CG.2 Coastal Geomorphology - response to the questions raised by the Examining Authority (ExA) for Deadline 7 (3rd September 2021) Bill Parker IP No 20026713

I wish to thank the Examining Authority for asking for clarification on a number of points on coastal geomorphology.

I have outlined below in section 1 responses to the questions directly raised by the ExA to Bill Parker on issues of coastal geomorphology.

In section 2, selected questions directed to the Applicant and others have been commented upon to provide more context and or clarification to assist the Examiners with their deliberations.

For clarity all the responses for each question are provided in blue:

Section 1 – Responses to questions specifically asked of Bill Parker (and others)

CG.2.6 ESC, MMO, EA, NE, RSPB, National Trust, Alde and Ore Association, Mr Bill Parker Impacts on coastal processes.

At DL5 the Applicant submitted a revised version of the CPMMP [REP5-059]. Please indicate whether there are any further concerns:

(i) as regards the wording of that draft plan including in relation to the geographical extent of

a. the proposed monitoring,

The proposed CPMMP [REP5-059] is weak on its justification of it proposed geographical extent. The limited extent of the research is only revealed in the table on page 27 stating it extends for just 3km centred on Sizewell C. There is no detailed justification for this. The report claims to be predicated on the Precautionary Principle (para 1.4.1) highlighting '… to determine whether any unanticipated impacts are occurring, or if conditions that could lead to unanticipated impacts are developing, within and in the vicinity of the Sizewell C development'.

However, the approach as set out entirely avoids the identification of changes elsewhere that may have consequent knock-on issues for the coastline in front of, or adjacent to Sizewell C from outside of this area of interest (for instance sediment supply from Benacre Cliffs) or the consequences of the changes in the coast caused by / or exacerbated by Sizewell C (esp. in the long term) as it becomes a greater feature in the developing Suffolk coastline. This lack of curiosity is incomprehensible considering that a) the reliance on sediment from (largely) the north to maintain longshore drift sediment supply on the soft coast defence b) the ability to demonstrate confidence in the self-contained cell argument and that locations such as Thorpeness are not being impacted.

Identification of these potential issues appears to rely on the work of others who lack suitable levels of resources / funding (in particular Anglian Monitoring Group) to identify changes elsewhere on the coastline and draw relevant conclusions. The CPMMP appears to be designed to limit the potential liability of EDF (or the future the owners of Sizewell C) rather than provide reliable data and detailed assessment of the changes to the coastline that may either impact or have consequences for the long-term protection and safety of Sizewell C and the adjacent communities and their coastlines.

This entire document makes little reference to the relevant Shoreline Management Plan which is the key reference point for coastal monitoring and is weak on its integration with the management of the adjacent coast which it is an integral part of.

The information identified with regard to seabed, longshore bars and Sizewell-Dunwich banks is minimal. There is no detail of the geographical extent of the area that will be bathymetrically surveyed.

It should also be noted that *'any proposed changes to the monitoring schedule, such as frequency increases or decreases, or cessation of individual monitoring components'* P62 there is an emphasis on reducing monitoring through the document. This should be resisted and short-term stability may mask longer term changes and the lack of data is one of the most challenging issues when analysing change of the coastline.

Note: It may also be helpful for the Examiners to be aware that I have previously chaired the Anglian Coastal Monitoring Group. This Group is responsible for overseeing the monitoring and data collection of the vulnerable East Anglian coastline. The summary from the website states:
'The programme began in 1987 and was the first regional-scale programme in UK. Its aims have been to provide essential coastal data to inform tidal flood and coastal erosion risk management decisions between the Humber and Thames estuaries, which includes the low-lying and potentially vulnerable Anglian coastal frontage'. Channel Coastal Observatory Welcome (coastalmonitoring.org). Having consistent quality baseline data is essential and the failure to continue with consistent monitoring provides gaps in data that cannot be recovered and leads to uncertainty with trends and future analysis.

b. the means of monitoring and

The value in monitoring the coastline is both the quality of the data and its availability for analysis. This relies on a consistency of and regularity of data collection. The Anglian coastline has been extensively monitored for the past 30 years through the Anglian Regional Coastal Monitoring Programme and yet no mention of this is contained within this document. Coastal data is held nationally at the Channel Coastal Observatory and is freely available for research and yet this is also ignored. Whatever the means of monitoring employed it will need to meet the standards set nationally in quality, format, frequency, availability and range of data. Whilst some of the techniques highlighted are novel, none are unique and the science of data collection and analysis is moving quickly. There is little discussion on how new techniques will be incorporated into the design of data collection or its analysis in future. The approach that EDF / Cefas have taken is one of isolation ignoring the inter-connectivity of features of the coastline and potential impact on others along the coast.

c. future mitigation to maintain the shingle transport corridor and mitigation triggers?

The options as set out in the CPMMP [REP5-059] represent little in the way of new innovative thinking in mitigation measures and is limited to techniques utilised with varying degrees of success by others. However, what is not clear is as the frontage of Sizewell C becomes a promontory as the undefended coastline erodes to the north and south is how the transport corridor will be maintained. The lack of long-term alternative options for mitigation makes this a limited response. Whilst highlighted under 1.4.1 the

precautionary principal section states '*In contrast, monitoring (and mitigation) can be expected to increase adaptively as observed risk changes'* the focus of this report is clearly on monitoring and little commentary is given to active mitigation. This can be seen as a paucity of ideas on how to respond to change especially in responding to major and or multiple events. A full vulnerability assessment of the Sizewell C site does not appear to have been undertaken and the monitoring and mitigation therefore must be considered at best weak.

(ii) in relation to the funding of the monitoring and mitigation process by the Applicant and the duration for that to process and funding to be in place?

There is no reference made to funding of the monitoring and mitigation process by the applicant in the CPMMP. Funding of monitoring and mitigation should be enshrined in the following principles:

a. The additional monitoring over and above that which the EACMG would normally undertake should be entirely funded by EDF (or future Sizewell C owner).
b. The decision on what to monitor, its frequency, methodology, analysis and subsequent communication of the results should be decided through the Marine Technical Forum (without the right of veto from EDF or future Sizewell C owner) with a precautionary principle being adopted on all decisions
c. The decision to cease any form of monitoring should be decided through the Marine Technical Forum (without the right of veto from EDF or future Sizewell C owner).
d. The decision that mitigatory action is required must either be triggered by the agreed thresholds on the SCDF or as requested by the MTF (without the right of veto from EDF or future Sizewell C owner). These mitigatory actions must be undertaken in prompt and appropriate timescales not only to protect Sizewell C but also to maintain coastal access routes and mitigate negative impacts of any erosion or accretion that may occur on the adjacent coastline. These must be fully funded by EDF (or future Sizewell C owner).
e. The liability for funding monitoring and mitigation must rest with EDF (or future Sizewell C owner) for not only the length of time that Sizewell C is being developed, in operation and decommissioned, but also whilst spent nuclear fuel or hazardous materials are being stored on site or in adjacent vulnerable locations. There should also be a clear recognition that EDF (or future Sizewell C owner) has a responsibility to fund in perpetuity a monitoring and mitigation where any form of residual structure is in place, that impact on how the Sizewell C frontage and its adjacent coastline evolve. Responsibility must rest with the Applicant for funding both the understanding and mitigation of the long consequences of this development.

(iii) the means of securing and enforcing the CPMMP provisions?

Experience from other locations of similar monitoring and mitigation agreements is that the Applicant will try to influence the development of legal agreements and seek to minimise their liabilities and 'water down' the provisions through future legal and technical challenge. It is essential that all agreements are both legally watertight and have clear and robust response times and mechanisms identified. The Applicant cannot be the arbiter of whether monitoring is needed or if a response is required. The Applicant should however be legally responsible for funding such works.

(iv) whether this now satisfactorily addresses the details sought of the proposed secondary mitigation in the event that the SCDF-supported sediment pathway across the site frontage is interrupted?

The proposals as outlined in the CPMMP does not take a long-term perspective. As the Sizewell C site becomes a promontory on the Suffolk coast as the coastline erodes either side of the HCDF there is no guarantee that the measures proposed will provide satisfactory protection for the site or have an impact on the adjacent coastline. The most serious risk of Sizewell C flooding whether generated from; sea level rise, storms, tsunamis, erosion or a combination of vectors is most likely to be from flood water egressing behind the coast defences and in the low-lying areas to the north of the site. The importance of the sediment pathway cannot be underestimated and the limited monitoring and proposed mitigation is insufficient to ensure that both the entire site is safe and that there is no negative impact of the site on the adjacent coastline. Therefore, this proposal is at present not fit for purpose and needs significantly more thought and safeguards to be built in.

(v) No question in the document. If there is a missing question then please let me know and I will be pleased to respond.

(vi) whether any further changes/provisions are required to safeguard the Coralline Crag from avoidable unnatural deterioration?

The Coralline Crag is a natural feature that is largely hidden beneath the sea surface or within the cliffs at Sizewell and Thorpeness. There will be deterioration and failure of this rock which is part of an ongoing and natural process. It is unlikely that any appropriate intervention would reduce this process which may accelerate with the multiple drivers from climate change. However, this rate of failure could also be accelerated with inappropriate cutting into or boring through for cable / pipelines etc. therefore, this should be avoided. EDF themselves highlighted this issue in their recent DCO examination of the East Anglia One North and East Anglia Two submissions. (Ref "EDF Energy has stated it will object to any damage to the crag [The Sizewell-Dunwich bank] on a precautionary basis."
East Anglia 2 Offshore Windfarm Appendix 4.6, Coastal Processes Applicant: East Anglia TWO Limited, Document Reference: 6.3.4.6, SPR Reference: EA2-DWF-ENV-REP-IBR-000896_006 Rev 01 Pursuant to APFP Regulation: 5(2)(a). The Sizewell-Dunwich banks are analysed at length in the paper, see page 54 for the quotation used.) This demonstrates that EDF are concerned about the fragility of this important natural coastal defence and the coastal stabilising properties of this feature.
Therefore, whilst EDF / Cefas are not explicit on their reliance of this feature and the practical inability to manage or mitigate its deterioration highlights the question of the suitability of this site to host two EPR power stations. In addition the requirement from ONR and EA for sea defences Principles for Flood and Coastal Erosion (onr.org.uk) to be in place for 160 years after the completion of the build – nominally 2190 but likely to be later.

In summary the CPMMP is in my view not fit for purpose. EDF / Cefas appear to be using the CPMMP to mitigate for the weaknesses in their coastal management plans, assuming that the CPPMP will deal with all future challenges. The Applicant appears to be hoping that the CPMMP will make up for the lack of knowledge about this coastline and in particular to be an answer to the challenging questions regarding the future impacts of climate change. This

is a dereliction of responsibility and the CPMMP needs significantly more work and thought before it could be acceptable. The safest and precautionary approach would to not build Sizewell C and then this issue is avoided.

CG.2.12 TASC, Nick Scarr, Bill Parker Impacts on coastal processes

The EA DL5 comments on TR544 and TR545 [REP5-149] makes reference was to the latest beach erosion assessment work in TR545 which uses wave data from a buoy offshore of the Sizewell-Dunwich banks.

The comments made below refer to the [REP5-149] p12 reference 2.2.1, p19 comment by the EA.

(i) Do you agree that this effectively discounts the influence of the banks on wave height?

The approach taken by EDF / Cefas in TR545 which utilises wave heights from off-shore and applies them inshore is an unorthodox approach which is not in my view appropriate to test the resilience of the coastline or any proposed sea defence for the following reasons:

1) This tries to dismiss the influence of the undersea bathymetry and the ways it may change over time. It is a 'blunt instrument approach' and fails to model potential increases in erosive energy on the coastline especially as the banks may focus high energy erosion on specific locations. This is a well-known feature of the Suffolk coastline.
2) To just dismiss the influence of the banks when in the Flood Risk Assessment for the DCO it states they are critical is inappropriate.
3) It makes an assumption that events such as the BfE as its bench mark and does not represent potential future extremes that could be occur in future, the lack of stress testing of the modelling is inexplicable.
4) In summary this approach can be seen as a contribution to understanding how the coastline could respond, however it would be unwise and not precautionary to rely on it for re-assurance that the conditions that may be faced in the longer term have been adequately assessed. Therefore, I disagree with the EA response.

(ii) Does that make it suitably precautionary, and the outputs can therefore accommodate natural dynamics including fluctuations in bank crest elevation for the duration of project?

The report from the IPCC Sixth Assessment Report (ipcc.ch) page 28 in its summary for policy makers states: *B.5.3 It is virtually certain that global mean sea level will continue to rise over the 21st century. Relative to 1995-2014, ….the likely global mean sea level rise by 2100 is ……..approaching 2 m by 2100 and 5 m by 2150 under a very high GHG emissions scenario (SSP5-8.5) (low confidence) – cannot be ruled out due to deep uncertainty in ice sheet processes*. Each re-assessment of the combined impact of climate change indicates that future impacts are becoming increasingly challenging. The vulnerability of this site is acknowledged by all. It would be unwise in my view to make the assumption that this is suitably precautionary and that fluctuations in bank levels can be dismissed or ignored through the TR545 approach. I am also concerned that EDF / Cefas are yet again focussed on the short term and fail to take into account their responsibilities as set out in the ONR / EA requirement to have effective sea-defences for a minimum of 160 years after the start of the operational phase of Sizewell C. I am alarmed that the design and full analysis of the resilience of the proposed coast defence is still not complete at this stage of the DCO process. The continual re-working by the Applicant of such a critical feature does not inspire

confidence and appears to seek obfuscation of responsibility.

I also support Mr Nick Scarr's detailed response to this question submitted for Deadline 7 [ref no. unknown]

(iii) In any event, would the monitoring and mitigation proposed by the CPMMP provide a suitable mechanism to pick up any other fluctuations in bank topography?

It would be an abject failure of the CPMMP if fluctuations in bank topography were not closely monitored and the CPMMP must be designed to ensure this is done effectively. However, the critical question is not will the CPMMP will pick up the changes it should be, if changes are identified what actions can be taken to mitigate these changes. Evidence presented to-date indicate that the mitigation options available to the Applicant are limited to either moving sediment material around the beach or introducing additional material. There is an implicit admission that fluctuations in bank typography are beyond the control of the Applicant who unable to manage these changes. The uncertainty as to how the coastline will develop under the stresses placed by climate change challenges the assumption that this is a suitable location for a new nuclear power station. Future generations may come to see the development of Sizewell C as at best foolish but more concerningly they may struggle to be able to have the technical solutions or financial resources to appropriately manage the site and the adjacent coastline. This has not been adequately considered in any analysis seen to-date.

A detailed technical assessment of the weaknesses of the TR544 and TR545 has been submitted by Mr Nick Scarr for Deadline 7, I support his analysis and conclusions. This should be considered in detail when reviewing the evidence put forward by the Applicant.

Section 2 - Responses to questions specifically asked of others commented on by Bill Parker

CG.2.15 The Applicant Impacts on coastal processes

The DL5 submission of Mr Bill Parker in relation to ISH6 [REP5-191], highlights some areas which he submits have been overlooked in the modelling provided to date and is critical of the assumptions underlying the EGA including the use of 'reasonably forseeable' conditions.

(i) Please respond to those criticisms and summarise why the approach to monitoring utilised by Cefas can be regarded as robust.

The recent IPCC report Sixth Assessment Report (ipcc.ch) clearly highlights predictions of a worsening situation with regard to future climate change. This 'Code Red' report recognises that:

C.3 Low-likelihood outcomes, such as ice sheet collapse, abrupt ocean circulation changes, some compound extreme events and warming substantially larger than the assessed very likely range of future warming cannot be ruled out and are part of risk assessment.

And also

3.5 Unpredictable and rare natural events not related to human influence on climate may lead to lowlikelihood, high impact outcomes. For example, a sequence of large explosive volcanic eruptions within decades has occurred in the past, causing substantial global and regional climate perturbations over several decades. Such events cannot be ruled out in the future, but due to their inherent unpredictability they are not included in the illustrative set of scenarios referred to in this Report.

Therefore, the assumption made by the Applicant of 'reasonably forseeable' conditions cannot be accepted as a precautionary but more of a 'fingers crossed' approach. In view of the type of development, the storage on site of spent nuclear fuel for an undefined (but at least till 2150) period of time the wishful assumption that 'reasonably foreseeable' is appropriate is simply not good enough. A detailed in combination stress test against an array of threats must be carried out and validated by independent experts.

The failure to achieve confidence in the proposals must mean that this proposal is rejected.

CG.2.0 The Applicant Impacts on coastal processes

The submission of Bill Parker 'Tsunami geohazard – Lack of transparency on the precautions and mitigating actions for the proposed Sizewell C development' [REP2-228] submits that there is a quantifiable risk of a tsunami that the Applicant has not taken into account in the DCO application, and the level of risk is such that it makes the Sizewell C site too vulnerable to be built. The Applicant's response to ExQ1 Al.1.4 [REP2-100] indicates that it has considered Tsunami risk to help inform the design of the Sizewell C sea-defences.

(i) Please provide further details and explanation as to how the design of the sea defences would provide adequate safeguard against this risk?

(ii) In relation to "Storrega-type" Tsunami events, the Applicant indicates that they have an estimated return period of 1 in 10,000 years. Please explain how the design of the sea defences would respond to this risk or has provision been omitted due to the anticipated infrequent occurrence?

(iii) Has the potential for climate change to impact upon the frequency and severity of tsunamis been taken into account in the sea defence design?

It is anticipated that the Applicant may make one or more of the following responses to this question.

i) The issue is unlikely to occur as the exact conditions that initiated the Storegga event (under sea mudslides) don't exist anymore.

ii) The coastal defences are designed would withstand any tsunami.

iii) The issue will be dealt with by the ONR and therefore isn't relevant to the DCO application.

Before the ExA accepts any or all of these responses then the following points should be considered:

(i) Likelihood – There is a published view from well-respected academics working on this subject is that there is a small but genuine risk within the next 200 years, see my submission [REP2-228] for details. Prof Bill McGuire states *'there seems little doubt that the Storegga*

Slide occurred as a direct consequence of climate change' [1] P192 therefore it is not unreasonable to recognise that there is a risk of a similar event whether precipitated or not by climate change could occur again in a period of rapid climate change over the next 170+ years. there are clear warnings in the latest IPCC report IPCC_AR6_WGI_SPM.pdf that states very clearly:

C.3.2 Low-likelihood, high-impact outcomes could occur at global and regional scales even for global warming within the very likely range for a given GHG emissions scenario. The probability of low-likelihood, high impact outcomes increase with higher global warming levels (high confidence). Abrupt responses and tipping points of the climate system, such as strongly increased Antarctic ice sheet melt…, cannot be ruled out (high confidence).

Note: Prof Bill McGuire states that *Iceland is the prime candidate to host a volcanic response to a warmer climate.* P256[2] If/when this occurs this is likely to impact the North sea.

(ii) Scale - The size of any future tsunami may or may not be as significant as the Storegga event however even a modest tsunami in combination with a storm surge (for instance) should be taken into account when planning and considering the locations vulnerability.

(iii) Timing – An event could occur at any time and the probability of an occurrence will increase over time especially with the increasing influence of climate change. The defence of the Sizewell C site relies on the basic design with the potential to increase defence capability (for example wall height) should they appear inadequate over time with climate change. The warning of a tsunami will be a matter of hours, it will be impossible for the Applicant or future owners of Sizewell C to react to increase defence measures in such a short timescale.

(iv) Effectiveness of proposed flood defences - In addition, examination of the evidence presented to-date identifies that whilst the front face of the defences may be at 14+m AOD the of defences to the north (inc. the SSSI crossing), west and south are significantly lower. Experience of disaster events identifies that tsunami / flood water will find the weakest point in the defences to ingress.

(v) Consequences - It would be foolish to dismiss the Storegga event either that there was no impact on the Sizewell location as evidenced from the event 8,000 years ago or its scale. To do this ignores the changed conditions the changed environmental and social conditions that are in existence now and into the future. Firstly, there is no longer the protective barrier of Doggerland to reduce / prevent impact of any tsunami and it would (if generated from the north) likely affect the entire North sea. Secondly the impact of any tsunami event would be huge with the density of low-lying communities and economic assets that would be directly affected all along the coastline. When such an event occurs then national and local government and agencies would be fully stretched to respond. They would not also wish to have the additional risks such as nuclear spent fuel spillages to add to the challenges faced. The responders may not be able to adequately cope as demonstrated at the Fukushima

[1] 'Waking the giant' Oxford Uni Press ISBN 978-0-19-967875-4
[2] [2] 'Waking the giant' Oxford Uni Press ISBN 978-0-19-967875-4

disaster.

(vi) It's an ONR responsibility not PINS – This argument is not coherent with the rest of the DCO process. The consequences of a tsunami are likely to be flooding and erosion and effective risk assessment. These points are covered by the DCO process as well as the ONR, therefore it is an entirely legitimate area for examination by PINS. The mitigating actions needed (if these are actually possible) must come within the planning process.

CG.2.4 ESC Impacts on coastal processes

The ESC's DL5 written summary of oral submissions at ISH6 [REP5-144], in relation to Item 3b states that in the light of SMP Policy 13.1, the Applicant should minimise the seaward extent of the coastal defence features as far as possible. The Applicant's DL5 submissions include further details of the reduced seaward extent of the coastal defences at Appendix A to the Applicant's written submissions responding to actions arising from ISH6 and Revision 2 of the Coastal Defence Features Plans [REP5-118].

(i) In the light of the additional information and plans provided by the Applicant at DL5, are you satisfied that the HCDF is located as landward as possible?

(ii) If not, please explain whether and, if so, why any further changes to the seaward extent of the coastal defences are sought?

The revised location of the HCDF is as far as can be determined for the inadequate maps provided ca be as little as 3 m to the west of the initial proposals. Whilst the movement away from the coast / beach is welcomed this is grossly inadequate and makes little difference in reality over the time period being examined. The SMP7 Microsoft Word - PDZ4v9g post consultation_vFINAL.doc (suffolksmp2.org.uk) identifies that until 2105 (still at least 85 years short of the length of time defences must be in place) that the erosion range for 100 years is between 10 and 100m (P13) with an assumed sea level rise of 1m to 2105. This was approved in 2012 before more recent evidence of climate change and accelerating sea level rise esp. after 2105 and therefore should be considered conservative, in the sense that the reality is that erosion rates are likely to be significantly more rather than less. Therefore, the proposed movement of the defence westward are largely irrelevant and further emphasise that this proposal is too large for this site and must be considered inappropriate. Therefore, it should not receive DCO approval.

CG.2.7 The Applicant, ESC Impacts on coastal processes

ESC's DL5 written summary of oral submissions at ISH6 [REP5-144], reasserts that the HCDF should be removed when no longer required to protect nuclear site infrastructure, and that the default position should be for the HCDF to be removed subject to assessment at the time of decommissioning. The EA's DL5 submission [REP5-148] also says they would welcome a provision made for removal of the HCDF.

(i) Please provide an update in relation to the ongoing discussions on this topic and indicate how this would be secured by the draft DCO.

(ii) Is the wording of the new requirement proposed by ESC agreed?

(iv) In relation to that wording, is the last sentence relating to 'a proposal to be to submitted to ESC for approval' sufficiently precise and enforceable?

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The Applicant must be clear on the methodology for HCDF removal in particular the removal of residual structures with the loss of beach height and increased sea levels. Examples elsewhere in Suffolk (e.g. North Corton) of the failure to remove failed / old / redundant sea defences have rendered the beach area a hazard to users as old structures esp. steel and concrete now required current and future users to be permanently excluded from the area.

Secondly it should be made clear who and how this will be adequately funded and there must be the presumption that the costs of this will not be paid from the 'public purse'.

Finally, consideration must be given on how to protect the 'core' of Sizewell C which it may not be possible to remove. This need to be planned in detail at this stage to ensure that the full life cycle of this proposal can be adequately considered.

CG.2.8 The Applicant, ESC Impacts on coastal processes
ESC's DL5 written summary of oral submissions at ISH6 [REP5-144], proposes that either Thorpeness village frontage should be included in the area of assessment, or alternatively, the Applicant could provide funding to enable ESC to monitor the Thorpeness frontage.
Please provide an update in relation to the ongoing discussion on this topic and, if agreed, indicate how this would be secured by the DCO?

As I have already outlined previously see [REP5-191] it is essential that the Zone of Interest is extended beyond the 3km already identified, this should include Thorpeness. The issue however is not just the monitoring of the coastline but mitigating the (potential) impact of the Sizewell C development. Monitoring is only part of coastal management the bigger issue is the significant cost of mitigation that inhibits action to protect vulnerable communities. The Applicant should have responsibility to support this funding if there is any doubt that their activities during construction / operation of decommissioning may have a negative effect on Thorpeness.

CG.2.10 The Applicant, EA Impacts on coastal processes
The DL5 comments of Nick Scarr on the oral submissions made at ISH6 [REP5-253,254], refers to the suggestion by the Applicant and the EA that they have modelling with 'offshore wave patterns propagated inshore'.

(i) Please provide clarification as to whether additional modelling with the Sizewell-Dunwich banks removed for all Flood Risk Assessment epochs and shoreline change modelling is available and/or whether that reference was in fact to the latest beach erosion assessment work in TR545 which uses wave data from a buoy offshore of the SD banks?
(ii) If that is the case, please explain why that makes TR545 suitably precautionary including in relation to fluctuations in bank crest elevation for the duration of project?
(iii) Please also explain how the CPMMP would, in any case, provide the mechanism to pick up fluctuations in bank topography and the consequential impacts of such a change?

I wish to highlight my response above to question CG.2.12 which covers many of these points. The nature of the approach outlined by the Applicant makes a number of assumptions regarding the consequences of changes in sea level, the banks and the consequential impact on the shoreline. It is not precautionary to assume that TR545 reflects a) the consequences

on multiple interacting forces on the shoreline and b) the absence of recognition of the impact of wind, wind direction and fetch none of which were even mentioned.

Whilst the CPMMP may pick up changes in bank topography the question of what actions can be undertaken to mitigate these changes is left unresolved.

CG.2.11 The Applicant Impacts on coastal processes

The DL5 comments of Nick Scarr on the oral submissions made at ISH6 [REP5-253,254], raises a number of issues including in relation to the Expert Geomorphological Assessment (EGA).

(i) Please indicate whether a new EGA should be conducted in respect of the latest data and modelling and, if not, why not?

(ii) Please indicate how (giving paragraph references) the submitted FRA and EGA have considered any change or degradation of the Sizewell-Dunwich banks over the lifetime of the Sizewell C project?

(iii) Please explain the variation in the assessment of the importance of the Sizewell-Dunwich banks to Sizewell shoreline stability pre DCO, in the DCO application and post DCO?

(iv) Please respond to the criticism that changes or degradation of the Sizewell-Dunwich banks would have the consequence of placing the exposed landward side of the main nuclear platform at increase flood risk and the northern defences could be vulnerable.

The EGA assessment undertaken and included in BEEMS document TR311 and TR403 *'Expert Geomorphological Assessment of Sizewell's Future Shoreline Position' 21/3/19 rev. 21/4/20'* [] had very significant constraints including; time horizon (only to 2070), lack of independence (4 of the 7 members were from Cefas), and further issues which leads to questions regarding if this was an appropriate methodology to look at the long-term issues faced on the coastline. In view of the highly critical assessment made by Prof. Derek Jackson and Prof. Andrew Cooper of TR311 [REP2-449g] and Nick Scarr [AS-028] which is the basis for much of the coastal geomorphology work it would seem entirely precautionary, indeed essential that the recent modelling and work presented by EDF / Cefas should be under truly independent scrutiny.

The number of individuals that have been drafting the documentation is relatively small. There is a potential issue of 'group think' within Cefas which could lead to a lack critical assessment of the work to-date.

If EDF / Cefas are that confident in their assessments then they should welcome the review. The review should also include the array of critiques of the work presented by EDF / Cefas to ensure a thorough review has been undertaken and provide the ExA with the reassurance they are seeking. If, however EDF / Cefas are less confident about their work then they will of course find numerous reasons to avoid independent scrutiny.

If a new EGA is undertaken the ExA should re-assure its self that a) those undertaking are truly independent and b) the scope of the assessment is sufficiently broad to ensure a complete picture of the coastal geomorphology is clearly understood.

I welcome the ExA enquiry into the issue of the changing relevance of the Sizewell-Dunwich banks. Their role is crucial in the long-term development of the coast and the apparent inconsistency of

approach by EDF / Cefas needs to be explained and confidence built that it is appropriate for this location.

CG.2.13 Applicant, EA Impacts on coastal processes

In relation to the EA DL5 comments on TR544 and TR545 [REP5-149]:

(i) The EA questions whether the SCDF erosion assessment adequately considers the 'worst case predicted SCDF erosion' scenario and encourages the addition of more severe scenarios in the next stage of modelling. Is it agreed that this modelling should be undertaken and, if so when will it be carried out and be available?

(ii) The EA indicates that it welcomes the chance to discuss further the SCDF geometry, in particular crest height, with the Applicant. Is this is a matter for detailed design stage that would be satisfactorily secured by the draft DCO?

(iii) The EA recommends modelling more severe scenarios beyond 2099 for the SCDF and that further work is needed to explore the potential for more extreme events to occur more frequently in the future. ESC's DL5 written summary of oral submissions at ISH6 also points out that the assessment currently covers only part of the Project's lifetime. The Applicant's DL5 written summary of oral submissions made at ISH6 [REP5-111], confirms that work is underway for the modelling of the SCDF through the decommissioning phase to 2140 and is due for submission at Deadline 7. However, please clarify the position in relation to the timing and submission of the assessment to 2099, and whether it will include the more severe scenarios and exploration of extreme events mentioned by the EA. In addition, please provide a timeline for the carrying out and submission of this work.

(iv) In relation to TR545, the EA comments on the reliance placed upon the currently bimodal wave climate. Please can the Applicant respond as regards the potential for changes to wave bimodality due to the impacts of climate change and whether this will be assessed?

I welcome the EA's approach and requests for the modelling of more severe scenarios. The recent IPCC report (IPCC_AR6_WGI_SPM.pdf). I note that for instance in section *B.5.3 it states:*
' It is virtually certain that global mean sea level will continue to rise over the 21st century….. Global mean sea level rise above the likely range – approaching 2 m by 2100 and 5 m by 2150 under a very high GHG emissions scenario (SSP5-8.5) (low confidence) – cannot be ruled out due to deep uncertainty in ice sheet processes'.

Sea level rise is just one of the vectors challenging this site, others include storm severity and frequency, therefore in view of the requirement that the site will need to be defended until at least 2190 (as identified in the ONR / EA Principles for Flood and Coastal Erosion (onr.org.uk) report) presuming the highly unlikely completion of Sizewell C by 2030, and the uncertainty of the impact of climate change, it must be prudent to look at much more severe scenarios.

More long term and critical analysis is required on this issue before the ExA can have confidence in the information being presented by EDF / Cefas to-date.

CG.2.14 The Applicant Impacts on coastal processes

The Alde and Ore Association Written Submission for DL5 providing commentary on ISH 6 [REP5-187], submits that the CPMMP should have a wide geographical coverage going at least as far south

as Shingle Street with appropriate time intervals for monitoring. That proposition is supported by other IPs including Mr Bill Parker.

(i) If an extension to the monitoring area is not agreed, please explain further why the monitoring is only considered to be necessary within the area proposed;
(ii) Without baseline monitoring for the wider neighbouring coastline how would any unusual changes and/or adverse effects resulting from the proposed development in such wider locations be recognised and mitigated?
(iii) In any event, should funding be provided and secured in order to mitigate against such an eventuality?

I welcome the ExA questions with regard to geographical coverage of the CPMMP. I am concerned that the Applicant is seeking to minimise its area of responsibility to being immediately in front of the Sizewell C site. The reluctance to look wider may indicate that the Applicant either wishes to avoid liabilities that the development may create (directly or indirectly) in future and / or minimise its investment in research which would provide evidence to local communities of how the coastline is developing. Coastal managers and academics know from experience and research that developments that are exposed on the coastline will have impacts both upstream and downstream. The coast is contiguous and cannot be divided in convenient self-contained discrete and independent segments. For a development of this scale and over such a long term the current EDF / Cefas position looks untenable.

CG.2.16 The Applicant, ESC Impacts on coastal processes
The DL5 submission of Mr Bill Parker in relation to ISH6 [REP5-191], suggests that certain aspects should be built into the structure of the Marine Technical Forum including having meaningful local community membership and being open to public scrutiny. Please indicate whether it is agreed that such inclusion and external scrutiny would be beneficial and should be accommodated?

The ecosystem of expertise in Suffolk is widely developed and there is clear recognition that the wider coastal community has an important and valid voice in the management of the coast. The Suffolk Coast Forum (for instance) Wider Work | Coastal Partnership East (coasteast.org.uk) since its inception in 2010 has a wide range of agencies, local authorities, community groups etc involved and considers all aspects of management of the Suffolk coast. The Marine Technical Forum on the other hand has a very restricted membership and in consequence many local stakeholders are excluded from its deliberations. I see no reason why this should continue to be the case especially going forward and very valuable in building confidence locally.

Bill Parker
1/9/21