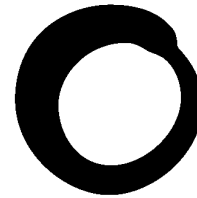




Marine Information Network

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**Friends of
the Earth**

24th March 2005.

For the attention of: Mr. Jonathan Lewis, Senior Consultant, Emu Limited,
1 Mill Court, The Sawmills, Durley, Southampton SO32 2EJ.

Dear Mr. Lewis, Application for a Government View by Hanson Aggregates Marine Ltd.,
Area 401/2 (Great Yarmouth) Aggregate Dredging Licence Renewal.

Thank you your letter of 9th February 2005 to MARINET, the Marine Network of Friends of the Earth Local Groups, and for your invitation to comment on the Government View application by Hanson Aggregates Marine Ltd with respect to the aggregate dredging licence renewal in Area 401/2. Thank you also for the provision of the Environmental Statement.

We should like to offer comment on a number of points, and these are detailed below.

Need for the Resource.

It is submitted by the applicant that:

“The resource under consideration in the Area 401/2 will provide for the continuation of a suitable resource for building materials to meet future needs in the South East [UK] and The Netherlands.” Reference: Environmental Statement (ES) Appendix C, section C.8.

and also

“Unless there are compelling environmental disadvantages, which are proven to be associated with Dredging from Area 401/2, it is submitted that there is a clear need to continue extraction from this resource.” Reference: ES, Appendix C, section C.8.

The actual consumption of aggregate in the South East and its sourcing is not specifically tabulated in Appendix C. However, by extracting figures from various sections in Appendix C it is possible to compile the following portrait for the year 2001.

Total consumption of aggregate materials:	44 million tonnes (Ref: C.5.1)
Marine sourced aggregate	12.1 million tonnes (Ref: Table C 4)
Indigenous (South East) land sourced aggregate	14.5 million tonnes (Ref: Table C 4)
Recycled aggregate	6.6 million tonnes (Ref: C.5.2)
Other UK land sourced aggregate *	10.8 million tonnes (See Note *)

Total	44 million tonnes

Note *: No actual figure for land sourced aggregate from other regions of the UK is given specifically for year 2001, but a figure of 10.05 million tonnes is cited in figures provided by DETR for 1997 (Ref: C.7.3). Therefore the figure of 10.8 million tonnes cited above for 2001 would appear to be a reasonable estimate.

This means that currently (2001) marine aggregate is supplying 27.5 % of the South East's annual consumption of aggregate materials (i.e. 12.1 mtpa as a % of 44 mtpa).

It is also to be noted that in 1997 the total production of land-won aggregate from land-based reserves in the South East was 22.5 million tonnes (Ref: C.7.2). And, in 1999 licensed land-won reserves in the South East stood at 10.4 years (Ref: C.7.2).

Therefore, if land-won reserves from the South East were allocated at the above rate of production solely to meet the annual aggregate needs of the South East, the shortfall in consumption (i.e. the need to import aggregate resources) would be 21.5 million tonnes per annum (44 mt minus 22.5 mt = 21.5 mt).

If the use of recycled aggregate is further added into the ability to make good this deficit (and the available recycled figure is 6.6 million tonnes [ref. 2001 level]), then the deficit falls to 14.9 million tonnes per annum.

Further, if the use of land-won aggregate sourced from other regions of the UK is added into the ability to meet this deficit (and the available source is 10.1 million tonnes [ref: C.7.3]), then the deficit falls to 4.8 million tonnes per annum.

Accordingly, the question arises: is it absolutely essential to source this annual deficit of 4.8 million tonnes from marine resources ? Or, could this deficit be made good by:

1. Expanding the amount of recycled aggregate production – note: the South East England Regional Assembly recommend in their Regional Minerals Plan that recycled aggregate production should rise from 6.6 mtpa to 8.8 mtpa by 2016 (ref: C.5.2). If this were to happen, this would provide 2.2 million tonnes per annum to meet the deficit – leaving a net deficit of 2.6 million tonnes per annum.
2. At the present time, secondary aggregate (waste from other industrial processes) is not being maximised. For example, considerable sand resources are available from the waste produced by china clay production in Cornwall, and considerable aggregate reserves are available from old slate quarry workings in North Wales.
3. Also, established land-won reserves from quarries in other regions of the UK could be used to make good the deficit.

As a result, we submit that the need for marine sourced aggregate to meet the South East's annual aggregate consumption is not as clear cut as is stated in the licence application for Area 401/2.

As demonstrated above, this deficit could be reduced to 4.8 million tonnes per annum based on existing land-won UK activity.

Also to be considered is the question of whether extraction of marine aggregate from Area 401/2 has to be supplied to The Netherlands. At present, The Netherlands is receiving around 7 million tonnes per annum from the licensed UK sites off East Anglia and the Thames Estuary. Reference: ES, Appendix C, section. C.8.

The applicant notes “*In recent years, The Netherlands has become the most significant producer of marine aggregates in north-west Europe*”. Reference: ES, Appendix C, section. C.3.

And, in Table C.3 the annual production of marine aggregate by The Netherlands is cited as just short of 60 million tonnes per annum.

Total UK production of marine aggregate in 2003 is cited by the applicant as being 22.2 million tonnes per annum. Reference: ES, Appendix C, section. C.2.

Therefore, does the UK *need* to be exporting 7 million tonnes per annum of marine aggregate to The Netherlands. The assertion by the applicant that this need exists appears to be seriously debatable.

The applicant also states (ref. ES, Appendix C, section. C.8) that a restriction on cross-boundary movement of aggregate would be inimical to free trade and thus illegal under EU law. However, a restraint of trade under EU law is only likely to exist if the UK actually issues marine extraction licences of a sufficient magnitude to enable an export demand to be met. If the total amount of UK licensed production were confined to UK needs, then there would be no surplus available for export.

No foreign country has a right to demand that we export our production to them. For example if the commodity is carrots, The Netherlands cannot demand that we export UK carrot production to The Netherlands. Of course, The Netherlands can enter the UK carrot market and purchase the tonnage of carrots which it desires. However, it will only make a purchase if the price is acceptable. Thus, by controlling production levels and thereby costs, the UK can determine whether The Netherlands enters the UK market place – and this applies to any commodity, whether it be carrots or aggregate.

Thus, if the UK Government limits production of marine aggregate to meet UK needs alone, it is able to influence production costs and thus the market price. In short, The Netherlands would find it advantageous to use its own marine aggregate production in order to meet its demand, rather than using UK production. This is likely because annual production levels of marine aggregate in The Netherlands are nearly three times greater than in the UK, with the result that there would be economies of scale and location which favour indigenous production by The Netherlands.

Of course, whether the UK Government would wish to control production levels in this way is, as the applicant observes, a question of whether there are “compelling environmental disadvantages” associated with marine dredging for aggregate. Reference: ES, Appendix C, section. C.8. This particular issue is addressed below.

Recommendation for Government View:

In our opinion, it has not been clearly established that there is a need for Area 401/2 to be relicensed in order to meet the aggregate needs of the South East region. Alternative land-based sources of supply exist, and any shortfall in the overall supply for the region could probably be met by existing marine licences.

In respect of supply to The Netherlands, it is our opinion that The Netherlands is able to meet its own requirements for marine aggregate. There is therefore no need for Area 401/2 to be relicensed in order to meet an export demand from this country.

Physical Nature of the Seabed.

It is a requirement of the Environmental Impact Assessment (EIA) under Marine Minerals Guidance Note 1 (MMG1) to provide a description of the physical nature of the seabed. In particular, we note, this requirement specifies:

“ • the characteristics of seabed sediments in and around the site should be identified using side-scan sonar, shallow seismic and grab sample data. The mineral resource characteristics including particle size and lithology , origin and composition, thickness, and nature of underlying deposits should be identified.” Reference MMG1, Annex A5.

Whilst the EIA does offer some information in this regard e.g. particle size, it is to be noted that the applicant has not provided information on the thickness of the deposits, or how that thickness may vary with the composition (sand/gravel) of the deposit. The nearest the applicant comes to providing information in this regard is in Appendix F, Figure 3.1 where the percentage mixture of sand and gravel in the deposit is described in very general terms, however the information does not extend beyond this very general description.

This is an important matter. If a licence is to be issued, it is essential to know:

1. The size (depth) of the resource so that the reasonableness or otherwise of the extraction rate may be determined.
2. As this is a re-licensing application, it is important to know the rate of depletion of the resource over the previous licence period (10 years) and how this rate of depletion may be affected by the operation of a new licence.

This is essential information when determining whether the site is capable of recovery in biological terms following the cessation of the licence. Without this information, such questions are incapable of being determined.

Moreover it is to be noted that MMG1, in referring to environmental effects, states:

“ It may also be necessary, in appropriate cases, to demonstrate that:

(i) an adequate depth (normally at least 50 cm) of suitable material has been left as a ‘capping layer’ to provide a substrate for recolonisation.” Reference: MMG1, para. 41.

and

“Dredging should aim to leave the seabed in a similar physical condition to that present before dredging started in order to enhance the possibility of, and rate at which, the seabed recovers physically and biologically to its pre-dredging condition.” Reference: MMG1, Annex A12.

The applicant has failed to provide this essential information. This failure relates both to the original condition of the seabed (i.e. at the time of the commencement of the original licence), and the condition of the seabed that now pertains. This lack of basic information as to the nature of the seabed undermines the assessment of the biological character of the site, and the development of a strategy for its biological recovery.

Recommendation for Government View:

It is our view that no re-licensing of this site can be determined until the basic information as to the physical nature of the seabed has been provided by the applicant.

Coastal Impact Study.

The coastline itself, from Winterton to Lowestoft, is made of soft materials (sand and clay cliffs, sand dunes) as opposed to hard materials (rock) and, in places, is bolstered by seawalls and groynes. As a result, it is inherently vulnerable to erosion.

The applicant does not believe that dredging in Area 401/2 has caused any damage to the adjacent coastline, nor that a continuation of dredging will cause any future damage.

It is to be noted that Area 401/2 is part of a large block of dredging sites, numbering around nineteen sites in total (sixteen according to the applicant) located between 6km to 26 km offshore. Reference: ES, Appendix D, Figure 1.

The inshore area between this block of dredging sites is characterised by a system of sandbanks and channels, the most notable sandbanks (moving from the coast eastwards) being Caister Sand, Scroby Sand linked to Corton Sand and Holm Sand, and Cross Sand; and, the most notable channels being Yarmouth Road (consisting of Caister Road linked to Corton Road), and Barley Picle. Reference: ES, Appendix D, Figure 1.

The maximum depth of the Yarmouth Road is 25 metres, and Barley Picle's maximum depth is 35 metres. The entrance to Yarmouth Road is via the southerly entrance (Corton Channel) whose maximum depth is 20 metres. Reference: Appendix D, Figures 8 and 9 (regarding depths) and R. Docrwa (personal communication to MARINET) regarding Corton Channel.

The applicant does not record how many of the sites within the offshore block are being actively dredged at the present time, or the scale of activity at these sites, both historically and at the present time. This is unfortunate because it is likely that these sites are collectively operating as one unit when it comes to assessing the impact on the coastline, and therefore this information is essential in order to understand the impact of Area 401/2.

The applicant's view that no damage is being caused to the coastline is based on the following arguments:

“While some of the sediment at the seabed surface will undoubtedly be mobile within the proposed dredging area, all the evidence is that such transport will take place parallel, not perpendicular to the shoreline. In our opinion, therefore, sediments within the proposed dredging area are very unlikely to ‘interact’ with the sediments in the system of near shore sandbanks, and even less so with the coastline itself.” Reference: ES, Appendix D, section 2.7.

and

“In general, dredging can have two direct effects on the coastline. Firstly, the beaches can suffer from ‘beach draw-down’. However the western edge of the dredging area is over 8km from the shore, where the water depths are greater than 20m and a system of sandbanks is located between the dredging area and the coastline. These sandbanks will prevent the direct interchange of material between the coast and the dredging area. Therefore there is no possibility of beach ‘draw-down’ taking place due to the existing or proposed dredging.

The second concern is that dredging may affect the supply of sediment to the shoreline from further offshore. From conclusions drawn from the evolution of the sandbank system in the review on Section 2, it is considered the major supply of sediment for the beaches in the region comes from cliff erosion.. It is highly improbable that any sediment transported through or from the dredging area will directly reach the coastline, and if any tendency for such sediment transport existed, it would be intercepted by the near shore bank system.” Reference: ES, Appendix D, section 6.7

Also, with respect to wave conditions, the applicant relies on computer models and asserts that:

“It can be safely concluded that the proposed continuation of the dredging in Area 401/2 will not affect wave conditions either along the shoreline, or even along the seaward edge of the sandbank system off this coastline.” Reference: ES, Appendix D, section 5.1.

However the applicant’s portrait of no adverse impact from dredging on the adjacent coastline, either historically or in the future, does not concur with the reports submitted to MARINET by its members and other persons/organisations on the East Coast.

Therefore, the question arises whether the applicant’s portrait in the Environmental Statement and Appendix D is accurate.

A number of points appear to us to require consideration, and these have been largely ignored in the Environmental Statement and its related Coastal Impact Study. These are:

1. Prior to the commencement of dredging in the East Coast licences some forty or so years ago, the offshore sandbanks had a very different character to that which they possess today. This is important because these sandbanks are a primary means of “defence” for the coastline against erosion by waves and severe storms.

The Coastal Impact Assessment does not consider the historical nature of these sandbanks. This is an important deficiency, given that the applicant recognises the importance and role of these sandbanks in protecting the coastline from erosion:

“The sandbanks, east of Great Yarmouth, reduce the severity of the wave climate experienced at the coastline by dissipating energy through frictional effects and breaking as waves pass over them. As any decrease in the height of these banks could increase the severity of the wave conditions further inshore it is necessary to assess the likely effects of dredging on these banks in the same rigorous manner as assessing the effects of dredging the coastline in other coastal impact studies. As described above, the wave analysis showed negligible impact from the proposed and existing dredging on waves arriving at the near shore banks.” Reference: ES, Appendix D, section 6.6.

We will come to a consideration of the wave analysis in a moment, but let us first consider the historical character of these offshore sandbanks and the possibility that dredging may have altered their character because, if their character has been so altered, this would be a significant material fact for the Government View procedure.

Firstly, it must be noted that the applicant’s Coastal Impact Study provides no historical information as to the nature of these sandbanks i.e. their range, topography, composition and so forth, prior to the commencement of dredging (i.e. pre-1960s) and their subsequent evolution since the commencement of dredging. In our view, this is a serious deficiency of the Study. Not only is this essential information absent from the Study, but it also means that no assessment has

been made of the cumulative effect of dredging in the East Coast block of licences upon the coastline during the last forty years.

Secondly, our own research (Percy Trett, naturalist, personal communication to MARINET) has revealed that one of these sandbanks, Scroby Sand, used to be permanently above sea level whereas today it is always below low tide level.

In our communication with Mr. Trett, we have learnt that Scroby Sand in 1947 used to measure three-quarters of a mile by one-quarter of a mile in extent, and that this extent is for sand above high water on a spring tide. The sandbank was shaped like a comma, composed of very fine sand with a clay ridge, supported marram dunes, and could be safely remained upon overnight by naturalists undertaking surveys of the seal and tern colonies which lived there. At low water on a neap tide, the sandbank would measure 7 miles by 1 mile.

Clearly, a sandbank of this character would provide important shielding to the adjacent coastline from waves and winter storms, especially when linked to the associated sandbanks also located offshore.

Mr. Trett, who as a naturalist was part of the regular survey of the seal and tern colonies, has noted that a storm surge in the winter of 1953 cut the island (Scroby Sand) in half, but that in the following years the size and extent of the sandbank regenerated.

Then again, according to Mr. Trett, a winter storm surge levelled the island (Scroby Sand) in 1963, but this time the expected regeneration (which had occurred historically following such surges) did not take place. In Mr. Trett's opinion, this was due to the commencement of offshore aggregate dredging in the licensed areas adjacent to both Scroby Sand and the other sandbanks. In short, this dredging appropriated the disturbed sand and thus denied the sand to the process involved in the natural regeneration of these sandbanks.

This record described here has not been recorded or assessed by the applicant. It is important to be clear on one point. Although this record has been provided to us in detail by one individual (and supported by the testimony of others), it is not anecdotal. It is a factual record which exists and can be substantiated by archived records.

It is therefore a serious deficiency of the applicant's Coastal Impact Study not to have considered this matter. It is serious because the erosion and loss of these sandbanks is a material factor in the protection of the adjacent coastline from erosion.

Therefore, it is an essential requirement of the Study to have determined whether the historical pattern of aggregate dredging has been a significant causal or contributory factor to the pattern of coastal erosion which is documented to have occurred offshore and on the adjacent coastline in the past forty years.

This specific analysis is wholly absent from the applicant's Coastal Impact Study.

2. The applicant's Coastal Impact Study asserts that wave conditions have not been affected by aggregate dredging activities, and that therefore neither the offshore sandbanks nor the coastline itself will have been adversely affected.

The information above on the failure of the offshore sand banks to regenerate casts doubt on this assertion.

The question must therefore be asked as to what is the factual basis for the applicant's assertion. In Appendix D, the applicant states the following with regard to the factual data for its wave model:

“Within the area of interest, there were only two sources of instrumentally measured offshore wave data. The first was from the wave rider buoy 7km offshore from Great Yarmouth, the data from which for commercial reasons was not available. The other source of wave data is Smith's Knoll Light Vessel, some 35km offshore from Great Yarmouth, although no directional information had been collected at this site.” Reference: ES, Appendix D, section C 3.1.

As a result, the applicant used the following wind data for its wave model:

“The offshore wave conditions used as input to the wave transformation model are based on extremes derived from HINDWAVE predictions [the computer model] driven by 20 years of wind data measured at Gorleston 1970-1990.” Reference: ES, Appendix D, section 3.3.

Thus, it is clear that offshore wave data were not used in this model, and that the data took the form of wind speeds for a land based station (Gorleston), and for a twenty year period which is almost fifteen years distant from the present (i.e. not contemporaneous).

In Appendix 1 to the Coastal Impact Study [Appendix D of the Environmental Statement] this matter of wind data in the calibration of the computer model is referred to:

“Suitable wind data is available from coastal stations only, which may not be representative of conditions over the sea. A speed-up function is necessary, which may be dependent upon both speed and direction. Calibration of the model usually takes the form of adjustment of this factor. Its magnitude may be determined by a general examination of the anemograph site, or by comparison with the offshore wind frequencies, or by a comparison between predicted and measured wave heights, if available.”

As has already been noted, a comparison with offshore wind frequencies and offshore wave heights was not available (Reference: ES, Appendix D, section C 3.1.). Therefore one must assume that the calibration of the computer model [HINDWAVE] for increased wind speed and variations of wind direction offshore (i.e. in the area of the sandbanks) must have been accomplished by a general examination of the anemograph site [Gorleston].

However, no details of this “general examination of the anemograph site” are provided, and therefore the accuracy of the calibration of this computer model is undetermined.

Also, Appendix 1 [Appendix D] notes:

“The model is dependent upon having a long sequence of high quality hourly wind velocities, which are assumed constant across the wave generation area. The calculations do not include an estimation of long period swell, which may render the model unsuitable for use in certain areas of application.”

As has already been noted, the Gorleston wind data is fifteen years out of date. This does not exactly square with the requirement for “a long sequence of high quality hourly wind data velocities, which are assumed constant across the wave generation area.” Indeed, the applicant provides no detail as to the nature of the Gorleston wind data.

Further, as has been noted earlier, the offshore sandbanks are most vulnerable during winter storm surges. This is when wave heights and velocities are at their greatest. In the applicant's computer model “calculations do not include an estimation of long period swell.” This suggests

that the computer model is incapable of assessing those precise offshore wave conditions (winter surges) which are most likely lead to erosion of the offshore sandbanks. Hence, as a direct consequence, this suggests that the computer model is incapable of assessing whether aggregate dredging is intensifying those wave conditions; and, as a further consequence, whether waves of increased height and velocity are arriving at the beaches.

There is, therefore, a large area of uncertainty as to the accuracy of the applicant's Coastal Impact Study and wave model.

What conclusions are therefore to be drawn from the foregoing analysis ?

The applicant asserts that sediment movements offshore are parallel, not perpendicular, to the coast and therefore there is no exchange of material between the dredging sites and the coast i.e. material is not supplied to the coast from offshore. Further, it is asserted that the pattern of waves, in height and velocity, arriving on the coast from offshore has not changed over time or due to offshore dredging. And, additionally, it is asserted that beach material (sand) arises along the coastline due to wave erosion of the sand cliffs and not from any other source.

Whilst the character of offshore sediment movement may be as the applicant describes, and whilst cliff erosion may be the primary source of sandy beach material along the coast, the applicant's portrait of the dynamics of this system begins to appear deficient when other factors are taken into account.

These other factors are:

1. The historical nature of the offshore sandbanks and their function as a form of coastal defence. As we have seen, Scroby Sand was a significant factor in this regard, and this sandbank has altered significantly during the past forty years. This primary defence against onshore coastal erosion has been seriously weakened, and the applicant's Coastal Impact Study has given no account of this change. Nor has the applicant's Study attempted to assess whether dredging is a causal or contributory factor in this change. It has to be said that this is a major deficiency in the Study because it is clear that the change in the nature of Scroby Sand, and possibly the other adjacent sandbanks, appears to be a material factor in the protection of the coastline from erosion.
2. With the decline in the height and extent Scroby Sand, and possibly the other adjacent sandbanks, it is reasonable to suppose that the offshore wave pattern, both in terms of height and velocity, has altered. And, that such a change would impact on the coastline itself.

The analysis of the applicant's wave study reveals that offshore wave data did not inform their study. Data from the wave rider buoy 7km offshore from Great Yarmouth (i.e. in the vicinity of the offshore sandbanks) was not available for commercial reasons. We are surprised by this statement. The applicant does not state who owns this information, or why it was not commercially available. This is clearly crucial information for informing the wave study, and we believe the Government View procedure should give rigorous analysis to this point.

The wave model therefore relied on onshore wind speed data which, the applicant clearly indicates, needs to be very carefully calibrated if it is to accurately reflect offshore conditions. In fact, this onshore wind data is fifteen years out of date, and its calibration appears not to have been checked against the wind speeds recorded offshore at the Smith Knoll Light Vessel situated 35km offshore. Further, the calibrations in respect of wind direction and "long period swell"

(surges under storm conditions) appear not to have been validated at all, both of which are identified as significant factors by the applicant in establishing the integrity of the wave model.

Therefore, the applicant's assertion that wave conditions (height and velocity) moving from offshore onto the coast have not changed is highly suspect and lacks validity.

In turn, given the serious flaws in this wave model, this means that the true impact of aggregate dredging on the nature of the offshore sandbanks and onshore coastal erosion has not been properly assessed. This is a very fundamental deficiency and, in our opinion, seriously undermines the integrity of the Coastal Impact Study. In short its analysis, and the assertions based on this analysis, lack validity.

This also means that sandy material, which currently supplies the beaches as a result of cliff erosion, will likely be "drawn-down" from the beaches during storms and lost from the natural process of onshore-offshore sediment movement which has traditionally regenerated the beaches during calmer periods. In turn, this would mean that the beaches would possess less sand and become stonier, their profile would steepen, and that cliff erosion would intensify. It is to be noted that precisely these phenomena have been reported to MARINET as occurring along this coastline by MARINET members and other persons/organisations.

Finally, it is to be noted that in Appendix C the applicant records:

"The Dutch Government has undertaken a strategic environmental impact assessment which has established that extraction down to 2m is generally acceptable outside the 20m depth contour or 20km distant from the Dutch coast, whichever is closer. A further study has been commissioned to consider the potential environmental effects of larger scale production, with potential reserves of up to 400 million tonnes." Reference: ES, Appendix C, section C.7

Given that the East Coast (Great Yarmouth) block of dredging sites is located between 6km and 26km offshore in water just below 20m in depth, and given that this block is engaged in large scale production (and has been for a number of years), it appears essential to MARINET that the UK Government acts, like the Dutch Government, to undertake a strategic environmental impact assessment (under EU Directive 2001/42) of the East Coast block of licensed dredging sites, and to do so before determining the decision on whether to licence Area 401/2

Recommendations for Government View:

It is our view that Area 401/2 should not be relicensed until

(i) The applicant has undertaken a full assessment of the impact of dredging on the offshore sandbanks, and has properly assessed whether changes in the nature of these sandbanks is leading an alteration in the height and velocity of waves arriving on the coastline, and

(ii) The UK Government has applied the EU Strategic Environmental Assessment Directive (2001/42) to the East Coast (Great Yarmouth) block of licences.

Plume Study.

We note that the Plume study for Area 401/2 relies substantially on the Plume study for Area 254 conducted in 2002. The applicant argues that this is acceptable since *"the physical and operational environments of Areas 254 and 401/2 are very similar and since the impacts*

identified in Reference 1 [Area 254] were relatively small.” Reference: ES, Appendix E, Summary.

The Area 254 study asserts:

“No significant permanent deposition of fine sediment is predicted by the model. Temporary deposition of fine sediment is predicted to be less than 0.5 mm in thickness for both spring and neap tide conditions.” Reference: ES, Appendix E, section 5.1.(4).

The Area 401/2 study asserts:

“In general, temporary deposition of fine sediment is predicted to be less than 0.5 mm in thickness for both spring and neap tide conditions.” Reference: ES, Appendix E, section 6.6.

A number of questions arise concerning these assertions.

1. We note that when Area 401/2 is dredged *“the total mass of material lodged in the hopper is one third of the total mass dredged.”* Reference: ES, Appendix 3, section 5.2.

Although not stated, we assume that the discard of two thirds of the material dredged will be in order to achieve the required mixture of sand and gravel. We understand that the construction industry typically requires marine aggregate to be supplied with a gravel content of greater than 50% (Ref. Marine Aggregate Site Restoration and Enhancement, Emu Ltd, 2004), and that the gravel content in Area 401/2 is recorded as between 20-35% (Ref: Environmental Statement, section 4.3, table iii). This means that the overwhelming bulk of sand, predominantly fine and medium grained sand, extracted from the seabed will be discharged back to sea by the dredger.

In our opinion, this will represent a considerable body of material, mainly sand. In short, for every tonne of material dredged from the seabed, two-thirds of a tonne will be returned into the water column.

The assertion that *“no significant permanent deposition of fine sediment is predicted by the model”* seems doubtful to us. Granted, there are currents on the seabed of the site which will have a scouring effect, but if this material is not being permanently deposited in the site or its immediate vicinity, where is it being deposited ?

The plume model suggests that deposition is along a band measuring 4km x 300m on a spring tide and 3km x 300m on a neap tide (Reference: ES, Appendix E, section 6 (i) and (ii)). If this is so, then the material (two-thirds of every tonne dredged) is being returned to the site. So, is this material being redeposited in the site, or is it not ? The plume study [model] provides no analysis of this situation, other than to assert that no permanent deposition greater than 0.5 mm will occur.

2. We note that factual validation of the model for Area 254 appears not to have taken place since 2002, and therefore its use for Area 401/2 cannot be empirically substantiated.

We also note that there appears to have been no empirical validation of plume dispersion and sediment deposition patterns in Area 401/2 (or elsewhere) since the original licence was granted some ten years ago.

3. We note that bathymetric studies of Area 401/2 undertaken for the current re-licensing application have recorded:

“Small areas of accretion (~ +1m over 8 years) can be observed between the dredged areas. These may represent accumulations of finer material, disturbed during extraction operations that have settled out over time or, may simply be a physical consequence of the dredging operation itself.” Reference: Environmental Statement, section 5.5.2.

Given this accretion of around 1 metre, and given the amount of material returned to the water column (750kg of every tonne extracted), and given the predicted deposition close to point of dredging, it appears to us that deposition is in fact likely to be a significant factor; and, that the “temporary deposition of fine sediment is predicted to be less than 0.5 mm in thickness for both spring and neap tide conditions” is, in fact, both unlikely and unsubstantiated.

Recommendation for Government View:

In our opinion, the plume dispersion model is failing to accurately predict the deposition character and depth of dredged material returned to sea. We have seen no evidence that its prediction of 0.5mm sediment deposition is accurate, and what evidence does exist suggests the contrary. Accordingly, we believe that no new licence should be granted until the plume dispersion model has been empirically tested and validated.

The Biological and Ecological Impact.

Whilst the 2004 benthic survey carried out by the applicant is fairly extensive, making use of grab samples from some 35 locations and trawl samples from 5 locations, there are a number of problems with this section of the Environmental Statement.

Firstly, the portrait of the biological and ecological baseline arising from the 1993 benthic survey (Unicomarine Ltd 1993 and 1995), is never fully recorded or presented in this Environmental Statement. This means that the nature and scale of change in the benthic community in Area 401/2 is never fully portrayed.

For example, it is stated in the Environmental Statement, section 7.1.4, when comparing the 1993 benthic survey with the 2000 survey (MES Ltd) that “major changes in community composition from 1993 (dominated by crustaceans and brittlestars) to 2000 (dominated by polychaete worms)” occurred; but, this change is never documented in the report of the 2004 survey (Appendix F, Emu Ltd).

Secondly, whilst the 2004 benthic survey (Emu Ltd) records the number of species, the number of individuals and the biomass at 35 sampling stations and 5 trawl sites, there is a continuous assumption in their report (Appendix F) that this benthic survey serves as the baseline for the re-licensing procedure i.e. this is the current condition of the dredging area, and this is the basis on which the area should be re-licensed.

This assumption is never explicitly stated in Appendix F, nor is it stated in section 7 of the Environmental Statement. However, this fact emerges in the form of a footnote in the final section of the Environmental Statement dealing with Proposed Monitoring during the period of the renewed licence. Here it is stated:

“ * 2004 surveys will act as a pre-dredge baseline for on-going monitoring under any licence renewal.” Ref. Section 13.6.2., Table 13.1.

In our opinion, this is not acceptable. The baseline for all on-going monitoring is the survey carried out by Unicomarine Ltd (1993, 1995). To do otherwise would, in effect, be an act that re-writes history.

At present, the report by Emu Ltd (2004) has not provided an adequate portrait or record of the Unicomarine Ltd (1993, 1995) survey.

Thirdly, it is now UK Government policy to manage the marine environment using an ecosystem-based approach. This policy requirement is stated in Safeguarding Our Seas, DEFRA, 2002, and is defined as:

“An ecosystem-based approach to management represents a new and more strategic way of thinking. It puts the emphasis on a management regime that maintains the health of ecosystems alongside appropriate human use of the marine environment, for the benefit of current and future generations. This requires setting clear environmental objectives both at the general and specific level, basing management of the marine environment on the principles of sustainable development, conservation of biodiversity, robust science, the precautionary principle and stakeholder involvement.” Ref, section 1.17.

In our opinion, there is no evidence that this Environmental Statement has sought to

- show how a new licence would provide a management regime that maintains the health of the ecosystem alongside appropriate human use
- provide clear environmental objectives, at both the general and specific level

Accordingly, it is our opinion that this Environmental Statement, whilst providing a limited record of the nature of the benthic community in Area 401/2, has manifestly not managed to show how this benthic community has been affected by a legacy of previous dredging (both within the area and from adjacent licensed areas) and has not managed to chart a way forward for the management of the benthic community on a sustainable basis in the future i.e. secure the restoration of its health and the subsequent retention of its good health.

As a result of the failure of the applicant to either observe or base its proposals (re-licensing application) on the principles identified in the above three areas, the following aspects of the benthic community have not in our view been properly evaluated in the Environmental Statement.

1. The *Sabellaria spinulosa* (Ross worm) community.

The applicant’s ES concludes:

“The continued presence of comparatively large numbers of living Sabellaria worms (and tubicolous structures) over the last 11 years suggests that there have been no significant detrimental effects on the Sabellaria reef communities since dredging commenced.” Reference: Appendix F, section 4.39

However, this conclusion is at odds with a number of facts recorded in the applicant’s Environmental Statement. For example:

“The Ross Worm, *Sabellaria spinulosa*, was the most abundant species present within the study area and a total of 281 individuals were recorded during the current study. Its distribution was, however, patchy with the majority of the population (92.5%) at just two sampling stations (stations 32 and 35).” Ref: Appendix F, section 3.14 [Note: there were 35 sampling stations].

and yet the applicant’s ES also observes:

“Trawl sampling at T33, located at station 33 and within licence block 401/2A, also recorded high numbers of *S. spinulosa* and *Sabellaria* reef structures suggesting that *Sabellaria* communities may be more widespread than initially indicated by the current grab sampling programme suggests [sic]. Historic surveys undertaken by Unicomarine Ltd (Unicomarine 1993, 1995) and MES (MES, 2001) have also identified other locations within the licence block 401/2A where *Sabellaria* communities exist. Figure 4.1 shows the locations of *Sabellaria* communities as described by the current study and historic surveys.” Ref: Appendix F, section 4.20

It is to be noted that Figure 4.1 records 25 *Sabellaria spinulosa* communities. The question therefore must be asked: why did the 2004 benthic survey (Emu Ltd) not confirm the existence of these communities ? Do these communities still exist, or have they been eliminated during the past 11 years of dredging ?

In our opinion, these are important unanswered questions. They are important because they show not only that the 2004 benthic survey is incomplete and inadequate (and certainly not able to serve as a benthic baseline as asserted in the Monitoring Programme of the Environmental Statement – see above), but also because *Sabellaria spinulosa* reef communities are Annex I habitats under the EU Habitats Directive 92/43, and their presence in Area 401/2 has been recorded by the Joint Nature Conservation Committee (JNCC) in their report 235 : *Natura 2000 in UK Offshore Waters*.

It is therefore vital that the applicant’s benthic survey is able to inform JNCC fully as to the status of the *Sabellaria spinulosa* communities in Area 401/2, and as to their conservation status as a result of dredging over the previous 11 years. Moreover, the ES should have provided a conservation plan explaining how the *Sabellaria spinulosa* communities are to be maintained at a “favourable conservation status”.

In our opinion, the Applicant’s ES has done none of these things adequately.

2. The *Ophiura* (brittlestar) communities.

From the limited reporting in the 2004 benthic survey regarding the presence of brittlestars in Area 401/2 before dredging commenced (i.e. the Unicomarine 1993 benthic survey), it is clear that brittlestars were dominant and widely prevalent, as were crustaceans (Ref. Environmental Statement, section 7.1.4)

This is an important fact. Brittlestars are suspension feeders which can occur in very high densities and can play a dominant role in the main nutrient exchanges in estuarine and coastal ecosystems, and they provide habitat structure and therefore shelter for other species. They are therefore a keystone species in the development of the eco-structure of marine benthic communities (Ref. <http://www.marlin.ac.uk/species/Ophiothrixfragilis.htm>)

The presence and survival of brittlestars is therefore a key factor in assessing the impact of aggregate dredging on the benthic community in Area 401/2. In short, if brittlestar communities are lost, then it is very likely that the ecosystem within the area will be damaged and impoverished. In turn, this will have implications for fisheries.

Brittlestars breed in the spring months (R. Docwra, personal communication), and they are also susceptible to smothering by sediment – such as plumes from aggregate dredgers. The 2004 benthic survey (Emu Ltd) states:

“Although relatively high numbers of Ophiura brittlestars occurred at some of the current sampling stations, these were positioned away from actively dredged areas and did not support the high faunal richness and diversity values recorded in 1993. Whether or not this has been due to dredging activities or a result of natural processes is difficult to assess due to the lack of baseline physical and biological reference data, although it does fit the established view of the consequences of dredging processes described above [dredging processes suppress macrofaunal diversity, abundance and biomass (Newell et al, 2004) within the boundaries of dredging area]” Reference: ES, Appendix F, section 4.44.

In our opinion, it is therefore clear that brittlestar communities have declined substantially since 1993. And, given their keystone position within benthic communities, this will have had a consequential and serious impact on the fecundity and structure of the wider benthic community.

Further, there is clear circumstantial evidence leading one to believe that this decline in the brittlestar communities in Area 401/2 is a direct consequence of aggregate dredging over the past 11 years.

Consistent with the principles of ecosystem management, it is incumbent upon the ES to have thoroughly investigated this matter and, in our view, the ES has manifestly failed to do so.

3. Meiofauna and Phytoplankton.

In this category we include not just small animals in the benthos which are retained by a 63µm sieve, but also phytoplankton and algal species.

These animals and plants are the foundation of the food chain. All higher orders of fauna depend on them for their existence. The impact of aggregate dredging on this category of species is therefore fundamental.

For example, brittlestars are filter feeders and are vitally dependent on this category of species. In turn, brittlestars provide nutrients via their faeces for phytoplankton and meiofauna, and shelter for higher order fauna such as shrimps and other crustacea. Similarly, these crustacea are an essential food stock for fish. And so this web of dependence is built up within the benthic community.

The applicant’s EIA suggests that it understands this web of dependency, and indeed makes its own contribution when it observes *“the relatively high number of pink shrimp [Pandalus montagui] recorded within trawl T33 correlated with a high abundance of the Ross worm, Sabellaria spinulosa, on which this shrimps may feed.”* (Ref: Appendix F, section 3.43).

However the ES does not develop this type of analysis. Indeed, not once in the Baseline Ecology Report (Appendix F) is the role of meiofauna and phytoplankton referred to. This is an extraordinary deficiency. It means that the ecological structure of the marine community in Area 401/2 has not been thoroughly examined and, as a result, the ES is incapable of making any credible assertion about the impact of aggregate dredging on the benthos of the area.

This deficiency does not prevent the Environmental Statement making the following assertion:

“Future impacts on the benthos through direct removal and deposition effects are predicted from continued dredging. However, the significance of these impacts is judged to be Low.” Reference: Environmental Statement, Box 13.2.

In our opinion, the failure to study the impact on meiofauna invalidates, on its own, the assertion that the significance of the impact will be Low. When this shortcoming is allied to the failure to analyse the impact on keystone species such as brittlestars (see above), then the assertion lacks even further evidential credibility.

In short, the ES has failed to acknowledge the basic principles of ecosystems and how they function and has failed to apply this method of analysis and assessment to the study of the impact on Area 401/2.

4. Fisheries.

It has been asserted to us by MARINET members and local fishermen (Ref. R. Docwra, Lowestoft Fishermen’s and Auction Services, personal communication) that the operation of aggregate dredging has destroyed the fishing in Area 401/2, and related spawning grounds.

Certainly, the applicant’s Fisheries Study (Appendix I) catalogues a serious decline in the catches from this area of the sea, but the Study largely attributes this to factors other than aggregate dredging.

Whilst it is true that fish stocks in the North Sea have been severely impacted by intensive fishing practices and rising temperature levels of the sea, it must be asserted that aggregate dredging is not without impact.

The passage of a dredger effectively destroys most of the life in the vicinity of its path and, through the deposition of displaced material and the discharge of unwanted material from the dredger, can have a damaging footprint of some size, ref. Appendix E. As a consequence, the ecological structure of the dredged area and its seabed in its vicinity is effectively destroyed. Further, the rate of recovery is very gradual.

For example, Area 222 which is located approximately 20 miles east of Felixstowe, has been studied by CEFAS, *Assessment of the re-habilitation of the seabed following marine aggregate dredging, Technical Report 121, 2004*. This report by CEFAS assessed the rate of biological/ecological recovery following the cessation of dredging:

“Evidence from this study suggests that the fauna remains in a perturbed state in areas previously subjected to high levels of dredging intensity at least 4 years at Areas 422 and 408 [Area 408 is approximately 60 east of the Humber estuary]. . . . These findings, particularly those obtained at Area 222 and 408, appear to conflict with the body of case studies which together suggest that substantial progress towards restoration of the fauna could be expected within 2-3 years following cessation of marine sand and gravel extraction Evidence from the present study indicates that the ‘recovery’ period may be more prolonged, especially for sites dredged repeatedly. Indeed, observations at Area 222 indicated that the fauna remains in a perturbed state some 7 years after the cessation if dredging in the northern sector of the extraction site.” Ref. CEFAS Op cit, section 10, pages 109-110.

Therefore, it is clear that for several years at sites where intensive dredging has been practiced, recovery of the marine benthos is uncertain. Indeed, in the case of the CEFAS study and Area 222, the site had still not recovered after 7 years and the eventual time required to restore this site to its former benthic condition remains unknown.

It therefore seems logical that aggregate dredging will impact severely on the fishery in the vicinity of the site, not least because the food chain and spawning grounds which support that fishery are destroyed, and neither appear to recover in either the short or medium term.

This reality, and how the ecological structure of a site is damaged with respect to its fishery, is neither studied nor assessed in the applicant's Environmental Statement and Fisheries Study (Appendix I). In our opinion, this is a very serious deficiency and invalidates the application for re-licensing because the EIA has failed to evaluate a key aspect of the marine ecosystem, and to demonstrate how aggregate dredging can operate sustainably in this regard.

Recommendations for Government View:

It is our view that the application to re-license Area 401/2 should not be granted until the baseline benthic study undertaken in 1993 and 1995 has been clearly recorded in the Environmental Statement, and the benthic study undertaken in 2004 by the applicant has been referenced against this baseline.

It is our view that any re-licensing of Area 401/2 and its ongoing environmental monitoring must be referenced to the 1993/1994 benthic study in terms of its baseline, and not referenced to the 2004 study as proposed by the applicant.

It is our view that the applicant's Environmental Statement does not record a management policy for the re-licensing of Area 401/2 based on the ecosystem approach (DEFRA 2002), and therefore re-licensing should not be permitted until the applicant has formulated a management policy to govern aggregate extraction in Area 401/2 based on the principles of the ecosystem approach.

It is our view that the applicant has not yet adequately assessed the impact of aggregate dredging on the *Sabellaria spinulosa* community, the *Ophiura* (brittlestar) community, the meiofauna and phytoplankton communities, and the fishery in Area 401/2; accordingly, no re-licensing should occur until these specific matters of impact have been properly assessed.

Conclusion.

Our specific recommendations for the Government View procedure have already been recorded throughout our submission.

In the course of the evaluation of these specific recommendations, we should like the following matter to be particularly noted: when assessing the need for this licence, the applicant asserted that the licence should be granted unless a question arose as to whether there are "compelling environmental disadvantages" associated with marine dredging for aggregate. Reference: ES, Appendix C, section. C.8.

Accordingly, in our opinion, it is essential that the specific recommendations we have made for re-examination under the Government View procedure should be assessed to determine whether there exist "compelling environmental disadvantages" associated with re-licensing Area 401/2.

It is also apparent to us that monitoring of the existing licence, although undertaken in a limited manner in 2000, has been very unsatisfactory. A limited benthic and *Sabellaria spinulosa* survey was undertaken in 2000, but this survey has done little to inform the current Environmental Statement or its ability to offer an ecosystem based management approach for the re-licensing application. And, with respect to such matters as impact on the coast, impact on

fisheries, impact on the major components of the benthos (e.g. *Ophiura*, meiofauna and phytoplankton), the monitoring survey of 2000 appears to have done no work at all.

In the current Environmental Statement a monitoring programme for a re-issued licence is set out (Ref. Table 13.1), but this monitoring programme ignores the areas that the 2000 ignored and offers virtually no detail as to how the aspects to be covered will actually be tackled. As a result, the monitoring programme advanced by the applicant is, in our opinion, seriously deficient.

In our view, the monitoring programme for a new licence (should it be issued) must be entirely reformulated. Its reformulation must take account of all the specific matters which we have recommended for review and further study in our Government View recommendations, and only when this information has been supplied to the Government by the applicant can the future monitoring programme be designed in any meaningful sense. And, we would add, when this re-design is undertaken it must be done in such a manner as to be able to inform an ecosystem based approach to the management of Area 401/2.

One point of note in the applicant's Concluding Statement of the Environmental Statement (ref. section 13.5) reads:

*“There appears to be greater scope for cumulative impacts from **all** [emphasis in the original] dredging within the Great Yarmouth block, especially on commercial fishing activity.”*

We would agree with this statement. We believe that there is an urgent need for the EU Strategic Environmental Assessment Directive 2001/42 to be applied to the Great Yarmouth block of aggregate dredging licences, and for this study to examine all aspects of impact (and not just commercial fishing activity). **Accordingly, we make this a specific recommendation for the Government View procedure.**

Finally, may we advise that Mr. Patrick Gowen, North Sea Action Group, has asked to be associated with this submission.

Yours sincerely

S. D. Eades
On behalf of MARINET,
Marine Network of FOE Local Groups.