different over the past 2 decades from the period before that. There is an explanation for the changes at Port-Eynon, and it has nothing to do with dredging activities.

57. It is evident from old photographic records that Port-Eynon beach has been subject to considerable change over the past century and, although there have been times when there has been more sand on the beach, the sediment outcrops seen on the beach today are similar to ones seen on several old Ordnance Survey maps (see maps dated 1879, 1898 and 1915 at Drawings A1-A3 of Document 15.3), and an old photograph taken in 1937 shows an abundance of cobbles and pebbles. During the 2nd World War Port-Eynon beach was used as a major practice area for the 1944 D-Day landings and a wide breach was caused in the sand dunes (see Drawings A4-A6 in Document 15.3). It is evident from aerial photographs taken in 1961 and 1969 (see Drawings A8 & A9 in Document 15.3) that major general erosion of the sand dunes occurred over that period, and other records explain that this was a result of people pressure.

58. Restoration works started in 1977, and aerial photographs in 1978 and 1981 (see Drawings A10 & A11 in Document 15.3) show evidence of various phases of the sand dune restoration work. By 1991 that work was substantially completed, as illustrated on Drawing A12 in Document 15.3. That same aerial photograph shows clear evidence of the sediment outcrops that are such a feature of the beach today, and that was 18 months before LSDL began dredging in Area 373 Helwick Bank.

59. Photogrammetric measurements based on the 1969 and 1991 Ordnance Survey datasets and the 2005 LIDAR data show the sand dune system experienced a net gain of 43,000m^3 over the period 1969-1991 and 46,000m^3 over the period 1991-2005. Similar analysis for the upper foreshore area shows sand losses of over 36,000m^3 for the period 1969-1991 and almost 12,000m^3 between 1991 and 2005. These figures indicate more favourable circumstances of sediment balance during the period when dredging was taking place than during the earlier period, providing further substantiation that the dredging activities have had little effect on the beaches of South Gower. In fact, the dunes have been transformed into a state so stable that it has markedly improved their efficiency in trapping sand and making sand movement a one-way mechanism to the detriment of the beach area in front of the dunes. Modern good practice is to restore sand dunes to a semi-stable state to guard against such an adverse effect on the beach itself.

60. Since LSDL began dredging at Helwick Bank in 1993 it has been a condition of its dredging licences that regular beach profiling surveys be carried out. These have been undertaken twice per year for the whole period and have been supplemented since 1998 by measurement of 2 storm profiles per year and an annual airborne laser-scanner (LIDAR) survey of the West and South Gower coastlines. These are illustrated on Drawings A27-A32 in Document 15.3 and do not support the popular argument that Gower beaches are continuously losing sand.

61. On Rhossili beach all of the August 2005 profile remains above the February 1993 benchmark, and the basic pattern of foreshore change has been a process of littoral drift. Mewslade Bay has exhibited a scenario of winter loss and summer gain with progressive sand recovery tending to take place during the late summer months. The main morphological impact on Oxwich and Three Cliff beaches is freshwater run-off across the foreshore, which acts in addition to the coastal processes. Elevational changes on these beaches are influenced by rainfall events, and particular sand losses in 1999-2000 coincided with the year 2000 being the wettest in the UK since 1872. This substantial and sound evidence base of beach and coastal surveys is the result of careful work over many years and has not been undermined by any other evidence presented at the public inquiry.

62. The Coastal Impact Study (Document LSDL/B2) provides further substantial evidence of the lack of impact of dredging activities on the Gower coastline. It included detailed computer modelling of waves travelling over Area 373 on their way to the coastline, which showed there would be no significant effects on wave conditions even at locations some distance offshore. These conclusions were reached despite adopting substantial safety factors, extreme weather parameters and "worst case" scenario assumptions for the volume of dredged material removed, the speed of removal, wave conditions, tide levels and other hydraulic factors (e.g. 15 years volume of dredging removed instantaneously, and the most extreme storm waves).

63. The sand on the seabed of Area 373 Helwick Bank is regularly mobilised by tidal currents and, while the sediment transport process is complicated, the general trends are clear and were explained earlier. Sand dredged from Helwick Bank would be replaced by sand arriving from Swansea and Carmarthen Bays, and the effect of the proposed dredging on the natural sediment transport processes would be a corresponding reduction in the amount of sand leaving the Bank in a westerly direction. That reduction would not affect the beaches of South Wales but would simply decrease the rate at which sand leaves the Bristol Channel for the deeper waters of the Celtic Sea.

64. Whilst this generalisation is a reasonable representation of the overriding pattern of sediment transport, it should be remembered that sediment comprises a wide range of particle sizes, which are subject to a range of transportation mechanisms. Small particles are carried in suspension for much of the time, while the larger particles tend to move mainly along the seabed, and there is a full range of particle sizes and transport mechanisms in between. Further research has been carried out into this, particularly the Helwick Bank Links Project (Document LSDL/B12) reported in January 2005.

65. Almost 90% of the sand on Port-Eynon beach is fine sand (less than 250 micron size) compared with 20% on the Helwick Bank. Fine sediment in suspension tends to move backwards and forward on both the flood and ebb phases of the tide and between the Helwick Bank area and the beach areas in a similar way. However, larger sediment particles would only tend to become suspended during the peak velocities associated with medium and spring tides, and any migration patterns would be dominated by bedload transport. Consequently, any such material swept off the Bank to the east would tend to quickly return to it on the ebb tide. The South Gower coastal shelf is found to be remarkably devoid of seabed sand from a point south of the East Helwick shoal across the Port-Eynon Bay frontage to a point part-way across the Oxwich Bay frontage, which provides further confirmation that there is little by way of a link between the Bank and the South Gower beaches for sand particles of that size.

66. The proposed dredging would not affect tidal currents close to the coastline or cause any direct morphological changes to beaches, for example through the phenomenon of beach draw-down by which sand is carried offshore and trapped in the dredged depressions. The

possibility of dredging activities at Helwick Bank and Nobel Banks, further offshore, having a combined effect on wave, tidal or sediment transport patterns has been considered but such effects would be most unlikely. Consideration has also been given to the effects of global warming on waves and sea levels but these would not materially change the conclusions of the Coastal Impact Study.

67. The Statement of Common Ground with the C&C of Swansea (Document 8.1) demonstrates that there is little between LSDL and the C&C of Swansea on these matters. The Council accepts the approach taken to the modelling of waves and tides in the Coastal Impact Study and agrees that the analysis of the beach profile surveys has been correctly carried out and that there is no correlation between the beach profiles and fluctuations in the concurrent Bank volumes. On the subject of climate change both parties agree that a rise in sea level would probably result in a corresponding increase in the height of the Bank.

68. The remaining disagreements with the Council are in relation to the nature of studies that would be carried out during dredging operations and the period for which the licence should be awarded. These are matters for conditions and do not affect WAG's ability to give a favourable Government View.

69. Overall it is concluded that dredging of up to 300,000 tonnes per year over a 15 year period from Area 373 Helwick Bank would not affect any coastline, including that of the Gower peninsula.

Impact on Fisheries (Documents 17 & 54)

70. There has been no dispute about LSDL's findings in regard to fisheries or its conclusions that the proposed dredging would not have an adverse impact on fisheries or the benthic community of the Bank. It is a high energy environment with relatively low species diversity. Those species of high mobility would merely avoid the dredger equipment; those disturbed would quickly recover and move back to the limited area of seabed affected, which would itself be quickly refilled.

71. Bass is an important species for both anglers and commercial fishermen and is an active and adaptable predator that will move back into an area rapidly after disturbance. Large bass feed on other fish and particularly favour sand eel, which live in clean sand areas such as Helwick Bank. However, even if disturbed, the habitat for such prey fish would rapidly recover, and the sand wave features would continue to provide suitable habitat in which bass can hunt. The populations of other known commercial fish, such as sole, whiting and ray, would show no detectable impact because of the limited area affected and the likely rapid recovery from disturbance.

72. A beam trawl survey carried out in 2001 found 9 species of fish living on Helwick Bank. The catch was dominated by the lesser weever, spotted ray, grey gurnard and sand sole, with plaice and turbot in lesser numbers. So far as non-commercial fish are concerned, the sand bank community is dominated by bottom-living lesser weever and sand sole, which are abundant and adaptable species that will rapidly recolonise suitable habitat after the completion of dredging. Migratory fish, such as salmon, sea trout, sea lamprey, river lamprey and twaite shad, are known to spawn and spend their early life in the freshwater regions of local rivers. However, as none of these species has any reason to live and feed on Helwick Bank, dredging would have no effect on their populations.

73. Finally, particular consideration has been given to whelks. However, as dredging would target clean sand and whelks prefer, and are to be found in, deeper, more mixed substrates, there would no direct impact. Nor would there be any likelihood of indirect effects through

damage to the food chain or community structure as there would be clear separation of the activities, the area impacted would be restricted, and sand-living communities would quickly recover.

Appropriate Assessment of Impact on SAC and SPA Conservation Objectives
(Documents 9.1, 10.3 & 54)

74. The Helwick Bank lies within the Carmarthen Bay and Estuaries Special Area of Conservation (SAC) and close to the Carmarthen Bay Special Protection Area (SPA) and the Burry Port SPA and Ramsar site. These nature conservation designations are collectively known as a European marine site and are subject to particular protection under the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) (Document LSDL/D7). The aim of the Directive is to promote biodiversity, and this is to be achieved by member states maintaining or restoring natural habitats and species of wild flora and fauna of interest at "favourable conservation status". "Favourable conservation status" for a natural habitat is taken to mean that its range and cover is stable or expanding, the specific structure and functions needed for its long-term maintenance are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable. The latter is defined in terms of long-term population viability and maintenance of the natural range of species in a sufficiently large habitat.

75. Article 6(3) of the Directive specifies that any plan or project not directly connected with the conservation management of the site, but likely to have a significant effect on it, has to be subject to "appropriate assessment", and plans and projects may only be authorised if the competent authority has ascertained that the integrity of the site would not be adversely affected. In this case, CCW (as the "appropriate nature conservation body") has advised that there will be no impact on the Burry Port SPA and Ramsar site as the waders and wildfowl that are the features of the site would tend to be away from the navigation channel at the time in the tidal cycle when the dredger passes through the site. However, appropriate assessment is needed in respect of the Carmarthen Bay and Estuaries SAC and the Carmarthen Bay SPA. In the UK the Conservation (Natural Habitats, &c.) Regulations 1994 have been enacted to ensure that the requirements of the Directive are met, and Regulation 48 sets out the requirements for appropriate assessment. In this case, the Welsh Assembly Government is the competent authority and is required to make an appropriate assessment of the implications of the project for the relevant elements of the European marine site in view of their conservation objectives.

76. LSDL has carried out an Environmental Impact Assessment and Coastal Study, and the reports on these (Documents LSDL/B1 & B2), supplemented by the Supplementary Environmental Statement (Document LDSL/B3) and a range of other studies and monitoring reports, provide useful information towards that assessment. WAG's appropriate assessment in 2003 for the Helwick Bank two year licence extension (Appendix MI7 of Document 9.3) is also relevant, though CCW has more recently (June 2005) published its "Draft Interim Advice" under Regulation 33(2) of the 1994 Regulations (Appendix MI6 of Document 9.3). LSDL's original evidence for the public inquiry included a tabular summary of the potential impacts of the proposed dredging on the SAC and SPA (Appendix MI9 of Document 9.3). However, at the Inspector's request, a more comprehensive summary has been prepared and submitted as Document 10.3.

77. The "integrity of the site" is related to its conservation objectives, which is a statement of the measures needed to maintain or restore favourable conservation status for the specific features and environmental conditions of the designated site. Although there is some confusion over CCW's commitment to the Regulation 33 Advice published in June 2005, in

the most part it provides the basis for the appropriate assessment. CCW's letters to WAG dated 6 May 2005 and 9 August 2005 (Documents 27.5 & 27.6) provided formal advice on the need for appropriate assessment and identified 3 particular features as requiring attention: the large shallow inlets and bays communities and the sublittoral sandbanks of the SAC, and the common scoter for the SPA.

78. The objective for the latter is defined as maintaining the number of common scoter at or above the 1997/8 to 2001/2 peak, allowing them to inhabit and move between their feeding grounds and resting areas with minimum disturbance, and maintaining the extent and quality of their supporting habitats and prey species at or above 1999/2000 levels. Although the dredging site would be well away from the SPA, the proposed dredging operations have potential to disturb the birds at their feeding grounds due to the passage of the ship through the SPA as it moves in and out of its base at Burry Port. The cumulative effect of dredging at both Helwick Bank and Nobel Banks would be an increased number of trips each year. However, as this is dependant on tides, any such disturbance would still be limited to a maximum of 2 trips every 24 hours. Given this level of movements, impacts are not expected to be significant, and a condition could be included in the licence setting this as the maximum combined number for the 2 licences together. It is concluded that there would be no significant impacts on the scoter population of the SPA.

79. Turning to the SAC, the objectives for the large shallow inlets and bays are the maintenance of communities at or above 34,500 hectares, species varieties at or above 1999/2000 levels, and the presence of notable species throughout their range. In addition, populations of fish should be at or above baseline levels, passage of migratory fish (including shad) should be unhindered, and physical and chemical conditions and processes should be within limits to maintain biological conditions. The dredging operations have the potential to affect the physical features in the bay due to loss of sediment supply caused by changes to the stability of Helwick Bank itself, to affect the water quality due to disturbance of sediments, and for these factors to affect the biological communities.

80. As has been demonstrated above, changes to tidal currents and waves would be negligible, and there would be negligible effects on sediment supply or general sediment transport within Carmarthen Bay. Any screened coarse material discharged from the dredger itself would settle rapidly to the ocean floor close to where it had been extracted. The target sand is clean and unpolluted and, notwithstanding a short period of increased suspended solids, impacts on water quality would be limited in degree, extent and duration. With regard to the benthic community, the sediment material within Carmarthen Bay is already highly mobile, and short term changes in turbidity and material settlement would not alter the habitat sufficiently to change the existing biotopes. Overall, impacts on sediment composition, stability and volumes, and water quality in Carmarthen Bay would be minor and localised, and there would be no consequential impacts on the habitat and species interests of the SAC.

81. Turning finally to the "sandbanks slightly covered by sea water at all times" feature, which is Helwick Bank itself, the potential impacts are changes to the physical processes on the Bank causing changes to the extent, topography and sediment characteristics of the Bank, changes to the water quality from disturbance of the sediments, and consequential effects on the biological communities, including benthic species, sand eels and their eggs, and demersal fish including elasmobranches (i.e sharks, dog fishes, rays etc.).

82. Helwick Bank has been surveyed annually from 1993 to 2005, and these show that it exhibits some natural variation in volume over time linked primarily to the degree of storminess. Research has demonstrated that the Bank has remained in its present position and alignment for over 100 years, and it has been explained above how LSDL has reached the conclusion

that the proposed dredging would have only minor and localised impacts on the physical structure of the Bank. Furthermore, the short-term disturbance of clean sand would have little effect on water quality such as to affect the benthic communities.

83. A benthic survey was carried out for the EIA, and the benthic biotopes were reassessed in 2004 to a new classification system. Only 2 biotopes were identified, with the biotope generally above the -10 metre contour being an impoverished version of the deeper water biotope around the flanks and off the Bank. The more diverse biotope in deeper water reflects the more mixed sediments and greater sediment stability of these areas. Helwick Bank is highly exposed to natural wave and tidal action, and previous bathymetric surveys showed no evidence of a dredging footprint, demonstrating the rapid replacement of sand in the dredged trench. The biological communities found in and on the Bank reflect these conditions, are tolerant of high levels of disturbance and show high rates of recovery. Dredging on one small part of the Bank would not have a significant effect on benthic biotopes or benthic diversity.

84. A number of sand eel species live in the area and are an important food source for other species. Sand eel larvae do not occur in high densities on Helwick Bank suggesting that it is not an important spawning ground. As the area dredged each year would be small in comparison with the total sand eels habitat and clean sand would still be present after a dredging operation, re-colonisation would occur rapidly, and the impact of dredging would, at worst, be a medium-term localised one and would not have a significant effect on the sand eel population. Some demersal fish are likely to spawn in or close to the area. However, as the seabed is naturally one of high energy and disturbed sediments, any fish that uses this habitat would be accustomed to such a dynamic environment. Furthermore, the area dredged each year would be relatively small. In conclusion, impacts on fish communities associated with the SAC would be negligible.

85. Particular consideration is also given to the shad. The Allis Shad and Twaite Shad both feed on mysids, which are known to be present in the Helwick Bank area. Both species spawn in freshwater areas but disperse widely to feed and are adaptable in their feeding habits. However, given their wide geographical spread, known adult behaviour and the limited effects of the proposed dredging on water quality, no impacts on shad or their prey species would be predicted.

86. No noticeable in-combination effects, for example with dredging at Nobel Banks, would occur, and all direct, indirect, short and long-term impacts have been considered in relation to the specific habitat and species features of the European marine site. It is concluded that, subject to conditions, monitoring and thresholds, the proposed dredging would have no adverse effects on the conservation status of the qualifying features of the SAC or SPA.

87. Finally, LSDL's advice in relation to the appropriate assessment is based, so far as possible, on principles established by CCW. However, CCW's own position is unclear as to what advice it is now actually providing. WAG's appropriate assessment in 2003 for the Helwick Bank two years extension licence was carried out before the conservation objectives for the SAC had been fully categorised and was *"guided by the advice that the extent, structure, function and typical species of any feature must be maintained"* (see page 6 of the assessment in Appendix MI7 of Document 9.3).

88. CCW's "Draft Interim" Regulation 33 Advice, defining the conservation objectives for the European marine site, was published in June 2005, and CCW's letters to WAG dated 6 May 2005 and 9 August 2005 (Documents 27.5 & 27.6) in respect of appropriate assessment for the current proposal took this fully into account; indeed, an extract from the Regulation 33

Advice was attached to the second letter. That advice was produced after CCW had consulted its expert on sediment transfer and after he had presented his initial report advising CCW of a decline in the volume of Helwick Bank since 1993 (Item JP1 of Document Bundle 22.4). However, even taking that into account, CCW's Regulation 33 advice and its letters to WAG described the Helwick Bank feature as in favourable conservation status. Yet at this public inquiry CCW now argues that the bank is no longer in favourable conservation status. However, the only additional evidence collected since the time of the Regulation 33 advice has been the results of the 2004/05 bathymetric monitoring, which showed an increase in the volume of the Bank since the previous year. CCW accepts that the Bank is subject to long-term natural variations in volume, yet it takes this change in stance for no apparent reason.

89. CCW's Regulation 33 advice is described a "Draft Interim Advice", and it was not clear at the public inquiry whether it is described in that way because it is, by its very nature, under constant review or because it is purely a draft, which has no formal status under the Regulations. If it is the latter, then there are no defined conservation objectives against which an appropriate assessment can be made, and it would be necessary to fall back on the aims of the Habitats Directive itself and have recourse to the more generally defined objectives used in the 2003 appropriate assessment. If it is the former, then the Advice has a formal status and it is against its defined conservation objectives that the appropriate assessment should be carried out, and little credence should be given to CCW's latest claim that the Bank is not in favourable status.

90. There are also implications for the performance indicators for the sandbank and for how CCW can fulfil its own responsibilities without dredging taking place. The Regulation 33 Advice establishes performance indicators for the Bank based on the mean volumes at the various levels (relative to chart datum, CD) during the period 2001-2005 (see page 68 of that Advice at Appendix MI6 of Document 9.3). CCW is now proposing the target be based on the survey data for the period 1993-2005, which would not be in accord with the conservation objectives. Furthermore, the monitoring technique prescribed (in the Advice) for the conservation objectives is "Data from annual bathymetric surveys (LSD Ltd data)", clearly with the expectation that further dredging would take place. Those surveys would not be carried out if no further dredging were permitted.

91. With regard to conservation status, if CCW were to change this to "unfavourable", then Article 6(1) of the Habitats Directive would require CCW to put effective remedial action in place, and it is clear that CCW has given no consideration to that. In conclusion, CCW's latest stance is ill-considered and unjustified. Whilst Regulation 48 requires WAG to *"consult the appropriate nature conservation body and have regard to any representations made by that body"*, it is not bound by that advice.

92. It is accepted that the test to be applied for the appropriate assessment is that there should be no reasonable scientific doubt remaining as to the absence of significant effects. The conditions and monitoring regime are to be taken into account in making that assessment and, in this instance, those conditions could be set such that the assessment of "no effect" can be confidently given.

Monitoring Strategy and Licence Conditions (Documents 9.1, 20.1 & 54)

93. In the light of the approach taken in IMADP, the inclusion of an effective monitoring strategy in the license conditions is an important consideration. These have been the subject of consideration not only at the conclusion of evidence at the public inquiry but also during the course of it and in meetings between the various parties outside the inquiry itself. All parties

have been able to participate fully and effectively. The original draft conditions put forward in Appendix IMG11 of Document 20.3 have been amended and updated, particularly to address concerns with regard to monitoring of the Bank volume and identifying whether it is in decline to such an extent that dredging should be limited or suspended.

94. The approach to monitoring the Bank volume now proposed (latest draft conditions are in Document 45.6) would make use of survey data from 1993 to 2005 to set the threshold volumes for the critical higher area of the bank, as requested by CCW, though calculations show there is little difference between this dataset and that covering the whole period from 1988 to 2005 preferred by LSDL (see Table 2 of Document 45.3 for the comparison). The use of threshold volumes for the higher part of the Bank in this way, based on confidence limits, would be effective in identifying possible effects before damage occurred and would be consistent with CCW's earlier advice to WAG. The condition would allow dredging to be stopped if the lower threshold circumstances were to arise.

95. Explanation of some of the suggested conditions might be helpful. Firstly, a condition is proposed to allow the maximum annual rate of dredging to be gradually increased by annual increments of 25,000 tonnes per year from 150,000 tonnes in the first year to 300,000 tonnes in the seventh year and successive years. This is a slower rate of increase than put forward in the original application and is intended to address objectors' concerns about the effects of an increased rate of dredging by allowing a longer period of monitoring during the period of the increase (Document 45.2).

96. In respect of the principle of the licence, the C&C of Swansea has advocated it should be for only a 2 year period to allow further research to be carried out into the circumstances of the local environment. This would be quite unjustified, particularly when the application process itself has taken at least 5 years and is acknowledged in the IMADP as having a long lead-time. The proposed licence conditions would include adequate provisions for review of the licence should unexpected circumstances arise.

97. Bathymetric and beach surveys would be proposed on an annual cycle, while benthic surveys are proposed as an initial baseline, after 2 years and then every 3 years in order to inform proposed licence reviews at 3 yearly intervals. Whilst general monitoring and reporting would take place each year, and WAG could review the licence on these occasions if it wished, a full formal review would be proposed at 3 yearly intervals. A five yearly cycle was originally proposed but this has been reconsidered in the light of third party concerns about environmental impacts. The proposed benthic surveys would be more comprehensive and regular than in the past and have been recommended by DEFRA, though in view of the impoverished nature of the benthic environment, LSDL doubts they would be strictly necessary. The DTLR/CEFAS Guidelines for the Conduct of Benthic Surveys at Aggregate Dredging Sites, May 1992 (Document LSDL/D3), advises that (amongst other things) frequency should depend on the sensitivity of the environment and the amount of material removed. With this in mind, there is no justification for more frequent benthic surveys.

98. Disagreement remains over the timing of benthic surveys during the calendar year. However, it is considered that the suggested scientific advantages of carrying out this work earlier during the calendar year are far outweighed by the benefits of future surveys being comparable with those previously carried out. The surveys for both the Helwick Bank and the Nobel Banks EIAs were carried out in June 2001, CCW's Welsh Sandbanks Survey (Appendix KR1 in Document Bundle 24.2) was done in July/August 2001, and the Eastern English Channel baseline surveys for a major proposal were undertaken in July/August 2005. Weather conditions are also more conducive for such surveys during the summer months.

99. One final point needs to be mentioned. It has been suggested that several localised surveys should be carried out immediately after a dredging run in order to measure the rate at which the dredged trench refills. Whilst this might be an interesting research project, it would have little relevance to the requirement to monitor the effects of the dredging or its impact on the conservation objectives of the European marine site, and it would not be appropriate to require such work to be undertaken as a condition of a dredging licence. It was suggested by the C&C of Swansea, and the CEFAS representative gave it support at the public inquiry. LSDL is concerned that throughout previous consultations DEFRA (supported by CEFAS) has never suggested any form of monitoring beyond that proposed by LSDL, and the support offered by CEFAS for a different form of monitoring is not consistent with that previous advice.

100. The draft monitoring strategy and licence conditions now put forward by LSDL are commended to WAG. They would provide a comprehensive monitoring and control mechanism for the dredging operations, a regime that ensured risks of harm to the natural environment and the Gower coastal features were minimised but also identified sufficiently early to allow corrective action to be taken before harm occurred, and provisions for regular review of the licence and its terms and conditions. The conditions would provide confidence in the conclusion that the proposed dredging operations would have a negligible effect on the surrounding environment.

Economic Risks, including Tourism (Documents 20.1 & 54)

101. Some of the objectors have expressed particular concern about possible harmful effects on tourism, particularly if dredging activities were to lead to loss of sand from the South Gower beaches. Some of the evidence put forward is exaggerated and alarmist and is strongly disputed by LSDL. However, there is no argument at all about the importance of tourism to the local economy or about the need to ensure the proposed scheme would not have a harmful effect on this sector.

102. Several parties have drawn attention to the results of surveys that show how important the quality of the beaches is to tourists. The C&C of Swansea's tourism expert has also presented evidence of steady growth in tourism expenditure in the area over the past 5 years (page 5 of Document 32), and it is clear that, notwithstanding assertions of loss of sand from certain beaches in recent years, the tourism economy has continued to grow. It is also noticeable, and was not disputed at the public inquiry, that none of the various reports and publications that address the tourism economy have identified dredging as a potential threat, e.g. the Strategic Tourism Growth Area Strategy for Swansea (Document 21.4) and especially paragraph 3.4.4 of the Council's Tourism Strategy 2000-2005 (Document 21.3).

103. The objectors' concerns relate to perceived risks of harm to the coastal environment as a result of dredging activities, and LSDL's evidence has shown that this would be most unlikely. However, the monitoring and review provisions that would be contained in the conditions attached to a dredging licence would identify any such risks early enough to prevent harm being caused even if that risk assessment should prove to be optimistic. There has been a well publicised campaign to protect the coastal environment of the Bristol Channel, and that has resulted in increased public awareness of this issue. However, there is a danger that this negative publicity, founded predominantly on anecdotal information, may itself be responsible for visitors gaining a negative perception of Gower.

104. In considering this matter, it is also important to remember that the economy of this area is not solely dependent on tourism. The economy is driven by the need for regeneration of parts of Swansea (see draft Unitary Development Plan map of regeneration schemes at Appendix IMG9 of Document 20.3), with that regeneration itself making a contribution to the economic

prosperity of this part of Wales. Therefore, taking a wider view of sustainable development, it is vital there should be suitable and adequate supplies of aggregates to allow that development to proceed unhampered by a potential shortage. The IMADP acknowledges the risk of adverse economic consequences for the region if there were a shortage of marine dredged sand resulting in increased costs and reduced quality of replacement materials from elsewhere. The Frank Knight South Wales Market Activity Report, April 2006 (Appendix IMG8 of Document 20.3), reported positive prospects for growth in South Wales and a revival of the construction market in 2007. Whilst tourism is an important part of the local economy, the benefits of the proposed scheme to the wider economy are also important factors.

105. Finally, it is worth mentioning the Company's own particular circumstances. Although it has recently been successful in gaining a positive Government View for a new dredging licence for the Nobel Banks area, that operation is, as yet, untested. Furthermore, reliance on a single dredging operation would leave LSDL in a precarious position as the licence could be withdrawn at short notice if adverse impacts were identified. The award of a licence for Helwick Bank would enable the Company to be more confident in the long-term viability of the business, to plan and invest beyond the short-term, and to expand its business to meet known additional opportunities. These business opportunities vary, and licence capacity is needed to meet supply peaks and troughs. These matters also contribute towards WAG's sustainability policy objectives. (Document 11.1)

Company's Overall Conclusions (Document 54)

106. Marine dredged aggregates are an essential and sustainable part of the aggregate supply for South Wales. The evidence presented in support of this proposal demonstrates that the exploitation would be entirely consistent with the application of sound sustainability principles. Without adequate and reliable supplies of aggregates, the economic prosperity of the region as a whole would be put at risk, a risk that should not be taken if importance is placed on the objectives for economic growth in the wider public interest.

107. IMADP provides an evidence-based sustainable set of policies and control requirements which provide a rational, coherent and transparent basis for the achievement of sustainable outcomes from proposals for marine aggregates dredging. This proposal is consistent with each of the requirements, particularly with the overarching principle of sustainable development contained in Policy SP1. Arguments that the proposal is unacceptable because it is in a Category 2 sediment environment or because it is not further offshore are not sustainable in the face of the evidence and the principle of each proposal being subject to site specific consideration, for which this proposal meets all of the tests.

108. There has been some disagreement over the level of test required for an appropriate assessment under the Habitat Regulations. Short of absolute certainty, which is neither an appropriate requirement nor ever practically achievable, the evidence in this case takes the proposal clearly over any reasonably appropriately set hurdle. The proposal is not for dredging in a new area but for one where there is a substantial background of monitoring and data gathering. It is difficult to imagine any proposal elsewhere with a more rigorously assessed background and testing.

109. LSDL is aware that Area 373 lies within a European marine site and that that carries with it particular obligations. However, in reality, those obligations do no more than legally encapsulate what is required for every application for a dredging licence, i.e. the adoption of the precautionary approach and the maintenance of high standards to avoid any materially

harmful effects. The current proposal would meet that aim and, subject to an appropriate regime of conditions and monitoring, a positive Government View is invited.

Objectors

110. The main objectors, professionally represented at the public inquiry, were the Countryside Council for Wales, the City and County of Swansea and the Gower Coalition. CCW's main concern is the effects on the European marine site. The Gower Coalition is particularly concerned about possible effects on coastal features, particularly the South Gower beaches. The C&C of Swansea has considerable common ground with the applicant company but advocates more research and a more cautious approach because of the importance of tourism in Gower.

111. Four individuals spoke at the public inquiry: Mrs Edwina Hart AM, the representative for Gower; Mr Allan Cairns AM, the representative for the South Wales West Region; Mr Martin Caton MP, the member for Gower; and Mr John Harding, a retired solicitor and resident of Gower. A large number of written representations were also received. The main concern of all of these local residents and their representatives was the possible effects on the coastal features and South Gower beaches.

Case for the Countryside Council for Wales

The material points are:

Classification and Significance of Helwick Bank and Other Designated Sites
(Documents 26.1 & 53)

112. The application site lies wholly within the Carmarthen Bay and Estuaries SAC, with the Helwick Bank qualifying as a *"Sandbanks which are slightly covered by sea water all the time"* feature. The SAC is in turn a component of the Carmarthen Bay and Estuaries European Marine Site, which also includes the Burry Inlet SPA and Ramsar site and the Carmarthen Bay SPA. These sites are subject to the Conservation (Natural Habitats, &c.) Regulations 1994, which give effect to the 1992 Habitats and Species Directive. The aim of the Directive is to help conserve the diversity of habitats and species across the European Community. Each SAC is designated for particular habitats and species, and the Directive requires them to be managed in ways that help to conserve those habitats and species.

113. The Carmarthen Bay and Estuaries SAC is one of the best areas in the UK for the following Annex I habitats and Annex II species: Atlantic salt meadows; Estuaries; Large shallow inlets and bays; Mudflats and sandflats not covered by water at low tide; *Salicornia* and other annuals colonising mud and sand; Sandbanks which are slightly covered by seawater all the time; and Twaite Shad. It also supports a significant presence of: Allis Shad; River Lamprey; Otter; and Sea Lamprey.

114. The Helwick Bank feature, *"Sandbanks which are slightly covered by seawater all the time"*, is defined as "Sublittoral sandbanks, permanently submerged, with water depth seldom more than 20 m below Chart Datum (Appendix ZO4 of Document Bundle 26.4). Sites have been selected to represent the main geographical and ecological range of variation of the habitat type, and the diversity and community associated with this habitat type are determined by sediment type and a variety of other physical factors, such as degree of exposure, depth, turbidity and water salinity. Helwick Bank conforms well to the general definition for this type of feature and is a linear, shallow subtidal sandbank that is unusual in being highly exposed to wave and tidal action.

115. The selection of UK sites has taken into account the differing character of this habitat around the UK coast. There are 35 such designated sites in the UK of which only 9 are of Grade A/B, i.e. outstanding examples of the feature (see Joint Nature Conservation Committee report extract at Document 27.1). Of these, Helwick Bank is one of only 3 in Wales and the only one in South Wales. Therefore, in Welsh terms it is almost unique.

116. Oxwich Bay, to the east of Helwick Bank, is a designated National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI) and Geological Conservation Review (GCR) site. The Oxwich NNR and SSSI encompass the sand dunes, freshwater marsh, saltmarsh and intertidal area, and the dune system is a designated GCR site. Any activity that altered or impeded sand supply to the dune system would ultimately result in damage to the sand dune feature of the 3 designations.

117. The Carmarthen Bay SSSI and GCR sites lie further to the west and would be damaged if any activity altered or impeded sand supply to the coastal features of that area. However, the risk to these areas is considerably less than to the areas to the east.

Conservation Objectives and Status (Documents 26.1 & 53)

118. Regulation 33 of the Habitats Regulations requires CCW to advise the relevant authorities for each European marine site in, or partly in, Wales as to the conservation objectives for the site and any operations which may cause deterioration of natural habitats or the habitats of species, or the disturbance of species, for which the site has been designated. CCW issued its Draft Interim Regulation 33 Advice in respect of the Carmarthen Bay and Estuaries European Marine Site in June 2005 (Appendix ZO1 of Document Bundle 26.4; also found at Appendix MI6 of Document 9.3).

119. LSDL has questioned the status of that Advice, particularly as it is termed "Draft Interim Advice". However, CCW, WAG and all other relevant authorities have treated the objectives set out in that Advice as the properly defined conservation objectives for the site, and they are considered to be the only conservation objectives so defined. Prior to the public inquiry it has not been suggested by any body or person that there are no conservation objectives for this site. In the appropriate assessment carried out by WAG in 2003 for the previous 2 year licence extension at Helwick Bank (Appendix ZO10 of Document Bundle 26.4; also found at Appendix MI7 of Document 9.3) the matters to be considered were advised by CCW, and in WAG's decision letter of March 2006 in respect of the Government View for a dredging licence at Nobel Banks specific mention was made of the conservation objectives of the Carmarthen Bay and Estuaries SAC and the Carmarthen Bay SPA.

120. Prior to the public inquiry CCW provided consultation advice to WAG on the requirements for appropriate assessment in letters dated 30 March 2004, 10 May 2004, 6 May 2005 and 9 August 2005 (Documents 27.3-27.6). The Regulation 33 Advice accompanied the fourth letter, and CCW's views at that time were summarised in the ministerial brief of October 2005 (revealed under the Freedom of Information Act).

121. The conservation objectives for a European marine site are intended to represent the aims of the Habitats and Birds Directives in relation to that site, and the Habitats Directive requires that measures taken under it, including the designation and management of SACs, be designed to maintain or restore habitats and species of European Community importance at "favourable conservation status", as defined in Article 1 of the Directive. The conservation objectives for the Helwick Bank feature are defined on pages 66-69 of CCW's Regulation 33 Advice (Appendix ZO1 of Document Bundle 26.4), and the Advice says that if each of the specified conditions is met the feature will be considered to be in favourable conservation status.

122. The first 3 conditions relate to the volume and topography of the Bank and say that *"(i) the extent and volume of Helwick Bank, as expressed by rolling 5-year means, are at or above the 2001-2005 means"*, *"the macro-topography of Helwick Bank* (as defined by respective volumes above the -5, -10 and -15m planes relative to CD)*, as expressed by the rolling 5-year means, is at or above the 2001-2005 mean"* and "*the total extent of mobile bedforms (sand dunes) on Helwick Bank, as expressed by rolling 5-year means, is at or above the 2001-2005 mean"*. All of these performance indicators are defined in terms of limits and measured by means of the annual LSDL bathymetric surveys.

123. In the light of events, CCW now considers that these elements of the conservation objectives need to be reviewed to refer to the longer dataset from 1993 onwards, as this will give more certainty in establishing past and present change.

124. Article 1 of the Habitats Directive defines the conservation status of a natural habitat as being favourable when:

- *its natural range and the areas it covers within that range are stable or increasing; and*
- *the specific structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future; and*
- *conservation status of typical species is favourable as defined in [Article] 1(i).*

125. Although it is acknowledged that as recently as August 2005 (see letter to WAG of 9 August 2005 at Document 27.6) CCW took the view that the Helwick Bank feature was in favourable conservation status, it now considers that is no longer the case. CCW is currently preparing a comprehensive report on all SACs in Wales for submission to WAG later this year (for European Community reporting purposes) and intends to report Helwick Bank as now in unfavourable conservation status.

Proper Approach to Appropriate Assessment (Document 53)

126. In regard to European sites, Article 6(3) of the Habitats Directive specifies that *"any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site's conservation objectives"* and that *"the competent national authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned"*. Regulation 48 of the Habitat Regulations expresses the requirement in similar terms and, although the Waddenzee judgement [ECJ, 2004 Case C-127/02, Waddenzee] (see Tab 2 of Document 52) was made in regard to the Directive, it is equally applicable to the same terms in the Regulations.

127. In that judgement the European Court of Justice established the level of test required for appropriate assessment under Article 6(3). It ruled that a plan or project may be authorised only if the competent authority has made *"certain"* that it will not adversely affect the integrity of the site and that *"that is the case where no reasonable scientific doubt remains as to the absence of such effects"*. Competent authorities must be *"convinced"* there will be no adverse effect and where doubts remain as to the absence of adverse effects, the plan or project must not be authorised. The only exception to this is where Regulation 49 is applicable, i.e. where there are no alternative solutions and the plan or project must be carried

out for imperative reasons of overriding public interest. That argument is not being made in this case.

128. The effect of the Directive and the Regulations, when read in the light of the Wadenzee judgement, is to place on the applicants the heavy burden of convincing WAG that no reasonable scientific doubt remains as to the adverse effects of the proposed operations. WAG's Consultation Draft Revised Technical Advice Note (TAN) 5, Nature Conservation and Planning, issued in January 2006, provides useful guidance on the requirements of the Habitats Regulations in Annex 3 and draws extensively on the Waddenzee judgement. Paragraph 14 states as follows: *"In the light of the conclusions of the assessment of the project's effects on the site's conservation objectives, the decision-taker must determine whether it can ascertain that the proposal will not adversely affect the integrity of the site(s). This test incorporates the precautionary principle. It is not for the decision-taker to show that the proposal would harm the site, in order to refuse the application or appeal. It is for the decision-taker to consider the likely and reasonably foreseeable effects and to ascertain that the proposal will not have an adverse effect on the integrity of the site before it may grant permission. If the proposal would adversely affect integrity, or the effects on integrity are uncertain but could be significant, the decision-taker should not grant permission, subject to the provisions of Regulations 49 and 53 as described below"*.

129. Paragraph 16 of the draft TAN5 provides further advice as follows: *"The integrity of a site is the coherence of its ecological structure and function"*; and *"Whilst it is the duty of the decision-taker to carry out the appropriate assessment and make a judgement as to the effect on site integrity, it would normally be expected to adopt the advice of CCW on the integrity test. If it does not, the decision-taker should have convincing and exceptional reasons for not adopting the advice, which it should be prepared to explain and which are clearly supported by sound scientific evidence."* That analysis and interpretation of the Directive, Regulations and court judgement is commended as the proper approach to adopt.

130. It is noted that the TAN5 draft also advises in paragraph 14 of Annex 3: *"This test incorporates the precautionary principle"*, implying that there is no separate test. Both LSDL and the C&C of Swansea seem to be misinterpreting the use of the precautionary principle in this case. Annex 1.1 of IMADP provides useful general advice about applying the precautionary principle and gives a reasonable risk-based interpretation of it, with reference to European Commission advice in 2000 (Document LSDL/D1). However, that is not the kind of precautionary approach that should be adopted in appropriate assessment cases, the correct approach for which was established by the Waddenzee judgement and is explained in the draft TAN5.

131. The C&C of Swansea interprets the precautionary approach to argue that limited dredging should be allowed to go ahead to enable further studies to be carried out to ascertain what its effects might be (Document 31.1). That approach would not be consistent with the Directive and the Waddenzee judgement, and it would be an error of law to apply it. That suggested approach is even more surprising when it is realised that it is quite the opposite of what the Council said its case was going to be at the time of its Statement of Case. That document stated: *"Concerns, previously expressed, remain that the precautionary approach adopted in the IMADP allows dredging to continue until clear evidence emerges that it is having a detrimental impact upon marine coastal environments. However, by such time irreversible damage may have occurred to the coastal environment and the dependant tourist and leisure interest of the Gower Peninsula and surrounding area."* These views capture the logic and rationale of the correct approach.

132. LSDL misinterprets the precautionary approach by invoking definitions and interpretations provided by other documents remote from the current circumstances and so argues that it has

been properly addressed. It also seeks to argue (Document 20.1) that the specific reference in IMADP to use of a precautionary approach for proposals in Category 2 sediment environments is less applicable to areas where dredging has been previously carried out than to new areas. Its argument that the only reasonable action in such cases is to allow dredging to continue subject to conditions aimed at preventing or mitigating environmental harm is clearly not correct. It remains open for the precautionary approach to reach the conclusion that dredging will not be allowed at all. The key to this decision is the appropriate assessment and the level of test required for that.

Physical Decline of Helwick Bank (Documents 22.1 & 53)

133. This is the central factual issue on which CCW and LSDL disagree, and it is pertinent to consider the degree of consistency and/or inconsistency in the views of the various expert witnesses on this matter. The evidence presented by CCW's expert witness is entirely consistent with 2 earlier reports he prepared for CCW in November 2004 and March 2005 (see Appendix JP1 in Document Bundle 22.4), which were not prepared for the purpose of justifying a case at the public inquiry but rather to enable CCW to fulfil its statutory responsibilities. In such a context, objectivity and independence can be assured. Furthermore, that consistency distinguishes CCW's expert witness from those of LSDL whose views on the stability of Helwick Bank and the methods applicable for its assessment have not been consistent.

134. There is general agreement that the Bristol Channel is slowly losing sand towards the west via a tidally driven current predominantly along the central axis of the Bristol Channel, that the Nobel Banks act as a temporary sink for this sand, and that this dominant westerly movement is opposed by a much weaker movement of sand in the shallow waters along the South Wales coast, which is driven by episodic storm waves. In work carried out on the sediment dynamics of the coast of south east Wales in 2002 (summarised in Appendix 5 of the Symonds Report, Document LSDL/C3) CCW's expert reached the conclusion that Helwick Bank was well buffered against sand loss, whether by natural or artificial means. However, that conclusion was based on data analysis carried out by HR Wallingford in 1997 that the Bank was stable and was neither gaining nor losing any significant quantities of sediment. Analysis of the most recent data indicates that not to be the case; the volume of sand on Helwick Bank is in decline.

135. As the trend continues for sediment in the Bristol Channel to move westwards, the original sediment stores become lost to the Celtic Sea, and the overall sediment system of the Bristol Channel is in decline. Thus the sediment supply to the coast of South Wales and to Helwick Bank is declining, and Helwick Bank is not capable of buffering the combination of natural and artificial impacts on it in order to maintain its morphology. This is borne out by the detailed bathymetric surveys carried out by LSDL.

136. It is generally agreed that Helwick Bank is subject to a clockwise gyre with the strong westerly flow along its southern side and the weaker easterly flow along the northern side. At times storm waves from the west or south-west may move sand over the crest to augment the easterly flow of sediment, and it is at these times that sand may move along the Helwick Channel and enter the nearshore zone of south Gower. It is loss of sand from the upper levels of the Bank that is the critical aspect of any assessment of the impact of aggregate extraction. If sand removed by dredging is re-supplied by natural processes so that no long-term loss is experienced, then the integrity of the sandbank will not be compromised. However, if it is not, then a gradual loss of crest elevation will be experienced with associated changes in its inherent geomorphological processes and its interactions with adjacent areas, including the South Gower beaches.

137. These beaches lie in deep bays separated from each other by rock headlands in a pattern often described as "fish-hook". It is difficult for sediment to move between adjacent beaches and any movement that does occur is only intermittent, small in scale and in an easterly direction. Hence, their only source of replenishment is from the west (i.e. from the direction of Helwick Bank) and it predominantly occurs during extreme storm events. If the crest level of the Bank were reduced, less sediment would be moved by the storm waves, and the sand supply to the Gower beaches would be reduced. Moreover, a lower crest level would provide reduced protection for the coast against the larger storm waves, which would further accelerate the removal of sand for the beaches. Hence, it can be seen that retention of the crest of the Bank is critical.

138. Turning now to the assessment of the decline of the Bank, data supplied by LSDL from its annual bathymetric surveys over the period 1993 to 2005 has been used to determine the trend in Bank volume above certain levels: -5 metres CD; -10 metres CD and -15 metres CD. These are summarised in Table 1 of Document 22.1 and plotted in graph form as Figures 1-3. Statistical linear regression techniques have then been applied to the data to enable the "best fit" regression line and 95% confidence limits to be determined and plotted on the graphs. These show a clear decline in the volume of the Bank above the 3 different levels, averaging: 7800 m^3 per annum above the -5 metres CD contour, 198,000 m^3 per annum above the -10 metres CD contour and 292,000 m^3 per annum above the -15 metres CD contour. These are equivalent to about 6%, 1.3% and 0.5% of the 2005 sandbank volumes above those heights. By way of illustration, 6% loss per year is equivalent to complete loss of sand above the -5 metres CD level in 17 years.

139. Further analysis of statistical probabilities indicates that the likelihood of the regression analysis misrepresenting the trend of the data is remote. Statistical significance is calculated at about 1:100 for the volume above -5 metres CD and less than 1:1000 for other 2 sets of data. These results show that, despite survey errors, natural cyclical changes and other perturbations, there is a clear indication of a highly significant decrease in the volume of the Bank above -15 metres CD over the past 10 years.

140. The average annual amount dredged over that period was 56.000m^3 and most of the sediment removed was at or just below the -10 metres CD level. Thus, it is clear that most of the volume reduction is attributable to natural variations. Nevertheless, dredging operations have contributed towards the loss and should not be continued.

141. LSDL has criticised several aspects of CCW's analysis. Firstly, it maintains that regression analysis is not appropriate for this data because of its wavy and cyclical nature. However, regression analysis is specifically intended for such use, and indeed one of LSDL's own expert witnesses has used the technique in a similar way in the past. LSDL has also criticised the omission of earlier survey data from CCW's analysis and argues that the 1988 survey data should have also been included. CCW's analysis was done in this way because the surveys carried out from 1993 to 2005 provide a continuous set of data at consistent time intervals, as is required for linear regression analysis. The earlier surveys, carried out in 1886, 1939 and 1988, would be inconsistent with the recent data and would lie well outside the main time period. However, if these were to be included, it would be appropriate to use all 3 and not just select the 1988 data. Some analysis has been carried out with these 3 surveys also included, and the conclusion reached is little different; the volume of Helwick Bank has decreased significantly above each of the same 3 levels since 1886.

142. LDSL's argument that Helwick Bank is not in decline relies on the views of only one of the Company's expert witnesses, and as recently as 2003 he expressed doubts about it (see July 2004 report, "Helwick Bank: An evaluation of error margins in historical bathymetric

surveys"). He has explained that the data used at that time has since been found to be unreliable. However, there is still no clear justification for his present view that Helwick Bank shows long-term stability.

143. In summary, the outcome of CCW's evidence on the decline of Helwick Bank is that:

- CCW's expert witness has analysed LSDL's bathymetric surveys for the period 1993-2005 and concluded, with a high degree of statistical confidence, that Helwick Bank is losing more sand than it receives and has declined in volume over that period;
- LSDL has failed to show that CCW's analysis is inappropriate or to provide convincing analysis of its own;
- the conclusion that Helwick Bank is in long-term decline is supported by the acknowledged fact that there is a gradual reduction in the volumes of sediment circulating within the Bristol Channel as a whole;
- although natural processes are the principal reason for the decline of the bank, it has been exacerbated by the aggregates dredging and would be accelerated if dredging were allowed at the increased rates sought in this application;
- the impact of the decline in volume of the Bank is focused on its higher levels, which are critical for the geomorphological integrity of the Bank and its interaction with adjoining areas, including the South Gower beaches; and
- continuation of any form of dredging would lead to an adverse impact on the sandbank feature and adjacent coastal areas.

Effect on Biology (Documents 24.1 & 53)

144. CCW agrees with LSDL that the fauna on the shallower part of the Bank, where dredging would take place, have relatively fewer species and relatively fewer numbers of each of these species than the deeper areas. However, even this relatively species-poor area has a conservation value, as one of the aims of the Habitats Directive is to protect a representative series of different habitats. As such, sandbank sites have been chosen in the UK to represent a range of different types, and Helwick Bank represents a more tide-swept and wave-exposed site, where the biological communities reflect the high level of dynamism (even though it may be low in species diversity).

145. The impacts of aggregates extraction may be direct or indirect. Direct effects would be short-term, as the dynamic nature of the environment would ensure rapid recovery of disturbed benthic communities (within months), suspended sediment levels would quickly fall to normal, and many species would be able to avoid the dredge completely. Such short-term, direct effects are not an issue in this case. CCW has previously advised (Document 23.2) that it takes no issue with regard to shad (a SAC feature) and common scoter (SPA feature).

146. CCW's concern is for long-term, indirect effects resulting from the decline in the height of the Bank. The biology of Helwick Bank is directly linked to its physical characteristics, and a change in its topography would lead to changes in the biology of the Bank. At present the sediments on the higher parts of the Bank are mobile and the biological communities are strongly influenced by this tidal and wave movement. That influence would be reduced if the top of the Bank were deeper. It is impossible to say what degree of change in topography would be required to cause significant change in the biological communities; rather it would be a matter of gradual change over a period of time.

147. LSDL's case is that the topography of Helwick Bank is relatively stable. However, the Company does not dispute that, if it were not, the changes to biological communities described above would occur.

Appropriate Assessment (Documents 26.1 & 53)

148. The classification and significance of Helwick Bank and other environmental features and designated areas were described earlier, as were the conservation objectives for the Helwick Bank and other SAC and SPA features, and the approach that should be taken to carrying out appropriate assessment of the implications of the proposed dredging project. It is established in law that the competent authority making the decision must be convinced there will be no adverse effect on the integrity of the SAC, and no reasonable scientific doubt must remain as to the absence of such effects, before it can grant permission for the project to proceed.

149. WAG carried out an appropriate assessment in October 2003 for the 2-year extension licence for dredging at Helwick Bank, and the following statement made in the decision is particularly relevant to the current application: *"The precautionary approach taken is to adopt measures proportionate to the possible level of risk and to the desired level of protection, pending the availability of more reliable data. In this case, the measures are the relatively low level of extraction, the two-year period and the Condition that 'if monitoring shows the likelihood of actual or potential damage to the marine environment and/or coastline, then dredging will cease'."* The more recent 2004 and 2005 survey data, which will be taken into account in the current appropriate assessment, provides a high degree of confidence that the sandbank is in morphological decline.

150. With this in mind, CCW's experts advise that:

- further aggregate extraction from Helwick Bank would have an adverse effect on the geomorphological integrity of the feature; and
- as the biology of Helwick Bank is directly linked to the physical characteristics of the sandbank, a change in the topography, sedimentology and/or extent of the sandbank will lead to changes in the biology.

151. If it is accepted that these conclusions are correct, or even if only the first is correct, or alternatively, if LSDL's evidence on these matters is not accepted as correct, or is found to be unlikely to be correct, then a favourable Government View should not be given. So far as CCW's case is concerned, the key question is whether or not the evidence put forward by LSDL (and by the C&C of Swansea on this matter) enables the conclusion to be reached that CCW's expert's advice on the decline of the Bank is not correct or is likely not to be correct.

152. Applying the principles established by the Wadenzee judgement to the current case, CCW invites the following conclusions to be reached in relation to the evidence:

(1) CCW's evidence to the effect that the Bank is in long-term decline is persuasive; if it stands without contradiction, it would be determinant on the question of whether, consistently with Wadenzee, there could be a favourable Government View.

(2) Of itself, the evidence relied upon by LSDL is not persuasive on the issue of whether the Bank is in long-term decline or not, and so is not persuasive on the issue of whether or not the project would adversely affect the integrity of the SAC.

(3) Alternatively to (2) above, if it were concluded that the balance of evidence provided by all parties leaves "reasonable scientific doubt" as to the absence of such effects (i.e. it is doubtful it would not have such an adverse effect on the integrity of the bank).

Whichever of the conclusions in (2) and (3) were arrived at, the effect would be the same, namely that the applicant company has failed to discharge the burden of proof placed upon it by the Wadenzee judgement.

153. CCW takes no other issue with the other conservation objectives of the SAC and SPA. It is satisfied that they could be adequately safeguarded by the use of appropriate licence conditions such that the integrity test would be satisfied.

Need and Policy Considerations (Documents 28.1 & 53)

154. A Statement of Common Ground has been agreed with LSDL on licences, port landings, licence applications and the calculation of effective licensed marine reserves (Document 8.3). That data is used to illustrate that sand from Helwick Bank is not needed either for practical market purposes or to meet the policy requirements of IMADP.

155. Figures on aggregates consumption (and production) are provided every 4 years in the Aggregate Minerals Survey; the most recent data available is for 2001. More recent data is available on production: from figures published annually by Crown Estate up to 2005; and from the 2003 report of the South Wales Regional Aggregates Working Party (SWRAWP). Allowing for corrections and inconsistencies in this data, the best estimate of demand for natural sand in South Wales is 1.64 million tonnes per annum (mtpa). About 1.32 mtpa is supplied from the sea-bed and foreshore under various types of authorisations; the rest is land-won or imported. Landings for licensed marine dredged aggregates have been reasonably constant at a little over 1 mtpa since 2000. WAG considers (ref. MTAN1) that the demand for aggregates in South Wales is not likely to change significantly over the next few years and that there will not be a need for a significant increase in marine dredged aggregates production.

156. IMADP Policy SP3 seeks to maintain a licensed capacity within Welsh waters of up to 2 mtpa. This has been set in the knowledge that, in the past, extraction rates from licensed areas have averaged 60% of licensed tonnages and some flexibility is needed for the pattern of supply and the matching of supplies to needs. On that basis, a licensed capacity of about 1.7 mtpa (rather than 2 mtpa) would be needed to meet the current supply rate of a little over 1 mtpa. The current licensed capacity is just over 1.5 mtpa (including Denny Shoal and Culver Sands and allowance for the new Nobel Banks licence), a shortfall against policy of some 22%.

157. IMADP Policy SP4 aims to maintain licensed dredging reserves at between 5 and 15 years supply. Making practical allowances for licences that are currently open-ended and including Denny Shoal, Culver Sands (sand from which is usually landed at Welsh ports) and Nobel Banks, the total licensed reserves amount to some 10.2 million tonnes, which is equivalent to about 8.7 years at the current Welsh landing rate of 1.17 mtpa. Therefore, the policy aim is satisfied until mid 2010, by which time it is likely that other licences will have been granted. IMADP policy is to gradually move dredging activities into offshore areas and areas further to the west, and there is a good prospect of licences being issued in more favourable sediment environments in the foreseeable future. One application has already been made for such a location and is for a massive 1.8 mtpa. It would be prudent to wait for these other sites to come on-line rather than permit further dredging at Helwick Bank.

158. Sand type and quality is a factor to be taken into consideration. However, the sediment at Nobel Banks is such that it is likely to be able to supply medium graded material that is similar to Helwick Bank and will prove a reasonable alternative to it. LSDL has explained that it is difficult for the Company to rely on a single licensed source and that it expects to be able to expand its market to make use of both the Nobel Banks and Helwick Bank licences.

However, difficulties of dredging in the more exposed environment of the Nobel Banks, particularly at some times of the year, and the close proximity of Helwick Bank to the Company's base at Burry Port would be likely to influence the Company to dredge at Helwick Bank in preference to Nobel Banks at many times of the year. As such it would often tend to act as a substitute for the use of Nobel Banks, which would tend to frustrate the policy aim of IMADP to move dredging further offshore.

159. In view of the current licensed capacity and reserves of marine aggregates in the Bristol Channel, it is considered that the additions offered by the Helwick Bank proposal are not needed to meet market demand or WAG policy aims for several years. By that time, it is likely that other licences will have been awarded for dredging in more favourable sediment environments further offshore. It would be prudent to wait for those rather than allow the current proposal to go ahead.

Case for the City and County of Swansea Council

The material points are:

Council's Role (Document 52)

160. The City & County of Swansea has various legal powers and responsibilities relevant to its position in this case. In particular, the Council is a coastal protection authority with powers and duties under the Coast Protection Act 1949 and, as the lead authority in the Swansea and Carmarthen Bay Coastal Engineering Group, plays a key role in co-ordinating shoreline management over an extensive area. As the local planning authority, the Council is also responsible for the preparation of a variety of plan documents, which include policies for the protection of the Gower Area of Outstanding Natural Beauty. The Gower AONB was the first AONB to be established and celebrates its 50th anniversary this year. The Council has been involved as a consultee throughout the Government View procedure and has made representations at appropriate times, usually through the Coastal Engineering Group.

161. For the purposes of the public inquiry, the Council has adopted an independent position based on objective expert evidence. Its overall view is that the application for a 15 year licence at the extraction rates proposed is not justified but that there is scope for a limited amount of dredging for a period of 2 years while further studies and investigations are carried out to confirm that cumulative damage to the Bank would not become significant as a result of future dredging.

162. It has been suggested by CCW (Document 26.3) that the Council has changed its position since its statement of case was produced. However, that is not so, as has been confirmed in the statement of the Council's Cabinet Member for the Environment Department, Cllr John Hague (Document 33.1). In reality, it is CCW that has changed its position, as evidenced by its changed view about the conservation status of the Helwick Bank feature since its previous advice to WAG in 2005. It is regrettable that CCW has confined its evidence to matters of geomorphology and statistical analysis when sediment dynamics is the crucial issue in assessing adverse impacts on the designated sites and their features. CCW has chosen to ignore a wide range of evidence that has led the Council to its position of support for limited further dredging while opposing the full scope of the current application (Document 30.6).

National Marine Aggregates Dredging Policy (Documents 31.1 & 52)

163. It is agreed that the Interim Marine Aggregates Dredging Policy, South Wales, published by WAG in November 2004 (IMADP), is the primary policy document for the examination of this application (see Statement of Common Ground at Document 8.2). The Symonds Report (Document LSDL/C3) has been referred to by some parties, as it informed the preparation of

IMADP, but the Report itself acknowledges that it is *"an aid to policy making"*, and it has no policy status. Minerals Planning Policy Wales, December 2000, points out that it is necessary to supply the construction industry with sand and gravel for the economic health of the Country, and Minerals Technical Advice Note (MTAN) 1, Aggregates, says the overriding objective is to *"ensure supply is managed in a sustainable way so that the best balance between environmental, economic and social considerations is struck, while making sure that the environmental and amenity arrangements of any necessary extraction are kept to a level that avoids causing demonstrable harm to interests of acknowledged importance"*. These principles underpin the more specific policies of IMADP.

164. IMADP Policy SP2 establishes the basic principle to progressively move aggregates dredging in the Bristol Channel towards areas offshore and further to the west where this remains consistent with the principles of sustainable development. To guide development within this overall strategy, IMADP has established categories of sediment environment and divided up the Bristol Channel into 49 such areas. Although part of the application area appears to fall within a Category 3 sediment environment where a favourable Government View is unlikely (and which should, in any case, be excluded from any licence granted), Helwick Bank principally lies within a Category 2 sediment environment where the Assembly will adopt a precautionary approach (Document 31.1).

165. Policy SP7 says *"A favourable Government View within a Precautionary Sediment Environment would normally support a licence for between three and seven years, in a Favourable Sediment Environment for up to fifteen years"*. Although Helwick Bank is identified as a precautionary sediment environment, LSDL argues that a licence for 15 years would be appropriate as the area has been dredged in the past and has accumulated several years of environmental monitoring data. However, Policy SP7 is clearly not limited to "new areas", and the application should be considered within this policy constraint. The proposal is for a significant increase in extraction levels compared with previous dredging.

166. Before moving on to local policies, it is noted that IMADP Policy P9 says that proposals likely to cause demonstrable harm to the distinctive character and features of an AONB, National Park or Heritage Coast are unlikely to receive a favourable Government View. Also, Section 4.8 recognises the importance of leisure, tourism and the amenity of the shoreline, and paragraph 4.8.2 specifically acknowledges that *"fears and concerns held by members of the public are a consideration in the GV process"*. Policy P16 aims to protect the amenity of the coastline and manage impacts at acceptable levels.

Relevant Local Policies (Documents 31.1 & 52)

167. Whilst it is acknowledged that IMADP is the principal policy document, it is considered that adopted and emerging development plan policies may also be relevant to the Government View procedure where demonstrable harm may be caused to the Gower AONB or Heritage Coast or to the SAC, SPA or Ramsar sites. The development plan comprises the West Glamorgan Structure Plan Review No.2, adopted in 1996, the Swansea Local Plan Review No.1 (including Waste Policies), adopted in 1999, and the Minerals Local Plan, adopted in 1999. The emerging City and County of Swansea Unitary Development Plan is progressing towards a public inquiry expected to be in late 2007. These plans show a longstanding, consistent approach to the protection of the Gower environment.

168. The importance attributed to the Gower AONB is reflected in the Council's adoption of a management plan that sets out the Council's continuing approach to its conservation and enhancement. The Gower Management Plan was first adopted in 1990. However, in the light of the Countryside and Rights of Way Act 2000, the new Gower AONB Management Plan 2006 has just been published (Document 33.3).

169. The Statement of Common Ground identifies 2 matters of particular relevance (Document 8.2). Support text in the Local Plan makes reference to concerns about the removal of sand from beaches, dunes and offshore banks. On the other hand, the Minerals Local Plan recognises that, if offshore dredged aggregates applications were to be viewed unfavourably, this would place greater pressure on land-based sources. Such sources would have their own environmental impacts.

Appropriate Assessment Principles (Document 52)

170. The Council has not provided specific evidence about the appropriate assessment of the project needed for compliance with the Habitats Directive; it was agreed in advance of the inquiry that CCW would take the lead on that. Its only comments are that it considers there to be no cumulative effects linking Helwick Bank with the Nobel Banks dredging scheme and that LSDL's evidence in relation to fisheries has not been subject to any dispute. Notwithstanding these comments, the Council is a relevant authority in relation to this application for the purposes of Regulation 5 of the Habitats Regulations, and it puts forward advice towards a full understanding of the legal framework and complex factual matrix upon which an appropriate assessment will be made by WAG.

171. All parties agree that the Habitats Directive applies in this case and that appropriate assessment is required pursuant to Article 6(3), even though IMADP advises that the Habitats Regulations do not implement the Directive for applications such as this and that Regulations 48-51 do not apply. Whether or not the Regulations are applicable, the principles for appropriate assessment remain the same.

172. The Wadenzee judgement (ECJ 2004 Case C-127/02, see Tab 2 of Document 52) establishes that the test to be applied by the decision maker in relation to an application governed by the Habitats Directive is whether the competent authorities have made certain that the project will not adversely affect the integrity of the European site concerned, in the sense that *"no reasonable scientific doubt remains as to the absence of such effects"*. However, there can never be absolute certainty about what will happen in the future (see EnvLR WWF-UK v Secretary of State for Scotland, October 27 1998, at Tab 3 of Document 52), and there can never be an absolute guarantee that the integrity of the site would not be affected. Therefore, *"the most that can be expected of a competent authority is to identify the potential risks, so far as they may be reasonably foreseeable in the light of such information as can reasonably be obtained, and to put in place a legally enforceable framework with a view to preventing these risks from materialising"* (see WWF-UK above). The same judgement takes the view that this is why Regulations 48(6) and 54(3) of the Habitats Regulations make provision for the use of conditions.

173. In June 2005 CCW published Draft Interim Regulation 33 Advice, which included the site's conservation objectives. Although the legislation and guidance make no provision for "draft" advice, the concept of the "integrity of the site" is well established, including in the European Commission's "Managing Natura 2000 Sites" guidance document and in TAN5, Nature Conservation and Planning. These define the "integrity of a site" as *"the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of population of the species for which it was classified"*. Paragraph 4.6.3 of Managing Natura 2000 Sites is summarised as *"The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives."*

174. In view of the "draft" nature of the Regulation 33 Advice, CCW's latest advice that Helwick Bank is no longer in favourable conservation status, and the use of differently worded objectives in the 2003 appropriate assessment for this site, the exact form of the conservation

objectives is uncertain. However, whichever is considered to apply, it is plain that they all focus on the volume of the Bank, and specifically in changes in volume above specified contour levels over time. This requires a consideration of whether the supply of sand to the Bank is sustained at an adequate level to ensure that the dredged trench infills rapidly, which is essential if adverse impact is to be avoided as the Bank changes in response to natural fluctuations over time. This is dealt with in the next section.

Physical Impact on Helwick Bank (Documents 30.2 & 52)

175. Helwick Bank is a very substantial sandbank, illustrated in simple terms as 14 km (9 Miles) long, 3 houses high and as wide as 6 football pitches. It has exhibited a constancy in overall location over the last 100 years, though mean level changes of the Bank over time suggest that around 0.3 metre depth of sand is regularly active due to tide and wave exposure. The general pattern of sediment transport has been explained by others; suffice it to say that there is a high differential in tidal energy between the southern and northern flanks of the sandbank with the southern side having high energy with associated high sediment transport potential. The tidal excursion is between 10 and 15 km, and sediment excursion for fine-medium sand is likely to be about 30% of this, i.e. 3-5 km, and mainly on an east-west axis rather than a north-south axis. The Bank influences the excursions with circulatory fields around it.

176. The Council is concerned about the dearth of studies into sediment dynamics to provide an adequate database from which to evaluate sediment linkages to and from the surrounding area. The proposal is for a substantially higher rate of extraction than previous operations, as illustrated by the graph of past and proposed tonnage (see revised Figure 12 in Document 30.5; also at Tab 7 in Document 52). 300,000 tonnes per annum represents about 3 times the average rate extracted over the past 10-12 years and probably about 10 times the rate before that. In the absence of adequate research into sediment dynamics, it is considered that the proposal should not be approved.

177. On several occasions in the past the Council has advised that better evidence on sediment dynamics is needed for Helwick Bank, particularly the use of Lagrangian rather than Eulerian modelling and the separation of wave and tide effects for sediment transport quantification. Although Eulerian modelling has been the standard for many years, Lagrangian modelling is now well established and has been used in connection with several similar development proposals in recent years. The benefits are apparent when one considers the factors that affect sediment dynamics, for example sediment size and density, particle settlement velocity, sediment availability, flow depth, bed shear stress and wave characteristics. Sediment may be moved along the seabed (rolling, sliding, bouncing etc.) as bedload or carried in the water as suspended load. The latter occurs above a certain velocity threshold, which is greater for larger particles.

178. Eulerian modelling employs a network of fixed points and calculates the vectors for each point. Lagrangian modelling uses a moving frame of reference (i.e. as if following a single particle through its travels) and includes provision for the threshold between movement and non-movement and modified velocity (compared with the water velocity) for the sediment movement within the water; it moves at a fraction of the velocity of the water itself. This complex calculation can now be included in numerical models that cover areas as large as the Bristol Channel and allows different particle sizes to be tracked separately. Such modelling offers a direct means of applying the physics of sediment dynamics to the issue of sediment linkages between the Bank and its sediment sources and between the Bank and the shoreline.

179. The 2002 Pethick and Thompson report on Coastal Change Issues Affecting South East Wales (see Appendix 5 of the Symonds Report, Document LSDL/C3) reviewed the data available at that time for input to the Symonds Report. It included the development of a

composite model of the Swansea and Carmarthen Bay part of the Bristol Channel and reached conclusions about the open nature of the sediment transportation system. However, it was purely a qualitative study and provided little assistance in understanding the quantities of sediment movement in that area. A quantitative strategic study of the area extending from Nobel Banks to the South Gower shoreline should now be carried out to address this shortcoming in knowledge using Lagrangian modelling techniques. It would use current velocities over depth for a spring-neap tide cycle to determine likely sediment particle movements over a year and would provide data to enable appropriate sand extraction rates to be assessed.

180. Turning to the assessment of Bank volume data (over the period 1993 to 2005) by CCW which concluded that Helwick Bank is in decline, this at first sight concurs with the volumetric data presented in the Council's evidence (Figure 19 in Document 30.3). However, closer examination suggests 2 distinct trends: one for the 1990s; and one after 2000. LSDL has explained the change in survey locations and lines that took place from 1998 onwards, and it would appear that that had a significant effect on the Bank volume calculations. In the application of linear regression it is important to look at the data in several different ways before drawing a conclusion. In this case, the Council does not agree with CCW's assessment that Helwick Bank is in decline.

181. The evidence shows that Helwick Bank has been surprisingly stable over the past 100 years, and there is no evidence that the dredging carried out over the past 10-12 years has had any discernible effect on the morphology of the sandbank. However, the extraction rate now proposed would be some 3 times that of recent years on a scale comparable with the rates of natural change in Bank volumes in its upper levels. This increased rate is not considered acceptable as, in the absence of a quantitative understanding of sediment dynamics, it would not be possible to assess its impact over a short timescale. However, the modelling study suggested would use the latest science available to reduce levels of uncertainty and allow risk to be properly evaluated in the appropriate assessment. Having regard to the conservation objectives of the SAC, adverse impact would only occur if the dredged trench were to persist, and it is the Council's view that immediate research should be carried out to see how quickly the dredged trench recovers after it has been dredged. Indications are that it occurs quite quickly (Document 30.5). However, trench recovery is the key factor in assessing the Bank's stability. It is noteworthy that European Commission advice on Managing Natura 2000 Sites advises that the capacity of a site for self-repair and self-renewal under dynamic conditions is a factor counting towards the assessment of a high degree of integrity.

182. Finally, wider evidence for the Bristol Channel as a whole suggests that the sand resource along its northern flank is diminishing and that reductions at Helwick Bank (and on beaches) are part of the process. This does not necessarily mean that no dredging should be carried out. If the sand removed would have dispersed widely, then the effects of dredging would be insignificant compared with the natural processes, at least for the time being. Again, the suggested study would address this.

Physical Impact on Beaches (Documents 30.2 & 52)

183. The Bristol Channel Marine Aggregates: Resources and Constraints Research Project is particularly helpful in considering possible effects on the nearby beaches. The final report was published in August 2000 (BCMA report) and is reproduced as Document LSDL/D10. It includes at Appendix 4 a report by ABP Research and Consultancy Ltd into onshore-offshore sediment exchange between Helwick Banks and the Gower peninsula. That work comprised a tracer study using coloured sand released at 3 points: Helwick Bank and Rhossili and Port-

Eynon beaches. Although not fully representative of particle sizes most prevalent on Helwick Bank, it gives a useful indication of pathways. By chance, a storm occurred during the survey period, and so the results are representative of a combination of both wave and tide effects.

184. The results are illustrated in Figures 15, 16 & 17 (Document 30.3), which are also included at Tab 8 of Document 52. The conclusions of the tracer study included that there is an offshore-onshore sediment exchange between East Helwick and the adjacent beaches of the Gower peninsula (albeit fairly limited), that transportation between East Helwick and Port-Eynon beach took less than 9 days, and that longshore transport (i.e. parallel to the shore) was also demonstrated.

185. LSDL's Coastal Impact Study, carried out by HR Wallingford (Document LSDL/B2) was not consistent with those findings. The Coastal Impact Study used methodology set down in a 1998 CIRIA report as an industry standard but which acknowledged the limitations of such numerical modelling of natural processes, such as at Helwick Bank. It did not address potential pathways for sediment transport from Area 373 and the distribution of sediment along the Gower coastline in any quantitative way but concluded that there is no evidence of a long-term supply route from Helwick to the nearby beaches. The Council disagrees with this conclusion. There is short-term evidence of linkage (from the tracer study above) and, consequently, it is difficult to support the view that there is no long-term linkage, though the question of quantum remains.

186. The later Helwick Banks Link Study of January 2005 (Document LSDL/B12) aimed to derive likely sand bedload pathways in the vicinity of Helwick Bank from the consideration of sea bed features, notably sand waves. Sediment dynamics is inferred rather than examined quantitatively. It reached the conclusion that there is no bedload transport around Port-Eynon Point, which also directly contradicts other evidence, in particular the BCMA tracer study. LSDL tries to justify this by criticising the tracer study on the basis that the tracer particle size was smaller than the predominant particle size of sand on Helwick Bank. That is quite correct. However, the fact remains that the evidence suggests the finer fractions of Helwick Sand do circumnavigate Port-Eynon Point and reach the beach there.

187. This is an important point and, in the absence of direct science to show the sediment dynamics of the area, illustrates a serious gap in available evidence as to the risks of affecting Port-Eynon beach. It is noteworthy that the Statement of Common Ground between the Council and LSDL (Document 8.1) now includes agreement (based on a review of the evidence of all parties) that all sand particles within the medium sand grading for the area are capable of transport around Port-Eynon Point, in either direction, as bedload and suspended load under the prevailing tide and wave climate.

188. This conflict of conclusions between the various studies highlights the shortcomings in available evidence. No specific work has been carried out off Port-Eynon Point to determine velocities over depth of a spring-neap tide cycle and to assess likely sediment transport potentials and mechanisms for a variety of sand particle sizes. Also no specific work has been carried out to track representative sand particles emanating from Area 373 using Lagrangian particle-tracking within established numerical models to determine the potential distribution of sand particles along the Gower shoreline over a spring-neap tide cycle. In the absence of quantitative information on sediment dynamics, all interpretation of sediment linkages in LSDL's beach monitoring surveys has also been by inference, a feature of much of LSDL's evidence which relies heavily on the "opinions" of its expert witnesses.

189. LSDL's beach profile surveys provide useful information, notably on the lack of correlation between sand volumes on the beaches and that on Helwick Bank or between the beach volumes and the rate of dredged extraction, illustrating that sediment linkages between

Helwick Bank and the beaches is not the dominant driver affecting beach morphology over the timescale of the data. However, the beach profiles are too short to provide any information on the linkage between sediment changes on the beaches and areas further offshore. They need to be extended across the sub-tidal zone to provide such data.

190. The Council has also tested several extreme (theoretical) scenarios to assess the possible extreme effects of the dredged volumes on the levels of various beaches (Documents 30.5 & 30.7). This exercise was based on the simple physical processes involved in the infill of the dredged trench, which extend outwards until the level changes become negligible, unless interrupted by a physical barrier, such as a coastline. This has enabled the Council to reach the conclusions that no such trends are identifiable from the regular beach surveys and that a further 2 years dredging at historical rates would present no risk to the beaches and would meet the appropriate assessment test of "no reasonable scientific doubt".

191. Gower Coalition witnesses have shown strong opposition to these dredging proposals, substantially on the basis of concerns about possible impacts on the local beaches, and evidence has been brought forward to illustrate the vulnerability of the beaches and other coastal features to sand loss and erosion. The Council is well aware of these concerns and shares them.

192. Particular mention has been made by local residents of the loss of sand and the exposure of underlying layers of peat and rock at Port-Eynon beach. Regrettably however, it is an inevitable fact of nature that there will be a trend for the beach to continue to deteriorate with time as, on the cyclical occasions when these layers become exposed, they will be eroded and beach volumes will consequently be lost.

193. In conclusion, there is no straightforward correlation between Helwick Bank volumes or rates of dredging and the South Gower beach levels, though there is evidence of sediment linkage for certain particle sizes, albeit unquantified. To overcome the lack of knowledge on sediment dynamics the Council considers 2 studies are needed: one covering movements close to the dredge area; the other a more strategic study extending along the South Gower shoreline and to include Nobel Banks (effectively advancing the BCMA study of 2000). It is known that HR Wallingford has carried out the type of study required, and Enclosure K of Document 30.4 includes an outline specification. The 2 studies would cost about £120,000. In putting this suggestion forward, the Council is mindful of the advice in IMADP that dredging operators should not be required to fund strategic research over wider areas, and it would not be appropriate to require this by condition attached to any short-term licence (though some of the research should fall to LSDL).

Tourism (Documents 32 & 52)

194. Swansea Bay is highly regarded as a holiday destination, and Gower is a strong sub-brand in its own right with beaches and landscape featuring significantly. The 2005 Swansea Bay Visitor Survey asked what features most influenced people in their decision to visit the area, and the results showed: beaches 43%, scenery/landscape 41%, and coast 40%. Tourism is the biggest industry in Gower, and approximately 70% of the Swansea Bay bed-stock is located there. In 2005 tourism expenditure in the Swansea Bay area was measured at some £238M (using the "STEAM" model) and has risen steadily over the past few years (from £193M in 2000). This illustrates the importance of tourism to the local economy. In addition, Gower has a strategic role to play in promoting tourism in Wales as a whole.

195. There are 56 named beaches across Swansea, Mumbles and Gower, and they are popular for a range of activities. As one of the main reasons for visitors coming to the area there is a strong link between their attractiveness and the level of success of the tourism industry as a

whole. Five of the most popular beaches have been awarded "Blue Flags", which are assessed on compliance with 29 criteria covering environmental information, water quality, environmental management, safety and services. Several others have the "Green Coast" award for environmental excellence on rural beaches, including Mewslade and Rhossili.

196. Tourism marketing relies heavily on the strong natural environment and countryside of Gower complementing the Swansea city centre attractions. Any harm to the area's main asset would impact on the marketing of the area and detract from the value of tourism to the local economy with implications for employment and the ability to attract inward investment. Careful management of the coastline is needed to avoid any negative effect on the quality and attraction of the beaches.

Monitoring and Conditions (Documents 30.2 & 52)

197. The Council takes no issue with many of the draft conditions put forward by LSDL but makes suggestions for improvement of some. There is clearly a requirement for Helwick Bank to be monitored and there are problems with the interpretation of some historic surveys due to equipment accuracy, procedure and density, further complicated by changes in the survey area. The best reconciliation of the survey data is presented in Table 01 of the Helwick Bank Links Report (Document LSDL/B12) and is reproduced for convenience as Table F in Document 30.3. Over time the survey area has been extended from the "Old Boundary" to the "New Boundary" and the "Extended New Boundary". The "Old Boundary" needs to be retained in order to provide comparability with the older data but the "New Boundary" can be dispensed with.

198. Bearing in mind error bands, interpretation of the data is the main problem, and the use of a rolling 5 year mean, as specified by CCW as the performance indicator for the Helwick Bank feature, would be likely to be breached as a licence condition during the application period due to natural variations. It would be preferable to use the data from 1993 and to establish suitable statistical variations. Use could also be made of average depths of erosion or accretion as monitoring parameters.

199. The main drivers for future monitoring should be: the importance of sediment supply to the Bank; the importance of rapid infill of the trench; the fitness for purpose of the shoreline monitoring; and the assessments of Bank volume fluctuations with time. The key issue is the rate of trench refill, as it is an indicator of ongoing sediment supply to the Bank and the adequacy of that supply to infill the dredged trench. Early research should be carried out to assess this. If the trench were reinstated fairly quickly, it would demonstrate that the sand supplies remain adequate in relation to the relevant extraction rate, that there was no harm to the Bank as a feature of the SAC, and that impacts were spread over a large area. Reference to changes in Bank volume over time would only be necessary if these matters could not be demonstrated.

200. The important change needed to the beach surveys would be to extend the profile lines out to provide seabed level links between beach and offshore survey levels. This would improve understanding of the offshore variability and the sediment links between the beaches and offshore areas.

Council's Overall Conclusions (Document 52)

201. It is important to emphasise that the Council is firmly of the opinion that the proposal should not receive a favourable Government View, as there is reasonable scientific doubt as to the cumulative effect of dredging beyond a short period of, say, 2 years. The proposed rates of extraction and period of licence are not supportable on the available evidence.

202. Whilst past levels of extraction over the past 10-12 years have resulted in no detectable impact on Helwick Bank or the South Gower beaches, the monitoring carried out over that period is not "fit for purpose". Furthermore, the present evidence is incomplete due to the limitations of the sediment tracer technology available to the BCMA study in 1999. This needs to be updated using more modern and reliable computer models in order to reduce the level of conservatism that needs to be applied and allow a reasonable level of scientific "certainty".

203. Where sediment supply is sustained to a sandbank feature such as Helwick Bank, set within an open sediment system, it does not matter whether the Bank is in natural process growth or decline. The important matters are the extent and location of the dredge depression dispersal area and its rate of spread and infill and whether this is significant regarding the integrity of the Bank feature. Monitoring of any future dredging should focus more on confirmation of the sustained sand supply and treating embayments such as Port-Eynon, Oxwich and Rhossili as 3-dimensional entities extending offshore to the limits of seasonal sediment exchange.

204. The use of monitoring thresholds such as those included in the 2003 licence extension and in the draft proposals for the current application are not appropriate as self-standing requirements and should only be used if the dredge trench does not fill rapidly but persists in time. It is only when the dredge trench persists that there is a risk of significant damage to the Bank and the volume threshold condition should be triggered.

205. There has been no real risk to Helwick Bank or the Gower beaches from historic dredging since 1993, and there would be no real risk if a similar rate of dredging were continued for a further 2 year period whilst the best scientific information available was obtained. Without that data, there would be real risk if the present application were consented.

Case for the Gower Coalition

The material points are:

Introduction (Document 51)

206. The Gower Coalition comprises a group of people with a passionate concern for safeguarding the coastal environment of Gower. Whilst other parties have concentrated on scientific evidence, the Coalition representatives have based their evidence on local knowledge and direct experience of the evolution of the beaches over a period of many years. This is not a dispute between reason and emotion; the Coalition's case is based upon intelligent observation. Rather than summarise the Coalition's case in terms of the matters identified by WAG, it is simpler to present it below in terms of the areas covered by each witness.

207. The Coalition includes the following members:

- the Gower Society, a campaigning organisation founded in 1947;
- the Gower Save Our Sands (SOS) campaign, formed in 1999 specifically to save Gower beaches;
- the National Trust, owner of 26 miles of coast in Gower;
- all Community Councils across Gower, representing the people of the southern coastline;
- the Campaign for the Protection of Rural Wales, founded in 1928;
- the Civic Trust;

- many other interested organisations and individuals, including the Penrice Estate, which owns and operates Oxwich beach;
- representatives of the tourism sector.

208. Gower is an exceptional place and this year celebrates the 50th anniversary of its designation as Britain's first Area of Outstanding Natural Beauty. Its scenery is magnificent and its beaches are superb, and Swansea is a unique city in having such a hinterland. It is unthinkable to put such a resource at risk for commercial gain when so many factors are unknown. There is a difference of opinion amongst the various scientific experts on many of the key matters in this case, and it is difficult to know how much weight to give to the many assurances. The Coalition's view is one of common sense that the precautionary approach should prevail. It is clear that the Gower beaches are shedding sand, the cliffs are being eroded and the shoreline is in retreat. It may well be that most of that is due to natural causes but the human factor can easily be recognised as an additional stress that can be avoided.

Malcolm Ridge (Section 1 of Document 34 & Document 35)

209. The beaches of Gower are an essential component of the AONB and they are vulnerable. The beaches at Port-Eynon and Horton have been considerably damaged over recent years. Movement of sand along this coastline is affected by a combination of waves, winds and tidal currents that is so complex that no one can satisfactorily explain the changes that occur. These natural factors are unpredictable and uncontrollable. However, dredging may also be affecting Gower's beaches and can be controlled. As a precautionary measure it should cease.

210. There is considerable inconsistency in the published scientific data. For example, the beach surveys appear to show little change when the general public clearly see the beach levels varying, sometimes from day to day. Perhaps the surveys are too infrequent. In any case, they do not seem to be sufficiently robust to effectively measure the changes. The LIDAR surveys (Light, Direction and Ranging, an airborne mapping technique) are sometimes used by LSDL to demonstrate beach gain and at other times are described as *"inaccurate"* and *"not worth continuing"* (Coastal Impact Study, Document LSDL/B2). The mathematical modelling on which the Coastal Impact Study relied used synthetic wind and wave data with no calibration. Attempts made to draw conclusions from a lack of correlation between the beach profiles and the sand volumes on Helwick Bank are illogical. These various matters all serve to illustrate the difficulty in understanding the complexity of sediment transport in this area.

211. The 1947 Hobhouse Report, which led to the establishment of the AONBs, said *"it is urgent to ensure that some at least of the extensive areas of wild and beautiful countryside in England and Wales are specially protected as part of the national heritage"*. Gower is not only an AONB but also has an unparalleled array of other local, national and international designations showing how very special it is. Where an activity presents a potential and avoidable threat to an AONB it is the duty (under the CROW Act) of the relevant authorities, including WAG, to disallow or remove that threat.

212. Prior to publication of the IMADP, WAG was well aware of the opposition of many Gower residents to its policy support for the continuation of dredging at Helwick Bank. This policy seems to be ill-judged and contradictory of the other part of the same policy, to move dredging further offshore. No need has been established for extraction of aggregates at Helwick Bank, as illustrated by the fact that over the last 10 years only a third of the licensed extraction from the Bristol Channel has actually been dredged and that, if current applications were granted, reserves far in excess of the IMADP policy target would be available.

213. In the Oxford English Dictionary "precaution" is defined as *"caution exercised beforehand to provide against mischief or secure good results"*. Continued dredging with monitoring would not meet this definition, as it would not be *"caution exercised beforehand"* but would merely establish when *"mischief"* had occurred. The only effective precautionary measure is for dredging at Helwick Bank to be stopped until it can be demonstrated beyond reasonable doubt that it is not harmful to Gower beaches. The onus to prove this falls on the Applicants.

214. Finally, the Coalition takes issue with the City & County of Swansea, which has changed its position since its Rule 6 Statement was adopted in February 2006. That statement criticised the IMADP approach to precaution whereby dredging may be continued until clear evidence emerged of environmental harm and made it clear that the Council considered dredging should be stopped. However, its position now is that dredging should be allowed for a limited period while further surveys are carried out. This is quite inconsistent with the Council's original statement.

Tony Dobbs (Sections 3 & 7 of Document 34)

215. Evidence from the Environmental Statement and the Coastal Impact Study (Documents LSDL/B1 & B2) shows that Helwick Bank is losing sand; CCW has reached the same conclusion. Dredging sand from a resource that is already diminishing cannot be sustainable. However, a particular feature of analysis work for both the Bank and beach volume surveys has been the lack of consideration given to uncertainties. Survey errors are comparable with the perceived year-on-year changes, and comparisons based on the data are suspect in the absence of a full analysis of such errors.

216. The existence of Helwick Bank in such an energetic area of the Bristol Channel is proof that it is maintained by natural processes. These are complex and not fully understood but are no doubt a function of tidal currents, weather, coastal geography and sea-bed topography. It follows that, if sand is removed from Helwick Bank, these natural processes will move sand from elsewhere to replace it. The Coastal Impact Study refers to an earlier study in 1997, which reported that "it is much more likely that sand dredged from the Bank has come from Port-Eynon Bay". Although later studies may have reached a different conclusion, the tracer studies described in Appendix 04 of the 2000 BCMA report (Document LSDL/D10) found a clear sediment transport link between the South Gower beaches and Helwick Bank.

217. There is universal recognition that there has been loss of sand at the Port-Eynon/Horton beach in recent decades since about 1970. LSDL says this occurred before dredging started in 1993. However, it should be remembered that, in fact, earlier dredging was carried out by another company, and that started in 1964. Thus, the beach damage started at about the same time as dredging. LSDL maintains that sand was lost from the beach as a result of regeneration of the dunes. However, that explanation contains inconsistencies such as incidences of exposure of shingle outcrops on the beach throughout the period of time when the dunes were not vegetated, lack of convincing evidence of sand accumulation in the dunes, and disagreement by local residents of the use of sand "reclaimed" from the foreshore. Furthermore, similar patterns of sand loss on other beaches have no such explanation.

218. LSDL has also claimed that some of the changes on Port-Eynon beach are attributable to sand migration from one end of the beach to the other. That does not accord with the observations of local people, who say damage has taken place at both ends of the beach. The local community has little confidence in the results of the beach surveys, which seem to show little change from year to year, in contrast with personal experience and observation (including

that of Dr Dobbs and his wife). This may be due to the survey lines not being representative of the beach as a whole and to lack of consideration of the statistical significance of the data.

219. There are a number of flaws in the arguments and explanations put forward by LSDL, and the local community has little confidence in them. The Company's case is based more on wishful thinking than on sound technical evidence. Sand extracted at Helwick Bank is lost to the area around it, including the beaches and sand dunes that are key features of the AONB.

220. Personal records kept by Dr and Mrs Dobbs since about 1988 indicate that dramatic changes have occurred to Port-Eynon beach from about 1995 onwards. Photographs in Section 7 of Document 34 and at Document 39 illustrate the magnitude of the changes, including drops in beach levels of some 30 cm, and it is noticeable that the beach surveys have failed to properly record this. Exposures of underlying peat and rock continue to occur, and the state of these exposures suggests they have never been exposed before. The peat beds are many thousands of years old, and exposure now for the first time indicates beach levels lower than for thousands of years. When exposed these features tend to erode and break up. Consequently, aerial photographs showing reduced exposure areas do not necessarily mean the beach has risen, as alleged by LSDL, and are a poor measure of beach damage.

Gordon Howe (Section 4 of Document 34)

221. There is no dispute about the fact that sand is removed from Mewslade Bay and Fall Bay (a small bay between Mewslade Bay and Worms Head – see Plan A) by westerly swells and gales and added when quiet, calm easterly conditions prevail. In recent years the gales and swells have caused less damage than seen in the 1980s, and sand levels on many beaches are currently at very high levels, e.g. Rhossili, Fall and Mewslade, in contrast to the low levels at Port-Eynon and Horton. LSDL's studies do not explain why the pattern should be so different for these 2 beaches. Beach conditions are illustrated by several photographs.

222. In the 1980s local surfers were well aware of extreme sand loss events at Fall and Mewslade Bays, especially in 1985 when rock was exposed over the whole of Mewslade Bay. However, recovery occurred during the following spring and summer. Such natural events occur periodically. However, sand movements off the South Gower coast are complex, and it has not been demonstrated that dredging activities do not have a negative effect on the coastline. Such effects may take many years to become apparent, and Port-Eynon and Horton beaches may be the first to show it.

223. The sand layer is quite thin on many beaches, and little can be left after extreme storm events. If dredging were to exacerbate such incidents, the beaches may not recover. They are vulnerable features. In addition to the direct removal of sand, there is also the risk that dredging would lower the level of Helwick Bank, which has an important role to screen the coastline from large waves. Waves can often be seen breaking on Helwick Bank at low tide, and during moderate to big swells waves break there even at full tide. If the Bank were lower, the coastline behind it would be exposed to increased wave action with increased risk of erosion and sand loss.

224. In conclusion, the proposal to extend dredging at Helwick Bank for a further 15 years is extremely worrying but to also increase the quantity would be foolhardy and irresponsible. There are still too many unanswered questions to be confident of lack of harm.

Siân Jones, for National Trust (Section 8 of Document 34 & Document Bundle 36)

225. The National Trust's purpose is defined by Act of Parliament as *"promoting the permanent preservation of lands and buildings of natural beauty and historic interest for the benefit of the nation"*. It has been involved in the practical management of land and coastline in Gower

since 1933 and now has over 2,200 hectares of land there under its protective ownership, encompassing 26 miles of coastline (75% of the Gower coastline). The Trust aims to support the environment in perpetuity and takes a long-term view to the management of its property.

226. The Gower peninsula was the first AONB in Britain and was designated in 1956, reflecting the national importance of the landscape. AONBs share with National Parks the highest status of protection from inappropriate development whether on land or offshore. The landscape of the AONB contains considerable variety within a small area and includes the hard coast of cliffs and headlands and the soft coast of beaches, dunes and marshes. The interaction of land and water is of great concern along the coastline. Archaeological remains are also important in Gower, which has been settled since prehistoric times, and there are 23 Scheduled Ancient Monuments in the care of the National Trust. On the coast, cave earths hold important palaeontological remains, and these and other coastal archaeological features are particularly vulnerable to damage through change.

227. The beautiful environment and attractive beaches are highly valued by both the residents of Gower and its visitors. The health benefits of open air recreation are well recognised, and tourism contributes some £238M per annum to the local economy. These benefits should not be put at risk. There is uncertainty and disagreement about the causes of the observed changes around Gower, and that casts doubt on the reliability of predictions of what will happen in the future. In view of the potential consequences for the Gower AONB and the lack of confidence in those predictions, the precautionary principle should be used and the dredging licence be refused.

228. Two other National Trust witnesses present evidence on photographic records of observed changes along the coastline and the Trust's national interest in coastal change.

Siân Musgrave, for National Trust (Section 9 of Document 34 & Document 37)

229. The Gower coast is highly dynamic, and some areas regularly exhibit noticeable changes over a period of a few days while others may take a year or two. Changes have been observed over a period of several years and are illustrated by an extensive presentation of photographs (in Document 37), cross referenced to a location map.

230. The photographs at Tab 2 of Document 37 are of Whiteford Burrows (an area of sand dunes on the north west corner of the Gower peninsula) and show: erosion of the dunes in 2005 and formation of a spit at right angles to the point; exposure of a blue clay layer and a petrified forest; the relocation of a bird hide due to sand loss; and formation of a marsh behind a spit. At Tab 3 photographs of Whiteford Beach show a shingle bank forming and reforming at right angles to the dune, and at Tab 4 other photographs of the beach show: erosion of the dunes so that the World War II lookout post gets nearer to the mean high water mark; and sand accretion at beach gate below Cwm Ivy Tor and the emergence of a new dune.

231. The photographs at Tabs 5 and 6 were taken at Rhossili Beach. At Tab 5 they show accretion around the Helvetia, the remains of a ship wrecked in 1887, and another shipwreck, the Vernani. At Tab 6 a large number of photographs over several years show the development of slumps at locations along the front of the Warren, along the track to the old rectory (note marker posts to monitor progress of slip), at the besanded medieval buildings (a Scheduled Ancient Monument) and below the Worms Head Hotel at the southern end of the beach.

232. The photographs at Tab 7 record several washouts of the coastal path between Slade and Horton in 1997/98 and the subsequent repair measures. At Tab 8 there is a sequence of photographs (including some quite old) illustrating changes to the dunes (both accretion and

erosion at various points) at Three Cliffs Bay (which is at the eastern end of Oxwich Bay – see Plan A). Finally, Tab 9 contains photographs of erosion at Hunts Bay (further to the east).

233. The photographs illustrate the coastal processes that are continually taking place. The role of sand dredging in these is uncertain. Given their cyclical nature and unreliability of prediction, further sand dredging may have irreversible consequences. In these circumstances, the precautionary principle should be followed.

Robin Jarman, for National Trust (Section 10 of Document 34 & Documents 41.1 - 41.4)

234. The proposed dredging area lies within a Category 2 sediment environment, as defined in IMADP, in which the Assembly will adopt a precautionary approach, and Annex 1.1 of IMADP provides guidance on what is meant by that term. The National Trust also applies the precautionary principle to its coastal policy and seeks to avoid actions that create unnecessary risk and are difficult to reverse or adapt to unforeseen circumstances. This does not imply doing nothing but is reflected in a wiser and more cautious approach than might otherwise seem necessary and the taking of a long-term approach.

235. The Trust is well aware of the dynamic nature of the Bristol Channel. Its work elsewhere has demonstrated the importance of understanding the long-term cycles at play in the coastal environment if short-term impacts are to be predicted. The Trust's concerns on Gower are that its efforts at sustainable coastal management might be negated by other works in the coastal cell. The effects of climate change have to be factored into all coastal work, and predictive forecasts cannot be precise. Consequently, the Trust works in very cautious ways with the aim of ensuring that its coastal systems are robust and can respond and adapt to events. It removes the causes of fragile coastal systems, alleviates sediment supply and removes structures from risk zones. This approach relies heavily on the natural supply of sediment, and the proposed dredging would put that at risk.

236. The Trust campaigns for sustainable coastal planning, as illustrated by its various brochures (Documents 41.1 – 41.4), including the Shifting Sands and Neptune Coastline Campaign brochures. In a coastal environment strong physical processes and extreme events may occur without warning. In the context of predicting coastal sediment dynamics and the possible impact of offshore aggregate extraction, it is considered the short-term commercial benefits are outweighed by the need to avoid negative impacts on society and the environment if predictions are wrong.

Vicki James (Section 5 of Document 34 & Document 40)

237. The improvement, preservation and conservation of Swansea's outstanding natural environment are of crucial importance to the area's economic success. The coastal environment, including the many sandy beaches of varying character, offers unique appeal and distinctiveness. The tabular summary in Document 40 shows the many awards received by Gower's beaches and the wide range of activities carried out on them. A visitor survey carried out in 2004 showed beaches to be the highest scoring reason for people visiting the Swansea area, and other research has shown a "sandy beach" to be of paramount importance.

238. No evidence is available to link beach erosion and tourism impact However, it would be logical to surmise that many beach users would seek alternative beaches with better quality sand. The impact on tourism would depend on the extent of erosion, the level of use of the beach and the number of beaches affected. The worst case scenario, where all beaches were degraded, would inevitably lead to the loss of tourism trade, perhaps as much as £50M loss to the local economy. The impact would be most heavily felt in those rural communities

dependent on tourism. However, the quality of life of all people in the area would be degraded and the appeal of Swansea as a place to live and invest would be damaged.

Joy Cooke (Section 2 of Document 34 & Document 38)

239. A large number of old family photographs (mainly from the 1960s and 1970s) are compared with more recent ones to illustrate the degradation that has occurred to the Port-Eynon and Horton beaches. As recently as 1995 the beaches had a depth of soft golden sand in which children could play. However, the beach profile has changed dramatically in the past 10 years and the beach level has dropped. The areas of pebbles and rocks have substantially increased, and the nature of the sand has changed to hard and permanently wet. A primeval forest has been exposed and, although that has occasionally happened for short periods of time in the past, on this occasion it remained until it became broken-up and almost totally destroyed. These features are all illustrated with photographs.

240. At the western end of the beach the old lifeboat launching ramp has been left well above beach level. In addition, a knock-on effect of the lower beach level has been damage to the cliff face behind and collapse of the coastal path. It is no longer possible for children to play on the beach as they did in years gone by or to walk on the beach without being impeded by rocks and other obstacles.

241. It is accepted that much of the change is due to natural causes but it is believed that the dredging at Helwick Bank has also contributed towards it. If that is at all possible, then the precautionary principle should be applied and further dredging should be avoided before it is too late to save Port-Eynon Beach; it may already be too late for Horton Beach. It has happened before! At Hallsands in Devon, despite warnings from local people, sand dredging took place close inshore, and subsequent coastal erosion caused the whole village to collapse into the sea.

Susan Kent (Section 6 of Document 34 & Documents 42.1 & 42.2)

242. WAG's consideration of this proposal will be based on its Interim Marine Aggregates Dredging Policy, South Wales, published in November 2004 (IMADP). In response to consultation on that document 1,400 submissions were made by the people of Gower requesting an end to dredging on Helwick Bank. That policy document was informed by the Symonds Report (Document LSDL/C3) and several other studies but did not take into account a report commissioned by the Gower Society, A Review of Environmental Assessments and Coastal Impact Studies for the Aggregate Extraction Proposals at the Helwick and Nash Banks by Tim Deere-Jones, dated April/May 2001 (Document LSDL/D9), which highlighted deficiencies in the HR Wallingford research.

243. In addition, CCW submitted details of its Severn Estuary Sediment Environments Database (Appendix 1 in Section 6 of Document 34), which provided environmental risk grading for the various areas. That seems to have been partially taken into account in IMADP. However, CCW recommended that dredging should not be allowed in Sediment Environment OBC11, in which the current application site lies, on account of possible damage to the SAC and the coastline, including risks to beach replenishment. Despite all of this and although not having the lowest risk score and being close to the coastline, Sediment Environment OBC11 was attributed to Category 2 in IMADP. The Coalition considers that this was a mistake.

244. IMADP says WAG will adopt a precautionary approach to dredging proposals in a Category 2 sediment environment. In addition, the proposal is subject to appropriate assessment under the Habitats Directive. However, the advice in IMADP seems to misinterpret the requirements for this. IMADP Policy P4 says *"Where Appropriate Assessment shows the*

proposal to have an adverse effect on the integrity of a designated European site or Ramsar site the proposal will only receive a favourable Government View in the exceptional circumstances of there being no alternative solutions and being considered necessary for imperative reasons of over-riding public interest". This is subtly different to Article 6(3) of the Habitats Directive which makes it clear that the assessment is required to show that the proposal would not have an adverse effect. This is made clear by the European Court's judgement in the Waddenzee case (see Appendix 2 in Section 6 of Document 34), which says that the competent authority can authorise a project *"only if they have made certain that it will not adversely affect the integrity of the site. That is the case where no reasonable scientific doubt remains as to the absence of such effects."* Ample evidence has been put forward by various parties to show that there is reasonable scientific doubt.

245. LSDL justifies the need for the sand on the basis of its particular type and the market need for the quantity involved. However, the recent Nobel Banks licence award and the Western Bristol Channel application for Area 486 in a favourable sediment environment (when granted) will more than satisfy any projected need. Land-based sources would also be an option, despite possible higher cost. Thus the proposal cannot be justified as an exception under the Habitats Directive.

246. To date, over half of the sand ever dredged from Helwick Bank has been removed in 25% of the time (1993-2003) that dredging operations have taken place. If the current proposal was allowed at the dredging rates sought, 70-75% of the total sand ever dredged there would be removed in 28% of the total time (see Document 42.1). This illustrates the increased risk that would be caused to the stability of the Bank and to the beaches of South Gower, with its consequences for recreation and tourism.

247. It is a requirement of appropriate assessment that the general public be consulted. Public consultation has resulted in the submission of a petition with 25,000 signatures, 1,400 responses to the IMADP consultation, and opposition from public bodies representing over half a million people in the Swansea and Gower area (see Appendix 4 in Section 6 of Document 34). This represents a massive perception of risk by the general public, which has not been diminished by the arguments of the Environmental Statement.

Other Written Statements (Sections 11-17 of Document 34)

248. The Coalition's pack of evidence also includes statements of evidence for several other witnesses who, in the event, did not speak at the public inquiry. Instead, those statements are taken as written submissions. The other sections of the pack comprise statements by Gareth Watkins (local resident for 60 years), Alun John Richards (Campaign for the Protection of Rural Wales), Thomas Methuen-Campbell (Penrice Estate), Linda Bennett (Hawk and Owl Trust) and Professor Nigel Stott (local resident). Section 15 contains statements and letters of support for the Coalition from Community Councils, and Section 17 contains letters of support from many individuals.

249. Whilst each statement and letter draws on the individual knowledge and experience of the writers and many different topics are raised, these statements and letters serve to reinforce the evidence already presented by the Coalition witnesses, and reported above, rather than to raise new matters of significance in their own right. Whilst I have read all of them and treat them as further useful evidence, I do not propose to include further details of them in this report.

Coalition's Overall Conclusion (Document 51)

250. LSDL's scientific experts have acknowledged that evaluation of sediment transport on and around Helwick Bank is extremely complicated because of the large variations in wave and tide conditions and variations in the sediment itself. In the light of these uncertainties, it is difficult to understand how they can be so confident that the proposed dredging operations should continue, particularly when LSDL's view on the stability of the Bank is so strongly disputed by CCW's expert. The Coalition supports CCW's assertion that the proposed dredging would contribute towards further decline of Helwick Bank itself and the nearby beaches of South Gower and that there is no real market need for this source to be further developed, at least until decisions are taken on other sites likely to be more suited to aggregate dredging. Whilst the City & County of Swansea has taken a different approach to the precautionary principle, it has left no doubt about its opposition to the application or its views on shortcomings in data to support LSDL's assertions that risks of harm would be low and manageable.

251. With regard to the appropriate assessment there seems to be little dispute that a favourable Government View can only be given if WAG has made certain that the proposal would not adversely affect the integrity of the European site. The Coalition has also provided considerable evidence of degradation of nearby beaches and other coastal features, which are important elements of the Gower AONB and the tourism economy. This evidence goes beyond "anecdotal" and draws on the knowledge and personal experiences of many local residents and organisations. Consultation with local people is an important aspect of appropriate assessment under the Habitats Directive as well as the Government View procedure itself. It is interesting to note the strong support provided to the Coalition by local politicians, particularly Edwina Hart AM, Alun Cairns AM and Martin Caton MP, who all spoke at the public inquiry.

252. In conclusion, the key issue is the balance of risks and benefits. The benefits would be the provision of a low cost material for the building industry. The risks would be of damage to the SAC and to the nearby beaches within the AONB, which are important to tourism. In the Coalition's view, the magnitudes of the risks and possible consequences are so great that the only appropriate precautionary measure is to refuse the licence and stop any further dredging at Helwick Bank.

Cases for Other Objectors

The material points are

Edwina Hart AM (Document 43)

253. A large number of local people and visitors have written to express concern about the current application for further dredging at Helwick Bank, and particularly the prospect of increasing the rate to 300,000 tpa for a period of 15 years. In addition, a petition of 25,000 signatures has been submitted to the National Assembly for Wales. The reduction of sand cover at Port-Eynon and Horton beaches in recent years is a great source of dismay to local people, and the exposure, breaking up and loss of ancient peat beds has further contributed towards the reduced beach level. People quite reasonably wonder whether these changes are linked to the dredging activity.

254. In common with most people, no claim is made to expertise in the complex scientific matters at issue and reliance is placed on the experts to properly investigate, measure and explain their findings. Bearing in mind the ecological, environmental and economic importance of Gower, these investigations need to be rigorous and to give sound conclusions. However, that is not the impression that many people have gained. Many of the submissions received take issue with the survey methods, data collection and conclusions of LSDL and its consultants,

and it is important that these are thoroughly questioned by other people who are competent in these specialist fields.

255. In November 2004 WAG published the IMADP, which takes a precautionary approach to dredging in the Bristol Channel. Even though the Minister announced that independent studies at that time did not support claims that dredging was harmful to beaches, the general principle of moving dredging further offshore and to the outer channel area was seen as more consistent with policies on sustainable development, particularly as dredged aggregate is necessary to the Welsh economy. The policies also seek to ensure decisions are consistent with the need to protect the landscape, habitats, ecology and heritage of Gower's coastline. Consequently, there is a balancing act between the need to provide aggregates for economic development and safeguarding our natural environment and attractiveness to tourism.

256. LSDL says that dredging has no appreciable impact on local beaches or habitats and that Helwick Bank has remained stable over the recent geological past. However, it is generally acknowledged that the sediment processes in the area are not fully understood or fully predictable. It is this apparent conflict in levels of confidence that causes concern to local people. Section 85 of the CROW Act places a duty on WAG to have regard to the conservation of biodiversity and clarifies many other duties with respect to AONBs. Assurances have been given about future surveying, data collection and monitoring of the effects of dredging. However, there are no assured answers to the questions "When sand is removed from the Bank by dredging, where does the replacement sand come from?" or "At what point would dredging on the Bank begin to have an adverse effect on the coastline?"

257. The natural processes, long-term weather cycles and recent worries about climate change are complex issues, and the science used to try to predict the effects of human intervention is inexact. Under these circumstances, the precautionary principle must ensure that Helwick Bank is not subjected to avoidable, adverse, man-made stress that may damage the South Gower coastline. It does not make sense to mortgage this important coastline against an incomplete understanding of the complex issues involved.

Alan Cairns AM

258. The sea around Helwick Bank is a complex, dynamic environment that is not fully understood, and WAG now accepts there is a risk of possible effects on the nearby coastline. There is strong public opinion against further dredging at Helwick Bank, not least because of the risk of damaging the attractiveness of the area for tourism. The precautionary approach is required, and dredging should be halted until there is a more complete understanding of the mechanisms involved.

Martin Caton MP

259. Consideration of the proposal involves a complex environmental assessment, and many very real questions have been raised about the information presented. Under the circumstances, the scientific case has not been made to provide assurance that there would be no environmental consequences.

260. It is well known that sand levels on beaches go up and down in response to natural variations in the climate. However, it is clear that on some beaches there has been a trend for loss of sand for some years, which many people think is partly due to the past dredging activities at Helwick Bank. The Gower coastline is a precious landscape, which must be safeguarded for both environmental and economic reasons. The availability of good quality beaches is the most important factor in attracting tourists to Gower, and tourism is vitally important to the local economy.

261. It seems likely that the removal of sand by dredging would have some impact on the availability of sand at nearby beaches. Whilst much of the change may be due to natural variations, if there is a reasonable chance that human activity may contribute, then that activity should be stopped. The possibility of a physical relationship between Helwick Bank and the nearby beaches requires that the precautionary principle be applied and, in view of the nature and value of Gower, the "bar" should be set high.

John Harding (Document 44)

262. The 80 km of sandy bays and dramatic limestone cliffs of the Gower peninsula has few rivals in Britain and its value has been recognised by the National Trust, which now owns most of it. Gower's combination of outstanding natural scenery, diverse avian life, rare fauna and flora, palaeoethnological and archaeological sites, mediaeval castles and churches has made it a magnet for recreational tourism, which is now the area's most important economic activity. The jewels in Gower's crown are its golden beaches.

263. Since 1964 dredging at Helwick Bank has removed almost 2 million tonnes of aggregate. The current application for a maximum extraction rate of 300,000 tpa for a 15 year period would involve the further removal of up to over 4 million tonnes. It cannot be discounted that such operations would lead to further decline in the volume and height of the Bank.

264. The destructive power of waves is the single most important agent in coastal erosion, and wave speed is the critical factor in this. Shallow waters reduce wave speed and their destruction power, and Helwick Bank has provided this protection to an extensive length of the South Gower coastline for many years. Although there is a tendency for offshore sandbanks to replenish themselves naturally, their removal or lowering usually affects the levels of sand cover in other areas of the general locality. In this case, any reduction in the level and volume of Helwick Bank would be likely to increase the likelihood of erosion occurring along the nearby coastline and affect sand levels in the surrounding area.

265. In recent years the sand cover of many beaches nearby has been eroded, in some cases on a temporary basis but in others an apparently long-term trend. It is important to safeguard the Gower coastline both in the interest of preserving an exceptionally beautiful area for the benefit of future generations and for its recreational and amenity value to the tourism economy. The sands will not disappear overnight but their gradual degradation will inevitably make Gower a less attractive tourism destination.

266. In conclusion, it is likely that the dredging of sand from Helwick Bank contributes towards the erosion of nearby beaches, and the proposal to remove some 4 million tonnes over a 15 year period would pose an unacceptable risk to this unique and fragile coastline. Whilst it may be an easily exploited source of cheap, high quality sand for commercial purposes, sand is available at other locations where the risks of environmental damage are far less. In view of the irreplaceable nature of Gower's beaches, the burden of proof must fall on LSDL to demonstrate conclusively that dredging would cause no further damage, and without that proof the extraction licence should not be granted.

Written Representations (Documents 2.1-2.4, 3 & 4.1-4.2)

267. A large number of written representations have also been submitted. Documents 2.1 and 2.2 are letters from Cheryl Gillan MP and Martin Caton MP. Document Bundle 2.4 contains 80 letters submitted over the period January to March 2006 by local residents and their representatives, including County and Community Councils. Document Bundle 2.3 contains 10 letters submitted over the period April to June 2006, mainly from DEFRA (including comments on possible license conditions) and CCW. A list of the third party correspondence

in Documents 2.1-2.4 is included in the folder for Document 2.3. Document 3 contains a bundle of 33 letters of support for the Gower Coalition, which was handed in at the inquiry by the Coalition. Finally, a written statement by Michael George, a local resident (Document 4.1), and a letter from the Civic Trust for Wales (Document 4.2) were also handed in at the public inquiry.

268. I have read all of these submissions, and they reiterate and reinforce many of the points made by objectors at the public inquiry (indeed, some of the letters are from the same people). Of particular interest are several letters that provide information on variations in levels of sand at other Gower beaches, e.g. Brandy Cove, Caswell Bay, Rotherslade Bay, Braclet Bay and Heatherslade Bay. The general theme seems to be that exceptionally low levels have occurred in recent years, though some recovery has taken place as a result of moderate winter weather. Although drawing on the individual knowledge and experience of the writers, the letters do not raise significant new matters, and I do not propose to include further details of them in this report.

Possible Licence Conditions

269. One of the matters on which the Assembly wished to be informed was the monitoring strategy and appropriate conditions to be attached if a favourable Government View were given. To assist in consideration of this LSDL put forward a set of draft conditions in its evidence to the public inquiry (Appendix IMG11 of Document 20.3). During the course of the inquiry 2 informal discussions were held on this subject, and outside the inquiry the parties held several more meetings and discussions. Over this period several revised drafts were produced (Documents 45.1, 45.4, 45.5 and 45.6) and several position and comments statements were produced by the various parties (Documents 45.2 and 45.3 by LSDL; Document 46 by CCW; Documents 47.1 and 47.2 by the City and County of Swansea; Documents 48.1 and 48.2 by the Coalition; Documents 49.1 – 49.4 by DEFRA; and Documents 50.1 and 50.2 by CEFAS). DEFRA had also submitted written comments in advance of the inquiry by letters dated 22 May 2006 and 19 June 2006 (see Document Bundle 2.3). These written notes, meetings and discussions contributed to general agreement being reached on most, but not all, matters. The revised draft conditions dated 6 July 2006 (Document 45.6) were produced following the final discussions at the inquiry, and I shall use them as the basis for this report.

270. Condition 1 deals with the duration of the licence, and the draft reflects LSDL's application for 15 years. Other parties point to IMADP Policy SP7 that licences for dredging in Category 2 sediment environments will normally be for 3-7 years, though the City and County of Swansea argues that a licence should be awarded for just 2 years to enable further studies to be carried out.

271. Condition 2 on the commencement of dredging is not contentious. Condition 3 defines the boundaries of the licence area and dredging zones, which are delineated on Plan LSDL1 (Plan E), and the only matter of dispute is whether an area along the northern boundary should be excluded as it lies nominally within the adjoining sediment category area, OBC12. Previous licences have not had any such exclusion.

272. Condition 4, maximum extraction rate, is one of the most contentious draft conditions. The LSDL draft has been amended from the original proposal to allow for a slower annual rate of increase in the extraction rate. The original proposal (and application) was for a rate of 150,000 tpa in the first year, rising in increments of 50,000 tpa to 300,000 tpa in the 4th year. In response to concerns about that rate of increase, LSDL now proposes annual increments of 25,000 tpa up to 300,000 tpa in the 7th year and thereafter. The starting level of 150,000 tpa is

intended to correspond to the highest past extraction rate of 142,000 tonnes over a 12 months period, though the average rate since 1993 has been much lower (approximately 90,000 tpa).

273. The Council argues that trials to check the rate of infill of the dredged trench are needed before any dredging at increased rates is contemplated and that, pending those trials, any licence should be limited to an extraction rate similar to that in the past. Furthermore, any additional incremental increases in the rate of extraction should be subject to similar trench infill tests (Document 47.2). LSDL is opposed to that approach as it considers the provisions for annual monitoring and review and the provisions for more extensive reviews at 3 yearly intervals (contained in other conditions) would provide an adequate control should unforeseen circumstances begin to appear as the rate of extraction increased. It also pointed to the practical difficulties of carrying out such a survey. CCW and the Coalition agree that any future licence should limit the maximum rate of extraction to one similar to the rates of past dredging.

274. Conditions 5 (maximum total quantity of aggregates), 6 (procedure for changing dredging zones), 7 (appointment of a fisheries liaison officer) and 8 (dredging equipment) were agreed by all parties. DEFRA had previously expressed concerns about the provision for "returning rejected material to the sea" in earlier drafts but now that the provisions have been clarified to refer specifically to "returning screenings and overspill material to the sea", which is part of the dredging operation itself, it is content with the condition. LSDL advises that Condition 9 (navigation and safety procedures) has been improved by drawing on DEFRA's advice and a similar condition applied to a Government View in the English Channel and that Condition 10 (notification of discovery of significant archaeological remains) follows standard industry protocol. There were no comments on these, other than a suggestion by DEFRA that it would be worth checking that they meet the requirements of the Maritime and Coastguard Agency (MCA) and CADW respectively.

275. The next group of conditions deals with surveys. Condition 11 covers the monitoring strategy and baseline surveys for bathymetry, benthos and seabed sediment composition. DEFRA has raised concerns about the provision for the Company to proceed with the baseline surveys if the monitoring strategy were not approved within the specified 3 months period. However, LSDL has confirmed that this would be entirely at the Company's risk and would not obviate the need to gain approval of the monitoring strategy and complete the baseline surveys in accordance with the approved strategy before dredging could begin.

276. Annual beach surveys are specified in Condition 12. It was generally agreed that the accuracy of the LIDAR surveys (Light Direction and Ranging, an airborne mapping technique) carried out in the past had been disappointing and that RTK (Real Time Kinematic) surveys would be preferred. The Coalition would like aerial photographs to be taken on a regular basis but LSDL considers these to be unnecessary, particularly as they are usually available commercially nowadays. All parties agreed it would be important to have a clear picture of the aim of the beach surveys and to ensure they would be "fit for purpose".

277. The annual bathymetric surveys are specified in Condition 13, and all parties agreed they should include sub-tidal transects that link to the beach survey profiles in order to gain improved information on sand movements between the 2 areas. CCW would wish to see the surveys carried out during the August/September period each year for consistency with past surveys, while LSDL would prefer June/July when weather conditions are likely to be most favourable. These surveys can take several weeks, or even months, if weather conditions are not suitable.

278. Condition 14 deals with benthic surveys, and the frequency and time of year for such surveys is in dispute. DEFRA and CEFAS maintain that the best time to carry out benthic surveys is

during the period February to May when populations are fairly stable. LSDL argues that they should be conducted in June/July for consistency with previous surveys and when weather conditions are most favourable. They say that many such surveys have been carried out elsewhere during the summer months without objection from DEFRA. As to the frequency of survey, LSDL proposes the schedule included in Document 45.2, i.e. a baseline survey followed by surveys in years 2, 5, 8 etc. timed to inform the 3-yearly licence reviews (which are the subject of another condition). DEFRA, CEFAS and CCW all argue that surveys would need to be carried out annually, at least initially, in order to establish an adequate database on the benthos species present. If these proved to be fairly stable, the frequency could be relaxed in future years.

279. There is no dispute about Condition 15 on post dredge surveys (the details of which would be subject to approval at the time), other than a suggestion by CCW that the condition should also be triggered if dredging were suspended. Condition 16 covers arrangements for survey reporting, and LSDL confirmed that these reports would include assessments of uncertainty.

280. Condition 17 specifies Bank volume thresholds to trigger, first, a warning of reduced volumes and then critically reduced volumes at which dredging would be suspended if the reduced volume were to persist. All parties agree that most of the variation in volume of the Bank is due to natural causes. The thresholds are intended to ensure that dredging activities would not exacerbate natural cyclical reduction in the volume of the Bank below critical levels. The threshold volumes selected in the draft condition are based on 90% and 95% confidence limits for the volume of the Bank above the -10 metre CD level based on the annual survey data over the period 1993 to 2005. Statistically, these thresholds would be expected to occur due to natural causes together with the effects of dredging at past rates once every 20 years and 40 years respectively. LSDL considers the 1988 survey data should also be used and that the most appropriate dataset would be the survey data from 2001 to 2005 together with 1988. CCW's draft interim Regulation 33 Statement established conservation objectives for the Helwick Bank feature in terms of the volume of the Bank above certain levels as measured by the surveys for the period from 2001 to 2005 (see Document 27.6) but CCW now argues strongly for the dataset from 1993 to 2005 to be used. LSDL has compared the implications of using the various datasets and found the threshold totals to be similar (Document 45.3). On this basis most parties now accept the condition as drafted.

281. The exception is CEFAS, which recommends a more complex hierarchical approach based on beach levels, Bank crest levels, volumes and areas, and recovery of the dredged trench. CEFAS argues that the simple thresholds contained in the draft condition are too limited to be robust and fail to address the identified risks. The CEFAS approach is explained in more detail in Document 50.1, which was submitted to the inquiry immediately before the closing submissions on the final day and was not subject to detailed discussion.

282. Conditions 18 and 19 deal with the annual review of monitoring results and the substantive (3-yearly) review. LSDL originally proposed substantive reviews at 5-yearly intervals, and other parties see the change to 3-yearly substantive reviews as a considerable improvement. DEFRA commented (Document 49.2) that the condition could usefully be rephrased to ensure that the review is a rigorous procedure; an example condition is contained within DCLG's Consultation Paper on Draft Marine Minerals Dredging Regulations and Procedural Guidance (June 2006), Annex C of which provides guidance on licence conditions (see Document 49.4).

283. The only comment on draft Condition 20 (survey requirements in the event that the licence is suspended) was from CCW that the benthic surveys should be continued, to which LSDL

reminded everyone that benthic surveys are very expensive. Finally, there were no comments on Condition 21 (vessel movements).

284. In addition to the draft conditions put forward by LSDL (as above), the Coalition asked for consideration to be given to the inclusion of a condition for the provision of compensation in the event of damage to the AONB features of the South Gower coastline. In connection with this, attention was drawn to a forthcoming EC Directive on Environmental Liability, which will hold operators whose activities have caused environmental damage financially responsible for remedying it (Documents 48.1 & 51).

285. DEFRA and CEFAS requested that their availability to provide further advice on detailed licence conditions be made known to WAG.

Inspector's Appraisal and Conclusions

[The numbers in square brackets indicate the relevant source paragraphs on which my appraisal and conclusions are based.]

Matters of Agreement

286. Several matters are not in dispute by any of the parties. The first is the importance of safeguarding the beaches and other features along the South Gower coastline both as a matter of principle and because of their importance to the tourism industry. The coastal features are important components of the Gower Area of Outstanding Natural Beauty and several National Nature Reserve and Geological Conservation Review sites and Sites of Special Scientific Interest, and any degradation of beaches, sand dunes or intertidal areas would be likely to cause material harm to these designated sites. [116, 117, 211, 225, 226, 252]

287. The quality of the Gower beaches is fundamental to the attraction of tourism, which is of substantial benefit to the economy of the Gower and Swansea area. In addition to the direct income attributable to tourism, the attractive character of the area and its beaches is an important factor in the quality of life of local residents and businesses and in the attraction of investment to Swansea. None of these matters is in dispute. What is at issue is whether or not the proposed dredging would be likely to adversely affect the nearby beaches and what degree of risk is acceptable for such a vital asset. [101, 102, 194-196, 227, 237, 238, 265]

288. Secondly, there is no real dispute about the importance of dredged sand to the South Wales market. 85% of supplies for the construction industry come from offshore dredging and, if that were not maintained, alternative land-based sources would have to be found with their own environmental implications. However, there is disagreement on the need for aggregates dredging to take place at this particular site. [20, 23, 106]

289. Thirdly, all parties agree that WAG's Interim Marine Aggregates Dredging Policy, South Wales, of November 2004, (referred to as IMADP) is the primary policy document against which the application is to be considered. It establishes the principles for future aggregates dredging in the Bristol Channel based on sound evidence and sustainability principles. [22, 163]

290. Fourthly, none of the parties has disagreed with the evidence presented by Llanelli Sand Dredging Limited (LSDL) that the dredging would not have an adverse impact on fisheries. The marine environment on the higher levels of the sandbank is naturally highly dynamic as a result of the influence of tidal currents and waves, and dredging operations would have little additional effect. The Countryside Council for Wales (CCW) takes no issue with regard to fisheries. [70-73, 84, 85]

291. I agree with the parties on these matters and do not intend to go into any further detail on them in this part of my report.

Main Considerations

292. The proposed dredging site lies within the Carmarthen Bay and Estuaries Special Area of Conservation (SAC), and Helwick Bank itself is a designated SAC feature, described as *"Sandbanks which are slightly covered by seawater all the time"*. Consequently, one of the main considerations is whether the physical impact on Helwick Bank would adversely affect the integrity of the SAC and, in particular, the conservation objectives for the sandbank feature. Appropriate assessment is needed in order to meet the requirements of the Habitats Directive and to enable the decision-maker to decide whether or not there is sufficient

certainty as to lack of adverse impact to support a positive decision. [11, 75, 112, 126-129, 148, 172, 173]

293. In my view, the other main considerations are whether or not there would be an unacceptable risk of the proposed dredging adversely affecting the nearby beaches of Gower, and whether or not it would be in accord with national policy contained in IMADP. [4, 11, 110, 206, 208]

Physical Impact on Helwick Bank

294. Helwick Bank is a large sandbank, approximately 14 km (9 miles) long, which has been a relatively stable feature for at least 100 years. Its size and position no doubt reflect the natural balance of circulatory currents in the Bristol Channel and the landforms around it. As such, the sandbank itself has a major influence on the natural balance of its surroundings and, if it were to become degraded as a result of excessive aggregates dredging, it would have a knock-on effect on the local pattern of currents and sediment transport paths and on the exposure of the nearby coastline to increased wave action. All parties agree that further dredging should only be allowed if one can be confident that it would not adversely affect the long-term stability of the Bank. [175, 181, 216]

295. Past studies have demonstrated that Helwick Bank is part of an "open" system, i.e. that it is affected by currents and sediment transport mechanisms from a much wider area. There is a predominant east-to-west movement of sediment in the Bristol Channel towards the Celtic Sea with major stores of sand in the Nobel Banks and Carmarthen Bay areas, amongst others. Sand reaches Helwick Bank mainly through the strong east-to-west currents in the deeper waters to the south, an element of which circulates round the western end of the Bank, and partly from Carmarthen Bay to the north-west. The east-to-west currents also carry sediment away from the western end of the Bank. There are weaker and less consistent sediment pathways in a west-to-east direction in the waters on the northern (landward) side of the Bank parallel to the coastline. [10, 41, 42, 63, 134, 135, 182, 203, 256]

296. Whilst the description above seems fairly simple, the reality is far more complex due to the ever changing balance of natural forces (tides, wind, waves, storms, weather, etc.) and the range of sediment particle sizes. Smaller grains of sand are more readily transported than larger grains both in suspension in the body of the water and along the seabed. The higher levels of Helwick Bank are in fairly shallow water, particularly at low tide, and water velocities are generally high so that the surface of the Bank is in a dynamic state. It is argued that that may be seen as an advantage so far as dredging operations in this case are concerned, as it ensures that the dredged trench (typically 1.5 metres wide by 0.2-0.3 metre deep) is quickly refilled and the impact of the extraction spread out over a wider area. [15, 42, 63, 216, 250]

297. The City and County of Swansea has submitted that further investigations should be carried out into the rate of refill of the trench, and that would indeed be an interesting research project. However, no evidence of a trench has been identified in the annual bathymetric surveys of the site, which suggests that rapid recovery has occurred at the rates of dredging carried out in the past. If similar rates were to continue in the future, such research could not be justified. However, it would be worth further consideration as a measure of the ability of the Bank to sustain higher levels of extraction should that take place. [42, 99, 181, 273]

298. It is not easy to gauge the likely physical impact on the Bank of the proposed future dredging as, whilst past studies and research have investigated the sediment transport patterns of this part of the Bristol Channel, they have provided qualitative but not quantitative analysis. The main quantitative evidence is the results of the annual bathymetric surveys carried out by LSDL since 1993. These provide a regular annual set of data on the volume of Helwick Bank,

including the volumes of its higher parts above the shallower water depths of 5, 10 and 15 metres below Chart Datum. This is the critical part of the Bank, and so variation in these volumes is a good indicator of its stability. [43, 137, 256]

299. CCW maintains that the Bank is in decline, as analysis of the survey data over the period 1993 to 2005 shows a statistically significant reduction in the volumes above all 3 levels. However, LSDL argues that the statistical analysis method used is flawed, that the dataset contains a discontinuity and that the results of an earlier survey in 1988 should also be used. The City and County of Swansea also disagrees with CCW's analysis. I do not intend to address the highly specialised matter of statistical analysis techniques in detail as it seems to me to be unnecessary in this case. In my view, a far more important factor is the comparability of the different sets of data. [44-46, 49, 52, 133, 138-143, 215]

300. From 1993 to 1997 the bathymetric surveys were carried out with the intention of measuring the crest line of the Bank and were taken along north-south lines. In 1998, at the request of the regulator, the methodology was changed with the express intention of providing better information for monitoring of the sandbank surface. Since 1998 the survey lines have comprised a network of both north-south and east-west lines. Consequently, the data used for CCW's analysis comprises 2 different sets of data, one from 1993 to 1997 and the other from 1998 to 2005. As they both provide a means of calculating the Bank volumes, at first sight they might appear comparable. However, when one considers that the sandbank is a long, thin feature running essentially in an east-west direction, one should not be surprised that the change of survey methodology appears to have introduced a discontinuity in the combined dataset. [48]

301. It is not disputed that statistical analysis of the 1993-2005 dataset shows a decline in the volume of the Bank over that period, regardless of arguments over the finer points of the analysis. However, it is also apparent that the volumes show a dramatic fall between 1997 and 1998, coincident with the change of survey methodology. It is highly unlikely that by pure chance such a substantial reduction in the Bank volume occurred at the same time as the survey change, and it is far more likely that the reduction (or at least a considerable part of it) merely reflects the change in the way of measuring the volume. Consequently, an assessment that ignores this is fundamentally flawed. [45, 47, 48, 180]

302. An alternative approach is to view the 2 sets of data separately, and the C&C of Swansea supports LSDL's report that they suggest 2 distinct trends: variable but reasonably consistent from 1993 to 1997; and variable but slightly upwards from 1998 to 2005. In my view, this is a more appropriate analysis of the data. [47, 180]

303. However, there is also much to be gained by taking into account earlier survey data where it is reasonably comparable. Three earlier surveys of Helwick Bank exist: 1886, 1937 and 1988. The 1886 and 1937 surveys were carried out for a different purpose, by different methods and to unconfirmed datum levels, and there is considerable doubt about their comparability with the modern data. However, all parties accept that the 1988 survey was carried out to modern standards and methodology (including a combination of north-south and east-west lines) and that its data is comparable. The only reason CCW did not use it in its analysis was because its timing was not consistent with the regular annual surveys from 1993 to 2005, i.e. it would be an "outlier" from the rest of the data. Nevertheless, it provides useful information from an earlier date. [46, 47, 141]

304. If the 1988 survey is included, the data indicates an increase in Bank volume between 1988 and 1995, a slight fall to 1997, a sudden plunge from 1997 to 1998, and a variable but rising trend since. The picture is essentially of a sandbank subject to natural variation with no evidence that dredging operations over that period have had any harmful effect on the

topography of the Bank. That is the view taken by the City and County of Swansea, and it is the conclusion that I have reached. As the sediment regime is influenced by periodic extreme storm events, natural variation over time is to be expected. [47, 51, 54, 138-143, 181]

305. During the period 1993-2005 annual dredging rates at Helwick Bank have varied from 51,000 to 119,000 tonnes per annum, and the average has been a little under 100,000 tonnes per annum. The maximum extracted over any single 12 months period has been 142,000 tonnes. I conclude that these rates of aggregate extraction are unlikely to have any adverse impact on the volume of the upper parts of the Bank. [12]

306. The application is for a maximum rate of extraction of 300,000 tonnes per annum, which is considerably more than previously dredged, and it is much more difficult to anticipate the effects of such increased dredging. LSDL has proposed a gradual increase in the maximum rate from 150,000 tpa in the first year, rising by 25,000 tpa increments to 300,000 tpa in the 7th and subsequent years, coupled with a detailed monitoring strategy to identify early signs of any adverse impact so that measures could be taken to prevent it continuing. Clearly that would involve restricting any further increase in the rate of dredging. Whilst that would be a constructive and pragmatic approach, I do not consider it would provide an adequate safeguard against long-term damage to the Bank. The natural variations in sandbank volume are far greater than the planned rates of aggregate extraction and would tend to mask the effects of dredging over the short periods of intermediate monitoring proposed. It would not be possible to tell whether each incremental increase had any effect on Bank volume trends until survey data had been collected for several years, by which time several more increments would have occurred. [14, 176, 246, 273]

307. I conclude that the impact on the topography of the Bank of significantly increased rates of dredging cannot be predicted with any confidence. The Council has suggested that further modelling work should be carried out to quantify sediment movement patterns in the area, and that work might provide predictions of suitable confidence. However, on the basis of present evidence, my favourable conclusions do not extend beyond the rates of dredging carried out and licensed in the past. [201, 202, 263]

Impact on Designated SAC and SPA Features (Appropriate Assessment)

308. The application site lies wholly within the Carmarthen Bay and Estuaries SAC, and the route of the dredger to and from its base at Burry Port would be through the Burry Inlet Special Protection Area (SPA). As the project is not directly connected with or necessary to the management of these designated sites, Article 6(3) of the Habitats Directive (Directive 92/43/EEC) requires that it be subject to appropriate assessment of its implications for the sites in view of their conservation objectives. IMADP advises that the Habitats Regulations 1994 do not implement the Directive for applications such as this and are not directly applicable to it. Nevertheless, there is no dispute that the Directive should be applied or that the guidance provided in the Regulations on how that should be done is useful and relevant. [74, 75, 112, 170, 171]

309. There is also no dispute on the level of test required for an appropriate assessment. Article 6(3) says *"the competent national authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned"*. Legal judgements have provided further clarification of this to the effect that the competent authority has to be *"certain"* the project will not adversely affect the integrity of the site, and *"that is the case where no reasonable scientific doubt remains as to the absence of such effects"*. There can never be an absolute guarantee, and further legal judgement has also established that *"the most that can be expected of a competent authority is to identify the potential risks, so far as they may be reasonably foreseeable in the light of such information*

as can reasonably be obtained, and to put in place a legally enforceable framework with a view to preventing these risks from materialising". Thus, legally enforceable conditions and management strategies are to be taken into account. [92, 109, 126-128, 172, 251]

310. It is also accepted that the precautionary principle is inherent in the tests, that the burden of proof lies with the Applicant to show lack of harm, and that if there is any reasonable doubt as to lack of harm, then permission should not be granted for the project. [130, 266]

311. The Gower Coalition has referred to Regulation 49 (which corresponds to Article 6(4) of the Directive), which allows for projects to be approved for reasons of overriding public interest and where there are no alternative solutions. However, LSDL makes no argument in this respect and relies on demonstrating there would be no adverse effects on the various SAC features. Therefore, no consideration needs to be given to Article 6(4). [244, 245]

312. Turning to the appropriate assessment itself, there is some confusion as to the status of CCW's Regulation 33 Advice published in June 2005, as it is titled "Draft Interim Advice" and, in some respects, is considered by CCW to be out of date. LSDL has referred to the appropriate assessment carried out by WAG before making its decision in 2003 to extend the previous licence, which was carried out before the conservation objectives were fully defined. However, even though the Regulation 33 Advice is ill-titled, it provides the most comprehensive basis for the assessment. Indeed, I note it was referred to in WAG's March 2006 decision on the application for a licence for the extraction of marine aggregates by dredging in Area 476 Nobel Banks, when its status was clearly taken to be substantive. Furthermore, although that Advice reports the Helwick Bank feature to be in favourable conservation status, it is not unreasonable for CCW to now say that it considers the Advice to be out of date in that respect as a result of its consideration of more up to date information as part of its ongoing review of all designated European sites in Wales, which is required for reporting to the European Commission in the near future. Consequently, I consider the appropriate assessment should be based on the conservation objectives identified in the Regulation 33 Advice but subject to CCW's latest position in regard to the Helwick Bank feature and to the other evidence presented to the public inquiry. [52, 55, 76, 78-91, 118, 119, 123, 125, 149, 162, 173, 174]

313. Having said that, I do not endorse CCW's latest position. As explained above, I do not accept CCW's argument that Helwick Bank is in decline. Furthermore, CCW's current advice with regard to the unfavourable status of the Bank is different to the advice it provided to WAG in 2005 even though the only additional evidence available since that time (the 2004/05 bathymetric survey data) shows an increase in the volumes of the Bank. There is an element of inconsistency in CCW's advice. [50-53, 55]

314. The appropriate assessment is required to consider the integrity of the site, and this is related to its conservation objectives, which is a statement of the measures needed to maintain or restore favourable conservation status for the specific features and environmental conditions of the designated site. CCW's letters to WAG dated 6 May 2005 and 9 August 2005 provided formal advice on the need for appropriate assessment and identified 3 particular features as requiring attention: the large shallow inlets and bays communities and the sublittoral sandbanks of the SAC and the common scoter of the SPA. LSDL has provided particular information on these to inform the assessment [summarised in paragraphs 77-85], and most aspects are not in dispute. CCW's advice is that the proposed dredging operations would not adversely affect any conservation objectives of the SAC or SPA other than Helwick Bank itself. Nothing I have read or heard leads me to doubt that advice, except in regard to the Helwick Bank feature to which I now turn. [75-85, 113-115, 120, 124, 153, 173]

315. Within the SAC Helwick Bank is identified as a "sandbanks slightly covered by sea water at all times" feature. It is defined as "Sublittoral sandbanks, permanently submerged, with water depth seldom more than 20 m below Chart Datum". The impacts of aggregates extraction may be direct or indirect. Direct effects would be short-term, as the dynamic nature of the environment would ensure rapid recovery of disturbed benthic communities, suspended sediment levels would quickly return to normal, and many species would be able to avoid the dredge completely. CCW advises that such short-term impacts are considered to have little adverse effect on the relevant conservation objective. CCW's only concern is for long-term indirect effects resulting from possible decline in the height of the Bank, as that would change its topography and the biological communities of that part of the Bank. [81- 85,114, 121, 122, 145-147, 150]

316. CCW's Regulation 33 Advice established performance indicators for Helwick Bank in terms of its volumes above certain levels (relative to Chart Datum) during the period 2001-2005, as measured by LSDL's annual bathymetric surveys. However, CCW now considers a better way to assess its performance is by statistical analysis of the dataset for the period 1993 to 2005 and, on the basis of that, argues that the Bank is in decline. I have considered that argument above and concluded that it is incorrect. My own conclusion is that a review of past bathymetric survey data for the Bank does not give any indication of decline but of a sandbank subject to natural variation due to the periodic nature of its influences and with no evidence that dredging operations over that period have had any harmful effect on the topography of the Bank. [121-123, 174]

317. So far as the current application is concerned, I conclude that aggregates dredging at rates similar to those carried out and licensed over the period 1993 to 2005 would not adversely affect the volumes and levels of the Bank. Subject to such a limit on the maximum rate of extraction, I am satisfied beyond reasonable scientific doubt as to the absence of such effects, and I consider that the level of test required for the assessment has been met. Past extraction rates have averaged almost 100,000 tpa; the most extracted over a 12 months period was 142,000 tonnes; and the maximum permitted extraction rate was 150,000 tpa (in the licence from 1998 to 2003). On this basis, I consider a licensed maximum extraction rate of between 100,000 tpa and 150,000 tpa to fall within this part of my conclusions. On the evidence of past operations (both at this and other dredging sites), it is unlikely the maximum licensed rate would be dredged very often, as business needs inevitably vary from year to year. Consequently, and bearing in mind the comprehensive regime of monitoring and control provided by the licence conditions, I consider the necessary level of confidence would be provided for the maximum rate of dredging to be set at 150,000 tpa. [12, 34, 94, 100, 105, 156]

318. However, I am not satisfied that the case has been demonstrated so far as higher rates of extraction are concerned. I have concluded in the section above that it is not possible to assess the possible impact of higher rates of extraction on the evidence available and that the proposal by LSDL to increase the maximum extraction rate gradually over several years while monitoring the results would not provide an acceptable degree of control to safeguard against possible long-term damage to the integrity of the Bank. Consequently, there is considerable scientific doubt as to the possible effects, and I do not consider the appropriate assessment test to be satisfied for higher rates of extraction. [151, 152]

319. No noticeable "in combination" effects have been alleged, and I do not consider any to materially affect my conclusions. My main conclusion is that, subject to a suitable monitoring strategy and licence conditions, including limiting the maximum extraction rate to 150,000 tpa, the proposed dredging would have no adverse effects on the conservation status of the qualifying features of the SAC or SPA. [86]

320. Objectors have made particular mention of the requirements of both the Habitats Directive and the Habitats Regulations that, if it considers it appropriate, the competent authority will obtain the opinion of the general public. In addition, the Regulations require the competent authority to *"consult the appropriate nature conservation body and have regard to any representations made by that body"*. The extensive Government View procedures and the holding of the public inquiry, at which representations were heard from CCW, the Gower Coalition representing a wide range of the general public, and from other members and representatives of the general public, have ensured that these requirements have been met. However, WAG is not bound to accept the advice and views put forward and may, indeed should, reach its own conclusions on the evidence put before it. [110, 111, 129, 206, 207, 247, 248, 251, 253, 267]

Impact on Gower Beaches

321. The Gower Coalition, in particular, has expressed concern about possible implications for the beaches of South Gower if dredging were allowed to continue at Helwick Bank. An extensive and wide range of evidence has been put forward to demonstrate the vulnerability of the coastline, and in particular the beaches, to change. Evidence is based on the knowledge and experience of many local residents in the form of photographs, diaries and personal recollections, and these leave little doubt about the effects of the forces of nature (perhaps supplemented by man) on these features. [56, 191, 220, 229-233, 239-241]

322. It is widely recognised that beaches are subject to variation both seasonally and over longer cycles. They experience the general principle of "winter loss, summer gain" whereby sand is often eroded from the beach during winter storms and gradually recovered during the generally calmer weather of the summer. This cycle is often not balanced within a single year, and several witnesses have described particularly severe winters when some beaches have been left very low on sand only to fully recover as a result of a series of less severe winters over the following years. Cycles may even occur over much longer periods of time. In addition, beach sand is subject to littoral drift, which tends to move sand from one end of the beach to the other due to predominant directions of tidal currents. [61, 221, 222]

323. Since 1993 it has been a condition of LSDL's various dredging licences that regular surveys be carried out along a series of cross-sectional profiles on each of the main beaches in the area, and since 1998 these have been supplemented by additional surveys following storm events and by annual aerial laser scanner (LIDAR) surveys. Analysis of these surveys shows no correlation between the volumes of sand on the beaches and either the volumes of sand on Helwick Bank (from the bathymetric surveys) or the volumes of sand extracted at that time. With the exception of the Port-Eynon/Horton beach (to which I will return later), the surveys also show no long-term trend of deterioration of the beaches in terms of sand loss. [60, 61]

324. The C&C of Swansea has confirmed its support for these analyses, though several local residents have questioned the accuracy of the surveys and their apparent failure to indicate variations in beach levels, which have been clearly apparent to people familiar with the beaches on a daily basis. Several reasons have been suggested for this but the most likely would appear to be that the surveys only record beach levels at particular positions on the beach and at particular "snapshots in time". Clearly, they fail to record many variations in the beaches between these times and positions but I am satisfied they provide a reasonable indication of long-term trends. [67, 189, 210, 218]

325. The surveys do, however, fail to provide a means to better understand the variations in levels of sand on the beaches, and it has been suggested that in future (if dredging were allowed to continue) they should be linked to the bathymetric survey profiles in the bays. This would

help in tracking the movement of sand between onshore and offshore locations, and provision for it has been included in the recommended licence conditions. [190, 200, 203]

326. LSDL's evidence on beach surveys is supplemented by that in its Coastal Impact Study, which included detailed computer modelling of waves travelling over Area 373 on their way to the coastline. Some local residents have commented on the protection that Helwick Bank provides to the nearby coastline, shielding it from the most extreme impacts of storm waves, and it has been reported that waves are regularly seen breaking in the shallow water over the Bank. The computer modelling work showed that, even if the most extreme assumptions were applied (e.g. 15 years volume of dredging removed instantaneously, and the most extreme storm waves), it had no significant effects on wave conditions passing the Bank towards the shore. This illustrates the relatively small volume of the proposed dredging compared with the dimensions of the Bank itself and the natural variations to which it is subject regardless of dredging activities. [62, 137, 223, 264]

327. A particular weakness in LSDL's case is its failure to adequately deal with the findings of the tracer studies carried out in 1999 and reported in the 2000 BCMA report (Bristol Channel Marine Aggregates: Resources and Constraints Research Project). Although the particle sizes used in that study were not particularly representative of the majority of the Helwick Bank material, it demonstrated a link between the East Helwick area (i.e. the eastern part of Helwick Bank) and the adjacent beaches, albeit a fairly weak link. Most of the sand on Helwick Bank is of a larger grain size than the tracer material and so is less disposed towards transportation, and that is reflected in the generally smaller grain size of sand on, for example, Port-Eynon beach. Nevertheless, there is a link, and there can be little doubt that sediment can be transported between the Bank and the nearby beaches. LSDL has acknowledged that in its Statement of Common Ground with the C&C of Swansea prepared during the course of the inquiry. [65, 183-187, 216]

328. In order to better understand that link and its potential for transporting any meaningful quantity of sediment, the C&C of Swansea has suggested further studies be carried out in conjunction with a short (2 years) dredging licence. If such a study could provide a reasonable estimate of the quantities of sediment transport involved for a range of dredging regimes and rates then it would be very useful. However, it would not be appropriate to make such a study a condition of a licence because of its wider and more strategic scope. In the absence of such a study, the only evidence on the quantity of sediment likely to be transported between the Bank and the beaches is provided by the 1999 tracer study which, although it identified a link, suggested the quantities involved would be quite small. [176-179, 188, 193]

329. I now turn to consider Port-Eynon/Horton beach, which is a clear exception to the conclusion that the Gower beaches do not seem to show evidence of long-term decline. Evidence has been presented that the beach had plentiful high quality sand during the 1960s and 1970s and that some was still present as recently as 1995. However, the beach is in poor condition nowadays. Its level is considerably lower than 30-40 years ago and there are extensive areas of exposed underlying deposits, both rock and softer materials, including peat. There is conflicting evidence as to whether this has been exposed before. Some local residents argue that the nature of the exposed peat shows it has not been previously exposed for hundreds, perhaps thousands, of years. However, LSDL has researched old Ordnance Survey maps that indicate similar amounts of exposure in the late 19th and early 20th centuries. Whichever is correct, there is little doubt that the overriding reason for the deterioration of the beach since the 1970s had been the loss of sand to the dune area behind the beach rather than any offshore dredging. [56-59, 217, 239-241]

330. The dune area appears to have suffered considerable erosion in the past as a result of wartime activities and the increase in tourism visitors during the 1960s. Between the late 1970s and the early 1990s measures were taken to reverse that erosion and to reinforce the dunes by the entrapment of sand. That was extremely successful. However, it appears to have been achieved at the expense of the sand resource on the beach, which became degraded in parallel with the accretion of sand in the dunes area. All of that occurred before LSDL began aggregates dredging at Helwick Bank in 1993. Previous dredging had taken place in the wider area since the 1960s but at a much lower rate and, if dredging had been a significant cause of the deterioration of the beach, one would have expected it to have accelerated from 1993 onwards. That does not seem to have occurred. In fact, none of the evidence demonstrates any relationship between the deterioration of Port-Eynon beach and the offshore dredging activities. By comparison, there is evidence of similar circumstances arising about 100 years ago, though the Council expert has even suggested the beach may be in natural long-term decline. [57-59, 192, 217]

331. Taken as a whole, my first overall conclusion is that the evidence shows no relationship between sand levels on the nearby beaches and the offshore dredging activities that have taken place since 1993. Consequently, it would be unlikely that future dredging at a similar rate would have any detrimental impact. The Gower Coalition has acknowledged there is little evidence of such a link and that beach conditions are predominantly affected by natural forces. However, it argues that the extraction of sand offshore from the beaches would tend to exacerbate any loss of sand and that the precautionary principle should be applied to such circumstances. I have taken that into account but it has limited application where there is so little evidence of harmful effects and what evidence there is supports the case for negligible effects. [66, 193, 205, 208, 209, 233]

332. My second general conclusion is in respect of increased rates of dredging. As the 1999 tracer study indicated sediment links between Helwick Bank and the adjoining beaches, albeit fairly small, it is difficult to anticipate the effects an increased rate of dredging might have. Studies to date have not quantified the sediment transport patterns and, indeed, further research could usefully be done into that. In the absence of such information and bearing in mind the importance of the beaches to both the AONB and the area's economy, I consider a cautious approach should be taken towards the proposal for increased dredging. It is not possible to be confident that it would not affect the sand levels on the beaches and, for this reason, I consider it would be prudent to refuse any significant increase in the rate of dredging at Helwick Bank. [224, 236, 246]

Compliance with National Policy

333. Finally, I turn to consider the proposal against the national policies contained in the Interim Marine Aggregates Dredging Policy, South Wales, dated November 2004. The basic principle of the document is established by Strategic Policy SP1, which says *"the use of marine dredged sand and gravel will continue for the foreseeable future but only where this remains consistent with the principles of sustainable development"*. During the course of the public inquiry there was much reference to sustainability in the context of environmental protection. However, one must remember that the definition of sustainability in wider national policy also encompasses the prudent use of natural resources, social progress and the maintenance of high and stable levels of economic growth. Therefore, the need for the aggregate is also an important factor. [21, 24, 104, 255]

334. Policy SP2 expresses the intention that *"aggregates dredging will progressively, over the next ten years, become focused in areas off-shore and to the West of the Bristol Channel"*, and this policy is supported by guidance based on 3 categories of sediment environment. The

application site lies within a Category 2 sediment environment where *"the Assembly will adopt a precautionary approach"*. Clearly, this involves a thorough appraisal of possible environmental implications and an assessment of the risks involved. Many views have been expressed on interpretation of the precautionary principle, and I have taken these into account in reaching my conclusions. The precautionary principle is inherent within the appropriate assessment requirements of the Habitats Directive for the designated European sites. It is also IMADP's intention that it should be applied to the wider appraisal of applications for dredging licences in Category 2 sediment environments. Accordingly, it has been the cornerstone of my consideration of all aspects of this application, including the possible physical impacts on Helwick Bank itself and possible secondary impacts on the SAC and SPA features and the nearby beaches of Gower. [24, 27, 30, 131, 132, 164, 208, 213, 214, 234, 235, 242-244, 250, 257, 258]

335. Several other IMADP policies are relevant to the particular environmental matters raised by this application, and I consider it to be fully in accord with the aims and intentions of all of those policies. It is also in line with the aim of Strategic Policy SP2 to focus future dredging further offshore and to the west than has previously been the practice in the Bristol Channel. It was recognised when IMADP was adopted that one implication of the policy would probably be the need for increased dredging at Helwick Bank. Some objectors have mentioned another licence application for dredging in deeper waters even further offshore and to the west than Helwick Bank (understood to be in Area 486), which may reduce the policy need for aggregate extraction at Helwick Bank. However, it is likely to be several years before that application is resolved and, in the meantime, the current proposal would make a useful contribution towards the aims of Policy SP2. [24-26, 34, 35, 166, 212, 245]

336. Strategic Policies SP3 and SP4 aim to maintain an adequate supply of aggregates, SP3 in terms of *"maintaining a licensed capacity within Welsh waters of up to 2 million tonnes per annum"* and SP4 by seeking to *"maintain licensed dredging reserves at between five and fifteen years supply"*. The aim of 2 million tonnes per annum (mta) takes into account the operational needs for flexibility in managing demand and quality of material, and it has been argued that 1.7 mta would make adequate provision for this. However, whichever target were adopted, there is currently a substantial shortfall, which will increase even further when dredging at Nash Banks ceases, which is expected to be in 2010. [31, 32, 154-156]

337. Calculation of the supply of licensed reserves depends on a number of assumptions and, even using the same base data (including Nobel Banks), different estimates were presented by LSDL and CCW ranging from 5.76 years to 8.7 years; i.e. that, without additional licences, reserves will fall to the minimum target level between now and mid-2010. The inquiry participants were only aware of one other licence application having been made (for Area 486 as mentioned above), and it is unlikely that will be resolved for several years. Thus, without the award of a licence for further dredging at Helwick Bank, licensed reserves of aggregate will fall towards or below the minimum target required by Policy SP4 within the next 4 years and possibly sooner. I conclude that the award of a licence for Helwick Bank would make a useful contribution towards maintaining the policy aims of Strategic Policies SP3 and SP4. [13, 33, 154, 157, 159]

338. The other strategic policy that warrants detailed consideration is Policy SP7, which states: *"A favourable GV within a Precautionary Sediment Environment would normally support a licence for between three and seven years, in a Favourable Sediment Environment for up to fifteen years"*. The current application is for a site in a precautionary sediment environment and yet is for a licence period of 15 years. LSDL argues that the supporting text of the policy makes it clear that the period of time for which a favourable Government View is given is site specific and that the periods in the policy are intended as guidance rather than

prescription. It maintains that, in this case, the long history of surveys and monitoring associated with the previous licences, taken together with the evidence of lack of harm caused by those operations, gives high levels of confidence to justify the long licence period sought. LSDL also draws attention to the lengthy period of time and high costs involved in the application procedures (some 6 years so far in this case) to further justify consideration of a lengthy licence period on grounds of practicality. [29, 36, 37, 96, 165]

339. There is some merit in the Company's arguments, particularly when considered in conjunction with the conclusions I have reached on other matters based on the maximum annual rate of extraction not exceeding 150,000 tonnes. In view of the history of dredging at the site at licensed rates comparable with those that I now conclude would be appropriate, the evidence of lack of harm caused by that past dredging, the general consistency with the aims of national policy, and the strong controls provided by the proposed licence conditions, I consider a licence for a period of at least 7 years would be appropriate and that it would not be inconsistent to award a licence for a period higher than 7 years. In my view, a period of 10 years would be in line with the aims of the policy. [36, 37]

340. The C&C of Swansea has suggested a 2 year licence should be awarded in order to enable further studies in sediment transport pathways and quantities to be carried out. Whilst it would be useful to carry out such studies (as explained above), such a licence period could not be justified in view of my favourable conclusions on the key environmental impacts for the rate of extraction above. [38, 96, 161]

341. Overall, my conclusions are that the proposal would be in accord with the policies of IMADP, provided the maximum rate of extraction is limited as described. [39, 107]

Overall Conclusions

342. I deal below with particular conclusions on each of the suggested conditions, and my overall conclusions take those into account.

343. I have detailed above the matters on which the parties were agreed, and I have seen no evidence to lead me to draw any other conclusions on those matters. My detailed consideration has concentrated on the physical impact on Helwick Bank, the impacts on the designated SAC and SPA features and on the beaches of Gower, and the degree of compliance with national policies contained in IMADP. All of the matters on which the National Assembly for Wales particularly wished to be informed have been considered and covered in my conclusions.

344. My conclusions with regard to physical impact on the Bank are that there is no evidence that past rates of dredging have had any detrimental effect, and it is unlikely future dredging would be harmful provided it were limited to similar maximum extraction rates. However, I do not consider the impact of the gradual increase in extraction rate proposed by LSDL could be adequately assessed in the short intermediate periods of time involved, and I do not have sufficient confidence in the likelihood of lack of harmful impact to conclude such an expansion should be allowed.

345. I have considered the matters to be dealt with in appropriate assessment of the project to meet the requirements of the Habitats Directive. CCW's advice is that the project would not adversely affect the integrity of the European site in connection with any designated features other than the Bank itself, and I have seen no evidence to lead me to disagree with CCW on any matters other than Helwick Bank. So far as the conservation objectives of Helwick Bank are concerned, I am satisfied beyond all reasonable scientific doubt as to the absence of

adverse impact from dredging at rates similar to those practised in the past. However, I do not consider the appropriate assessment tests to have been satisfied for higher rates of extraction.

346. Similarly, I conclude that dredging at rates comparable with past operations would be unlikely to be detrimental to the retention of sand levels on the nearby beaches but that the absence of evidence on the effects of higher rates prevents me drawing any confident conclusions for that scenario. Consequently, and bearing in mind the importance of maintaining the high quality of the beaches, I consider it would be prudent to refuse dredging at significantly higher rates.

347. Finally, I conclude that the proposal, appropriately limited in terms of the maximum extraction rate and subject to suitable monitoring and control conditions, would be in accord with the policy aims of WAG's national policy on marine aggregates dredging. I present conclusions below on the details of those conditions.

Monitoring Strategy and Licence Conditions

348. A comprehensive set of draft licence conditions was discussed at the public inquiry. In addition to specifying the scope and extent of the proposed dredging operations, the conditions would cover mitigation, monitoring and regulatory measures and arrangements for navigation, maritime and fisheries liaison provisions. Many of the draft conditions were not contentious. However, some would need to be amended if a favourable Government View were to be considered. My conclusions on disputed conditions are detailed below. [93, 100, 103, 269, 274]

349. The record of past dredging at Helwick Bank and the wealth of data already available would certainly justify a licence period corresponding to the normal maximum of 7 years for a precautionary sediment environment, as specified in IMADP Policy SP7, and in my view, the particular circumstances of this application may even be considered to warrant a longer licence period of, say, 10 years. On balance, I conclude that 10 years would be an appropriate licence period in Condition 1. [29]

350. With regard to Condition 3, I do not consider the alleged nominal overlap with the adjoining sediment environment OBC12 to be of any significance; it merely reflects the level of inaccuracy of the maps delineating the boundary between the 2 areas rather than an actual change in the nature of the environment. Consequently, I do not consider there is any need to exclude any part of Area 373 from the scope of the licence. [28, 271]

351. Condition 4 specifies the maximum rate of extraction and, in accordance with my conclusions above, I consider it should specify 150,000 tonnes per annum and no provision for the increased rates sought by the applicant. That, together with the 7 or 10 year period for the licence, would have a knock-on effect on the total quantity of aggregates specified in Condition 5. [95, 272]

352. In Condition 11, I consider DEFRA's concerns to be misplaced, as any early start to the surveys would be entirely at LSDL's risk and would not jeopardise the essential intention of the condition, which is that the dredging operations shall not commence until the baseline survey has been completed in accordance with the Approved Monitoring Strategy. If survey work were carried out that did not accord with the Approved Strategy, it would not enable the dredging operations to commence. The condition, as worded, makes that quite clear. The same principle applies to Condition 12, which makes adequate and appropriate provision for the beach surveys. I do not consider anything further would be gained by requiring aerial photographs to be taken as a condition of the licence. [275, 276]

353. With regard to the timing of the bathymetric and benthic surveys specified in Conditions 13 and 14, I consider the aims of practicality and consistency would be best achieved by carrying out the surveys in June/July when weather conditions are likely to be most suited. As for the benthic surveys, as the proposed baseline survey would be supported by other surveys carried out in the past and there is general agreement that dredging would have negligible direct effect on the sparse benthic populations on the higher levels of the sandbank, I can see no justification for requiring surveys to be carried out every year, even initially. I consider the frequency proposed by LSDL to be adequate. For similar reasons, I do not consider it necessary to change Condition 20 with regard to benthic surveys. [97, 98, 277-279, 283]

354. Condition 17 would provide for Bank volume thresholds, and in practical terms the final draft proposed would be acceptable to all parties. Although most of the variation in Bank volume is due to natural forces, if it were to reduce to the thresholds set it would be a wise precautionary measure to apply the controls specified in Condition 18 to reduce the risk of dredging operations further contributing towards even greater reductions in Bank volume, thus improving its chances of recovering more quickly. In view of the limited licence period now recommended, there would be little to be gained by considering a complex hierarchical approach, as suggested by CEFAS; simplicity is preferred. [94, 198, 199, 204, 280, 281]

355. DEFRA has suggested Condition 19 (Substantive Review) could usefully be rephrased to ensure that the review is a rigorous procedure, and I have considered the guidance to which reference was made. However, I consider the combined requirements of Conditions 16, 18 and 19 would provide WAG with an adequate level of control to safeguard the environment. [282]

356. Finally, I consider there is no justification for a condition for the provision of compensation in the event of damage to the environment occurring, as requested by the Gower Coalition. If (for example) a nearby beach were to deteriorate, it would not be possible to prescribe the cause of the harm by means of a condition when the natural factors are so variable, and such a condition would not be enforceable. [284]

Recommendations

357. I recommend that a favourable Government View be given for the award of a licence for the extraction of marine aggregates by dredging in Area 373 Helwick Bank, subject to conditions as detailed in the Annex to this report.

358. Notwithstanding the full extent of the licence application made, I recommend that the favourable Government View be given for a licence restricted to a maximum extraction rate of 150,000 tonnes per annum and for a period not exceeding 10 years.

Clive Nield

Inspector

APPEARANCES

FOR LLANELLI SAND DREDGING LIMITED:

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Mr Ian Taylor, BSc	Resources & Development Manager for Royal Boskalis Westminster Group – Llanelli Sand Dredging Limited, Westminster House, Crompton Way, Segensworth West, Fareham, Hampshire, PO15 5SS
Dr Alan Brampton, BSc, PhD	Technical Director, HR Wallingford Limited.
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He called:	
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Dr Kirsten Ramsay, BSc, PhD	Senior Subtidal Ecologist, CCW.
Dr Siegbert “Ziggy” Otto, BSc, MSc, PhD	Estuarine and Coastal Scientist, Marine and Freshwater Sciences Group, CCW.
Mr Richard Bate, MA, MPhil, MRTPI	Senior Partner, Green Balance (planning and environment consultancy).

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Mr Eric Owen of Counsel	Instructed by Ms Janine Townsley, Solicitor, City and County of Swansea.
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Mrs Susan Kent	"Save Our Sands" Coordinator. Y Wenllys, Caswell Bay, Swansea, SA3 3BM.

OTHER INTERESTED PERSONS:

Mrs Edwina Hart AM	Representative for Gower, NAW.
Mr Allan Cairns AM	Representative for South Wales West Region, NAW.
Mr Martin Caton MP	MP for Gower, Houses of Parliament.
Mr John Harding	The Old Rectory, Ilston, Gower, SA2 7LD.

DOCUMENTS

Documents	1.1-1.10	Lists of persons present at the inquiry on each day.
Documents	2.1-2.4	Bundles of correspondence from third parties, including Martin Caton MP and Cheryl Gillan MP.
Document	3	Bundle of letters submitted to Inquiry by Gower Coalition.
Documents	4.1-4.2	Written statement and letter submitted to Inquiry by Mr Michael George and the Civic Trust for Wales respectively.
Documents	5.1-5.2	Lists of Appearances on behalf of Llanelli Sand Dredging Limited and City and County of Swansea.
Document	6	Note presented by Countryside Council for Wales concerning their advocate's sickness.
Documents	7.1-7.4	Opening Statements on behalf of the Gower Coalition, C&C of Swansea, CCW and Llanelli Sand Dredging Ltd respectively.
Documents	8.1-8.3	Statements of Common Ground: 2 between LSDL and C&C of Swansea; 1 between LSDL and CCW.
		LLANELLI SAND DREDGING LIMITED EVIDENCE
Documents	9.1-9.3	Mr Irvine's Statement of Evidence, Summary and accompanying Appendices MI1 – MI9.
Documents	10.1-10.3	Additional evidence submitted at Inquiry relating to matters dealt with by Mr Irvine: letter from Agent to CCW dated 15 June 2006; note on draft monitoring strategy and survey frequencies; and note on potential impacts on interest features of the SAC, SPA and Ramsar sites to inform the appropriate assessment.
Documents	11.1-11.2	Mr Taylor's Statement of Evidence and Summary.
Documents	12.1-12.2	Additional evidence submitted at Inquiry relating to matters dealt

		with by Mr Taylor: additional note on potential tonnage requirements; and corrections to evidence.
Documents	13.1-13.2	Dr Brampton's Statement of Evidence and Summary.
Documents	14.1-14.3	Additional evidence submitted at Inquiry relating to matters dealt with by Dr Brampton: CCW letter to WAG dated 9 August 2005 concerning Regulation 33 advice on conservation objectives for the Carmarthen Bay and Estuaries SAC; extract from 2003 report on the North Norfolk Coast Coastal Habitat Management Plan; and comment on Professor Pethick's supplementary evidence.
Documents	15.1-15.3	Dr Davies' Statement of Evidence, Summary and Technical Drawings (latter also provided as A3 size folder).
Documents	16.1-16.4	Additional evidence submitted at Inquiry relating to matters dealt with by Dr Davies: letter to CCW dated 26 October 2004 concerning error margins in bathymetric surveys; comments on Ms Musgrave's evidence; note on the boundary between sediment environments OBC11 and OBC12; and note for site visits to Port Eynon and Oxwich beaches.
Document	17	Dr Henderson's Statement of Evidence.
Documents	18.1-18.2	Additional evidence submitted at Inquiry relating to matters dealt with by Dr Henderson: additional comments on time series analysis; and extract from StatSoft Electronic Statistics Textbook on time series analysis.
Document	19	Joint Rebuttal Statement of Professor Pethick's evidence by Dr Brampton, Dr Davies and Dr Henderson.
Documents	20.1-20.3	Mr Gilder's Statement of Evidence, Summary and accompanying Appendices IMG1 – IMG11.
Documents	21.1-21.4	Additional evidence submitted at Inquiry relating to matters dealt with by Mr Gilder: February 2002 Government decision and Inspector's report on planning permission for sand-winning at Southport, Lancashire; extract from deposit draft UDP on tourism policies; extract from Council's Tourism Strategy; and executive summary from Strategic Tourism Growth Areas in Wales report for Swansea.

COUNTRYSIDE COUNCIL FOR WALES EVIDENCE

Documents	22.1-22.4	Professor Pethick's Statement of Evidence, Summary, Responses to Rebuttal of Evidence, and bundle of 4 reference documents JP1 – JP4.

Documents	23.1-23.3	Additional evidence submitted at Inquiry relating to matters dealt with by Professor Pethick: short extract from StatSoft Electronic Statistics Textbook on time series analysis; letter from CCW to LSDL dated 23 May 2006 explaining CCW's latest view that Helwick Bank is in decline; and comment on supplementary evidence by LSDL concerning approach to time series analysis in 2002 Pethick report.
Documents	24.1-24.2	Dr Ramsay's Statement of Evidence and bundle of 3 reference documents KR1 – KR3.
Document	25	Additional evidence submitted at Inquiry relating to matters dealt with by Dr Ramsay: clarification note on 3 points.
Documents	26.1-26.4	Dr Otto's Statement of Evidence, Summary, Supplementary Statement of Evidence (with covering explanatory letter), and bundle of reference documents ZO1 – ZO10.
Documents	27.1-27.6	Additional evidence submitted at Inquiry relating to matters dealt with by Dr Otto: UK locations for similar designated habitats; comments on LSDL's note on potential impacts on interest features of the SAC, SPA and Ramsar sites to inform the appropriate assessment; and CCW letters to WAG dated 30 March 2004, 10 May 2004, 6 May 2005 and 9 August 2005 (with accompanying Regulation 33 advice).
Documents	28.1-28.2	Mr Bate's Statement of Evidence and bundle of reference documents RB1 – RB6.
Documents	29.1-29.2	Full list of CCW reference documents, and useful glossary of terms.
		CITY AND COUNTY OF SWANSEA EVIDENCE
Documents	30.1-30.7	Dr Barber's Summary, Statement of Evidence, accompanying Figures and Tables, and Enclosures, and subsequent Supplementary Statement of Evidence, Rebuttal Statement, and Supplementary Proof Calculations 1-3.
Documents	31.1-31.3	Mr Sumner's Statement of Evidence, Summary and Supplementary to Statement of Evidence.
Document	32	Mr Hopkins' Statement of Evidence.
Documents	33.1-33.3	Additional evidence submitted at Inquiry: Statement by Cllr John Hague; photographs of Crumlin Burrows, near Neath; and copy of Gower AONB Management Plan 2006 (published 5 July).
		GOWER COALITION EVIDENCE
Document	34	Compendium (white) folder of all Statements of Evidence.
Document	35	Mr Ridge's Supplementary Statement of Evidence.
Document	36	Folder of documents presented by Mrs Jones.

Document	37	Folder of Ms Musgrave's Statement and photographs shown in her presentation. (NB. Photographs also on disk in Document 34)
Document	38	Additional photographs presented by Mrs Cooke.
Document	39	Photographs to supplement Mr & Mrs Dobbs' written statement.
Document	40	Table of main Swansea beaches, submitted by Ms James.
Documents	41.1-41.4	Note on National Trust Coast & Marine Policy, and booklets on Mullion Cove, Neptune Coastline Campaign and Shifting Shores, submitted by Mr Jarman.
Documents	42.1-42.2	Amended Appendix 3 on sand dredged quantities for Mrs Kent's Statement of Evidence; and extract from European Communities communication on the precautionary principle.

OTHER EVIDENCE

Document	43	Ms Edwina Hart's Statement of Evidence.
Document	44	Mr Harding's Statement of Evidence.

POSSIBLE CONDITIONS

Documents	45.1-45.6	LSDL submissions: Revised Draft Conditions dated 22 June 2006; position statement dated 22 June 2006; discussion note on the establishment of thresholds for volume changes, dated 29 June 2006; Revised Draft Conditions dated 4 July 2006; Revised Draft Conditions dated 5 July 2006; and Revised Draft Conditions dated 6 July 2006. (latter also provided on disk)
Document	46	CCW comments on 29 June draft conditions.
Documents	47.1-47.2	C&C of Swansea comments on 4 July draft conditions; and joint statement with CEFAS representative on possible method to measure rate of infill of dredged trench.
Documents	48.1-48.2	Gower Coalition responses to draft conditions of 22 June and 4 July 2006 respectively.
Documents	49.1-49.4	DEFRA submissions: explanatory letter to Inspector dated 29 May 2006; Annex A to letter commenting on the 22 June 2006 draft of conditions; Schedule of Conditions attached to Government View for Areas 473, 474 and 475 (as example of good practice); and Annex C extract from DCLG June 2006 Consultation Paper on Draft Marine Minerals Dredging Regulations and Procedural

		Guidance for England and Northern Ireland (covering the application of conditions).
Documents	50.1-50.2	CEFAS' comments and supplementary comments on 5 July 2006 draft conditions.

CLOSING SUBMISSIONS

Document	51	Closing submission on behalf of the Gower Coalition.
Document	52	Closing submission on behalf of the City and County of Swansea, including supporting legal judgements, legislation extracts and figures/plans from evidence (blue folder).
Document	53	Closing submission on behalf of the Countryside Council for Wales.
Document	54	Closing submission on behalf of Llanelli Sand Dredging Limited.

LLANELLI SAND DREDGING LIMITED - CORE DOCUMENTS

Document	**LSDL/A**	**Application Letters**
Document	LSDL/A1	Scoping letter to consultees, 12 June 2001.
Document	LSDL/A2	Production Licence Application letter to NAW, 30 October 2000.
Document	LSDL/A3	Scoping letter to NAW, 23 October 2001.
Document	LSDL/A4	PINS letter advising that a hearing or public inquiry had been called and listing matters on which NAW particularly wished to be informed, 13 February 2006.

Document	**LSDL/B**	**Supporting Documents**
Document	LSDL/B1	Environmental Statement (ERM January 2003).
Document	LSDL/B2	Coastal Impact Study, EX4677 (HR Wallingford, December 2002).
Documents	LSDL/B3A-B3B	Summary of Consultation and Supplementary Environmental Statement (2 volumes) (ERM February 2004).
Document	LSDL/B4	Sandwaves on Helwick Bank and Nobel Banks (Davies 2004).
Document	LSDL/B5	Draft Environmental Monitoring Programme (ERM February 2005).
Document	LSDL/B6	Stability of Helwick Bank, Past, Present and Future (Davies

		2004)
Documents	LSDL/B7A-B7B	Helwick Bank Monitoring 2001-2002 (Davies 2003): Report and Drawings.
Documents	LSDL/B8A-B8B	Helwick Bank Monitoring 2002-2003 (Davies 2004): Report and Drawings.
Documents	LSDL/B9A-B9B	Helwick Bank Monitoring 2003-2004 (Davies 2005): Report and Drawings.
Documents	LSDL/B10A-B10B	Helwick Bank Monitoring 2004-2005 (Davies 2006): Report and Drawings.
Document	LSDL/B11	History of Port-Eynon Beach (Davies 2003).
Document	LSDL/B12	Helwick Bank Links, an investigation of sand bedload transport pathways on the seabed near Helwick Bank, Bristol Channel, Jan 2005 (Davies) (funded by LSDL and WAG).
Document	**LSDL/C**	**Procedures and Policy Documents**
Document	LSDL/C1	Council Directive 97/11/EC of March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment (European Commission 1997).
Document	LSDL/C2	Government View Interim Procedures (NAW 1998).
Document	LSDL/C3	Symonds Report (NAW 2002).
Document	LSDL/C4	Marine Minerals Planning Guidance 1 (ODPM 2002).
Document	LSDL/C5	Town and Country Planning (Inquiries Procedure)(Wales) Rules 2003 (No. 1266).
Document	LSDL/C6	Interim Marine Aggregates Dredging Policy (WAG 2004).
Document	**LSDL/D**	**Miscellaneous (in 4 white folders)**
Document	LSDL/D1	Communication of the European Commission on the precautionary principle, February 2000.
Document	LSDL/D2	Guidelines on the Impact of Aggregate Extraction on European Marine Sites, May 2001 (Posford Duvivier Environment).
Document	LSDL/D3	Guidelines for the Conduct of Benthic Studies of Aggregate Dredging Sites, May 2002 (DTLR).
Document	LSDL/D4	Interdepartmental Liaison Group on Risk Assessment: The Precautionary Principle, Policy and Application, June

		2002.
Document	LSDL/D5	Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment.
Document	LSDL/D6	Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds.
Document	LSDL/D7	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
Document	LSDL/D8	Advice given by Planning Branch 4 to the Minister for Environment, Planning and Countryside on the Interim Marine Aggregates Dredging Policy, 15 October 2004.
Document	LSDL/D9	A Review of Environmental Assessments & Coastal Impact Studies for the Aggregate Proposals at Helwick and Nash Banks, 2001 (Deere-Jones).
Document	LSDL/D10	Bristol Channel Marine Aggregates: Resources and Constraints Research Project, Final Report (2 volumes), 2000 (Posford Duvivier).

Document	**LSDL/Bundles**	**Correspondence**
Document	LSDL/Bundle A	Correspondence from LSDL to PINS.
Document	LSDL/Bundle B	Correspondence from LSDL to CCW.
Document	LSDL/Bundle C	Correspondence from LSDL to C&C of Swansea.
Document	LSDL/Bundle D	Correspondence from LSDL to: Gower Coalition; DEFRA; and WAG; and third party correspondence provided to LSDL.

PLANS

Plan	A	Beach Site Visits (from Inspector's map).
Plan	B	Site Location (from Environmental Statement).
Plan	C	Other Dredging in Bristol Channel (from Environmental Statement).

Plan	D	Conservation Designations (from Environmental Statement).
Plan	E	Plan LSDL1, referred to in draft Conditions.
Plan	F	Plan LSDL2, referred to in draft Conditions.