

**Advice on Potential
Landscape/Seascape and Visual
Impacts of a Severn Barrage**

Final Report

**Prepared for Natural England
by
Land Use Consultants**

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43 Chalton Street
London NW1 1JD
Tel: 020 7383 5784
Fax: 020 7383 4798
luc@london.landuse.co

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1. INTRODUCTION

- 1.1. Natural England is the government's statutory advisor on landscape. Natural England has the remit to protect and improve landscape and seascape, to provide new and improved opportunities for access to the countryside, and to promote enjoyment of the natural environment for all. Natural England works to ensure positive planning for rural areas, promoting development that respects the character of all landscapes and meets the needs of local communities.
- 1.2. Natural England commissioned Land Use Consultants (LUC) in February 2007 to undertake a study of potential landscape/seascape and visual impacts of a possible Severn Barrage between Lavernock Point (in Wales) and Brean Down (in England).
- 1.3. This report presents information about the existing landscape, seascape and visual amenity of the area around the potential Severn Barrage and Severn Estuary, as well as potential key landscape/seascape and visual issues in relation to a barrage of this type. The report considers the following environmental resources:
 - Landscape character – as defined by the 'Character of England' map.
 - Seascape character – as defined by seascape units.
 - National landscape designations.
 - Views and visual receptors.

Limitations of the Report

- 1.4. This report does not provide a landscape and visual impact assessment since such an assessment would require details of a developer's proposal, and would entail much more extensive site work and time inputs than were possible within the scope of this study. The report also does not consider any other potential environmental impacts (such as impacts on biodiversity and the historic environment).

Structure of the Report

- 1.5. This report presents:
 - The methodology used during the study;
 - Identification of the characteristics of the tidal barrage upon which this study is based;
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- A summary of the planning policy guidance relevant to such a development in this area;
 - Identification of a study area;
 - Description of the baseline landscape/seascape character and views;
 - A broad brush analysis of the potential impacts of a barrage on the landscape/seascape character, and views, within England;
 - Recommendations for landscape mitigation/enhancement in relation to this type of development;
 - Guidance and recommendations on further work that may be beneficial either in advance or in the event of a formal development proposal.
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2. METHOD

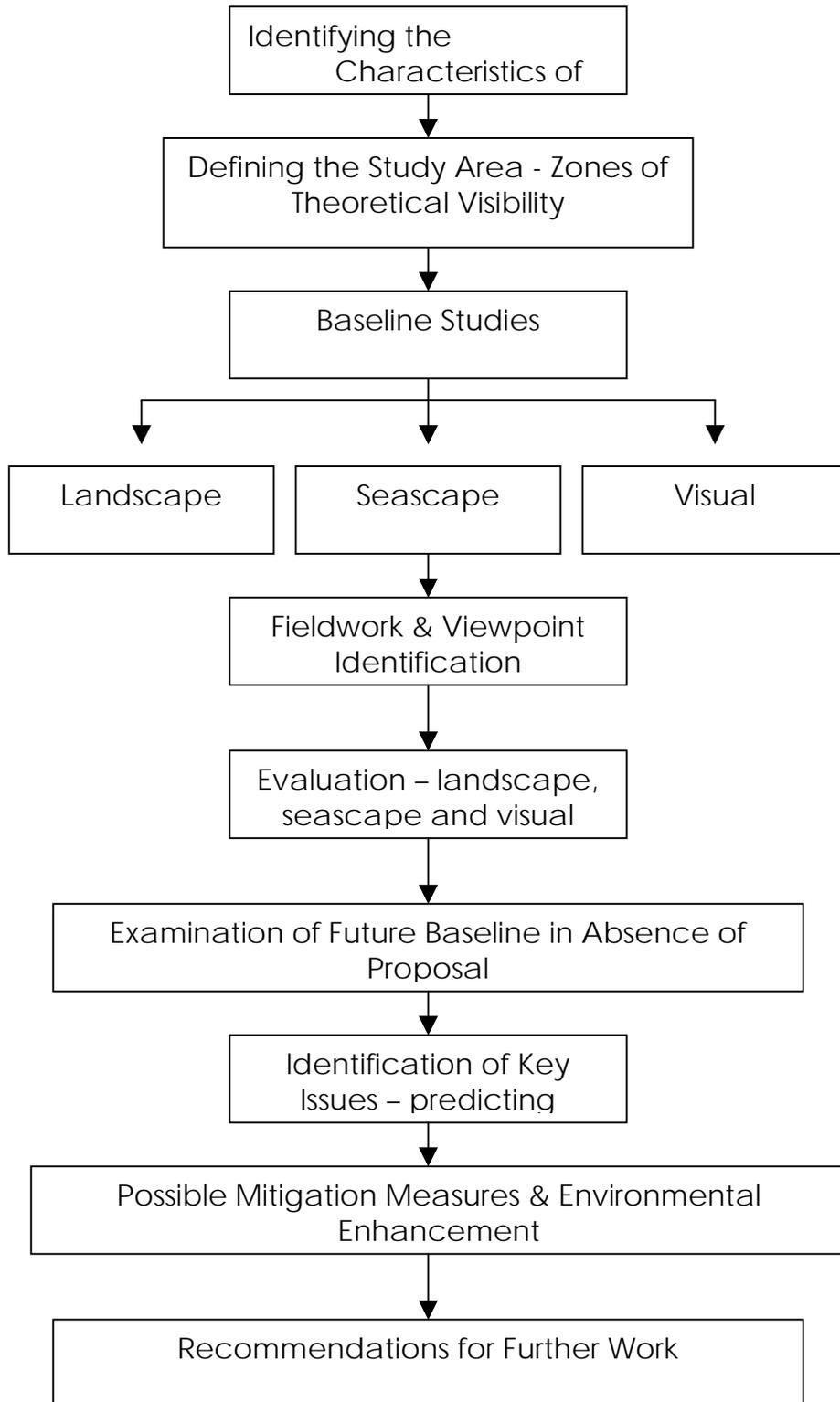
2.1. The approach to this study draws on the following guidance documents, as well as LUC's experience in undertaking landscape and seascape character appraisals and landscape and visual impact assessments:

- Countryside Agency and SNH (2002) *Landscape Character Assessment Guidance for England and Scotland, CAX 84*.
- Countryside Council for Wales, Brady Shipman Martin and University College Dublin (2001) *Guide to Best Practice in Seascape Assessment Maritime Ireland/Wales INTERREG Report No.5*.
- Landscape Institute and the Institute of Environmental Assessment (2002) *Guidelines for Landscape and Visual Impact Assessment, 2nd Edition*.
- Department of Trade and Industry (2006) *Guidance on the impact of Offshore Wind Farms*.

2.2. As requested by the brief, this study:

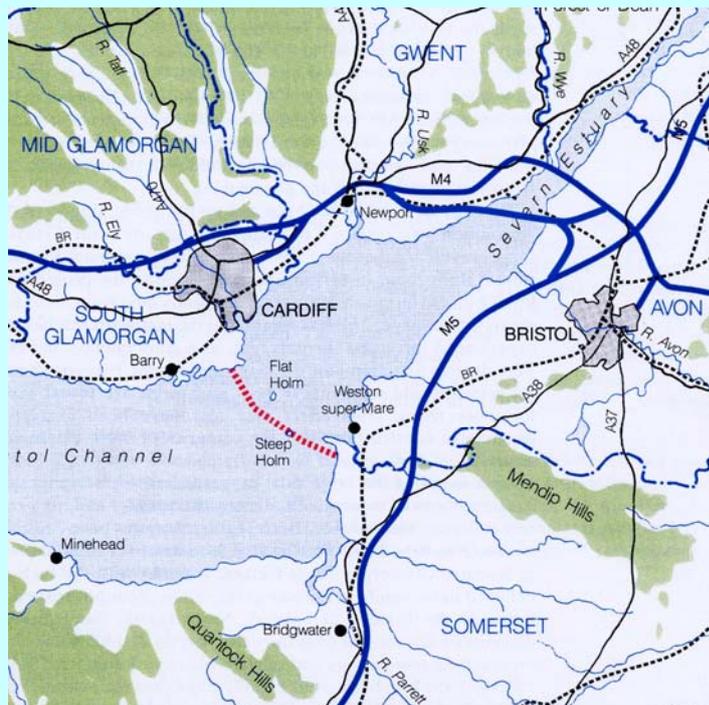
- Provides a summary of the planning policy guidance relevant to such a development;
- Provides a broad brush analysis of the potential impacts of a barrage on the landscape/seascape character within England;
- Provides an indication of potential visual impacts within the zone of visual influence within, and from, England;
- Gives guidance and recommendations on further work that may be beneficial to be undertaken either in advance of or in response to a formal development proposal.

2.3. The stages of the study are summarised in the flow chart overleaf:



3. THE CHARACTERISTICS OF A TIDAL BARRAGE

- 3.1. This section of the report sets out the known and unknown aspects of the development proposal, to set out the basis upon which this study has been undertaken. It presents the characteristics of the temporary and permanent features of a tidal barrage.
- 3.2. Since plans are not yet drawn up in detail it is necessary to maintain a broad description of the potential development. Information on the barrage has been drawn from Severn Tidal Power Group's (STPG) proposed barrage¹ (see diagram below), with information on the indirect features of the barrage proposal drawn from other sources (listed below).
- 3.3. The proposed barrage considered in this report is located between Lavernock Point and Brean Down, a distance of some 16km.



EP 57 (1989)
(inner barrage)
Cardiff
(Lavernock point)
to
Weston-super-Mare
16 km length

¹ Details of construction are contained in the Department of Energy, Central Electricity Generating Board and Severn Tidal Power Group's 'Severn Barrage Project: Detailed Report' ETSU Harwell UK 1989, Report No. TID 4060.

[image from Severn Tidal Power Group's presentation at the Severn Energy Symposium on 1st November 2006, available to download from <http://www.gloucestershire.gov.uk/index.cfm?articleid=14442>]

Likely Sources of Impact During Construction

- 3.4. It is assumed that the sources of impact on landscape and visual amenity during construction will be broadly as follows:
- Construction compounds at each 'rockhead' including access roads and construction activities in these locations;
 - Increased boat traffic on the Severn during construction of the barrage.
- 3.5. Since the plans for construction of the barrage are not yet drawn up in detail, this study focuses on the long term impacts of the permanent barrage structure and related changes in the estuary and coast (see below).

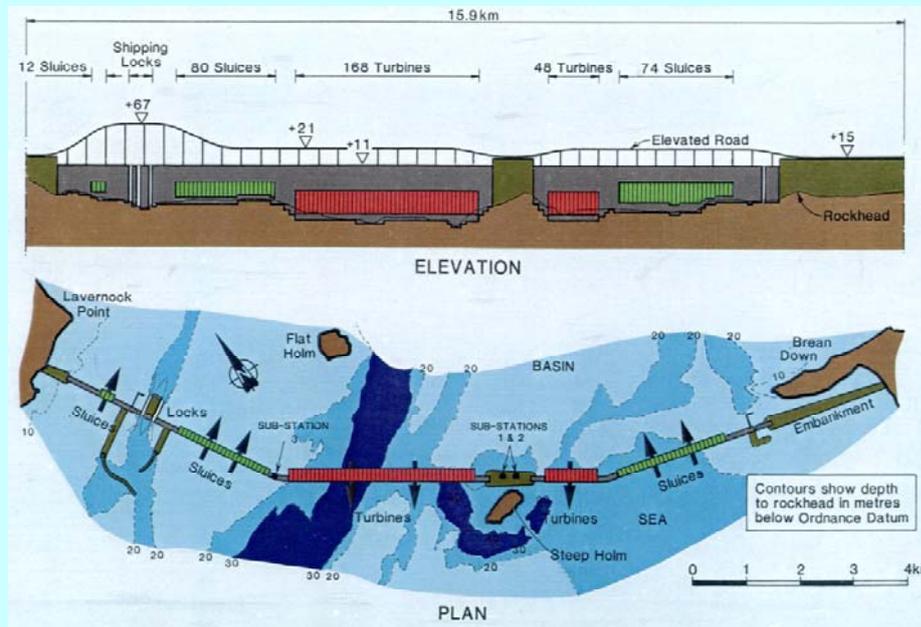
Permanent Features of the Proposal

- 3.6. Features of the proposal that are likely to give rise to longer term landscape/seascape and visual impacts are:
- The permanent barrage structure itself;
 - The related changes in the estuary and coast;
 - Possible related transport links, power transmission and associated built development, for example recreational facilities.

Assumptions on the permanent barrage structure

- 3.7. The introduction of a large barrage across the Severn Estuary will no doubt result in impacts on landscape/seascape character and visual amenity.
- 3.8. For the purposes of this assessment it has been assumed that the barrage will be constructed from concrete and will be run between Lavernock Point and Brean Down. The proposed barrage will incorporate locks and sluices, and may or may not have a public road along its length. Typically, the structure would be in the region of 15m above ordnance datum (AOD) at the rockheads, the main barrage 11m AOD, and a possible elevated road running on top at around 21m AOD rising to 67m AOD over the locks. The general layout of a barrage of this type is shown below:
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Barrage Layout (EP 57-1989- inner barrage)



- 216 Turbines, 40MW each, 8640MW total
- 166 Sluices 35,000m²
- Ship Locks
- Small Locks
- Public Road

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STPG

[image from Severn Tidal Power Group's presentation at the Severn Energy Symposium on 1st November 2006, available to download from <http://www.gloucestershire.gov.uk/index.cfm?articleid=14442>]

Assumptions on related changes to the estuary and coast

- 3.9. Although the barrage itself constitutes a potential source of impact on landscape and visual amenity, the indirect changes that the barrage will cause on the adjacent estuary and coast also need to be considered.
- 3.10. There is some debate about the extent to which suspended sediment in the inner estuary might increase biological productivity, and the extent to which the reduction in high water levels will counter sea level rise. These changes could result in change to landscape/seascape character.
- 3.11. Geomorphological impacts of the Severn Barrage proposal are considered in Prof J Pethick's report to Natural England on the Assessment of Geomorphological Impacts of the current proposal for an Inner Severn Barrage (March 2007). The report predicts a reduction in tidal range – in the inner estuary this is mainly due to a rise in the low

water elevation (predicted to rise by 6m at Avonmouth) and seaward of the barrage this is principally due to a fall in high water elevations of approximately 0.5m.



3.12. The key landscape-related points from this report are:

Landward of the Barrage

- landward of the barrage the reduction in tidal range will be a result of a rise in the low water elevation (which is predicted to rise by 6m at Avonmouth) and a slightly lesser fall in high water (predicted to fall by 0.5m immediately upstream of the barrage, increasing to 1m at Avonmouth and to 1.5m at Sharpness);
- the reduction in high water levels will result in die back of salt marsh vegetation and erosion of the salt marsh cliffs upstream of the barrage (including in the major tributaries upstream of the barrage e.g. Usk, Wye and Avon where there may be some major slope instability and failure);
- in the long term there is likely to be deposition to form new salt marsh at the new inter-tidal zone;
- lower inter-tidal areas will become sub-tidal (e.g. sandy areas of North Middle Grounds, North Bristol Deep, Bedwyn Sands; and the Oldbury/Lydney Sands).

Seaward of the Barrage

- Seaward of the barrage, there is also predicted to be a reduction in high water levels (by up to 0.5m) extending to Ifracombe on the Devon coast;
- there is likely to be a significant reduction in deposition in the Bridgwater Bay mud-zone (from upstream) resulting in loss of salt marsh vegetation along the Steart peninsula and in the Parrett estuary;
- the Parrett delta will decrease in extent due to lack of sediment – and accelerated wave erosion of inter-tidal zone along the Steart and Berrow Flats;
- pressure on flood defences at Stolford and increased cliff erosion around Hinkley Point;
- possible change in sediment circulation of banks in the Bristol Channel e.g. the Culver, Holm, Nash, Scarweather and Helwick;
- possible increase or decrease in beach sediment stores along the English and Welsh coasts.

3.13. The report also predicts that the fall in high water levels, post-barrage, will be offset by the predicted sea level rise by 2066 in most places.

However, this will not result in restoration of the salt marsh habitats as we see them today.

Possible related development

- 3.14. Possible related development such as transport links, power transmission and associated built development including recreational facilities will be considered very broadly in this report. No assumptions on locations or types of development have been made at this stage, except that the road link for a barrage option with road would join the A370 at Weston-Super-Mare.
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4. PLANNING POLICY CONTEXT

- 4.1. This section considers the national, regional and local planning policy context relevant to the assessment of the impact of a potential barrage development of this type on landscape/seascape character and visual amenity.

EUROPEAN PLANNING CONTEXT

European Landscape Convention (Florence Convention) (2000)

- 4.2. The European Landscape Convention (ELC), awaiting ratification by the Council of Europe, but signed by the UK on 24th February 2006, is a new instrument devoted to the protection, management and planning of landscapes in Europe. It highlights the importance and need for public involvement in the development of landscapes and encourages a joined up approach through policy and planning². The Convention states that its aims are to “promote landscape protection, management and planning, and to organise European co-operation on landscape issues”.
- 4.3. The convention itself does not contain policies on landscape protection or management of landscapes, but aims to ensure that policies are put into place by all those who manage landscapes at a more detailed level; the explanatory report accompanying the convention clarifies that “the general purpose of the convention is to encourage public authorities to adopt policies and measures at local, regional, national and international level for protecting, managing and planning landscapes throughout Europe so as to maintain and improve landscape quality”.

NATIONAL PLANNING POLICY

PPS7: Sustainable Development in Rural Areas (2004)

- 4.4. This guidance note draws attention to the Government’s objectives for rural areas. Amongst these are promoting *‘good quality, sustainable development that respects and, where possible, enhances local distinctiveness and the intrinsic qualities of the countryside; and continued protection of the open countryside for the benefit of all, with the highest level of protection for our most valued landscapes and environmental resources.’*

² Natural England European Landscape Convention, Available at: <http://www.countryside.gov.uk/LAR/Landscape/CC/convention.asp>

'The Government's overall aim is to protect the countryside for the sake of its intrinsic character and beauty, the diversity of its landscapes...'

'All development in rural areas should be... sensitive to the character of the countryside and local distinctiveness.'

'Planning authorities should continue to ensure that the quality and character of the wider countryside is protected and, where possible, enhanced.'

PPG20: Coastal Planning (1992)

- 4.5. Planning Policy Guidance note 20 identifies planning policies for the coast. As a general rule, the limit of the coastal zone, and local planning authorities' powers, is the mean low water mark. PPG20 outlines four types of coastal policies: Conservation policies which aim to protect and enhance the natural character and landscape of the undeveloped coastline; Development policies, which should normally only provide for development which requires a coastal location; Policies for risks, particularly from flooding, erosion by the sea and landslips and falls of rock; and policies for improving the coastal environment.
- 4.6. PPG20 identifies renewable energy schemes as development which may often require a coastal location.

PPS22: Planning for Renewable Energy; ODPM (2004)

- 4.7. Planning Policy Statement 22 sets out the Government's approach to planning for renewable energy; Government policy is discussed in the Energy White Paper, which sets targets to generate 10% of UK electricity from renewable sources by 2010, and 20% by 2020.
 - 4.8. The key planning principals of renewable energy development are set out, these include that regional and local level policies should encourage, rather than restrict renewable energy development and that local planning authorities should set out the criteria that will be applied in determining planning applications for renewable energy projects. It is also stated that wider environmental and economic benefits of all renewable energy proposals should be material considerations in determining whether planning permission should be granted; and that development proposals should demonstrate any environmental, economic or social benefits, as well as how any adverse impacts have been minimised.
 - 4.9. Within sites with nationally recognised designations (including National Parks, Areas of Outstanding Natural Beauty and Heritage Coasts), planning permission for renewable energy projects should only be
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granted where it can be demonstrated that the objectives of the designation will not be compromised, and that any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by the environmental, social and economic benefits. In areas surrounding nationally designated sites, the potential impacts on the designated areas should be a material consideration in determining planning applications for renewable energy developments.

- 4.10. PPS22 states that the landscape and visual effects of particular renewable energy developments will vary according to the type of development, its location and the landscape setting of the proposed development, some of which may be minimised through appropriate siting, design and landscaping. Proposed developments should be assessed using objective descriptive material and analysis where possible.

Planning for Renewable Energy, A Companion Guide to PPS22, ODPM (2004)

- 4.11. The companion guide to PPS22 is designed to assist planners, decision-makers and stakeholders in understanding the complex issues surrounding the planning and development of different renewable energy technologies and their applications in different environments.
- 4.12. The guide outlines the broader landscape issues which should be considered at a strategic regional level. These include the broad landscape character areas defined within the region, the sensitivity to change of these areas, and the criteria-based development policies in the regional spatial strategy which should be based on these.
- 4.13. When assessing individual applications, the guide states that it will be important to consider:
- National designations;
 - Landscape character areas;
 - Landscape sensitivity;
 - Landscape and visual analysis; and
 - Cumulative effects.

Local planning authorities should agree methodologies for carrying out Landscape and Visual Impact Assessments with developers. These could include assessments of the Zone of Visual Influence (ZVI), which would assist in identifying the resources (e.g. designated areas, landscape units) and locations of visual receptors (e.g. settlements,

public access land and popular viewpoints); photomontages and scale drawings.

- 4.14. The guide provides detailed information on planning issues likely to be associated with the development of small-scale hydro-power schemes of up to 0.5MW. Although a potential Severn Barrage (based on the STGP proposal) could produce a total of up to 8640MW, some issues are still likely to be relevant. The guide recognises that hydro-power schemes enjoy relatively little locational flexibility, and that therefore design to minimise adverse impacts on landscape will be important. It is also recognised that the waterside locations of hydro-power schemes will, in many cases, place them in areas valued for their visual and recreational amenity.

REGIONAL PLANNING POLICY

Regional Planning Guidance for the South West RPG10 Government Office for the South West (2001)

- 4.15. Regional Planning Guidance 10 for the South West of England states that in developing renewable energy schemes, it is important to ensure that they are compatible with other environmental objectives, and recognises that impacts on the landscape are likely to be a particular issue. The RPG extends national targets for the generation of renewable energy in the South West to 11-15% by 2010.
- 4.16. Policy EN1 in RPG10 states that local planning authorities should provide for the strong protection and enhancement of the region's internationally and nationally designated sites of landscape and nature conservation value, and that the protection and enhancement of landscape and biodiversity should be planned into new development. Development should also have regard for the region's significant landscape joint character areas, and should take measures to protect the character of the countryside.
- 4.17. Policy TCS2, on culture, leisure and sport, states that local authorities' plans and policies should aim to maximise the use of highly managed recreational areas, such as National Trails.

Draft Regional Spatial Strategy (RSS) for the South West, plus update newsletters

- 4.18. The Draft South West Regional Spatial Strategy (RSS) was submitted to the Government in April 2006, and the Examination in Public will take place in Spring 2007, following which a Panel Report on recommendations and proposed changes will be issued, and the final RSS is due for publication in 2008. As the RSS is not yet adopted, the
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policies in RPG10 take precedence; however, the draft RSS is a material consideration in the determination of planning permission.

- 4.19. The South West RSS aims, in Policy RE1, to meet the Government's targets for 20% of electricity to be generated from renewable resources by 2020. It is acknowledged that the South West has one of the best wave and tidal resources in the UK, and that this will be likely to be developed in aiming to reach renewable energy targets.
- 4.20. Policy ENV1 aims to protect and enhance the quality, character, diversity and local distinctiveness of the environment in the South West. Local Planning Authorities are required to carry out strategic assessments of landscape character (Policy ENV2), and in National Parks and Areas of Outstanding Natural Beauty, the conservation and enhancement of their natural beauty, wildlife and cultural heritage will be given priority over other considerations in the determination of development proposals. Policy ENV3 states that particular care should be taken that no development outside the National Park or AONB which would damage its natural beauty, character or special qualities.

LOCAL PLANNING POLICY

Somerset & Exmoor National Park Joint Structure Plan Review

- 4.21. The Exmoor National Park Authority and Somerset County Council jointly produced a Structure Plan in April 2000, which was reviewed in June 2004, planning for the period until 2016. When completed, the South West RSS will supersede the Structure Plan.
 - 4.22. Policy 2 of the Reviewed Structure Plan states that in the Exmoor National Park, the conservation and enhancement of the natural beauty, wildlife and cultural heritage, and the promotion of opportunities for public understanding and enjoyment of the area should be given priority over other planning considerations. Additionally, particular care will be taken to ensure that no development outside the National Park which would damage its natural beauty, character or special qualities will be permitted. Policy 3 states that in Areas of Outstanding Natural Beauty, the conservation of the natural beauty of the environment should be given priority over other planning considerations, and that particular care should be taken to ensure that development does not damage the landscape character of the area.
 - 4.23. To protect the natural beauty, ecology and geology of the coastline, Policy 15 states that development along the coast should be within towns and villages, and that where an undeveloped coastal location is necessary and essential in a particular location, it should respect the natural beauty, biodiversity and geology of the coast.
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- 4.24. The Reviewed Structure Plan, in Policy 64, states that, where environmentally acceptable, provision should be made for the development of renewable energy.

Sedgemoor District Local Plan and emerging Development Documents

- 4.25. The Sedgemoor District Local Plan covers the area at Brean Down where the barrage would be sited. The Local Plan covers the period 1991-2011, and was adopted in September 2004.
- 4.26. The text accompanying Policy RLT18 in the Sedgemoor Local Plan explains that the area at Brean and Berrow has the second largest concentration of chalets, static caravans and sites for touring caravans and camping in the country, which has had significant adverse effects on the natural landscape of the area.
- 4.27. Policy CNE1 of the Sedgemoor Local Plan is specifically focussed on the protection of the Quantock Hills and Mendip Hills Areas of Outstanding Natural Beauty. The policy states that development proposed within either of these AONBs will not be allowed if it would harm the natural beauty or exceptional character or quality of these areas. More generally, policy CNE2 aims to protect landscape character in the District, by stating that development which harms local landscape character or scenic quality will not be permitted. Particularly, siting of development should have regard for visibility from publicly accessible viewpoints, and the form, bulk and design of buildings should have regard for their context in terms of the immediate setting and general landscape character of the area.
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5. DEFINING THE STUDY AREA

DEFINING THE STUDY AREA

- 5.1. The study area should contain all of the potential significant impacts of the proposed barrage (between Lavernock and Brean Down) on any component of the landscape and visual resource in England.
- 5.2. A Zone of Theoretical Visibility (ZTV) of a proposal is one of the first steps in identifying such a study area. However, it should be acknowledged that the study area for this proposal will extend beyond the zones of visibility of the barrage itself, to encompass areas that will be affected by the indirect changes to water levels and flooding patterns in the whole of the estuary and the lower reaches of its tributaries.

Defining Zones of Theoretical Visibility

- 5.3. Two ZTVs for the proposed barrage were computer generated, based on a digital terrain model (DTM) and assumed heights for the barrage as described in the scenarios in Chapter 3. These were:
 - ZTV for the barrage option minus road (rockheads at 15m AOD and main barrage structure at 11m AOD);
 - ZTV for the barrage option plus road (main barrage structure at 21m AOD, with road rising over shipping locks to 67m AOD).
- 5.4. In terms of the extent of visibility of such a development, the seascape assessment guidance gives us some indication of visibility. The guidance states that '*On a clear day viewed from a beach, the horizon will be in the order of 3 nautical miles (approx. 6km) distant. Viewed from a height of 60 metres the horizon will be in the order of 16 nautical miles (approx. 32km) and from the top of a 1000 metre mountain the horizon will be at a distance of 62 nautical miles (approx. 113km).*³'
- 5.5. It goes on to say '*It is worth bearing in mind that there is a limit to the acuity of the human eye. At a distance of 1 km, in conditions of good visibility a pole of 100mm diameter will become difficult to see, and at 2km a pole of 200mm diameter will similarly be difficult to see. In other words there will be a point where an object whilst still theoretically visible will become too small for the human eye to resolve. Mist, haze, or*

³ Countryside Council for Wales, Brady Shipman Martin and University College Dublin (2001) *Guide to Best Practice in Seascape Assessment*, Maritime Ireland / Wales INTERREG 1994-1999, p.8

*other atmospheric conditions may significantly exacerbate that difficulty*⁴.

- 5.6. University of Newcastle (2002) Visual Assessment of Windfarms Best Practice. Scottish Natural Heritage Commissioned Report (F01AA303A) states that '*Assuming absolute clarity of view, this suggests that the... absolute limit of visibility imposed by the limit of the horizon viewed across a flat plane is... approximately 46 km*'⁵.
- 5.7. Taking into account issues of extent of visibility and visual acuity, firstly very broad ZTVs were generated to a distance of 50km. The ZTVs were generated using ESRI ArcMap 9.2. The surface model was created from Panorama 10m contours. Height values for the estuary/sea surface were assumed to be zero metres. The ZTV was created as a 50m grid, assessing the visibility of 400 evenly spaced points along the barrage structure with and without the road from an observer height of 1.6m. The viewshed model takes into account the curvature of the earth. The results of these broad ZTVs are shown in **Figures 5.1** and **5.2**. These maps indicate that, at sea level (0m AOD), earth curvature means that the barrage option (without road) would disappear from view between 20-25km and the barrage option with a road on top would disappear from view beyond 35km. The barrage option with road will be visible from a greater area than the option without the road.
- 5.8. At this stage the ZTVs were taken into the field for checking. Fieldwork revealed that a barrage structure of this size and height would be difficult to pick out beyond 20km, and significant impacts on visual amenity are likely to only occur within 10km (within 15km for the option with road and bridge over shipping locks).
- 5.9. As a result of these observations, we focussed on ZTVs for an area up to 20km from the proposed barrage location. The ZTVs were overlaid into a more detailed map base (1:50,000 scale) and colour coded to indicate what proportion of the barrage would be visible from which parts of the landscape. Using the same method as above, each cell in the 50m grid was given a value showing how many of the 400 points along the barrage could be seen from that cell. This was converted to a percentage. The results are shown in **Figures 5.3** and **5.4**. These more refined ZTVs indicate that the key areas from which the barrage would be visible include the coast around Hinkley Point Nuclear Power Station (where there are few receptors), Brean Beach, the headlands around Weston Super Mare (including Brean Down), Brent Knoll, and small parts of Bleadon Hill (which tend to be the parts without public access). The

⁴ Ibid. p.8-9

⁵ University of Newcastle (2002) Visual Assessment of Windfarms Best Practice. Scottish Natural Heritage Commissioned Report (F01AA303A), p.16

barrage option incorporating a road and bridge rising over the shipping locks would also be particularly visible from the Steart Flats in Bridgwater Bay, and from the seafront at Weston Super Mare.

- 5.10. It is important to note that the ZTVs show theoretical visibility, based on a 'bare ground' terrain model. Actual visibility is often considerably reduced by screening features, such as buildings and vegetation, on the ground (particularly in flat landscapes, such as the Somerset Levels and Moors). Atmospheric conditions are also key to the extent of visibility when dealing with a proposal within a seascape context – sea mist and haze often limits impacts.

Wider Study Area

- 5.11. The study area should encompass areas that will be affected by the indirect changes to water levels and flooding patterns. This needs to include the Severn Estuary, the lower tidal reaches of the Severn and its tributaries (the Wye and Avon), the Parrett Delta, Bridgwater Bay and the Steart Peninsula.
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6. DESCRIPTION OF THE BASELINE

6.1. The key aim of the landscape/seascape baseline is to identify and evaluate existing landscape/seascape character and quality as a basis for the assessment of potential change resulting from a barrage. The report considers the following environmental resources:

- Landscape character – as defined by the ‘Character of England’ map.
- Seascape character – as defined by seascape units.
- National landscape designations.
- Views and visual receptors.

Context

6.2. The River Severn is one of England's principal rivers, rising in the Cambrian Mountains in Wales and flowing southwards to its mouth in the Bristol Channel. It is also Britain's longest navigable waterway. Numerous tributary rivers drain into the Severn – these include the Wye, Avon, and Parrett.

6.3. The edge of the Estuary is characterised by the muddy interface between land and sea. Once this was a vast expanse of salt and fresh water marshes, but over the centuries the land has been drained to leave intertidal mud flats and narrow strands of saltmarsh. The Severn Estuary experiences the second highest tide anywhere in the world, and the difference between the lowest and highest tide in any one day can be more than 14.5 metres⁶. Before the construction of locks and weirs, the effect of the tide reached as far as Worcester. Today, weirs near Gloucester hold back the daily tides, except at high Spring tides when they overtop the weirs and reach as far as Upper Lode Lock, near Tewkesbury. The funnel-shape of the Estuary helps produce the spectacular Severn bore. The Severn Bore has been known to reach two metres in height, with an average speed of 16km per hour.

6.4. The service industry, and particularly tourism, is one of the largest employers in the Severn Estuary. The area receives several million visitors per year, attracted by the towns, countryside and water-based activities. Brean and Berrow has the second largest concentration of chalets, static caravans and sites for touring caravans and camping in the UK⁷ Designated National Trails within the 50km study area include

⁶ <http://www.environment-agency.gov.uk/regions/midlands/434823/>

⁷ Sedgemoor District Local Plan, Adopted Version, 2004.

Offa's Dyke Path (reaching the coast at Chepstow), The Cotswold Way (through the Cotswolds), and the South West Coast path west of Minehead.

- 6.5. Agriculture is the major land use in the Severn Estuary; farming and associated activities provide several thousand jobs in the area. Additionally, significant amount of fishing takes place in the Estuary, particularly for eels, salmon and white fish, including cod, whiting, bass, mullet, sole and plaice. While commercial fishing levels have decreased recently, leisure fishing remains important.
- 6.6. Heavy industry in the Severn Estuary includes port installations and shipping, chemical processing companies and nuclear power stations⁸. Sharpness and Royal Portbury and Avonmouth Docks employ approximately 550 people between them⁹, and import and export pulverised coal, oil products, grain, soya, gypsum, forest products and cars. Oldbury Nuclear Power Station is adjacent to Gloucester Harbour, and the former Berkeley Nuclear Power Station is now decommissioned.
- 6.7. The Severn Estuary is traversed by the Severn Bridge (M48) and the Second Severn Crossing (M4). Gloucester Harbour currently accommodates between 400 and 500 piloted ship movements per year, which involve the transport of cargoes such as cement, coal, scrap metal, grain fertiliser, stone and forest products. There is currently no tanker traffic¹⁰.
- 6.8. Marine dredging for aggregates is a significant industry in the Severn Estuary; the Bristol Channel is the main source of fine aggregates for South Wales, with six sandbanks licensed for dredging¹¹. This would permit around 4.5 million tonnes of aggregates to be removed each year, with actual extraction estimated at less than 2 million tonnes per year.

BASELINE LANDSCAPE /SEASCAPE APPRAISAL

Landscape Character

- 6.9. Landscape character assessment is used as the basic tool for understanding the landscape of a study area.

⁸ Strategy for the Severn Estuary. Severn Estuary Partnership. 2001. Available at: <http://www.severnestuary.net/sep/pdfs/sesstrat.pdf>

⁹ The Severn barrage: definition study for a new appraisal of the project. Report of a project carried out under the UK Sustainable Energy Programmes. DTI. 2002. Available at: <http://www.ecdti.co.uk/cgi-bin/perlcon.pl>

¹⁰ <http://www.gloucesterharbourtrustees.org.uk/1-foreward.htm>

¹¹ Marine Aggregate Dredging. Cardiff University briefing for WWF Cymru. 2004. Available at: http://www.wwf.org.uk/filelibrary/pdf/ma_aggdred_wa.pdf

National/Regional Level Assessments

- 6.10. National and regional level assessments are of most interest to Natural England. Natural England's countryside character initiative is a tool to improve understanding of the countryside and to develop a vision for the future of England's landscapes to help manage change sustainably. The landscape character context for the Severn Estuary is described in the Countryside Agency's Countryside Character Volume 8: South West England. This identifies the following countryside character areas within the study area:
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Table 6.1: Countryside Character Areas

<i>Countryside Character Area</i>	<i>Summary Description and Management Objectives (from Countryside Character Volume 8: South West England)</i>
105 Forest of Dean and Lower Wye	<p>Summary description:</p> <ul style="list-style-type: none"> • A well-wooded plateau of ridges and valleys, contained by outer rim of more open landscape on limestone and sandstone ridges. • Small-scale varied industry and industrial artefacts intermixed with settlements and large broadleaved and coniferous woodlands. • A strong sense of identity through being remote and self-contained. • Ever-present evidence of history, with artefacts and elements from many historic periods still visible. • Scattered and sprawling settlements and small holdings retaining the feel of clearances from the forest. • Mixed building materials and sporadic development give amorphous and disorganised feel to settlements. <p>Management objectives: Proposals for shaping the future focus on woodland management, hedgerows and smallholdings, restoration of derelict industrial sites, and avoidance of suburbanisation/ gentrification.</p>
106 Severn & Avon Vales	<p>Summary description:</p> <ul style="list-style-type: none"> • Diverse range of flat and gently undulating landscapes, united by broad river valley character. • Riverside landscapes with little woodland, often very open. Variety of land uses from small pasture fields and commons in the west to intensive agriculture in the east. • Distinct and contrasting vales: Evesham, Berkeley, Gloucester, Leaddon, Avon. • Many ancient market towns and large villages along the rivers. • Nucleated villages with timber frame and brick buildings. • Prominent views of hills - such as the Cotswolds, Bredon and the Malverns - at the edges of the character area. <p>Management objectives: Proposals for shaping the future focus on management of river corridors and their nature conservation and historic features, conservation of hedgerows and hedgerow trees, grazing of commons, management of grassland wetlands, and retention of village character.</p>
118 Bristol, Avon Valleys & Ridges	<p>Summary description:</p> <ul style="list-style-type: none"> • A landscape of very mixed landform, geology and settlement pattern, strongly influenced by the Avon Valley, Bristol at its centre and by its industrial history. • Low-lying, shallow valleys which contrast with limestone ridges and scarps.

	<ul style="list-style-type: none"> • Frequent large villages, small towns and major conurbations but also undisturbed rural areas. • Wooded scarps - with ancient woodland - and high, open, downland ridges. • Legacy of coal industry evident in tips, settlement patterns and reclaimed areas. • Waterside mills and other features of former rural industries. • Frequent parks, mansions and manor houses. <p>Management objectives: Proposals for shaping the future focus on woodland expansion in the Bristol & Avon community forest, hedgerow management, management of pastures and calcareous grassland, conservation and interpretation of historic features, management and interpretation of reservoirs, using the Avon as a focus for landscape conservation, and aversion of suburbanisation.</p>
141 Mendip Hills	<p>Summary description:</p> <ul style="list-style-type: none"> • Chain of prominent limestone hills extending inland from the coast and rising up sharply from surrounding lowlands. • An open, largely treeless, limestone plateau with karst features, cave systems, dry stone walls and sparse settlement. • Dramatic gorges, cliffs and escarpment slopes around the plateau. • A sharp contrast between the open plateau and steep escarpment slopes of the karst landscape and the more complex, gentler landforms in the east. • Many industrial archaeological sites reflecting the lead, coal and cloth industries. • Perpendicular church towers. • Country houses in the east with wooded parks. • Buildings in local stone with pantile roofs: stones include grey limestone, reddish dolomitic limestone and grey or honey-coloured oolitic limestone. • Outstanding prehistoric ritual landscapes. <p>Management objectives: Proposals for shaping the future focus on long-term management of unimproved grasslands, management of archaeological resources and lead mining features, management of visually important woodlands, maintenance of dry stone walls and karst landscape features, quarry restoration, tree planting and hedgerow reinstatement.</p>
142 Somerset Levels and Moors/ 143 Mid Somerset Hills	<p>Summary description:</p> <ul style="list-style-type: none"> • Flat, open landscape of wet pasture, arable and wetland divided up by wet ditches or 'rhynes'. • Absence of dispersed farmsteads or any buildings on

	<p>levels and moors. Nucleated settlements on ridges/islands.</p> <ul style="list-style-type: none"> • Surrounded, and divided up, by low hills, ridges and islands which form distinctive skylines. • Peat working and nature reserves contrasting with the rectilinear planned landscape of the Moors. • Dramatic and prominent hills such as Brent Knoll, the Isle of Avalon and Barrow Mump, rising above the Levels and Moors. • Sparse tree cover on Levels and Moors contrasting with woodland, hedges and orchards of surrounding hills. • Sparsely populated Moors but settlements common on hills, ridges and islands. • Historic landscape strongly evident in features ranging from prehistoric trackways and lake villages to post-medieval enclosures and peat working. • International nature-conservation significance for wetland, waders and waterfowl. • Narrow dune belt fringing Bridgwater Bay. • Raised rivers and lev'es, with main roads and causeways flanked by houses. Flooding in winter over large areas. <p>Management objectives: Proposals for shaping the future focus on management of water levels (which should integrate landscape, nature conservation, urban drainage and agricultural objectives), wetland restoration, and conservation or orchards on the fringes of the hills.</p>
144 Quantock Hills	<p>Summary description:</p> <ul style="list-style-type: none"> • Central high, heathland ridge, with some beech clumps. • Irregular field patterns and farmsteads in sheltered fringes. • Steep wooded valleys and lower slopes, commonly with former deer parks. Beech copses and lines are characteristic. • Red sandstone and shales used in older buildings and giving colour to the soils. • High archaeological interest of Bronze Age monuments such as burial mounds. <p>Management objectives: Proposals for shaping the future focus on reversion of conifer plantations to mixed woodland or open moorland, and re-establishment of pony grazing.</p>
145 Exmoor	<p>Summary description:</p> <ul style="list-style-type: none"> • A diverse upland landscape, rising abruptly out of the surrounding lowlands and ending in a high and spectacular cliffed coastline with coastal heath at the edge of the Bristol Channel. • Central high, treeless heather and grass moorlands used for rough grazing.

- Extensive 19th century moorland-edge enclosures and farms with beech-topped hedgebanks and beech windbreaks.
- Steep, wooded inland valleys and steep, coastal combes.
- Regular, straight-sided fields usually enclosed by earth banks and stone walls.
- Villages and farmsteads nestle in sheltered valley bottoms.
- Wooded lower slopes in some places, some with former deer parks.
- Slates and sandstones used in older buildings.
- Complex and visually outstanding coastline of headlands, steep cliffs and coves.
- High archaeological interest of Bronze Age monuments such as hill-forts

Management objectives:

Proposals for shaping the future focus on management of farmland, developing a woodland strategy, moorland reversion and deer management, enhancing the heathland and valley bottom pastures, reversion of conifer plantations to mixed woodland and open moorland, and environmental improvements to tourist hotspots.

<p>146 Vale of Taunton & Quantock Fringes</p>	<p>Summary description:</p> <ul style="list-style-type: none"> • Lowland farmland qualities in sharp contrast to surrounding upland landscapes. • Lowland, mixed farming landscape, with dense hedges, sparse woodland and frequent settlement. • Contrast between floodplain, low clay vale and higher sandstone vale edge. • Scattered settlement of farmsteads and hamlets linked by winding lanes. • Scattered villages. • Red sandstone buildings and prominent Perpendicular church towers. • Cider apple orchards. • Variable hedgerow tree cover, with some areas of abundant hedgerow oaks. • Willows on floodplains. • Open and windswept coast with low cliffs. <p>Management objectives:</p> <p>Proposals for shaping the future focus on retaining the irregular field pattern and thick hedgerows/oaks, management of hedgerows, trees, copses and woods, retention and re-planting of traditional orchards, maintaining influence of local red sandstone in buildings, and emphasising the diversity between river floodplain, low vale and high vale.</p>
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6.11. The location of these Countryside Character Areas is shown on **Figure 6.1**.

6.12. The National Landscape Typology, shown in **Figure 6.2**, does not provide descriptions of landscape character, but illustrates the diversity of landscape types found around the Severn Estuary. Along the shoreline of the estuary, the main landscape types are:

- UBA - wooded hills meeting the Bristol Channel at dramatic cliffs along high Exmoor Coast;
- LBD – lowlands meeting the Bristol Channel at low cliffs from Minehead to Hinkley Point;
- LWD - lowland, unwooded wetland along the Brean foreshore and around the River Axe;
- LWW - lowland, unwooded wetland/waste along the shoreline of the Severn upstream from Avonmouth;

- ULA - low, wooded chalk and limestone hills meeting the estuary at low cliffs between Portishead and Clevedon.



Perceptual Aspects of the Landscape

- 6.13. The CPRE have recently produced a map that illustrates tranquil areas within England. The study involved a nationwide survey to understand what tranquillity means to people, and then used a Geographical Information System (GIS) model to create a map showing how likely each locality was to make people feel tranquil. This map is available at <http://www.cpre.org.uk/campaigns/landscape/tranquillity> and may assist in describing the more intangible elements of the landscape (excluding seascape). The tranquillity mapping (**Figure 6.3**) shows that the most remote parts of the study area are Exmoor National Park, the Quantock and Mendip Hills, the Steart Flats, the Somerset Levels and Moors between East Huntspill and Glastonbury (along the River Brue), the Forest of Dean, and the English coastline north of the Severn crossing, between Oldbury and Frampton.

National Park/ AONB Assessments

- 6.14. National Park and AONB assessments are also of interest to Natural England since they describe the character of nationally designated landscapes within the study area.

Table 6.2: National Park/AONB Assessments

<i>Assessment and Date</i>	<i>Key Points from Assessment</i>
Draft Exmoor National Park LCA (not published) (30km from proposed barrage)	The assessment identifies 10 landscape types in the National Park. It provides landscape descriptions, but no identification of forces for change or management guidance. Key issues emerging from the characterisation exercise include the impact on the landscape of erosion and scrubbing up of moorland; "horsiculture" – the accoutrements of equestrian activity; telecommunication masts; agricultural sheds; rhododendron encroachment; urbanisation of road corridors and the impact of commercial game shooting activity. A renewed attention to landscape is emerging through the National Park Management Plan process and it is intended that the assessment will be used to inform the development of landscape policy, to supplement the Local Development Framework Core Strategy, to guide development control decisions and to direct future landscape conservation and enhancement work. ¹²
Cotswolds Area of Outstanding Natural Beauty	An assessment of the character, distinctiveness and qualities of the Cotswolds AONB, including cultural

¹² From http://www.exmoor-nationalpark.gov.uk/ar-enpa-14_11_06-item10.pdf [dated October 2006 and accessed February 2007]

<p>(2004)</p> <p>(45km from proposed barrage)</p>	<p>and natural heritage resources.</p> <p>The assessment contains descriptions of the AONB's component landscape character types and landscape character areas, and a summary of key characteristics associated with each landscape type to inform the principles in respect of landscape change and guidelines.</p> <p>The Cotswolds Partnership's Landscape Character Assessment (2004) describes how the combination of the dramatic escarpment, high wolds, limestone walls, beechwoods, secluded valleys, valley bottom meadows, picturesque villages, historic towns, churches, mansions and landscape parks creates a landscape of outstanding landscape quality and scenic beauty.</p> <p>A Landscape Strategy and Guidelines have also been prepared for the AONB as part of a separate report.</p>
<p>Wye Valley AONB (1996)</p> <p>(40km from proposed barrage)</p>	<p>This assessment reports on principal features of the landscape and the pressures upon them; perceptions of the AONB landscape and the significance of each of its five regional character areas, and a description of each character area; forces for change; and reasons why the Wye Valley is a landscape of national as well as local significance. Appendix 1 lists forces for change and their management, for each of the five character areas.</p>
<p>Mendip Hills AONB (1998)</p> <p>(under 5km from nearest part of AONB to nearest part of proposed barrage)</p>	<p>This assessment contains features contributing to the special character and sense of place of the Mendip Hills; a description of landscape character, dividing the area into a number of distinct areas; the historic and artistic associations, illustrating how the landscape has been perceived and appreciated over the years; identification of the pressures for change; a summary of the outstanding and special qualities of the landscape, the prospects for change and a vision for the future of this nationally important landscape.</p>
<p>Quantock Hills AONB (2003)</p> <p>(18km from nearest part of proposed barrage)</p>	<p>This assessment contains a review of the features contributing to the special character of the Quantock Hills; classification of the landscape into a number of distinct and recognisable landscape types and a description of the particular characteristics of each; a review of the forces for change that are influencing the Quantock Hills landscape at the present time or that may affect it in the future; information about the way in which the landscape has been perceived and appreciated over the years; a summary of the special character</p>

	and quality of the area that makes it of national importance.
Blackdown Hills AONB (1989) (38km to nearest part of proposed barrage)	This assessment describes the character of the landscape of the Blackdown Hills, dividing the AONB into 5 landscape types. It also includes a section on landscape change, threats to landscape quality, and the importance of the Blackdown Hills in terms of its outstanding qualities that make it of national importance.

County/District Level

- 6.15. County and District level assessments are also of interest to Natural England. However, they are generally at a detailed scale which is better suited to planning at the individual Local Authority level, and are often inconsistent in their approaches, dates of production, and content.
- 6.16. Landscape Character Assessments are not available for the whole of the study area - Local Authority areas not covered are Somerset County, Stroud District, North Devon District, and City of Bristol. County and District Level Assessments within the study area are listed in **Table 6.3** with key points noted.

Table 6.3: County/District Level Assessments

<i>Assessment and Date</i>	<i>Key Points from Assessment</i>
Landscape Character Assessment and Landscape Strategy - Gloucestershire and Forest of Dean (2006)	<p>Identifies 38 landscape character types and sub-areas.</p> <p>The Landscape Assessment provides landscape descriptions. The Landscape Strategy identifies forces for change and provides a management strategy.</p> <p>Of particular relevance to this study are landscape types 7: Drained Riverine Farmland and Grazed Saltmarsh and 8: Littoral Sands and Rock Outcrops.</p> <p>Key characteristics of Type 7 include treeless flat unsettled landscape, 'Pills' and Wharves at the outer edge of the drained farmland and the riverside extent of marsh often marked by a sea wall. Forces for change include an increase in river tourism and climate change including loss of inter-tidal habitats, farmland and biodiversity as a result of rising sea levels, and increase in tidal surges and high waves. The landscape strategy for Type 7 aims to conserve the remote and undeveloped character, restore the derelict 'Pills' and Wharves for modern riverine traffic and protecting coastal habitats/bird populations.</p> <p>Key characteristics of Type 8 include open water, sandbanks, mudflats and rock outcrops, an open character, industrial sites bordering the river, rich wildlife and archaeological resource, and the Severn Bore. Forces for change include river tourism and climate change – the landscape strategy for Type 8 aims to conserve the remote character, restore derelict 'Pills' and Wharves, conserve derelict river craft, conserve flood defences and avoid</p>

	<p>significant engineered structures along the river edge.</p> <p>Landscape Character Assessment and Landscape Strategy available in the web.</p>
<p>The Devon landscape: an appraisal of Devon's landscape at the beginning of the 21st Century (2002)</p>	<p>Identifies 32 landscape character zones.</p> <p>Of particular relevance to this study is zone 21: Exmoor and North Devon High Coast.</p> <p>The key characteristics of this landscape are the distinctive jagged features, high 'hogsback' cliffs, hidden inlets and rocky coves, wooded combes, settlement in sheltered combes, archaeological interest and ecological habitats. The assessment describes this as 'one of the most dramatic coastal landscapes in the country'. The coast is described as an important recreational resource, but also has characteristics of solitude and remoteness. The landscape is described as generally intact and not under any real threat. The assessment also identifies panoramas at a county scale that may be of relevance to this study.</p> <p>N.B. This assessment is in the process of being updated with an assessment of 'Land Description Units' (LDUs) across Devon.</p>
<p>North Somerset Landscape Character Assessment SPD (2005)</p>	<p>Identifies 11 landscape types and component landscape character areas.</p> <p>Of particular relevance to this study are Type A: The Moors (A1: Kingston, Seymour and Puxton Moors, and A5: Bleadon Moor), Type C: Settled Coastal Edge (C1 Weston Bay Settled Coastal Edge), Type E: Limestone Ridges and Combes (E4: Portishead Ridge) and Type L: Intertidal Bays (L1: Weston Bay, L2: Sand Bay, and L3: Woodspring Bay).</p> <p>The positive significant features of Type A include the flat, open pastoral grassland, rural and remote character, open skies and wide horizons, hedgerow trees of pollarded willow along with oak and ash, rhynes and ditches, estuary and rivers concealed by flood banks adding to sense of isolation, unsettled character (some ancient villages and farmsteads of stone with church towers important vertical features), small rural roads are bordered by ditches or rhynes, and strong sense of isolation.</p> <p>Forces for change on Type A that might be relevant to this study include land raising (which is incongruous within this flat wetland landscape), proliferation of clutter, signage associated with development, recreational uses, visual impact of unsympathetic urban edges and urban fringe influences, encroachment of development along rural roads and villages, and demand for tall vertical structures (e.g. masts, industrial type farm buildings) which are visually prominent within parts of the flat open landscape.</p> <p>The landscape strategy for Type A includes some pointers which may be of relevance to this study, including conserving the remote and rural nature of the pastoral landscape, restoration of scrubbed over ditches back to open water, maintaining key local landscape features including the distinctive pollarded willows and orchard remnants, encouraging public access but retaining a sense of remoteness through careful design of routes and infrastructure, minimising the impact of the urban edge and the encroachment of visually intrusive land uses through design guidance and appropriate land management, ensuring management of the important archaeological resources (including maintenance of grassland containing archaeological sites, and grazing management), managing water levels to maintain high water tables to preserve organic cultural and palaeoenvironmental evidence.</p> <p>The positive significant features of Type C include the wide sea views across the Bristol Channel, rich variety of water bodies (including ditches and rhynes, remnant areas of pastoral landscape associated with historic farmsteads,</p>

shelter belts of broadleaved woodland, marshy grassland, and the strong maritime influence with container ships, yachts and small boats in the docks and boatyards.

Forces for change on **Type C** that might be relevant to this study include proliferation of visually dominant large scale industrial and institutional buildings with associated parking areas, security fencing and amenity landscape, and visual impact of unsympathetic urban edges and urban fringe influences within the immediately adjacent landscapes.

The landscape strategy for **Type C** includes some pointers which may be of relevance to this study, including conserving the remnant pasture with rhynes and hedgerows, conserving the ecologically rich wetland and woodland habitats, promoting opportunities for creating areas of unimproved grassland, wetland and woodland habitats for linking existing habitats together and for screening, restoration of scrubbed over ditches back to open water, retaining a sense of remoteness through careful design of routes and infrastructure, and retaining and enhancing public access provision.

The positive significant features of **Type E** include the dramatic topography, wide and varying views from the ridges, peaceful secluded woods, geological interest, species rich unimproved calcareous grassland, stone farmsteads, drystone walls and historic village centres, and the wealth of archaeological remains particularly late prehistoric monuments (Iron Age hill forts).

Forces for change on **Type E** that may be relevant to this study include pressure for diversification of land uses, encroachment of development along roads and in villages (particularly rising up the open slopes at the bases of the ridges where it is highly visible from adjacent lowland areas), visual impact of unsympathetic urban edges, proliferation of clutter, signage associated with development, recreational uses impacting on the peaceful secluded character and causing wear and tear to fragile habitats and geological sites, urbanisation e.g. lighting, kerbs and increased road markings, visual impact of quarries, and changes in land use may affect the archaeological remains.

The landscape strategy for **Type E** includes some pointers which may be of relevance to this study, including conserving the peaceful and secluded nature of the wooded landscape, encouraging access while retaining sense of remoteness and minimising damage through wear and tear by careful design of routes and infrastructure, minimising the impact of the urban edge and the encroachment of visually intrusive land uses such as quarrying, and management of archaeological sites.

The positive significant features of **Type L** include the strong sense of exposure and remoteness, wide open skies and views to sea, changing tide and seasons, limestone ridges that frame the landscape, defined edge separating the area from other inland areas, Victorian and Edwardian seaside structures such as piers, stone sea walls, seating and shelters, ecological value as habitat for over wintering birds, buried archaeological potential.

Forces for change on **Type L** that might be relevant to this study include potential adverse impacts from heavy recreational use, impacts of geomorphic degradation and aggradation, introduction of unsympathetic signage, handrails, lighting and other landscape furniture along the inland edges of the bays, encroachment of settlement up the limestone ridges that overlook the bays, and damage to archaeological resource due to lack of information on nature and location of remains. The landscape strategy for **Type L** includes some pointers which may be of relevance to this study, including retaining the sense of exposure and isolation of the bays, conserving the important ecological resource of the mud flats, maintaining sensitive sea

	<p>defences where appropriate, conserving the typical historic seaside structures such as piers, stone sea walls seats and shelters and integrating new landscape furniture sensitively taking into account the varying characters of the individual bays, ensuring that open areas between the edge of the bays and the townscape is preserved and that tall elements such as lighting do not become intrusive in views inland from the bays. In addition, the strategy identifies 'limiting the negative impacts on ecology and landscape of geomorphic change where possible', but does not state what these might be.</p> <p>[SPD available on the web at http://www.n-somerset.gov.uk/NR/rdonlyres/E7CF98B2-AAF8-42A2-B6AF-0C263780371E/0/document_NSlandscapeCharacterAssess.pdf]</p>
<p>South Gloucestershire Landscape Character Assessment SPD (2005)</p>	<p>Identifies 21 landscape character areas – landscape character areas relevant to this proposal include 3 character areas alongside the Severn Estuary:</p> <p>19: Oldbury Levels 20: Pilning Levels 21: Severn Estuary and Shoreline.</p> <p>The SPD provides a landscape description, observations on the changing landscape, and information on landscape sensitivity for each landscape character area. The assessment notes that the open mudflats and warths (salt marshes), the sense of remoteness and the large bird feeding grounds are key elements of the estuary landscape. It also notes that the Second Severn Crossing disrupted the tidal pattern of the estuary, changing patterns of erosion and deposition in this area.</p> <p>[SPD is available on the web at http://hosted.southglos.gov.uk/landscapecharacterassessment/main%20doc-internetR1.pdf]</p>
<p>Sedgemoor Landscape Assessment and Countryside Design Summary (2003)</p>	<p>The Sedgemoor Landscape Assessment contains four character areas and 18 sub-areas. Of particular relevance to this study are the Levels and Moors regional character area and its sub-areas:</p> <p>Levels; Estuarine Levels; and Peat Moors, Sea Edge and Inter-tidal Zone.</p> <p>The Levels and Moors regional character area is described as an area of summer pastures cross-crossed by a drainage pattern of rhynes, long straight access droves and distinctive pollarded willows. Key issues and forces for change include changing agricultural practices, decline of hedgerows, willow pollards and cider orchards, management of rhynes, tourism development, visibility of industrial buildings, and climate change. New development on the edge of larger settlements and road corridor proposals are seen as both a threat and an opportunity in terms of impact on adjacent rural areas.</p> <p>The assessment recommends maintenance of traditional patterns of summer grazing and pattern and systems of land drainage, pollarding of willows, maintenance and re-planting of orchards, hedge laying and maintenance of species diversity, maintenance of diversity in woodland and individual tree species, an integrated approach to wetland management (which protects nature conservation interests and vulnerable archaeological deposits), and maintenance of dew ponds in the estuarine levels.</p> <p>The assessment includes an assessment of sensitivity at the individual sub-area level. Of relevance to this project are the following notes (taken from the</p>

	<p>assessment):</p> <p>The extent of views in the flat landscape of the Levels and Estuarine Levels is dependent upon the extent of tree cover. The issue of scale is particularly relevant in this flat landscape - tall structures such as pylons are intrusive. However, the assessment notes that the opportunity for screening of new low level development as viewed from other areas at low elevation means that capacity for development in the Levels is often higher than in many other areas of the District. Sites that lie close to higher ground need to take account of views from these vantage points.</p> <p>In the Sea Edge and Intertidal Zone sub-area caravan sites are noted to be very visually dominant from Brean Down. The presence of sand dunes means that when viewed from the beach, this appears to be a relatively undeveloped coastline. Capacity for new development is considered to be low and development proposals in this area should respect the impact of development on views (especially from Brean Down, Steart bird hides, the beaches and the Parrett Trail) and the need to spread of suburban development.</p>
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Historic Landscape Character

- 6.17. Although English Heritage is the Government's statutory adviser on the historic environment, Historic Landscape Characterisation studies may be of indirect interest to Natural England in that historic character is a component of landscape character. Historic landscape character assessments (HLCs) provide a detailed view of historic landscapes within the study area. English Heritage have been instrumental in developing the methods for HLC, and ensuring that HLCs are undertaken for each Local Authority area in England. HLCs have been produced for Somerset, Devon and Gloucestershire. These detailed studies are of use in understanding the historic landscape and understanding the concept of 'time-depth'. They are used in landscape management and spatial planning, as well as to inform landscape character assessments and strategies.
- 6.18. The HLCs for Gloucestershire, North Somerset, Somerset, and Devon cover land down to the low water mark.
- 6.19. The Somerset HLC reveals fourteen historic landscape types which are available to view in mapped form on the on-line Somerset Historic Environment Record. This includes the following historic types in the location of the proposed rockhead at Brean:
- an area of mudflats;
 - an area of sand, sand and shingle, and dunes; and

- an area of 'Anciently Enclosed Land pre-17th century' (previously wetland with general field size between 3-6ha. And less than 25% boundary loss since 1905).

Seascape Character

'The character of the Estuary is defined by the continuous dynamic movement of the water. With the second highest tidal range in the world, of at least 12 metres, the waters are turbid with a high suspended sediment, creating a mass of grey, brown and yellow water depending on the status of the tide, the light conditions and the weather'¹³.

Introduction to Seascape Character

- 6.20. Landscape assessment is now well established in UK planning as an integral part of the decision-making process and most land-based areas are now covered by a landscape character assessment. However coastlines and the sea present unique environments and seascape assessment is a technique that has been developed by the Countryside Council for Wales, Brady Shipman Martin and University College Dublin¹⁴. Seascape assessment identifies discrete visual areas of sea surface, land and coastline together to characterise them as one seascape unit. As with landscape character areas, change to one component may have effects on the character of the seascape unit overall.
- 6.21. Seascape characterisation is the recommended method to provide a robust baseline from which to assess effects of proposed offshore wind farms and other changes to the seascape. The DTI's 'Guidance on Seascape and Visual Impact Assessment of Off-shore Wind Farms'¹⁵ refers to this technique.
- 6.22. The method starts by studying coastal geometry and coastal inter-visibility (seaward and then landward) to identify seascape units. This works at different scales to suit different purposes. The characterisation process then identifies what is distinctive or important about the seascape unit.
- 6.23. Since there are no existing seascape assessments for the Severn Estuary, we have undertaken a rapid baseline seascape character appraisal to define what makes one coastal area similar, or different, or special

¹³ From the Severn Estuary Strategy – Summary Report
<http://www.severnestuary.net/sep/pdfs/sesengli.pdf> [accessed February 2007]

¹⁴ Countryside Council for Wales, Brady Shipman Martin and University College Dublin (2001) *Guide to Best Practice in Seascape Assessment*, Maritime Ireland / Wales INTERREG 1994-1999

¹⁵ DTI in association with The Countryside Agency (Landscape, Access, Recreation), CCW and SNH (2005) *Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report*.

when compared to another, so that judgements can be made on the effect of a proposed barrage on seascape character.

Scale of Assessment

- 6.24. Seascape units are identified at national, regional and local levels. National units identify extensive sections of the coast, defined by major headlands of national significance, for example the coastline between Gloucester and Land's End. Regional units are defined by regional headlands, islands or coastal features and are the normal working level for seascape assessment as well as typically being used in the formulation of strategic and area based planning policies on a county or sub-regional level¹⁶. Regional units generally extend 15km offshore and 10km inland. Local seascape units are used for complex areas of coast when dealing with 'specific localised interventions¹⁷' – they typically deal with local areas of coast or sea up to 2km offshore and are appropriate for impact assessment of specific proposals close to the shore. The process of characterisation for regional and local units is the same.
- 6.25. Regional seascape units are considered to be the most appropriate scale of unit for this study, although it is anticipated that the developer for a proposed tidal barrage would undertake a more thorough/more detailed seascape assessment as part of an EIA.

Components of the Seascape

- 6.26. The guidance recognises that there are three components to the seascape:
- Coastal Component – coastal geometry, coastal land use/human activity/cultural aspects, views and perceptual characteristics;
 - Hinterland Component – landform, land use/human activity/cultural aspects, views and perceptual aspects (often from existing landscape character assessments);
 - Marine Component – marine clarity, marine activity/cultural aspects, views and perceptual aspects.

¹⁶ Countryside Council for Wales, Brady Shipman Martin and University College Dublin (2001) *Guide to Best Practice in Seascape Assessment*, Maritime Ireland / Wales INTERREG 1994-1999, p.15.

¹⁷ Ibid, p.16.

Seascape Characterisation

6.27. Visually separate lengths of coastline were identified, a seaward limit of 15km applied, and a landward limit of 10km applied. The resulting units, listed below, are illustrated on **Figure 6.4**.

- ***Upper Severn Estuary Seascape Unit*** - River Severn down to the Second Severn crossing (both banks of the river);
- ***Avonmouth Seascape Unit*** – Lower Severn Estuary (Second Severn crossing to Battery Point);
- ***Clevedon-Portishead Seascape Unit*** – Lower Severn Estuary (Battery Point to Clevedon);
- ***Weston Seascape Unit*** – Lower Severn Estuary (Clevedon to Brean Down);
- ***Stear/Berrow Seascape Unit*** - Bridgwater Bay (Brean Down to Hinkley Point);
- ***Bridgwater Bay Seascape Unit*** - Bridgwater Bay (Hinkley Point to Exmoor);
- ***Exmoor Seascape Unit*** – Coast of Exmoor.

6.28. Site visits ‘ground truthed’ the seascape units and allowed characteristics of the coastal, hinterland and marine components of the seascape to be recorded. Seascape character is recorded in **Table 6.4** below:

Table 6.4: Seascape Character Units

<i>Seascape Unit</i>	<i>Description of Character</i>
Upper Severn Estuary Seascape Unit (Mouth of the Severn River down to the second Severn Crossing)	<p>Marine Characteristics: Dramatic changing tides (tidal range is the second largest in the world) expose large mud and inter-tidal sand banks at low tide. Tidal characteristics include The Severn Bore (due to the funnelled shape of the channel) which is one of the biggest bores in the world. The water in this part of the estuary is typically murky and muddy, carrying sediment. Although there appear to be relatively few boats in the estuary, a navigable channel extends from the Second Severn Crossing to Sharpness, used by commercial vessels and marked by lighted buoys, beacons and other aids to navigation. Lighthouse on Charston Rock is a feature. The first Severn Bridge spans this seascape unit between Beachley and Aust.</p> <p>Coastal Characteristics: The coasts are generally shallow and low lying, although there are some some low cliffs on the northern bank. The shallow profile results</p>

	<p>in extensive inter-tidal zones dominated by mudflats.</p> <p>The coast is generally tranquil and almost devoid of settlements, but is home to a number of power stations (including Oldbury and Berkeley), docks (at Sharpness) and transport infrastructure (Gloucester and Sharpness Canal/ railway lines). These structures form landmarks along the estuary.</p> <p>Reclaimed land is a feature, for example at Slimbridge Wildfowl and Wetland Trust.</p> <p>Canal boating is evident on the Gloucester and Sharpness Canal and The Severn Way long distance footpath runs along the bank of the Severn.</p> <p>Hinterland Characteristics:</p> <p>The hinterland is composed of flat and gently undulating landform of the <i>Severn and Avon Vales CCA</i> – mainly in agricultural use with scattered settlements. Wooded slopes of the Forest of Dean occur to the north.</p>
<p>Avonmouth Seascape Unit (Second Severn Crossing to Battery Point)</p>	<p>Marine Characteristics:</p> <p>Dramatic changing tides (tidal range is the second largest in the world) expose large mud and inter-tidal sand banks at low tide.</p> <p>The water in this part of the estuary is typically murky and muddy, carrying sediment. Although there appear to be relatively few boats in the estuary, a navigable channel extends from Avonmouth to the Second Severn Crossing, used by commercial vessels and marked by lighted buoys, beacons and other aids to navigation. Denny Island is prominent island, supporting a lighthouse.</p> <p>The second first Severn Bridge marks the northern end of this Seascape Unit – spanning the estuary between Caldicot and Severn Beach where limestone outcrops provide a rocky platform known as ‘English Stones’.</p> <p>Coastal Characteristics:</p> <p>This large, concave bay, is generally shallow and low lying with extensive inter-tidal zones dominated by mudflats. However, there is a slightly steeper inter-tidal zone at the mouth of the Avon.</p> <p>The coast is dominated by large scale industrial development of Avonmouth Docks (including old dockside warehouses and modern industry) interspersed by reclaimed land, marshes, engineered drainage channels and wasteland. Avonmouth Village and Severn Beach are residential settlements.</p> <p>Overhead transmission lines, railway, road and motorway infrastructure contribute to a busy shoreline and night time lighting levels and detracts from the sense of tranquillity along this part of the coast.</p> <p>The Severn Way recreational footpath brings visitors to the shoreline.</p> <p>Hinterland Characteristics:</p> <p>The flat hinterland behind the shoreline belongs to the <i>Severn and Avon Vales CCA</i>, before rising towards the wooded limestone ridges of the <i>Bristol, Avon Valleys and Ridges CCA</i>.</p>

<p>Clevedon-Portishead Seascape Unit (Lower Severn Estuary - Battery Point to Clevedon)</p>	<p>Marine Characteristics: Open water forming part of the lower Severn Estuary with a large tidal range. Water is deep on the English side with shallower flats towards the Welsh Coast – industry is visible on the Welsh shoreline. The water is muddy in appearance and the Welsh coast is just visible in the background. The Pier at Clevedon is a feature of the seascape.</p> <p>Coastal Characteristics: This exposed cliffed coastline of resistant limestones, mudstones and sandstones contrasts to the adjacent low lying Avonmouth shoreline. Narrow saltmarsh and inter-tidal zones at the bottom of the cliffs. Resistant bedrock means erosion of the cliffs is limited. Changes in the tides is less noticeable than in shallow sections of coast with large inter-tidal zones. The steep wooded cliff forms a backdrop to the sea, with development clinging to the cliffs at Clevedon and Portishead. Golf courses and the resorts of Clevedon and Portishead bring visitors to the shoreline.</p> <p>Hinterland Characteristics: The hinterland behind the shoreline comprises steep wooded ridges that form part of the <i>Bristol, Avon Valleys and Ridges CCA</i>.</p>
<p>Weston Seascape Unit (Lower Severn Estuary - Clevedon to Brean Down)</p>	<p>Marine Characteristics: Open coastal waters forming part of the lower Severn Estuary, containing two prominent islands – Steep Holm and Flat Holm which are key features of the seascape. The water is muddy in appearance. The Grand Pier, Knightstone Island, and Birnbeck Pier/Island protrude into the seascape. The Welsh Coast is just visible in the background. Great sense of exposure.</p> <p>Coastal Characteristics: A series of large concave bays, separated by the limestone headlands of Brean Down, Worlebury Hill, and Swallow Cliff, which provide a degree of stability for the bays. The bays are generally shallow and low lying with extensive inter-tidal zones dominated by sand close to the shore and mudflats further off-shore. The inter-tidal flats extend for up to 2km offshore. The southernmost bay is dominated by the settlement of Weston-Super-Mare and its promenade, which is a focus for activity on its sandy shores during the day and night (contributing to night time lighting levels). The promontories, with their rocky inter-tidal platforms, draw visitors to their summits.</p> <p>Hinterland Characteristics: The hinterland behind the shoreline comprises the flat drained levels and intermittent prominent knolls and hills of the <i>Somerset Levels and Moors CCA</i>.</p>

<p>Stear/Berrow Seascape Unit (Bridgwater Bay - Brean Down to Hinkley Point)</p>	<p>Marine Characteristics: Open water forming part of the lower Severn Estuary, containing two prominent islands – Steep Holm and Flat Holm which are key features of the seascape. Steep Holm is 800m across, rises steeply to 78m AOD and is located 5km offshore. Flat Holm is 700m across, reaches a maximum of 20m AOD and is located 8km off shore. The water is muddy in appearance and tidal range large. A great sense of exposure.</p> <p>Coastal Characteristics: This low-lying coastline results in some of the largest inter-tidal mud and sand flats in the Severn Estuary (2-4km wide), backed by extensive sand dunes at Berrow and Brean. The shore line along the Steart Peninsula is reclaimed marshland and is remote/tranquil in character – a nature reserve brings bird watchers to its shores. By contrast the Brean shoreline is a focus for holiday makers who are drawn to its sandy shores – row upon row of caravans dominate its shores.</p> <p>Hinterland Characteristics: The hinterland behind the shoreline comprises the flat drained pastoral levels of the <i>Somerset Levels and Moors CCA</i>, including the Parrett Delta.</p>
<p>Bridgwater Bay Seascape Unit (Bridgwater Bay - Hinkley Point to Exmoor)</p>	<p>Marine Characteristics: Open water forming part of the Bristol Channel – tidal range increases towards the east. Welsh coast just visible in the background within industry on its shorelines. A great sense of exposure.</p> <p>Coastal Characteristics: This coastline is composed of low, eroding limestone/mudstone cliffs with a wide inter-tidal platform of ledges and terraces. Bay have formed in the softer Jurassic mudstones, for example at Blue Anchor Bay and St Audrie's Bay. A mixture of mud and sand occurs in pockets. Villages are generally set back from the coast, although the holiday villages and parks are located on the coast at Minehead, Doniford and St Audire's Bay which contribute activity to the coastline.</p> <p>Hinterland Characteristics: The hinterland behind the shoreline comprises the gently undulating agricultural/ wooded landscape of the <i>Vale of Taunton and Quantock Fidges CCA</i>. The <i>Quantocks</i> also lie close to the coast.</p>
<p>Exmoor Seascape Unit (Exmoor Heritage Coast)</p>	<p>Marine Characteristics: Open water forming part of the Bristol Channel – tidal range increases towards the east. Welsh coast just visible in the background with industry in its shorelines. A great sense of exposure.</p> <p>Coastal Characteristics: A high and spectacular exposed, cliffed coastline - classic 'hog's</p>

	<p>back' cliff scenery of wave-truncated cliffs forming part of Exmoor National Park. Narrow inter-tidal zones at the bottom of the cliffs. Resistant bedrock means erosion of the cliffs is limited. Changes in the tides is less noticeable than in shallow sections of coast with large inter-tidal zones.</p> <p>The steep, unsettled and remote cliffs forms a backdrop to the sea. The South West coastal park runs along the top of the cliffs.</p> <p>Hinterland Characteristics:</p> <p>The hinterland behind the shoreline comprises the steep, dramatic moorland of the <i>Exmoor CCA</i>.</p>
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6.29. The characteristics of these seascape units are illustrated by the photographs in **Figures 6.5, 6.6** and **6.7**.

Landscape Designations

- 6.30. Natural England is responsible for designating England's finest countryside as National Parks and Areas of Outstanding Natural Beauty for the benefit of future generations. National Parks are recognised for their outstanding landscape quality and recreational potential – they are the most spectacular and valued landscapes in Britain. National Parks in England and Wales are designated under the National Parks and Access to the Countryside Act 1949. Also designated under the National Parks and Access to the Countryside Act 1949 are Areas of Outstanding Natural Beauty (AONB) in England and Wales, recognised for their outstanding landscape quality and scenic beauty. There are five AONBs within the 50km study area.
- 6.31. Heritage Coasts, although a national designation, are a non-statutory designation (unlike National Parks and AONBs). They are defined by agreement between the relevant maritime local authorities and Natural England. Most are part of a National Park or AONB, and are accessible by a network of public footpaths and bridleways, some of which are designated as National Trails.
- 6.32. In addition to existing designations, Somerset County Council are currently leading a partnership bid for World Heritage Site (WHS) status for the Somerset Levels and Moors. World Heritage Sites form an international register of places that have natural or cultural assets of such significance that they are considered to have 'universal value'. The aim is to protect, conserve, and pass on the cultural and natural heritage to future generations. Sites are included if they are judged to have outstanding universal value from a natural, historic, artistic, or scientific viewpoint. The process of designation is at an early stage (any applicant for WHS status first has to be accepted on its national 'tentative list' for WHS status), but Somerset County Council's commitment to the process reflects the fact that the Somerset Levels

and moors are highly valued for their unique record of the interaction of humanity and nature in an evolving wetland – this includes¹⁸:

- *A 10,000 year record of climate, sea level and landscape change;*
- *Amazingly preserved waterlogged prehistoric trackways and lake villages;*
- *Well preserved Roman relic wetland landscapes;*
- *Outstanding system of medieval reclamations and river canalisations;*
- *Ecclesiastical owners of the wetland (Glastonbury, Athelney and Muchelney Abbeys and Wells Cathedral and Bishop's Palace);*
- *Importance of the area for faith, pilgrimage, myth and legend.*

6.33. The key landscape designations in the study area are shown in **Figure 6.8** and presented in the table below:

Table 6.5: Landscape Designations

<i>Nationally Designated Landscapes within the Study Area (excluding Wales)</i>	<i>Summary Description and Reason for Designation/Contribution to Landscape Character</i>
<i>National Parks</i>	
Exmoor National Park (2004)	<p><i>Description¹⁹:</i></p> <p>The land of Lorna Doone. Less wild and open than its near neighbour Dartmoor, but a place of great beauty whatever the season.</p> <p>Exmoor contains a wide variety of magnificent landscapes in its 693 sq km. The moorland plateau terminates with the tallest cliffs in England, overlooking the Bristol Channel coast. Inland, the grass moorland of the former Royal Forest is surrounded by heather-covered moors, intersected by roundsided combes, and inhabited by wild ponies and red deer. To the east lies the fertile Vale of Porlock and the valleys of the Exe and Avill, dividing Exmoor from the Brendon Hills. Lynton and Lynmouth, with traditional stone and slate buildings contrasting with more ornate Victorian buildings, form the largest settlement. The Vale of Porlock villages have colour-washed cob, stone and thatched cottages.</p>

¹⁸ From

<http://www.somerset.gov.uk/somerset/cultureheritage/heritage/projects/whs/index.cfm>
[accessed February 2007]

¹⁹ From http://www.countryside.gov.uk/LAR/Landscape/DL/national_parks/exmoor.asp
[accessed February 2007]

	<p>The historic and archeological heritage of Exmoor is both rich and varied, with sites and monuments dating back some ten thousand years. Bronze Age burial mounds and stone circles, Iron Age hillforts, Roman fortlets, medieval castles, bridges, farmsteads, and unique rural industrial sites are preserved within the agricultural and moorland landscape.</p> <p>With a wide range of routes - from long distance walks to nature trails - opportunities abound for quietly exploring Exmoor on foot, cycle or horse. Fishing for salmon and trout in the fast-flowing rivers is also popular.</p> <p><i>Reason for Designation:</i> Designated for its outstanding landscape quality and recreational potential.</p>
AONBs	
Blackdown Hills AONB	<p><i>Description</i>²⁰</p> <p>The Blackdown Hills are a little-known group of hills lying on the border of Devon and Somerset. Broadly, the area extends from Wellington in the north to Honiton in the south and from Cullompton in the west to Chard in the east.</p> <p>The Blackdown Hills are best known for the dramatic, steep, wooded scarp face they present to the north. To the south the land dips away gently as a plateau, deeply dissected by valleys. On top of the plateau there are wide open windswept spaces; in the valleys nestle villages and hamlets surrounded by ancient and intricate patterns of small enclosed fields and a maze of winding high-hedged lanes.</p> <p>As part of the only extensive outcrop of Upper Greensand in the region, the geology of the Blackdown Hills is unique in Britain. Not only giving rise to the area's distinctive topography, the underlying non-calcareous rock has created a notably diverse pattern of plant communities.</p> <p>The isolated villages and springline farmsteads retain a quiet rustic charm and, using local building material - chertstone, cob and thatch - many of the buildings are of considerable architectural merit with great appeal in their mix of styles. A number of important archaeological sites add richness to the landscape, from high wooded promontories such as the great earthworks of Iron Age</p>

²⁰ Description from

http://www.countryside.gov.uk/LAR/Landscape/DL/aonbs/aonb_blackdown.asp [accessed February 2007]

	<p>Hembury fort to the recently discovered evidence of Roman iron smelting.</p> <p>Above all, however, what makes the Blackdown Hills special is the unspoilt rural character of the "ordinary" landscape. Farming, largely dairying, has retained many traditional practices. The area remains sparsely populated and there are no towns within the AONB.</p> <p><i>Reason for Designation:</i> Designated for its outstanding landscape quality and scenic beauty.</p> <p>The designation of the Blackdown Hills is recognition of the outstanding quality of the landscape as described in the Blackdown Hills landscape assessment (1989). The isolated and unspoilt rural area, unique Greensand geology, visual quality of the landscape and architectural appeal represent its most outstanding qualities.</p>
Cotswolds AONB	<p><i>Description²¹:</i> The Cotswold Hills rise gently west from the broad, green meadows of the upper Thames to crest in a dramatic escarpment above the Severn valley and Evesham Vale. Rural England at its most mellow, the landscape draws a unique warmth and richness from the famous stone beauty of its buildings.</p> <p>Jurassic limestone gives the Cotswolds their distinctive character, and an underlying unity in its use as a building material throughout the area. The limestone lies in a sloping plateau with a steep scarp slope in the west drained by short streams in deep cut wooded valleys, and a gentle dip slope which forms the headwaters of the Thames. This gentle slope has a maze of lanes connecting picturesque streamside villages built predominantly from local stone.</p> <p>The Cotswolds are nationally important for their rare limestone grassland habitat and for ancient beechwoods with rich flora. Important grasslands such as Cleeve Hill have survived due to their status as ancient common and a National Nature Reserve protects the finest ancient beech complex. Some Cotswolds plants are so rare that they have specific legal protection under the Wildlife and Countryside Act 1981.</p> <p>Traditionally a landscape formed by sheep grazing, this is now prosperous mixed and arable farming country. The AONB excludes urban areas but includes market towns</p>

²¹ From http://www.countryside.gov.uk/LAR/Landscape/DL/aonbs/aonb_cotswolds.asp [accessed February 2007]

	<p>such as Chipping Campden. Now only the third largest employer, agriculture is outranked by tourism and services. Of the working residents (population about 120,000), 73 per cent commute beyond the AONB to Cheltenham, Bath, Gloucester, Cirencester and elsewhere. There is still active mineral extraction in the AONB.</p> <p>Motorways together with a central location, make the Cotswolds accessible to a huge urban visitor area including Bristol, London and the West Midlands. The AONB, with 'honey pot' villages such as Bourton-on-the-Water, Bibury and Castle Combe, is a national and international tourist destination as well as an important local recreation area.</p> <p>The Cotswold Way National Trail, which runs between Bath and Chipping Campden, and a number of other walking routes extend across the AONB.</p> <p><i>Reason for Designation:</i> Designated for its outstanding landscape quality and scenic beauty.</p> <p>The designation of the Cotswolds is recognition of the outstanding quality of the Oolitic limestone landscape as described in the Cotswolds Partnership's Landscape Character Assessment (2004). The combination of the dramatic escarpment, high wolds, limestone walls, beechwoods, secluded valleys, valley bottom meadows, picturesque villages, historic towns, churches, mansions and landscape parks creates a landscape of outstanding landscape quality and scenic beauty.</p>
Mendip Hills AONB	<p><i>Description²²:</i> Stretching eastward from the Bristol Channel, the imposing 300m ridge of the Mendips rises, like a rampart above the Somerset Levels.</p> <p>The landscape's distinctive silver-grey crags, gorges, dry valleys and rock outcrops show unmistakably that this is carboniferous limestone country and in fact, Britain's most southerly example. Sink holes and depressions pockmark the surface and chemical action on the rock has produced spectacular underground caves.</p> <p>The Mendips' most dramatic landscape is in the centre of the AONB, site of the famous Cheddar Gorge and Wookey Hole Caves. The Mendips rise to a high, bare plateau around Priddy and Charterhouse, criss-crossed by</p>

²² From <http://www.countryside.gov.uk/LAR/Landscape/DL/aonbs/mendip.asp> [accessed February 2007]

	<p>drystone walls and rich in archaeological remains. Other areas of the AONB are well-wooded with a prosperous farmland fringe.</p> <p>Several important landscape features help to create the AONB's distinctive character, ranging from dew ponds and drystone walls to the 'gruffy ground' of old mine workings. The AONB, with two National Nature Reserves and many Sites of Special Scientific Interest, contains varied and important natural habitats including limestone pastures, ancient woodland and the gorge cliffs themselves with their rare flora. The Mendip plateau is particularly rich in ancient Bronze, Iron Age, Roman and medieval field monuments.</p> <p>Traditionally this is sheep farming country and the ancient Priddy Sheep Fair still takes place. Dairying is now the major farming activity plus high-investment, mixed farming units and horticulture on the fertile southern fringe. Forestry Commission plantations and limestone quarries are in operation in the AONB. Its main settlements are in the villages at the foot of the plateau, many of them now commuter territory for nearby Wells and Weston Super Mare. Tourism, in village and farmhouse B&B and caravan sites, makes a significant contribution to the area's economy. A national destination for coach excursions and day trips, the AONB is also a leading caving centre and popular local riding area.</p> <p><i>Reason for Designation:</i> Designated for its outstanding landscape quality and scenic beauty.</p> <p>The designation of the Mendip Hills is recognition of its karst scenery, scenic qualities, perceptions and values as described in the former Countryside Commission's 'The Mendip Hills Landscape' (1998) CCP 545. The qualities of the views from the edge of the Mendip Plateau are widely acknowledged, including views towards the Bristol Channel. The qualities of openness and remoteness and visual richness of the semi-natural vegetation are also acknowledged.</p>
Quantock Hills AONB	<p><i>Description</i>²³: A narrow, gently curving 19-km ridge, the Quantock Hills run north west from the Vale of Taunton Deane to the Bristol Channel coast. Standing out above the agricultural plain, the ridge looks far more imposing than its actual height of 245 to 275m and is famous for its views that, by repute, stretch over nine counties.</p>

²³ From http://www.countryside.gov.uk/LAR/Landscape/DL/aonbs/aonb_quantock.asp [accessed February 2007]

	<p>For so small an area, the landscape shows immense variety and on its heights, a surprising air of solitude and wildness. Underlying rocks range from the Hangman Grits of the hilltops to undulating shales and the distinctive new red sandstone of the West Country. The steep western scarp is deeply grooved by combes, rising to the hilltop heathland plateau. Eastward, long broad valleys, with an enclosed landscape of copses and hedgerows roll away towards the Somerset Levels.</p> <p>The heathland and sessile oak woodlands of the AONB are nationally important wildlife habitats, notably rich in species. Much of southern Britain's heathland has vanished or survives as fragments, making the AONB's extensive heaths particularly valuable. Native red deer still roam the Quantock Hills.</p> <p>The rural economy is based on mixed farming, dominated by dairying, sheep and beef rearing. A large part of the Quantocks plateau is open common with traditional grazing rights. Forestry and small-scale quarrying are secondary activities. There are no towns in the AONB but there are a number of attractive red sandstone villages.</p> <p>Tourism is a significant part of the economy, based on farm accommodation and guest houses. The AONB is also a highly popular local recreational area with heavy demand from the towns on its fringe.</p> <p><i>Reason for Designation:</i></p> <p>The Countryside Agency's publication 'The Quantock Hills Landscape: An Assessment of the Area of Outstanding Natural Beauty' (CA17) provides reasons for the designation of the Quantock Hills. The publication lists the Quantock Hills as a national landscape resource for reasons of their unique and outstanding qualities, including the dramatic ridge landform which exerts a strong influence over a wide area, as well as affording spectacular panoramic views from the hills, including sudden and surprising vistas. Views to the settled landscapes surrounding the hills are a special part of the AONB character²⁴. The hills represent a transition, between wild moorland and lowland heathland, and between upland/lowland landscapes – this transition is rare in southern England and is a distinguishing feature of the AONB. In addition, '<i>The juxtaposition of the different landscape types, and their close proximity to each other, is one of the most outstanding qualities of the Quantock Hills landscape.</i>'²⁵</p>
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²⁴ The Countryside Agency (2003) The Quantock Hills Landscape: An Assessment of the Area of Outstanding Natural Beauty CA17, p.69

²⁵ Ibid p.69

Wye Valley AONB	<p><i>Description</i>²⁶:</p> <p>The Wye Valley, winding sinuously down from Hereford to Chepstow, is both one of the finest lowland landscapes in Britain and one of the few lowland AONBs.</p> <p>In the north, the river meanders through the broad meadows, dotted woods and hedgerows of the Hereford plain. Its most dramatic limestone scenery, including the famous Symonds Yat, lies downstream from Ross-on-Wye. Deeply incised meanders have cut into the plateau to form sheer wooded limestone cliffs with superb views down to the valley floor. Between the gorges are broader valley reaches, with rounded hills and bluffs and a gently rolling skyline.</p> <p>In recognition of its immense nature conservation importance, the Wye was the first major river to be designated as a Site of Special Scientific Interest along its entire length. Within the AONB it is renowned both as a refuge of rare species, particularly those of limestone woodlands, and as one of the few remaining areas with comparatively large tracts of ancient broadleaved woodland. The pastures, hay meadows, hedges and copses within the farmed landscape of the AONB are also rich natural habitats.</p> <p>Farming in the AONB still follows a traditional pattern of mixed arable and dairying plus fruit orchards in the fertile north, and is an essential part of the landscape's value.</p> <p>Forestry has been an industry for centuries both here and in the nearby Forest of Dean and the Forestry Commission has substantial landholdings in the AONB. Limestone continues to be actively quarried.</p> <p>Tourism is a major contributor to the rural economy. The AONB includes a number of picturesque riverside settlements such as Ross-on-Wye and Tintern with its medieval abbey. Annually, an estimated two million visitors come to the Wye Valley, which is highly accessible from urban South Wales, Bristol and the Midlands. The Wye is a premier salmon fishing river and a major national focus for canoeing and other water sports. Offa's Dyke National Trail passes through the AONB and the Wye Valley Walk is one of the region's most heavily used recreational footpath routes.</p> <p><i>Reason for Designation:</i></p>

²⁶ From http://www.countryside.gov.uk/LAR/Landscape/DL/aonbs/aonb_wyevalley.asp [accessed February 2007]

	<p>Designated for its outstanding landscape quality and scenic beauty.</p> <p>The designation of the Wye Valley is recognition of the many qualities of the river and its catchment, as described in the former Countryside Commission's 'The Wye Valley' (1996) CCP 487. This includes the diversity of scenic beauty, richness of flora and fauna and the interesting dichotomy of waterscape and landscape.</p> <p><i>'The most outstanding quality of the AONB is the striking contrast between the limestone cliffs, steep wooded slopes and fertile, gently undulating, open farmland... the marriage between water and land is the fundamental factor promoting the national significance of the area.'</i> (Countryside Commission's 'The Wye Valley' (1996) CCP 487, p.38)</p>
Heritage Coasts	
Exmoor Heritage Coast	<p><i>Description:</i></p> <p>'Towering cliffs overlook the Bristol Channel, where the moors meet the sea. England's highest coastline - with its unique rounded 'hogs-back' cliffs (at their grandest near Combe Martin) make this a landscape of distinctive splendour.</p> <p>Steep wooded 'combes' cut down to the shore, and where oak woods have grown down the cliffs, woodland and seashore life share a rare coexistence on the pebble beaches'. [from http://www.countryside.gov.uk/LAR/Landscape/DL/heritage_coasts/exmoorhc.asp]</p> <p>The Heritage Coast is part of, and managed within, the Exmoor National Park.</p> <p><i>Reason for Designation:</i></p> <p>Designated for its coastal heritage – and to conserve the natural beauty and, where appropriate, accessibility for visitors.</p>

6.34. In Environmental Impact Assessment (EIA) there is some overlap between designations relevant to landscape and visual impact assessment and designations relevant to cultural heritage assessment. Some designations have both landscape and cultural heritage aspects to them – this is true particularly of Parks and Gardens of Special Historic Interest. This report considers those nationally important heritage sites that contribute visually to the landscape and are therefore of interest to Natural England (i.e. Parks and Gardens of Special Historic Interest and Scheduled Ancient Monuments – see **Figure 6.9**). It does not identify Conservation Areas and Listed Buildings (which are considered to be

too detailed for a strategic study of this type, and of less interest to Natural England's remit) although it should be recognised that these will be present in the study area.

- 6.35. Significant impacts on the landscape and visual interest of Parks and Gardens of Special Historic Interest and Scheduled Ancient Monuments are likely to occur where some part of the proposal directly affects a site or is located within the visual setting of that site. It is considered that the setting of any site located more than 10km from the proposed barrage would not be significantly affected by a proposal of this type and therefore those Parks and Gardens of Special Historic Interest and Scheduled Ancient Monuments that fall within a 10km ZTV of the barrage have been listed overleaf:
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Table 6.6: Cultural Heritage Designations

<i>Nationally Important Cultural Heritage Designations within the Study Area (excluding Wales)</i>	<i>Reason for Designation and Contribution to Landscape Character</i>
<i>Historic Parks and Gardens</i>	
Grove Park, Weston-Super-Mare	Grade II listed Municipal park on site of late C17 house and grounds. Contributes locally to character of Weston Super Mare.
<i>Scheduled Ancient Monuments</i>	
Multi-period site on Brean Down	Monument ref. 22841 Designated as a nationally important archaeological site in England. Visible as earthworks on top of Brean Down – contributes to the sense of time depth in the landscape.
Worlebury Camp	Monument ref. 13811 A large Multivallate hillfort on Worlebury Hill. Designated as a nationally important archaeological site in England. Visible as earthworks on top of Worlebury Hill where it forms a landmark feature and contributes to the sense of time depth in the landscape.
Bell Barrow 650m south-west of uphill farm	Monument ref. 22835 A barrow located at the foot of the Mendips. Designated as a nationally important archaeological site in England. Visible as an earthwork where it contributes to the sense of time depth in the landscape.
Two sets of two Palmerstonian gun batteries on Steep Holm	Monument ref. NS1 Designated as nationally important archaeological sites in England. Contribute to the historic character of the island.
Churchyard Cross at St John's Church, Weston-Super-Mare	Monument ref: NS12 Designated as a nationally important archaeological site in England. Contributes locally to historic character of the churchyard.

Appraisal of Landscape/Seascape Sensitivity

- 6.36. This section sets out the key sensitivities of the landscape/seascape of the study area. The evaluation draws on the baseline information and the principles outlined in the Countryside Agency's Topic Paper 6 '*Techniques and Criteria for Judging Capacity and Sensitivity*' and DTI's *Guidance on Assessment of the Impact of Offshore Wind Farms* (2006).

Key Landscape Sensitivities

- 6.37. The Countryside Character Areas form a useful framework for setting out key landscape sensitivities. The table below presents each countryside character area, providing information on key sensitivities as noted in the Countryside Agency's *Countryside Character Volume 8*:

South West England, and AONB assessments, plus additional information on tranquillity (from the CPRE map) and landscape designations.



Table 6.7: Key Landscape Sensitivities

<i>Countryside Character Area</i>	<i>Key sensitive features/ sensitivities</i>
105 Forest of Dean and Lower Wye	<ul style="list-style-type: none"> • Woodland and hedgerows; • The variety of industrial artefacts; • The sense of remoteness which is vulnerable to suburbanisation/gentrification*; • The amorphous character of the settlements; • The sense of tranquillity, particularly in the central forested area; • Scheduled ancient monuments including Offa’s Dyke and hill forts; • Historic parks and gardens; • The scenic quality of the Wye Valley (as reflected in designation of this part of the character area as an AONB).
106 Severn & Avon Vales	<ul style="list-style-type: none"> • The nature conservation and historic features of the river corridors; • The grassland wetlands and pastoral character of the riverside landscapes which are vulnerable to lack of grazing or mismanagement; • The ancient market towns and large villages whose character is vulnerable to new built development; • Historic landscape components including the Roman Villa at Wollaston and Historic Parks and Gardens e.g. Berkeley Castle; • The relative tranquillity of the southern banks of the Severn upstream from the M48 crossing.
118 Bristol, Avon Valleys & Ridges	<ul style="list-style-type: none"> • The woodland and hedgerow resource; • The remnant of rural industries including waterside mills and visible remnants of the coal industry; • Visible historic components including camps, hillforts and Roman settlements; • The pastures and calcareous grassland habitats; • The limestone scarps and remnant ancient woodland; • The reservoirs that are key landscape features; • The remaining undisturbed rural areas which are vulnerable to suburbanisation and areas of relative tranquillity (e.g. at Hawkesbury Common and around Chew Magna); • The high, open, downland ridges that are highly visible; • The parks, mansions and manor houses, some of which are designated.
141 Mendip Hills	<ul style="list-style-type: none"> • The karst features, dry stone walls and sparse settlement; • The industrial archaeological sites reflecting the lead, coal and cloth industries (some of which are designated)

	<p>as SAMs);</p> <ul style="list-style-type: none"> • The country houses and wooded parks (some of which are designated as Historic Parks/Gardens on English Heritage's Register); • The local building materials of local stone (grey limestone, reddish dolomitic limestone and grey or honey-coloured oolitic limestone); • The visual richness of the semi-natural vegetation; • Outstanding prehistoric ritual landscapes, some of which are designated as SAMs. • The qualities of openness and remoteness and sense of tranquillity; • The scenic quality of the Mendip Hills (as reflected in designation of a large part of the character area as an AONB); • Views from the edge of the Mendip Plateau, including views towards the Bristol Channel.
142 Somerset Levels and Moors/ 143 Mid Somerset Hills	<ul style="list-style-type: none"> • Wetland character (including wet pasture) that is vulnerable to changes in water levels; • The balance of landscape, nature conservation, urban drainage and agricultural objectives; • Remote character of the moors, particularly along the River Brue and on the Steart Flats; • Skylines of the low hills, ridges and islands which are visually prominent; • Nature reserves and remaining wetland habitats that are vulnerable to land drainage; • Sparse tree cover on Levels and Moors that would be vulnerable to changes through planting; • The many historic landscape features including prehistoric trackways, lake villages and post-medieval enclosures – including a number of SAMs such as the multi-period site on Brean Down and Brent Knoll hillfort; • The dunes at Bridgwater Bay; • The raised rivers and lev'es; • The orchards on the fringes of the hills.
144 Quantock Hills	<ul style="list-style-type: none"> • Remaining deciduous woodland and distinctive beech clumps; • The central high, heathland ridge that is highly visible; • Remnant open heathlands and commons that are vulnerable to lack of grazing; • Former deer parks and other historic landscape features including camps and hillforts on hill tops. • Distinctive red sandstone building materials which are vulnerable to replacement by modern building materials; • The relative tranquillity and solitude of the hills; • The views that, by repute, stretch over nine counties;

	<ul style="list-style-type: none"> • The outstanding landscape quality and scenic beauty (as reflected in designation of a large part of the character area as an AONB).
145 Exmoor	<ul style="list-style-type: none"> • Remnant open heathland and moorland that are vulnerable to lack of grazing. • The spectacular cliffed coastline that is highly visible; • Distinctive beech-topped hedgebanks and beech windbreaks; • The earth banks and stone walls that enclose the fields; • The local slate and sandstone building materials that are vulnerable to replacement by modern materials; • Visible historic features including former deer parks and Bronze Age monuments such as hill-forts. • The relative tranquillity and solitude of the hills; • The outstanding landscape quality and scenic beauty (as recognised by its designation as a National Park).
146 Vale of Taunton & Quantock Fringes	<ul style="list-style-type: none"> • The irregular field pattern and thick hedgerows/oaks that are distinctive in this lowland landscape; • The traditional cider apple orchards that have declined and are vulnerable to loss; • Distinctive red sandstone building materials which are vulnerable to replacement by modern building materials; • The rural character of the landscape that is vulnerable to suburbanisation; • The willows on floodplains; • The open and windswept coast.

* Sensitive features in bold are particularly relevant to a proposal of this type

Key Seascape Sensitivities

- 6.38. The Seascape Units form a useful framework for setting out key seascape sensitivities. This draws on the seascape evaluation guidance in CCW's *Guide to Best Practice in Seascape Assessment* by identifying seascape quality and value as well as key sensitivities.
- 6.39. The table below presents each seascape unit, providing information on quality, value and key sensitivities as determined through fieldwork undertaken in February 2007. Definitions of quality and value are drawn from definitions provided in Chapter 6 of the Seascape Guidance and are as follows:

Quality is defined as the condition of the seascape components or features that comprise a seascape. It also reflects the extent to which the character of the area is well defined, in the sense that features

present are not fragmented, are in good condition, and the seascape unit is an integrated whole.

Value has been defined by reference to landscape designations, the popularity of the seascape unit, and who it is valued by.

Table 6.8: Key Seascape Sensitivities

<i>Seascape Unit</i>	<i>Evaluation</i>
Upper Severn Estuary Seascape Unit (Mouth of the Severn River down to the second Severn Crossing)	<p>Quality: Variable quality – a quiet, largely naturalistic shoreline with some detractors including power stations, transmission lines, modern industrial buildings and dockside development.</p> <p>Value: This SU is valued for its birdlife (home of the Slimbridge Wildfowl and Wetlands Centre) and amenity resources provided by the Severn Way and other footpaths, Gloucester and Sharpness Canal, and Sharpness Docks picnic site. It is also valued for the natural phenomenon of the Severn Bore, particularly upstream.</p> <p>Key sensitivities:</p> <ul style="list-style-type: none"> • Remnant naturalistic and tranquil shoreline; • Birdlife on the dynamic inter-tidal zone; • Recreational and amenity values including Severn Way, Gloucester and Sharpness Canal, Sharpness Docks picnic site, birdwatching opportunities; • Views from the Severn Way footpath and Sharpness Docks picnic site; • The Severn Bridges; • The natural phenomenon of the Severn Bore.
Avonmouth Seascape Unit (Second Severn Crossing to Battery Point)	<p>Quality: This part of the shoreline is of relatively low quality – due to the derelict nature of many parts of the shore, and presence of detractors such as the modern industrial buildings, transmission lines, chemical works, motorway infrastructure and the exposed muddy banks of the mouth of the Avon. Despite this, it is a bold shoreline with good views to the Severn bridges.</p> <p>Value: This section of the coastline is not highly valued for its landscape/seascape qualities and there are no landscape designations covering this area. However, users of the Severn Way long distance recreational footpath value the visual interest provided by this section of foreshore, particularly the bridges over the Severn.</p> <p>Key sensitivities:</p> <ul style="list-style-type: none"> • Remnant naturalistic shoreline/marshes;

	<ul style="list-style-type: none"> • Views from the Severn Way footpath; • Views to the Severn Bridges.
Clevedon-Portishead Seascape Unit (Lower Severn Estuary - Battery Point to Clevedon)	<p>Quality: Good quality, intact, bold coastline. The settlements clinging to the cliff sides add to the scenic quality of the coastline. Few detractors.</p> <p>Value: Although this section of coastline is not designated for its landscape/seascape value, it is locally valued by the residents who live in Clevedon/Portishead, plus the visitors who visit these resorts.</p> <p>Key sensitivities:</p> <ul style="list-style-type: none"> • Distinctive coastal form; • Naturalistic shoreline qualities; • Recreational and amenity values; • Views to the islands; • Clevedon pier; • Views from the coastal resorts of Clevedon and Portishead.
Weston Seascape Unit (Lower Severn Estuary - Clevedon to Brean Down)	<p>Quality: A coastline influenced by man, but with pleasing form of promontories and bays contributing to a high scenic quality.</p> <p>Value: Although this section of coastline is not designated for its landscape/seascape quality, it is locally valued by visitors and holiday makers who flock to its sandy beaches.</p> <p>Key sensitivities:</p> <ul style="list-style-type: none"> • Distinctive promontories; • Sandy beaches which are rare in the Severn Estuary; • Piers and islands in Weston-Super-Mare; • Views from the coastal resort of Weston-Super-Mare to Brean Down and the islands of Steep Holm and Flat Holm.
Stear/Berrow Seascape Unit (Bridgwater Bay - Brean Down to Hinkley Point)	<p>Quality: A distinctive large scale sweeping bay with great sense of space and large skies, contributing to a high scenic quality. Detractors include the caravans and built development at Brean.</p> <p>Value: Although this section of coastline is not designated for its landscape/seascape quality, it is valued by birdwatchers (Stear) and holiday makers (Berrow/Brean) – the Stear Peninsula is also one of the most tranquil parts of the Severn Estuary.</p> <p>Key sensitivities:</p> <ul style="list-style-type: none"> • Remnant naturalistic and tranquil shoreline (Stear Peninsula);

	<ul style="list-style-type: none"> • Birdlife on the dynamic inter-tidal zone; • Recreational and amenity values including River Parrett Trail, campsites and birdwatching opportunities; • Views from the River Parrett Trail; • Panoramic views from Brean Beach to the island of Steep Holm and Brean Down.
<p>Bridgwater Bay Seascape Unit (Bridgwater Bay - Hinkley Point to Exmoor)</p>	<p>Quality: A stretch of low cliffed coastline, relatively remote with some scenic bays and cliffs. Detractors include Hinkley Point Nuclear Power Station, and holiday villages at St Audre's Bay, Doniford and Minehead.</p> <p>Value: Part of the coastline (between St Audrie's Bay and Quantoxhead) forms part of the Quantock Hills AONB, designated for its high landscape and scenic quality. It is also valued by holidaymakers visiting the coves and bays.</p> <p>Key sensitivities:</p> <ul style="list-style-type: none"> • Remnant naturalistic and tranquil shoreline; • Spectacular foreshore of ledges and terraces; • Recreational and amenity values including coastal footpaths and campsites; • Views from the Quantock Hills AONB.
<p>Exmoor Seascape Unit (Exmoor Heritage Coast)</p>	<p>Quality: Good quality, intact, bold and distinctive coastline. Highly naturalistic with few detractors and a strong sense of tranquillity. High scenic quality.</p> <p>Value: This SU is designated for its dramatic scenery as part of Exmoor National Park and Exmoor Heritage Coast. It is valued for its recreational and amenity value – including the South West Coast Path National Trail.</p> <p>Key sensitivities:</p> <ul style="list-style-type: none"> • Distinctive hog's back coastal form; • Naturalistic and tranquil qualities; • Recreational and amenity values; • Views from the National Trail.

BASELINE VISUAL APPRAISAL

- 6.40. A key aim of the visual baseline is to identify and evaluate the character and quality of existing views and the location of sensitive
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visual receptors within the study area as a basis against which to judge potential change. Whilst the study of visual impacts is separate from landscape impacts, aspects of landscape character and the physical components of the landscape are important in defining the visual and perceptual character of the landscape.

Defining Key Viewpoints and Visual Receptors

- 6.41. The OS maps of the study area indicate where there are likely to be important viewpoints, or sensitive visual receptors. The ZTVs were used to refine the area of search and aid in identifying potential key views for field checking.
- 6.42. Criteria outlined in the LI/IEMA 2002 Guidance on landscape and visual impact assessment and SNH's 2005 draft guidance²⁷ was used to select a number of key viewpoints. Selection of viewpoints will be based on the following criteria:
- They are publicly accessible;
 - They have a reasonably high potential number of viewers or are of particular importance to the viewers affected (e.g. recreational and residential areas);
 - They provide a representative range of viewing distances (i.e. short, medium and long range views);
 - They represent a range of viewing experiences (i.e. static views, for example from picnic areas or car parks, and points along sequential views, for example from public highways and walking routes).
- 6.43. In addition, it was considered that for this study viewpoints should be of particular relevance to Natural England i.e. regionally important viewpoints in England, including viewpoints within nationally designated landscapes and viewpoints located along major recreational routes or in popular recreational areas. It is expected that a developer would include a more detailed assessment of viewpoints in both England and Wales as part of an EIA.
- 6.44. The key viewpoints, and the reasons for their selection, are presented in **Table 6.9** below and shown in **Figure 6.10**.

Table 6.9 Viewpoints and Reasons for Selection

<i>Viewpoint (including grid reference and distance from</i>	<i>Reason for Selection and Visual Receptors</i>	<i>Particular Relevance to Natural England</i>
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²⁷ Scottish Natural Heritage, the Scottish Renewables Forum and the Scottish Society of Directors of Planning (2005) Visual Analysis of Windfarms Good Practice Guidance.

<i>proposed barrage)</i>		
<p>1. Sharpness Docks</p> <p>E366723, N202076</p> <p>57.3km to nearest part of barrage</p>	<p>Parking and picnic area – draws visitors.</p> <p>Representative of views from <i>Severn and Avon Vales CCA</i> and the <i>Upper Severn Estuary Seascape Unit</i>.</p> <p>Will show changes in estuary upstream of barrage.</p> <p>Receptors = recreational visitors to parking/picnic site and workers at Sharpness Docks.</p>	<p>Natural England has the remit to protect and improve the landscape and to enable enjoyment of the natural environment for all.</p>
<p>2. Old Passage</p> <p>E356356, N188777</p> <p>40.5km to nearest part of barrage</p>	<p>Representative of views from the <i>Severn and Avon Vales CCA</i> and <i>Upper Severn Estuary Seascape Unit</i>.</p> <p>Will show changes in estuary upstream of barrage.</p> <p>Receptors = users of local roads and residents of Aust/Old Passage.</p>	<p>Natural England has the remit to protect and improve the landscape and to enable enjoyment of the natural environment for all.</p>
<p>3. Severn Beach/Severn Way</p> <p>E353833, N184766</p> <p>35.8km to nearest part of barrage</p>	<p>Long distance recreational footpath (Severn Way) and traffic free cycle route 41.</p> <p>Representative of views from the <i>Severn and Avon Vales CCA</i> and <i>Avonmouth Seascape Unit</i>.</p> <p>Will show changes in estuary upstream of barrage.</p> <p>Receptors = users of the Severn Way footpath/cycleway.</p>	<p>Natural England has the remit to protect and improve the landscape and to enable enjoyment of the natural environment for all.</p>
<p>4. Clevedon – from Clevedon Pier</p> <p>E340005, N171996</p> <p>17.2km to nearest part of barrage</p>	<p>Popular resort and residential area of Clevedon with views into estuary.</p> <p>Representative of views from the <i>Bristol, Avon Valleys and Ridges CCA</i> and the <i>Clevedon-Portishead Seascape Unit</i>.</p> <p>Will show barrage and changes in estuary upstream of barrage.</p> <p>Receptors = residents of Clevedon and visitors to the sea front and pier.</p>	<p>Natural England has the remit to protect and improve the landscape and to enable enjoyment of the natural environment for all.</p>
<p>5. Weston Super Mare – south of the Grand Pier</p>	<p>Major residential area and holiday resort with views into Severn Estuary.</p> <p>Representative of views from</p>	<p>Natural England has the remit to protect and improve the landscape and to enable enjoyment of the natural</p>

<p>E331724, N161253 3.6km to nearest part of barrage</p>	<p>the low lying coastline of the <i>Somerset Levels and Moors CCA</i> (and the low lying coast of the <i>Weston Seascape Unit</i>).</p> <p>Will show barrage and changes in estuary upstream of barrage.</p> <p>Receptors = residents of Weston-Super-Mare and visitors to the sea front.</p>	<p>environment for all.</p>
<p>6. Brean Beach E329459, N156217 2.0km to nearest part of barrage</p>	<p>Popular recreational area and holiday resort with many camp sites.</p> <p>Representative of views from the low lying coastline of the <i>Somerset Levels and Moors CCA</i> (and the low lying coast of the <i>Stear/Berrow seascape unit</i>).</p> <p>Will show barrage, including direct impacts of the rockhead on the landscape.</p> <p>Receptors = visitors to the beach (sand dunes screen views from houses at Brean).</p>	<p>Natural England has the remit to protect and improve the landscape and to enable enjoyment of the natural environment for all.</p>
<p>7. Brean Down SAM E329052, N158957 0.5km to nearest part of barrage</p>	<p>SAM with public access – popular recreational area located adjacent to where the proposed rockhead would join the English shoreline.</p> <p>Will show barrage, direct changes to the landscape and changes to the seascape up and downstream of barrage.</p> <p>Receptors = visitors to the SAM and walkers on the down.</p>	<p>Natural England has the remit to protect and improve the landscape and to enable enjoyment of the natural environment for all.</p>
<p>8. Brent Knoll E333981, N 150968 8.4 to nearest part of barrage</p>	<p>National Trust site and SAM (hillfort) with public access.</p> <p>Representative of views from the prominent <i>Mid Somerset Hills CCA</i>.</p> <p>Will show barrage and possible changes in seascape downstream of barrage.</p> <p>Receptors = visitors to the SAM and walkers on the hill.</p>	<p>Natural England has the remit to protect and improve the landscape and to enable enjoyment of the natural environment for all.</p>
<p>9. Bleadon Hill in the</p>	<p>View from the Mendip Hills</p>	<p>Natural England is responsible</p>

<p>Mendip Hills AONB</p> <p>E333932, N157491</p> <p>4.2km to nearest part of barrage</p>	<p>AONB (and West Mendip Way long distance footpath). Representative of views from the high ground of the <i>Mendip Hills CCA</i>. Will show barrage and possible changes in seascape downstream of barrage.</p> <p>Receptors = visitors to the AONB, plus some residents on the north end of Bleadon Hill.</p>	<p>for designating AONBs and advising Government and others on how they should be protected and managed.</p>
<p>10. Steart Peninsula</p> <p>E326259, N145356</p> <p>13.4km to nearest part of barrage</p>	<p>Recreational area with views across the Steart Flats. Representative of views from this part of the Parrett Trail recreational path and the <i>Somerset Levels and Moors CCA</i> and <i>Stear/Berrow Seascape Unit</i>. Will show barrage and possible changes to coastline downstream of barrage.</p> <p>Receptors = visitors to the Steart Peninsula mud flats.</p>	<p>Natural England has the remit to protect and improve the landscape and to enable enjoyment of the natural environment for all.</p>
<p>11. Quantock Hills AONB</p> <p>E317408, N139478</p> <p>21.7km to nearest part of barrage</p>	<p>View from the Quantock Hills AONB. Representative of views from the high ground of the <i>Quantock Hills CCA</i>. Spectacular long-distance views are acknowledged as a special feature of the AONB in the former Countryside Agency's 'The Quantock Hills Landscape' CA17 (including views into the Bristol Channel and the islands of Flat Holm and Steep Holm). Will show barrage and possible changes in estuary seascape downstream of the barrage.</p> <p>Receptors = visitors to the AONB and some residents located in the AONB with views over the Bristol Channel.</p>	<p>Natural England is responsible for designating AONBs and advising Government and others on how they should be protected and managed.</p>
<p>12. Bratton Ball, Exmoor National Park</p>	<p>View from Exmoor National Park and Heritage Coast on a well used and nationally important recreational route</p>	<p>Natural England's remit includes the designation and management of National</p>

<p>E294290, N147443 30.3km to nearest part of barrage</p>	<p>(a National Trail), experienced by many recreational receptors. Bratton Ball is marked as a viewpoint on the OS 1:50,000 map. Representative of views from the high cliffs of <i>Exmoor CCA</i> (and the Exmoor seascape unit). 'Breathtaking coastal panoramas' from Exmoor are described in '<i>The Devon Landscape: An Appraisal of Devon's Landscape at the beginning of the 21st Century</i>'. Receptors = visitors to the National Park and walkers on the South West Coast Path National Trail.</p>	<p>Trails. Natural England is also responsible for designating National Parks and advising Government and others on how they should be protected and managed.</p>
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Evaluation of Key Views

6.45. The baseline evaluation of key views identifies the character and quality of views, including the presence of attractors/detractors, and the aspects of the view that are important or valued.

6.46. The representative viewpoints were photographed and viewpoint sensitivity identified using the following criteria:

- whether the viewpoint represents a designated viewpoint;
- the location of the viewpoint and the type of view (for example panorama, or framed view);
- the scenic qualities of the view, including the presence of other existing vertical and man made elements in the view;
- the number²⁸ and type of viewers likely to experience views from that particular viewpoint.

6.47. The views were photographed using a Nikon D70s digital SLR, which can be used to produce photographs equivalent to those from a standard 35mm SLR camera. Each photograph taken was at the equivalent of 50mm focal length for a standard 35mm camera in accordance with Landscape Institute Advice Note 01/04 'Use of Photography and

²⁸ This does not entail recording *exact* numbers, but gives an indication of the popularity of a viewing location, identifying relative numbers of people experiencing views from a particular viewpoint.

Photomontage in Landscape and Visual Assessment'. The photographs are presented in **Figures 6.11 – 6.15**.

Table 6.10 Definitions of Viewpoint Sensitivity

<i>Sensitivity</i>	<i>Definition</i>
High	Like to be an advertised or designated viewpoint with high scenic quality (e.g. Located in a National Park, AONB or Historic Park/Garden on English Heritage's Register) and is likely to be experienced by a large number of people. Likely to be in a residential or important recreational area.
Moderate	Likely to be a viewpoint with some scenic qualities (e.g. a viewpoint within a locally designated landscape) which is likely to be experienced by a moderate number of people; or a viewpoint in a non-designated landscape which is likely to be experienced by a large number of people.
Low	Likely to be a viewpoint that is not advertised in any way and lies within a non-designated landscape. Likely to contain existing man-made elements in the view and be experienced by a small number of viewers. Unlikely to be in a residential or important recreational area.

6.48. The results are presented in **Table 6.11** overleaf:

Table 6.11 Evaluation of Key Views

<i>Viewpoint</i>	<i>Viewpoint sensitivity/ importance (including landscape designations, receptors etc.)</i>	<i>View description (including presence of attractors/detractors)</i>
<p>1. Sharpness Docks</p> <p>E366723, N202076</p> <p>57.3km to nearest part of barrage</p>	<p>Viewpoint sensitivity is moderate – a moderate number of people experience this view. Lies in a non-designated landscape, but is a locally important recreational area with car park/picnic facilities. There are some existing detractors in the view.</p>	<p>The foreground is dominated by mown amenity grassland, a naturalistic foreshore and muddy inter-tidal flats. The middleground is dominated by the open water of the Severn Estuary and built development along its banks (including power station buildings of Berkeley Nuclear Power Station). The background is formed by the undeveloped Welsh coast, Oldbury Power Station and the Severn Bridges.</p> <p>Although there is considerable visual interest, there are a number of detractors in the view (including power stations and industrial warehouses).</p>
<p>2. Old Passage</p> <p>E356356, N188777</p> <p>40.5km to nearest part of barrage</p>	<p>Viewpoint sensitivity is low – a relatively small number of people experience this view from a local road. Viewpoint lies in a non-designated landscape - some existing detractors in the view.</p>	<p>The foreground is dominated by a flat, marshy foreshore strewn with washed up debris. The middleground is composed of the open estuary, the two Severn Bridges and transmission pylons. The background is formed by the developed English/Welsh coastline and hills beyond.</p> <p>Although there is considerable visual interest, there are a number of detractors in the view (including litter strewn shores and transmission pylons).</p>
<p>3. Severn Beach/Severn Way</p> <p>E353833, N184766</p> <p>35.8km to nearest part of barrage</p>	<p>Viewpoint sensitivity is moderate – a moderate-large number of people experience this view from a regionally important footpath. However, the viewpoint is in a non-designated landscape and there are a number of existing detractors in the</p>	<p>The foreground is dominated by the concrete retaining wall that supports the Severn Way footpath/cycleway and the litter strewn gravelly foreshore. The middleground is dominated by the change between muddy inter-tidal flats and open water of the Severn Estuary spanned by</p>

	view.	the second Severn crossing, and the industrial buildings of Avonmouth. The low cliffs of Portishead/Clevedon and the Welsh hills on the opposite bank of the estuary form an attractive backdrop. Although this view has considerable visual interest, there are a number of detractors in the view including the industrial works at Avonmouth.
4. Clevedon – from Clevedon Pier E340005, N171996 17.2km to nearest part of barrage	Viewpoint sensitivity is high – although this is a non-designated landscape, many residents and visitors experience this view. There are few existing detractors in the view.	The foreground is formed by the Victorian pier at Clevedon. The middleground is dominated by the open expanse of water that forms the lower Severn Estuary. Rocky promontories and the islands of Steep Holm and Flat Holm form an attractive backdrop to the south while the Welsh Coast forms a backdrop to the west, and the Severn Bridges visible on the skyline to the north. Scenic quality is high with considerable visual interest and few detractors.
5. Weston Super Mare – south of the Grand Pier E331724, N161253 3.6km to nearest part of barrage	Viewpoint sensitivity is high – although this is a non-designated landscape, many people experience this view, in particular residents and visitors to the holiday resorts of Weston Super Mare, both of whom have a great interest in their visual environment.	The foreground is formed by the sandy beach at Weston-Super-Mare with its built development including cafes, toilets. The middleground is composed of the open water of the Bristol Channel. Steep Holm, Brean Down and the Grand Pier provide visual interest in the middle ground. The coast of Wales provides a distant, hazy backdrop. Scenic quality is high despite the presence of some visual detractors in the foreground.
6. Brean Beach E329459, N156217 2.0km to nearest part of barrage	Viewpoint sensitivity is moderate - although the viewpoint is not in a designated landscape, the beach draws many visitors, particularly in the summer months.	The foreground is dominated by an open sandy beach with its wooden marker posts and signage. The middleground is formed by the open water of the Bristol Channel, with visual interest

		<p>provided by Steep Holm and Brean Down. The Welsh coast forms a hazy backdrop to the west and the Quantock Hills/ Exmoor form a hazy backdrop to the south.</p> <p>The view holds considerable visual interest and few detractors.</p>
<p>7. Brean Down SAM E329052, N158957 0.5km to nearest part of barrage</p>	<p>Viewpoint sensitivity is high - although the viewpoint is not in a designated landscape, the down is very accessible and well visited, scenic quality is high, and the viewpoint provides a 360 degree panorama.</p>	<p>A 360 degree panoramic view. The foreground is dominated by the wild, open windswept moorland of Brean Down. The middleground of the view is composed of the drained farmland of the Somerset Levels and Moors landward (beyond which lie the Mendips) and the open water of the Bristol Channel seaward. Weston-Super-Mare clings to the promontory of Worlebury Hill and the islands of Steep Holm and Flat Holm form focal points in the view. The distant hills of the Quantocks and Welsh coastline form a hazy backdrop to the view.</p> <p>Caravan development at Brean Beach and some of the modern built development at Weston-Super-Mare detract from the otherwise high scenic quality of this view.</p>
<p>8. Brent Knoll E333981, N 150968 8.4 to nearest part of barrage</p>	<p>Viewpoint sensitivity is moderate - although the viewpoint is not in a designated landscape, the knoll is relatively popular with walkers and has some scenic quality.</p>	<p>The foreground is dominated by pastoral fields, the middleground by the patchwork of pastoral fields, interspersed with farmsteads, beyond which lies the caravan parks of Brean beach and the open water of the Bristol Channel. The low cliffs of Bridgwater Bay form a backdrop to the south, while Steep Holm, Brean Down and Worlebury Hill with Weston-Super-Mare clinging to its slopes form an attractive backdrop to the</p>

		north. Although there is considerable visual interest, detractors include the caravans and built development at Weston-Super-Mare.
9. Bleadon Hill in the Mendip Hills AONB E333932, N157491 4.2km to nearest part of barrage	Viewpoint sensitivity is high – the viewpoint is within an AONB and is marked as a panoramic viewpoint on the 1:25,000 OS map. It is likely to attract large numbers of people.	The foreground is composed of fields of pasture on the edge of the Mendip Hills AONB. The middleground is dominated by the regular pattern of fields on the Somerset Levels and Moors – punctuated by built development and caravans at the foot of the Mendips. The ridge of land formed by the Quantock Hills and Exmoor form a hazy backdrop to the view. An impressive panoramic view over the flat Somerset Levels and Moors - caravans on the edge of Weston-Super-Mare are the only detractors in the view.
10. Steart Peninsula E326259, N145356 13.4km to nearest part of barrage	Viewpoint sensitivity is moderate – although the viewpoint is not in a designated landscape and few people access the peninsula, the viewpoint is representative of users of the Parrett Trail regionally important footpath and there are few existing detractors in the view.	The foreground is composed of a naturalistic foreshore of rough grazed common land and salt marsh. Beach signage (including the National Nature Reserve sign) also occupies the foreground. The middle ground is composed of the extensive inter-tidal mud flats of the Bridgwater Bay National Nature Reserve and the open water of the Bristol Channel beyond. Hinkley Point Power Station and its transmission lines are visible in the middleground to the west while caravans at Burnham-on-Sea and evergreen shelter belts around houses at Steart are visible in the middleground to the north. The island of Steep Holm, Brean Down, Bleadon Hill and Brent Knoll form an attractive backdrop to the view. Although this is an impressive

		panorama with an attractive backdrop of hills, the power station and transmission lines at Hinkley Point, the caravans at Burnham and the evergreen shelter belts in the middleground are detractors.
11. Quantock Hills AONB E317408, N139478 21.7km to nearest part of barrage	Viewpoint sensitivity is high – the viewpoint is located within an AONB whose views are one of the reasons for designation.	The foreground is composed of steep pastoral fields on the edge of the Quantock Hills AONB. The middleground is dominated by the patchwork of fields and woodland of the <i>Vale of Taunton and Quantock Fringes CCA</i> . Hinkley Point power station is a feature in the middle ground of the view, beyond which lies the open water of the Bristol Channel. The island of Steep Holm, Brean Down and the Mendips form an attractive backdrop to the view. An impressive panoramic view over the Quantock fringes and Bristol Channel. Apart from Hinkley Point there are few other detractors in the view.
12. Bratton Ball, Exmoor National Park E294290, N147443 30.3km to nearest part of barrage	Viewpoint sensitivity is high – the viewpoint is located within a National Park and is marked as a viewpoint on the OS 1:50,000 and 1:25,000 scale maps – views from the Exmoor Coast are noted in the landscape assessment of Devon.	The foreground is composed of open heather moorland. The dramatic rolling hills of Exmoor, the Quantock Hills ridge and the open water of the Bristol Channel form the middle ground of the view. The backdrop is formed by the low cliffed coastline of Bridgwater Bay stretching into the background to the east, and the distant and hazy coast of Wales to the north. High scenic quality – this is a dramatic panoramic view with no visible detractors.

FUTURE BASELINE WITHOUT DEVELOPMENT

- 6.49. In any LVIA it is important to consider the future baseline in the absence of the proposal – particularly in such as dynamic landscape. In this case, climate change and rising sea levels are of concern and are likely to affect the study area. Increased public access to coastal areas is also likely to change the pattern of visual receptors in the future. UKCIP's 2002 report on climate change scenarios²⁹, Shoreline Management Plans for the Inner and Outer Estuaries, forces for change reported in landscape character assessments, and development plans have been used to inform a vision of the future landscape/seascape baseline in the future, in the absence of a barrage.

Climate Change

- 6.50. UKCIP's 2002 report on climate change sets a range of greenhouse gas emissions scenarios, and predicts climate change impacts to the 2080s based on these. Predictions of sea level rise are made based on the thermal expansion of sea water due to increased temperatures and increases in ocean volume due to ice melting. Relative sea levels will vary regionally due to the on-going readjustment of the land to deglaciation, which has been taken into account in the model, and localised sediment consolidation, which are not included in regional estimates of sea level change. In South West England, mean sea levels are predicted to rise by between 16 and 76cm by the 2080s for low and high emissions scenarios respectively.
- 6.51. In addition, extreme weather events, and the likelihood of increased stormy conditions, combined with rising sea levels will make the problem of flooding much greater over the next few decades. For example, the prolonged flooding in the Parrett catchment in 1999/2000 proved that the river and drainage system cannot cope in extreme events and this led local agencies and people to form the Parrett Catchment Project (PCP) in 2000, whose aim it is to take action to address the issue of flooding.

Estuary and Shoreline Management

Strategy for the Severn Estuary

- 6.52. The Severn Estuary Partnership produced the Strategy for the Severn Estuary, which is a non-statutory, voluntary agreement between various stakeholder bodies on the principles of management of the Estuary, in 2001, and covers the area from Gloucester to Hurlstone Point near Minehead on the English coast and Nash Point in the Vale of

²⁹ Climate change scenarios for the United Kingdom: The UKCIP02 Scientific Report. UKCIP. 2002.

Glamorgan on the Welsh coast. The Strategy outlines the Severn Estuary Partnership's policies for: Planning and Management in the Estuary; Sustainable land use, development and transport; Agriculture; Coastal protection and flood defence; Tourism, recreation and access; Ports, shipping and navigation; Waste management and pollution; Aggregates and other minerals; Fisheries; Landscape and seascape; Nature conservation and wildlife; and Archaeology and the historic environment.

6.53. Policies relating to the future management of recreation and access in the Severn Estuary include to support the improvement of Public Rights of Way along the banks and in the vicinity of the Estuary and enhance the recreational and 'green' transportation network and to support measures for additional access to the shore where appropriate.

6.54. Specific policies on the future of the Estuary's landscape and seascape are:

- L1a: Promote the adoption of a coordinated, character-based approach to landscape and seascape assessment and the preparation of policies for landscape appraisal, conservation and enhancement;
- L1b: Co-ordinate a policy framework for landscape and seascape conservation and enhancement across authority boundaries;
- L1c: Plan and design all new developments including infrastructure and transport so that they conserve and enhance the character of the Severn Estuary landscape and seascape across authority boundaries;
- L2: Integrated across the SEP area, support and promote initiatives which implement the conservation of the distinctive landscape and seascape character qualities and enhancement of degraded areas;
- L3: Seek to encourage that proposals for coastal and river protection demonstrate due regard for landscape and seascape conservation and /or enhancement at both strategic and site specific levels. Impact on landscape and seascape character and visual amenities should be a material consideration in the assessment of options for flood defence and coastal protection;
- L4: Encourage sustainable farming practices to secure the conservation and/or enhancement of the particular character of the SEP area landscapes and seascapes;

6.55. The particular focus of these policies on the conservation of the character of the landscape and seascape within the Severn Estuary

implies that the future baseline of the landscape would be unlikely to be significantly different from the current landscape.

Severn CHaMP

- 6.56. The Severn Estuary Coastal Habitat Management Plan CHaMP (being produced on behalf of the Environment Agency by a consortium involving Jacobs Bابتie, ABP Marine Environmental Research, and Royal Haskoning), is intended to provide a high level framework to advise the management decisions that may affect sites designated under the Habitats and Bird Directives and the Ramsar convention. It is considered necessary for dynamic coastlines and where other activities by flood and coastal defence may significantly affect the management of the (semi-) natural system, and may help provide a way of fulfilling the UK government's obligations, to avoid damage and deterioration to Natura 2000 and Ramsar sites. Although the Severn CHaMP is focussed on nature conservation issues, it would be worth considering in any future work in this area (the CHaMP is due to be available in the next couple of months).

Shoreline Management Plans

- 6.57. Shoreline Management Plans provides the basis for sustainable coastal defence policies along the Severn Estuary. The existing Shoreline Management Plans are now 10 years old and are currently being reviewed and updated – the Bideford Bay to Bridgwater Bay Shoreline Management Plan is being updated this year and the Severn Estuary Shoreline Management Plan next year.
- 6.58. The existing Severn Estuary Shoreline Management Plan (SMP) has a non-technical summary dated 2000³⁰. This provides policies from Lavernock Point and Brean Down, upstream to the Haw Bridge, near Tirley, north of Gloucester. The SMP divides the shoreline into process units, and within them into management units; the preferred management strategy for each management unit is selected from: Do Nothing; Hold the Line, which would maintain the coastal defence line in its current position; Advance the Line, which would move the current line of coastal defence seaward; and Retreat the Line, which would move the current line of coastal defence landwards.
- 6.59. In general on the English side of the Severn Estuary, upstream of Brean Down, the preferred policies are to Hold the Line on developed stretches of coastline, and Do Nothing in undeveloped areas. This implies that significant changes were not planned for the coastline within the lifetime of the SMP.

³⁰ Severn Estuary Shoreline Management Plan Non-Technical Summary. Gifford Associated Consultants for Severn Estuary Coastal Group. 2000.

6.60. Downstream of Brean Down the Bideford Bay to Bridgwater Bay Shoreline Management Plan (1996) provides the preferred management strategy for each management unit. This states that the policy for the area between Minehead and Hinkley Point is a combination of 'hold the line' and 'observe and monitor'; for the area between Hinkley Point to River Brue is mostly 'hold the line' with a strategy to 'observe and monitor' (in conjunction with a strategy to possibly retreat the line) around the Steart Peninsula; and for the area between the River Brue and Brean Down the policy has been mostly 'hold the line', with a policy of 'observe and monitor' of the natural dunes at Berrow, and 'do nothing' at Brean Down. This implies that the policy for the coastline seaward of the proposed barrage has also been to maintain the existing situation, except for possible retreat on the Steart Peninsula.

Futurecoast

- 6.61. In order to help guide the next round of Shoreline Management Plans, the Department for Environment, Food and Rural Affairs (DEFRA) and the National Assembly for Wales have commissioned a study of the processes and geomorphology of the coastline of England and Wales to improve understanding of coastal processes and predict likely coastal evolution over the next 100 years – the study is known as 'futurecoast' (Halcrow 2003) and provides predictions of coastal evolutionary tendencies over the next century.
- 6.62. The results are presented on a single interactive CD, which is supplemented by two further CDs containing oblique aerial photographs covering the entire open coast of England and Wales. The study is available to selected organisations, including Natural England.
- 6.63. The assessment of future shoreline behaviour is divided into a number of shoreline units which are consistent with the *seascape units* derived as part of our baseline seascape character assessment. Between Minehead and Hinkley Point (equivalent to our *Bridgwater Bay Seascape Unit*) the future unconstrained shoreline behaviour is predicted to continue to erode with rates depending upon the differences in geology – with deepening of Blue Anchor Bay.
- 6.64. Between Hinkley Point and Brean Down (equivalent to our *Steart-Berrow Seascape Unit*) future unconstrained shoreline behaviour is predicted to broadscale recession of the low-lying soft coastline with retreat of the shoreline along the southern half of the headland at Brean Down, ultimately Brean Down becoming an island. A breach of the River Parrett through the Stolford to Steart frontage is also highly possible within the next century and frontal erosion of the dunes between
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Burnham-on-Sea and Brean Down would continue. The study also notes that accelerated sea level rise could be very significant for this low-lying shoreline.

- 6.65. Between Brean Down and Clevedon (equivalent to our *Weston Seascape Unit*) the limestone headlands will continue to influence the configuration of the coast. Retreat of the westward-facing bays is predicted and in the long term Weston Bay will become joined to Bridgwater Bay. The headland cliffs would recede slowly.
- 6.66. Between Clevedon and Portishead (equivalent to our *Clevedon-Portishead Seascape Unit*) the resistant cliffs will ensure that recession rates are slow and little change is expected.
- 6.67. Between Portishead Dock and the Old Severn Bridge (roughly equivalent to our *Avonmouth Seascape Unit*) landward recession of the shoreline is expected, with the extremities of the bay (sandstone cliffs at Portishead and the mudstone outcrop at English Stones) resisting erosion locally. Extensive marine flooding of the levels at Avonmouth would be expected, creating additional inter-tidal areas and landward migration of saltmarshes.
- 6.68. Upstream of the Old Severn Bridge (equivalent to our *Upper Severn Estuary Seascape Unit*) sea level rise could lead to inundation of the low lying levels. Increases in wave energy could result in erosion of the inter-tidal mudflats and saltmarsh margins.

Shaping the Future Landscape

- 6.69. Forces for change on the landscape are reported in the Countryside Agency's 'Character of England's Natural and Man-made Landscape) South West Volume 8. The volume also suggests how the future should be shaped.
 - 6.70. The most relevant countryside character areas to consider are those that immediately fringe the Estuary i.e. the Severn and Avon Vales (CCA 106), 118 Bristol, Avon Valleys & Ridges, 142 Somerset Levels and Moors, 145 Exmoor, and 146 Vale of Taunton & Quantock Fringes.
 - 6.71. In the Severn and Avon Vales loss of field patterns, small copses and semi-natural vegetation as a result of intensification of agricultural use are raised as issues, as is the continued decline of orchards and erosion of some parts of the river corridor. However, it is likely that in the future there will be a trend towards conservation and improvement of copses, orchards and semi-natural vegetation through agri-environment schemes.
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- 6.72. In the Bristol, Avon Valleys & Ridges there is likely to be continued pressure for quarrying. Targets have been set for the expansion of woodland (associated with the Forest of Avon Community Forest) which aims to create an attractive, diverse and well wooded landscape; protect and enhance wildlife and nature conservation areas; use woodland planting to reduce the impact of visually intrusive elements; protect and enhance historic parks and landscapes; and recognise and strengthen local identity and character³¹. Additional planting may also reduce the impact of negative landscape elements, and may also obstruct some views of the estuary.
- 6.73. In the Somerset Levels and Moors/Mid Somerset Hills peat workings will be gradually restored to wetlands, and there is likely to be conservation of the remaining orchards. There may be some decline in woodlands on ridges and 'islands' if they are not managed.
- 6.74. In Exmoor there has been a reduction in species-rich grasslands through agricultural improvement in the past, but this is now being given a high management priority and is not likely to continue. Visitor pressure has caused, and is likely to continue to cause, erosion on trackways and parking areas. The shingle ridge at Porlock may be breached permanently in the future (due to rising sea levels and increased storminess) which would lead to salt water flooding of the grazing marshes.
- 6.75. In the Vale of Taunton and Quantock Fringes there has been loss of hedgerows, traditional orchards, woodlands, and mature elm trees from Dutch Elm disease. Although there are likely to be further losses of elms, other aspects of the landscape are likely to come into better management as a result of the Environmental Stewardship Scheme.

Future Land Use and Development Pressures

- 6.76. A number of relevant development plans have been reviewed to identify policies and projects for future land use and development pressures on and around the Severn Estuary.

Gloucestershire County

- 6.77. The Joint Replacement Structure Plan acknowledges the role of land at Severnside in providing development opportunities for economic expansion in the short and long term. The Council recognises the area as a key strategic location of regional importance for a range of employment uses.

³¹ Forest of Avon (January 2002) Forest Plan, Chapter 6.

- 6.78. Policy SD.13 states that development will not normally be permitted where it is within a flood plain, which, according to the floodplain map in the Structure Plan, precludes much development alongside the River Severn.
- 6.79. Policy SD.24 of the adopted Gloucester Structure Plan states that the carrying of freight by water rather than road will be encouraged, and Policy SC.21 encourages the preservation of the Severn canal as a navigable waterway. This is likely to encourage development along the banks of the Severn. However, Policy MR.8, specifically on the Severn Estuary, states that "Development will not be permitted which has a detrimental impact on the scientific value, landscape setting and character, and the archaeology in the Severn Estuary".

Somerset County (and Exmoor)

- 6.80. No specific development plans that would affect the study area are set out in the Somerset and Exmoor Structure Plan.

Devon County

- 6.81. No specific development plans that would affect the study area are set out in the Adopted Devon Structure Plan.

North Somerset Unitary Authority

- 6.82. Policy ENV6 of the North Somerset Local Plan states that planning permission will not be granted for development which would be at unacceptable risk from flooding, which includes most of the undeveloped coast of the Severn Estuary in North Somerset. Policy NE9 states that development within the coastal zone will not be permitted except for uses and activities requiring a coastal location.
- 6.83. The former Avon County Structure Plan (upon which much of the North Somerset Local Plan is based) identifies the Avonmouth/Sevenside area be the appropriate location for special industry. Additionally, the Avon County Structure Plan identifies Weston-Super-Mare as sub-regional centre and states that Weston-super-Mare has recently seen a resurgence in the resort holiday market and the beginnings of new investment.
- 6.84. Reclamation of derelict land at East Portishead is planned, in line with the Council's long-held aspirations for the regeneration of the land around Portishead Dock. North Somerset Council are producing a Supplementary Planning Document (SPD) for Portishead Quay at East Portishead which will define the way development will progress around the important dockside hub of East Portishead.
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South Gloucestershire Unitary Authority

- 6.85. Policy E2 of the Adopted Gloucestershire Structure Plan states that the Council is committed to realising the long-term economic potential of the major strategic location at Severnside. This would involve the development of a broad range of employment uses, and three major road schemes, but would have to be balanced with the protection and enhancement of the coastal zone's ecology and landscape.

City of Bristol Unitary Authority

- 6.86. The Adopted Bristol Local Plan identifies Avonmouth as an "Area for Promotion and Regeneration". The Local Plan allocated land for employment, industrial and some limited housing development within the area of Avonmouth Docks and village. Major development projects are progressing in the Avonmouth area: the Bristol Port Company is proposing to build and operate three electricity generating wind turbines at Avonmouth, called the Avonmouth Renewable Energy Project. The proposed turbines will have a maximum height to blade tip of 131m.

Increased Coastal Access

- 6.87. Improving access to the English Coast was identified as a priority issue in Defra's five year strategy published in 2004. Minister's proposed that action to improve coastal access should be an early 'flagship' initiative for Natural England³². The vision for this project is:

*'A Coastal environment where rights to walk along the length of the English coast lie within a wildlife and landscape corridor that offers enjoyment, understanding of the natural environment and a high quality experience; and is managed sustainably in the context of a changing coastline.'*³³

- 6.88. It is proposed that there will be secure access along the length of the English coastline, creation of physical routes to access the coast, and improvements for coastal wildlife and the landscape, including encouragement of the enjoyment and understanding of the coastal environment. This means there will be changes in the number and distribution of visual receptors along the coast in the future, as well as increasing concern about changes to the coastline.

Conclusions on Future Baseline

- 6.89. This is a dynamic estuary that will continue to evolve with a predicted deepening of west-facing bays (Blue Anchor Bay, Bridgwater Bay,

³² Natural England Board Meeting 3 21 February 2007. Paper No. NEB P07 03

³³ Ibid. p1-2

Weston Bay, Sand Bay, Woodspring Bay, and Avonmouth. Erosion of sand dunes is predicted at Berrow and sea level rise and increasingly stormy conditions are likely to result in increased flooding of low land in the future.

- 6.90. Plans for expansion of woodland as part of the Bristol and Avon Community Forest may enhance landscape character, but obstruct some views to the estuary in the future. Further loss of elms in the Vale of Taunton and Quantock Fringes could lead to a more open landscape in that area. Increased public access to coastal areas is also likely to change the pattern of visual receptors in the future.
 - 6.91. In terms of development pressures, further development is likely to be encouraged in already developed locations along the Severn Estuary. In particular, industrial development is predicted at Avonmouth and Portishead, including three wind turbines at Avonmouth which will draw the eye. However, undeveloped, rural locations on the Estuary and in the surrounding area are not likely to see much additional development. The landscape is likely to become more polarised between developed areas (industrial dockside sites and tourism centres), and tranquil, undeveloped countryside.
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7. POTENTIAL KEY ISSUES

7.1. The role of this study is not to identify the magnitude and significance of all potential impacts arising from the barrage proposal – to do this it would be necessary to have detailed information about the proposal. Such a report would be the responsibility of the developer. Instead, this report identifies the key issues likely to arise from such a scheme (i.e. those that should be considered as part of any future LVIA), building on our knowledge of the sensitivities of the baseline landscape, seascape and visual environment, and our experience of undertaking landscape and visual impact assessment of large scale schemes. This information is intended to provide Natural England with the necessary information to offer advice and comment on likely effects of such a scheme. This report considers:

- whether landscape character is likely to be significantly affected;
- whether seascape character is likely to be significantly affected;
- whether special characteristics of national landscape designations are likely to be affected, or whether the purpose of designation would be undermined;
- whether views are likely to be significantly changed, or viewers significantly affected.

POTENTIAL LANDSCAPE/SEASCAPE IMPACTS

7.2. The section identifies potential landscape/seascape impacts during construction and operation of a barrage in this location (including direct impacts i.e. those arising directly from the barrage structure itself, and indirect impacts i.e. those arising from indirect changes to the inter-tidal areas as well as a potential new link road from the A370, power transmission lines, and additional built development/ recreational facilities upstream of the barrage).

Potential Impacts on National/Regional Landscape Character

Table 7.1: Potential Impacts on National/Regional Landscape Character

<i>Countryside Character Area</i>	<i>Potential Impacts on Landscape Character</i>
105 Forest of Dean and Lower Wye	<p>Direct changes: Since the barrage is not proposed in this character area, there will be no potential change to landscape character resulting from the barrage.</p> <p>Indirect changes:</p>

	<p>There is unlikely to be potential change to the well-wooded plateau of the Forest of Dean landscape.</p>
106 Severn & Avon Vales	<p>Direct changes: Since the barrage is not proposed in this character area, there will be no direct change to landscape character.</p> <p>Indirect changes: The predicted changes to the cross section of the upper Severn Estuary, the extent of inter-tidal flats and reduced tidal range (including loss of the Severn Bore) will result in a potential change in character of the Severn Estuary up to Gloucester. This potentially will affect the character of the <i>Severn & Avon Vales</i> CCA. Since the Severn Estuary does not strictly form part of this landscape character area, the change to landscape character is not likely to be significant.</p> <p>Potential land based development upstream of Portishead may affect the landscape, but this is unlikely to result in a significant change to the landscape character of the CCA since there is already built development within this CCA.</p>
118 Bristol, Avon Valleys & Ridges	<p>Direct changes: Since the barrage is not proposed in this character area, there will be no direct change to landscape character. Although the barrage would be theoretically visible from some parts of the <i>Bristol, Avon Valleys & Ridges</i>, it would form only a small part of the view and would not alter the fundamental character of the landscape.</p> <p>Indirect changes: The predicted changes to the tidal range within the estuary will affect the River Avon, resulting in a reduction of the extent of muddy bank exposure in this tributary river. Although this will affect the River Avon locally, it is not likely to significantly change the fundamental character of the <i>Bristol, Avon Valleys & Ridges</i> landscape.</p> <p>Potential land based development between Clevedon and Portishead may affect the landscape, but this is unlikely to result in a significant change to the landscape character of the CCA since there is already built development within this CCA.</p>
141 Mendip Hills	<p>Direct changes: Since the barrage is not proposed in this character area, there will be no direct change to landscape character. Although the barrage would be theoretically visible from some parts of the Mendips, the barrage would form a small part of the view and would not alter the fundamental character of the Mendip Hills landscape.</p>

	<p>Indirect changes: There will be no indirect changes to the character of the prominent limestone hills of the Mendips.</p>
<p>142 Somerset Levels and Moors/ 143 Mid Somerset Hills</p>	<p>Direct changes: There would be a direct impact of the rockhead of the barrage on the drained lowland landscape around Brean where construction would directly affect an area of low lying wet farmland and its ditches or 'rhynes', resulting in loss of landscape features. The barrage would be a major new component in the low lying landscape and would affect the low lying rural character of this area of drained marsh, as well as views to the sea from this area. The presence of the barrage is likely to result in a significant impact on landscape features and character in this part of the <i>Somerset Levels and Moors</i> countryside character area. The presence of the barrage would also affect the setting of Brean Down which is a relatively remote landscape of historic importance.</p> <p>Indirect changes: Since the landscape of the Somerset Levels and Moors is maintained by controlled water levels (controlled by pumps), there are not expected to be any indirect changes to landscape character as a result of changes to sea or tidal levels resulting from the barrage. However, the predicted reduction in deposition in the Bridgwater Bay mud-zone (from upstream) resulting in loss of salt marsh vegetation along the Steart peninsula and in the Parrett estuary, the predicted decrease in extent of the Parrett delta, and accelerated wave erosion of inter-tidal zone along the Steart and Berrow Flats will also result in a change to the character of this part of the <i>Somerset Levels and Moors</i> CCA. In addition, any potential road link between the A370 and the barrage, power lines associated with the development, and additional on-shore built development would also affect the character of part of this CCA. These changes could potentially be significant.</p>
<p>144 Quantock Hills</p>	<p>Direct changes: Since the barrage is not proposed in this character area, there will be no direct change to landscape character. Although the barrage would be visible from some parts of the Quantocks, the barrage would form a small part of the view and would not alter the fundamental character of the Quantock Hills landscape.</p> <p>Indirect changes: There will be no indirect changes to the character of the</p>

	prominent Quantock Hills with its high, heathland ridge, steep wooded valleys and beech copses.
145 Exmoor	<p>Direct changes: Since the barrage is not proposed in this character area, there will be no direct change to landscape character.</p> <p>Indirect changes: There will be no indirect changes to the character of this upland landscape, with its treeless heather and grass moorlands, steep, wooded inland valleys and steep, coastal combs.</p>
146 Vale of Taunton & Quantock Fringes	<p>Direct changes: Since the barrage is not proposed in this character area, there will be no direct change to landscape character.</p> <p>Indirect changes: The predicted accelerated wave erosion of the inter-tidal zone along the Steart and Berrow Flats, with possible threat to the low cliffs around Hinkley nuclear power station may result in an impact on the character of the cliffs where the <i>Vale of Taunton & Quantock Fringes</i> CCA meets the sea. However, any change to the cliffs is not likely to significantly alter the fundamental character of the <i>Vale of Taunton & Quantock Fringes</i> CCA.</p>

- 7.3. There will also be some potential impacts on individual landscape types. Landscape types likely to experience most impact are those directly affected by the rockhead, transmission lines and potential road link, and those low lying landscape types found alongside the estuary shoreline and alongside the major tributary rivers that are most vulnerable to indirect changes to erosion resulting from the barrage.
- 7.4. The construction, and permanent presence, of the rockhead, transmission lines and potential road link, will potentially result in a significant impact on the character of 'LWD' (lowland, unwooded wetland landscape) along the Brean foreshore.
- 7.5. Since the landscape typology only goes down to the high water mark and does not include the inter-tidal zone, there are unlikely to be any potentially significant changes to any of the other landscape types. However, indirect changes to water levels that reach inland up the main tributary rivers might potentially affect some landscape types to some degree. The following landscape types may be affected:
- Landscape type LWD (the lowland, unwooded wetland along the River Yeo and River Axe);

- Landscape type LWW (the lowland, unwooded wetland/waste in the Parrett Delta);
- 7.6. In addition, some landscape types downstream of the barrage may potentially be affected by changes in erosional power of the waves. This may affect:
- Landscape type LWW (the lowland, unwooded wetland/waste at Minehead and Porlock);
 - Landscape type LBD (the low cliffs between Minehead to Hinkley Point).
- 7.7. The low, wooded chalk and limestone hills (landscape type ULA) along the Severn shoreline between Portishead and Clevedon, and the wooded hills meeting the Bristol Channel at dramatic cliffs along high Exmoor Coast (landscape type UBA) are unlikely to be affected by any changes.
- 7.8. In addition to impacts on the countryside character areas and landscape types, there will also be potential impacts on County and District landscape character areas – these will be of most interest to individual local authorities.

Potential Impacts on County/District Landscape Character

Table 7.2: Potential Impacts on County/District Landscape Character

<i>County/District Landscape Assessment</i>	<i>Potential Impacts on Relevant Landscape Types/ Landscape Character Areas</i>
Landscape Character Assessment and Landscape Strategy - Gloucestershire and Forest of Dean (2006)	<p>Type 7: Drained Riverine Farmland and Grazed Saltmarsh Loss of inter-tidal habitats as a result of indirect changes to water levels upstream of the barrage may result in significant impacts on the character of this landscape type. Potential land based development associated with greater recreational use of the estuary may also affect the remote and undeveloped character of this landscape type.</p> <p>Type 8: Littoral Sands and Rock Outcrops. Loss of inter-tidal habitats as a result of indirect changes to water levels upstream of the barrage may result in significant impacts on the character of this landscape type. Potential water based development associated with increased recreational use of the estuary and engineered structures along the water's edge may also affect the remote and undeveloped character of this landscape type.</p>
The Devon landscape: an appraisal of Devon's landscape at the beginning of the 21st	<p>Zone 21: Exmoor and North Devon High Coast. There is unlikely to be any direct or indirect change to the character of this landscape of high 'hogsback' cliffs, hidden inlets, rocky coves and wooded combs as a result of the barrage proposal.</p>

Century (2002)	
North Somerset Landscape Character Assessment SPD (2005)	<p>Any potential road link between the A370 and the barrage, power lines associated with the development, and additional on-shore built development may affect the character of A5 Bleadon Moor and C1 Weston Bay Settled Coastal Edge. These changes could potentially be significant.</p> <p>In addition, the predicted geomorphological changes upstream of the barrage could potentially affect the character of L1: Weston Bay, L2: Sand Bay, and L3: Woodspring Bay.</p>
South Gloucestershire Landscape Character Assessment SPD (2005)	<p>The predicted changes to the cross section of the upper Severn Estuary, the extent of inter-tidal flats and reduced tidal range will result in a change in the character of Landscape Character Area 21: Severn Estuary and Shoreline. This is likely to be significant.</p> <p>Potential land based development upstream of Avonmouth, as a result of increased recreational use of the estuary, may also affect the character of parts of Landscape Character Areas 19: Oldbury Levels and 20: Pilning Levels.</p>
Sedgemoor Landscape Assessment and Countryside Design Summary (2003)	<p>There would be a direct impact of the rockhead of the barrage on the Estuarine Levels and Sea Edge/Intertidal Zone around Brean where construction would directly affect part of these sub-areas, as well as affecting views from Brean Down. The presence of the barrage is likely to result in a significant impact on landscape features and character in this part of the Estuarine Levels and Sea Edge/Intertidal Zone sub-areas.</p> <p>The predicted reduction in deposition in the Bridgwater Bay mud-zone (from upstream) resulting in loss of salt marsh vegetation along the Steart peninsula and in the Parrett estuary, the accelerated wave erosion of inter-tidal zone along the Steart and Berrow Flats will affect the character of the Sea Edge/Intertidal Zone sub-area.</p> <p>In addition, any potential road link between the A370 and the barrage, power lines associated with the development, and additional on-shore built development would also affect the character of the Levels and Estuarine Levels sub-areas. These changes could potentially be significant.</p>

Potential Impacts on Perceptual Aspects of the Landscape

- 7.9. The potential barrage is located in one of the less tranquil parts of the estuary (see **Figure 6.3**). There will be greater impacts on tranquillity downstream of the barrage than upstream. In addition, any road link between the barrage and the A370 and associated development at the rockhead would result in an impact on tranquillity, particularly around Brean and Brean Down. It is worth bearing in mind that a lesser impact on tranquillity means impact on a greater number of visual receptors, and *vice versa*.

Potential Impacts on Historic Landscape Character

- 7.10. There will also be some potentially significant impacts on historic landscape character – particularly where the rockhead joins the Somerset Coast at Brean Down, where there will be disturbance to the mudflats, sand, sand and shingle, and dunes, and loss of some of the ‘Anciently Enclosed Land pre-17th century’.

Potential Impacts on Seascape Character

Table 7.3: Potential Impacts on Seascape Character

<i>Seascape Unit</i>	<i>Potential Impacts on Seascape Character</i>
Upper Severn Estuary Seascape Unit (Mouth of the Severn River down to the second Severn Crossing)	<p>Direct changes: Since the barrage is not proposed in this seascape unit, there will be no direct change to seascape character. The <i>Upper Severn Estuary</i> seascape unit is too distant to be affected by views of the barrage.</p> <p>Indirect changes: The character of the <i>Upper Severn Estuary Seascape Unit</i> will potentially be significantly changed by reduction in tidal range in the inner Severn estuary by approximately 50% of the existing range, the fall in high water (predicted to fall by 1.5m at Sharpness), the predicted loss of salt marshes upstream of the barrage, the increased clarity of water, and reduction in channel cross section area, depth and width. The loss of the Severn Bore phenomenon is also a key change that is likely to significantly affect the seascape character of the Upper Severn Estuary. In addition, possible built development and recreational facilities associated with increased recreational use of the estuary could also affect the character of the Upper Severn Estuary Seascape Unit. This could particularly affect the more tranquil parts of the shoreline. However, since there is already built development (including industrial development) around the estuary this possible aspect of the development is unlikely to result in a significant adverse impact on the character of the Upper Severn Estuary.</p>
Avonmouth Seascape Unit (Second Severn Crossing to Battery Point)	<p>Direct changes: Since the barrage is not proposed in this seascape unit, there will be no direct change to seascape character. The <i>Avonmouth</i> seascape unit is too distant to be affected by views of the barrage.</p> <p>Indirect changes: The character of the <i>Avonmouth Seascape Unit</i> is likely to be significantly changed by reduction in tidal range in the inner Severn estuary by approximately 50% of the existing range, the fall in high water (predicted to fall by 1m at</p>

	<p>Avonmouth), the predicted loss of salt marshes upstream of the barrage, the increased clarity of water, and reduction in channel cross section area, depth and width. In addition, possible built development and recreational facilities associated with increased recreational use of the estuary could also affect the Avonmouth Seascape Unit. However, since there is already a large amount of built development in this seascape unit, this possible aspect of the development is unlikely to result in a significant adverse impact on the character of the Upper Severn Estuary. Impacts may be positive as well as negative.</p>
<p>Clevedon-Portishead Seascape Unit (Lower Severn Estuary - Battery Point to Clevedon)</p>	<p>Direct changes: Since the barrage is not proposed in this seascape unit, there will be no direct change to seascape character. Although the barrage is likely to be visible from this seascape unit, the fundamental character of cliffed coastline is unlikely to be significantly changed.</p> <p>Indirect changes: The character of the <i>Clevedon-Portishead Seascape Unit</i> is not likely to be significantly changed by the predicted reduction in tidal range and the fall in high water. This is because changes in the tides are less noticeable on this cliffed coastline than in shallow sections of coast with large inter-tidal zones.</p>
<p>Weston Seascape Unit (Lower Severn Estuary - Clevedon to Brean Down)</p>	<p>Direct changes: The character of the <i>Weston Seascape Unit</i> is likely to be significantly changed by the presence of the barrage intruding into views from this seascape unit.</p> <p>Indirect changes: The predicted reduction in tidal range and the increased clarity of water may also affect seascape character. However, the predicted extent of the change, and therefore likely significance of effect on character, is difficult to judge on the basis of information available at this stage.</p> <p>In addition, possible built development and recreational facilities associated with increased recreational use of the shoreline could also affect the low lying landscape of the Weston Seascape Unit. This could particularly affect the more tranquil parts of the shoreline e.g. Woodspring Bay.</p>
<p>Stear/Berrow Seascape Unit (Bridgwater Bay - Brean Down to Hinkley Point)</p>	<p>Direct changes: The character of the <i>Stear-Berrow Seascape Unit</i> is likely to be significantly changed by the presence of the proposed barrage in this seascape unit. The barrage would particularly affect the naturalistic character of the shoreline and the settings of Steep Holm and Flat Holm which are key features of the seascape unit.</p>

	<p>Indirect changes:</p> <p>The character of the <i>Stear/Berrow Seascape Unit</i> is likely to be significantly changed by the predicted reduction in high water levels (which will be emphasised by the flat nature of the coastline in this location), and the predicted erosion of the Parrett delta (and consequent loss of salt marsh vegetation along the Steart peninsula and in the Parrett estuary).</p> <p>In addition, power lines associated with the barrage, a possible road link with the A370 and possible built development and recreational facilities associated with increased recreational use of the shoreline could also significantly affect this tranquil seascape unit.</p>
<p>Bridgwater Bay Seascape Unit (Bridgwater Bay - Hinkley Point to Exmoor)</p>	<p>Direct changes:</p> <p>Since the barrage is not proposed in this seascape unit, there will be no direct change to seascape character. Although the barrage is likely to be visible from this seascape unit, the fundamental character of low, eroding limestone/mudstone cliffs with a wide inter-tidal platform of ledges and terraces is unlikely to be significantly changed.</p> <p>Indirect changes:</p> <p>Although the <i>Bridgwater Bay Seascape Unit</i> is likely to be affected by the predicted reduction in high water levels, and the predicted erosion of the Parrett delta (and as a result a possible threat to the cliffs at Hinkley Point nuclear power station), the predicted extent of the change, and therefore likely significance of effect on character, is difficult to judge on the basis of information available at this stage. Changes to seascape character are unlikely to be significant.</p>
<p>Exmoor Seascape Unit (Exmoor Heritage Coast)</p>	<p>Direct changes:</p> <p>Since the barrage is not proposed in this seascape unit, there will be no direct change to seascape character. The Exmoor Coast is too distant to be affected by views of the barrage.</p> <p>Indirect changes:</p> <p>The character of the <i>Exmoor Seascape Unit</i> is not likely to be significantly changed by the predicted fall in high water downstream of the barrage. This is because changes in the tides are less noticeable on this cliffed coastline than in shallow sections of coast with large inter-tidal zones.</p>

Potential Impacts on Designated Landscapes

Table 7.4: Potential Impacts on Landscape Designations

<i>Nationally Designated Landscapes within the Study Area (excluding Wales)</i>	<i>Potential Impact on Designated Area</i>
National Parks	
Exmoor National Park (2004)	Although the barrage will theoretically be visible from parts of Exmoor National Park some 30km away, in reality the barrage will not be perceptible at this distance and there will be no impact on this landscape, or the reasons for which it was designated.
AONBs	
Blackdown Hills AONB	Although the barrage will theoretically be visible from a small part of the Blackdown Hills AONB some 45km away, in reality the barrage will not be perceptible at this distance and there will be no impact on this landscape, or the reasons for which it was designated.
Cotswolds AONB	Although the barrage will theoretically be visible from a small part of the Cotswolds AONB some 45km away, in reality the barrage will not be perceptible at this distance and there will be no impact on this landscape, or the reasons for which it was designated.
Mendip Hills AONB	<p>Although the barrage will theoretically be visible from a small part of the Mendip Hills AONB from as close as 3.5km away, views from the Mendip Hills are focussed north and south rather than westwards. The only part of the AONB that the barrage will be visible from is the extreme west end of Bleadon Hill where the extensive development at Weston-Super-Mare is already visible in the view (including night time lighting). The presence of the barrage is therefore not expected to lead to a potentially significant impact on the AONB or the reasons for which it was designated (i.e. its karst scenery, scenic qualities, qualities of the views from the edge of the Mendip Plateau, qualities of openness and remoteness and visual richness of the semi-natural vegetation).</p> <p>However, if a road is proposed over the barrage, the link road to the A370 and lighting could intrude into night time views from the Mendip Hills, resulting in potential adverse impacts on the views from the edge of the hills.</p>
Quantock Hills AONB	Although the barrage will be visible from some of the north-eastern slopes of the AONB, it will be located over 20km away and will be a minor element of, or barely noticeable in, the view during the day. The presence of

	<p>the barrage is therefore not expected to result in a significant impact on the AONB or the reasons for which it was designated (i.e. its dramatic ridge landform spectacular panoramic views, sudden and surprising vistas and juxtaposition of the different landscape types). However, if a road is proposed over the barrage, the link road to the A370 and lighting could intrude into night time views from the Quantock Hills, resulting in potential adverse impacts on the spectacular panoramic views for which it is designation.</p>
Wye Valley AONB	<p>Although the barrage will theoretically be visible from a small part of the English part of the Wye Valley AONB, the barrage would be almost 50km away and would not be perceptible at this distance. There will be no impact on this landscape, or the reasons for which it was designated.</p>
<i>Heritage Coasts</i>	
Exmoor Heritage Coast	<p>Although the barrage will theoretically be visible from parts of Exmoor Heritage Coast some 30km away, in reality the barrage will not be perceptible at this distance and there will be no impact on this landscape, or the reasons for which it was designated.</p>

7.11. The table overleaf assesses potential impacts on Parks and Gardens of Special Historic Interest and Scheduled Ancient Monuments.

Table 7.5: Potential Impacts on Landscape Interest of Cultural Heritage Designations

<i>Cultural Heritage Designation</i>	<i>Potential Impact on Designated Feature</i>
<i>Historic Parks and Gardens</i>	
Grove Park, Weston-Super-Mare	Grade II listed Although this park lies within the ZTV of the proposed barrage, there will be no direct impacts on the park and built development in Weston Super Mare will limit views of the barrage from this park. The barrage is unlikely to affect the character of this historic park, or the reasons for which it was designated.
<i>Scheduled Ancient Monuments</i>	
Multi-period site on Brean Down	Monument ref. 22841 Although this SAM lies adjacent to the proposed barrage and within the ZTV, the visible earthworks will not be directly affected, and they will continue to contribute to landscape character and sense of time depth of the landscape. [NB There may be an impact on the setting of this SAM – this would form part of the cultural heritage assessment]
Worlebury Camp	Monument ref. 13811 Although this SAM lies within the ZTV, the visible earthworks will not be directly affected, and they will continue to contribute to landscape character and sense of time depth of the landscape.
Bell Barrow 650m south-west of uphill farm	Monument ref. 22835 Although this SAM lies within the ZTV, the visible earthwork will not be directly affected, and it will continue to contribute to landscape character and sense of time depth of the landscape.
Two sets of two Palmerstonian gun batteries on Steep Holm	Monument ref. NS1 The gun batteries are located on the opposite side of the island to the potential barrage. It is therefore unlikely that the batteries will be directly affected, and they will continue to contribute to historic character of the island. [NB There may be an impact on the settings of these SAMs – this would form part of the cultural heritage assessment]
Churchyard Cross at St John's Church, Weston-Super-Mare	Monument ref: NS12 Although this SAM lies within the ZTV, the cross will not be directly affected, and it will continue to contribute to the historic character of the churchyard.

POTENTIAL VISUAL IMPACTS

7.12. This section presents the key potential visual impacts of the proposed development during construction and operation of a barrage in this location (including direct and indirect impacts).

Potential Impacts on Key Views

7.13. The results are presented in **Table 7.6** below:

Table 7.6 Potential Impacts on Key Views

<i>Viewpoint</i>	<i>Predicted changes to the view</i>	<i>Likely significance</i>
1. Sharpness Docks	<p>Construction: Construction works will not be visible from this viewpoint.</p> <p>Operation: Although the barrage itself will not be visible from this location, the predicted reduction in tidal range by approximately 50% of the existing range, the fall in high water (predicted to fall by 1.5m at Sharpness), the predicted loss of salt marshes, the increased clarity of water, and reduction in channel cross section area, depth and width will result in changes to this view. Although it is possible to determine that there is likely to be a change in the view, it is difficult to predict whether this change will be positive or negative. For example, the reduction in exposed mudflats and improvement in water clarity may be seen as positive by some, negative by others.</p>	Since this viewpoint is considered to have a moderate sensitivity to change (see Table 6.7), effects on this viewpoint are likely to be significant.
2. Old Passage	<p>Construction: Construction works will not be visible from this viewpoint.</p> <p>Operation: Although the barrage itself will not be visible from this</p>	Since this viewpoint is considered to have a low sensitivity to change, effects on this viewpoint are not likely to be significant.

	<p>location, the predicted reduction in tidal range by approximately 50% of the existing range, the fall in high water, the predicted loss of salt marshes, the increased clarity of water, and reduction in channel cross section area, depth and width will result in changes to this view. Although it is possible to determine that there is likely to be a change in the view, it is difficult to predict whether this change will be positive or negative. For example, the reduction in exposed mudflats and improvement in water clarity may be seen as positive by some, negative by others.</p>	
<p>3. Severn Beach/Severn Way</p>	<p>Construction: Construction works will not be visible from this viewpoint.</p> <p>Operation: Although the barrage itself will not be visible from this location, the predicted reduction in tidal range by approximately 50% of the existing range, the fall in high water, the predicted loss of salt marshes, the increased clarity of water, and reduction in channel cross section area, depth and width will result in changes to this view. Although it is possible to determine that there is likely to be a change in the view, it is difficult to predict whether this change will be positive or negative. For example, the reduction in exposed mudflats and improvement in water clarity may be seen as positive by some, negative by others.</p>	<p>Since this viewpoint is considered to have a moderate sensitivity to change, effects on this viewpoint are likely to be significant.</p>
<p>4. Clevedon – from Clevedon Pier</p>	<p>Construction: Construction of the barrage</p>	<p>Since this viewpoint is considered to have a high</p>

	<p>will just be visible from this viewpoint in clear conditions. Construction activity will intrude into this open and unspoilt view.</p> <p>Operation: The permanent barrage will just be visible in this view where it will alter the view of the islands of Steep Holm and Flat Holm. The scale of impact will depend upon whether the proposal includes a road on top of the barrage or not. The proposal with road would be more visible by day and night – any lighting at night would be particularly intrusive in this view.</p> <p>The predicted reduction in tidal range and the fall in high water levels will be less noticeable in this view than further upstream.</p> <p>The increased clarity of water will result in a positive impact on visual amenity.</p>	<p>sensitivity to change, effects on this viewpoint are likely to be significant, particularly in the case of a barrage proposal that includes a road and road lighting.</p>
<p>5. Weston Super Mare – south of the Grand Pier</p>	<p>Construction: Construction of the barrage will be clearly visible from this well visited viewpoint where it will intrude into this high quality view.</p> <p>Operation: The permanent barrage will be clearly visible in this view where it will alter the open character of the view and affect views to the islands of Steep Holm and Flat Holm. The scale of impact will depend upon whether the proposal includes a road on top of the barrage or not. The proposal with road would be more visible by day and night – any lighting at night would be particularly intrusive in this view.</p>	<p>Since this viewpoint is considered to have a high sensitivity to change, effects on this viewpoint are likely to be significant, particularly in the case of a barrage proposal that includes a road and road lighting.</p>

	<p>The predicted reduction in tidal range and the fall in high water levels will also be noticeable in this view – the increased clarity of water will result in a positive impact on visual amenity.</p>	
6. Brean Beach	<p>Construction: Construction of the barrage will be clearly visible from this well visited beach where it will intrude into the view at close range.</p> <p>Operation: The permanent barrage will be clearly visible in this view where it will alter the open character of the view, and intrude into views of Brean Down and the islands of Steep Holm and Flat Holm. The scale of impact during the day will be large whether the proposal includes a road on top of the barrage or not. However, at night the proposal with road and lighting would be more visible than a proposal without road and lighting. The predicted reduction in tidal range and the fall in high water levels will also be noticeable in this view – the increased clarity of water will result in a positive impact on visual amenity.</p>	<p>Since this viewpoint is located extremely close to the barrage site, and is considered to have a moderate sensitivity to change, effects on this viewpoint are likely to be significant.</p>
7. Brean Down	<p>Construction: Construction of the barrage will be clearly visible from this well visited viewpoint where it will intrude into the view at close range.</p> <p>Operation: The permanent barrage (and possible link road to the A370) will be clearly visible in this view where it will alter the</p>	<p>Since this viewpoint is located extremely close to the barrage site, and is considered to have a high sensitivity to change, effects on this viewpoint are likely to be significant.</p>

	<p>open and naturalistic character of the view, and intrude into views of the islands of Steep Holm and Flat Holm.</p> <p>The scale of impact during the day will be large whether the proposal includes a road on top of the barrage or not. However, at night the proposal with road and lighting would be more intrusive than a proposal without road and lighting.</p> <p>The predicted reduction in tidal range and the fall in high water levels will also be noticeable in this view – the increased clarity of water will result in a positive impact on visual amenity.</p>	
8. Brent Knoll	<p>Construction:</p> <p>Construction of the barrage will be visible from this well visited viewpoint where it will intrude into a relatively small part of this rural view and will be seen in the context of existing built development along the coast.</p> <p>Construction activity may be more prominent if road construction is associated with the proposal.</p> <p>Operation:</p> <p>The permanent barrage will just be visible in this view where it will intrude into views of Brean Down and Steep Holm.</p> <p>The scale of impact during both day and night will be greater if the proposal includes a road on top of the barrage (with a link to the A370) than if it does not. The predicted reduction in high water levels, erosion of the Parrett delta (and as a result a possible threat to the cliffs at Hinkley Point nuclear</p>	<p>Since this viewpoint is considered to have a moderate sensitivity to change, it is marginal whether effects on this viewpoint are likely to be significant or not. This may depend on the exact proposal put forward. This viewpoint would require further assessment.</p>

	power station), are unlikely to be noticeable at this distance.	
9. Bleadon Hill in the Mendip Hills AONB	<p>Construction: Construction of the barrage would not be visible from the viewpoint illustrated in this report. However, it is likely to be visible from residents located on the west end of Bleadon Hill where it would be seen in the context of existing built development along the coast. Construction activity would be more prominent if road construction was associated with the proposal.</p> <p>Operation: Although the barrage would not be visible from the viewpoint illustrated in this report, it (and the possible road link to the A370) would be visible from residents located on the west end of Bleadon Hill. The scale of impact during both day and night would be greater if the proposal includes a road on top of the barrage. The predicted reduction in high water levels, erosion of the Parrett delta (and as a result a possible threat to the cliffs at Hinkley Point nuclear power station), are unlikely to be noticeable at this distance.</p>	Effects on this viewpoint are likely to be significant due to the high sensitivity of the viewpoint and the proximity to the site (within 5km).
10. Steart Peninsula	<p>Construction: Construction of the barrage will just be visible from this viewpoint in clear conditions. Although construction activity would intrude into the view, it would be seen in the context of caravan sites and built development along the coast – this would minimise the magnitude of change to</p>	Effects on this viewpoint are likely to be significant, predominantly due to indirect changes in the landscape of the inter-tidal flats viewed from a moderate sensitivity viewpoint.

	<p>the view.</p> <p>Operation: The permanent barrage would just be visible in this view where it would alter the view of Brean Down and Steep Holm. The scale of impact would depend upon whether the proposal includes a road on top of the barrage or not. The proposal with road would be more visible by day and night – any lighting at night would be particularly intrusive in this view.</p> <p>The predicted reduction in high water levels (which will be emphasised by the flat nature of the coastline in this location), and the predicted erosion of the Parrett delta (and consequent loss of salt marsh vegetation along the Steart peninsula and in the Parrett estuary) will possibly result in greater changes to this view than the barrage structure itself.</p>	
11. Quantock Hills AONB	<p>Construction: Construction of the barrage will be almost imperceptible from this viewpoint.</p> <p>Operation: The permanent barrage would just be visible on a clear day. The scale of impact would depend upon whether the proposal includes a road on top of the barrage or not. The proposal with road would be more visible by day and night – any lighting at night would be visible in this view.</p>	<p>Although this viewpoint is considered to have a high sensitivity to change, it is marginal whether effects on this viewpoint are likely to be significant or not and will depend on the exact proposal put forward. This viewpoint would require further assessment.</p>
12. Bratton Ball, Exmoor National Park	<p>Construction: Construction of the barrage will not be visible from this viewpoint.</p>	<p>Despite the high sensitivity of this viewpoint, effects on this viewpoint are not likely to be significant.</p>

	<p>Operation:</p> <p>The permanent barrage will not be perceptible from this viewpoint, neither will the predicted fall in high water downstream of the barrage. This is because changes in the tides are less noticeable on this cliffed coastline than in shallow sections of coast with large inter-tidal zones.</p>	
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CONCLUSIONS

7.14. This section reveals that if a Severn barrage is constructed that some aspects of landscape/ seascape character, national landscape designations and views are potentially significantly affected. Potential significant effects may include:

- Effect of construction and operation of the barrage on the character of the *Somerset Levels and Moors* countryside character area;
 - indirect effects resulting from reduction in deposition in the Bridgwater Bay mud-zone, loss of salt marsh vegetation along the Steart peninsula and in the Parrett estuary, decrease in extent of the Parrett delta, and accelerated wave erosion of inter-tidal zone along the Steart and Berrow Flats on the landscape character of *Somerset Levels and Moors* countryside character area;
 - indirect effects resulting from a potential road link between the A370 and the barrage, power lines associated with the development, and potential additional on-shore built development on the landscape character of part of the *Somerset Levels and Moors* countryside character area;
 - effect of construction, and permanent presence, of the rockhead, transmission lines and potential road link, on landscape type 'LWD' (lowland, unwooded wetland landscape) along the Brean foreshore;
 - effects of indirect changes to water levels upstream of the barrage and potential development associated with greater recreational use of the estuary on the character of Landscape *Type 7 (Drained Riverine Farmland and Grazed Saltmarsh)* and *Type 8 (Littoral Sands and Rock Outcrops)* of the Gloucestershire and Forest of Dean Landscape Assessment;
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- effects of any potential road link between the A370 and the barrage, power lines associated with the development, and additional on-shore built development on the character of *A5 Bleadon Moor* and *C1 Weston Bay Settled Coastal Edge* in the North Somerset Landscape Character Assessment;
 - effects of indirect geomorphological changes upstream of the barrage on the character of *L1: Weston Bay*, *L2: Sand Bay*, and *L3: Woodspring Bay* in the North Somerset Landscape Character Assessment;
 - effects of indirect geomorphological changes upstream of the barrage on the character of Landscape Character *Area 21: Severn Estuary and Shoreline* in the South Gloucestershire Landscape Character Assessment;
 - effects of potential land based development upstream of Avonmouth, as a result of increased recreational use of the estuary, on Landscape Character Areas *19: Oldbury Levels* and *20: Pilning Levels* in the South Gloucestershire Landscape Character Assessment;
 - effect of the construction and operation of the rockhead of the barrage on the *Estuarine Levels* and *Sea Edge/Intertidal Zone* sub-areas in the Sedgemoor District Landscape Assessment;
 - effects of indirect geomorphological changes in the Bridgwater Bay mud-zone and the Parrett estuary on the character of the *Sea Edge/Intertidal Zone* sub-area in the Sedgemoor District Landscape Assessment;
 - effects of any potential road link between the A370 and the barrage, power lines associated with the development, and additional on-shore built development on the *Levels* and *Estuarine Levels* sub-areas in the Sedgemoor District Landscape Assessment;
 - effect of the rockhead on historic landscape character types (mudflats, sand, sand and shingle, and dunes, and Anciently Enclosed Land pre-17th century) identified in the Somerset Historic Landscape Characterisation;
 - indirect effect of reduction in tidal range, loss of salt marshes, increased clarity of water, and reduction in channel cross section area, depth and width on the character of the *Upper Severn Estuary seascape unit*;
 - indirect effect of loss of the Severn Bore phenomenon on the seascape character of the *Upper Severn Estuary seascape unit*;
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- indirect effect of reduction in tidal range, fall in high water and loss of salt marshes, increased clarity of water, and reduction in channel cross section area, depth and width on the character of the *Avonmouth Seascape Unit*;
 - effect of barrage construction and operation on the character of the *Weston Seascape Unit*;
 - indirect effect of predicted reduction in tidal range and the increased clarity of water on the character of the *Weston Seascape Unit*;
 - possible effect of potential built development and recreational facilities associated with increased recreational use of the shoreline on the *Weston Seascape Unit*, particularly on more tranquil parts of the shoreline e.g. Woodspring Bay;
 - effect of barrage construction and operation on the character of the *Stear-Berrow Seascape Unit*;
 - indirect effect of predicted reduction in high water levels and erosion of the Parrett delta (and consequent loss of salt marsh vegetation along the Steart peninsula and in the Parrett estuary) on the character of the *Stear-Berrow Seascape Unit*;
 - possible effect of power lines, a possible road link with the A370 and possible built development and recreational facilities associated with increased recreational use of the shoreline on the tranquil *Stear-Berrow Seascape Unit*;
 - possible effect of night time lighting (on the barrage and any associated link road) on views from the Mendip Hills AONB;
 - possible effect of night time lighting (on the barrage and any associated link road) on views from the Quantock Hills AONB (including Viewpoint 11);
 - indirect effects of predicted reduction in tidal range, fall in high water, loss of salt marshes, increased clarity of water, and reduction in channel cross section area, depth and width on viewpoint 1, Sharpness Docks, Viewpoint 2: Old Passage, and Viewpoint 3: Severn Beach;
 - effect of a barrage with lit road on Viewpoint 4: Clevedon;
 - effect of construction and operation of the barrage on Viewpoint 5: Weston-Super-Mare;
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- effect of construction and operation of the barrage, plus associated power lines and possible road link to the A370 on Viewpoint 6: Brean Beach and Viewpoint 7: Brean Down;
 - indirect effect of predicted reduction in tidal range and the fall in high water levels on Viewpoint 5: Weston-Super-Mare, Viewpoint 6: Brean Beach and Viewpoint 7: Brean Down;
 - possible effect of a barrage with lit road proposal on Viewpoint 8: Brent Knoll.
 - effect of construction and operation of the barrage on Viewpoint 9: Bleadon Hill;
 - effect of a barrage with lit road proposal on Viewpoint 10: Steart Peninsula.
 - indirect effect of high water levels (which will be emphasised by the flat nature of the coastline in this location), and the predicted erosion of the Parrett delta (and consequent loss of salt marsh vegetation along the Steart peninsula and in the Parrett estuary) on Viewpoint 10: Steart Peninsula.
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8. MITIGATION/LANDSCAPE ENHANCEMENT

8.1. Siting, layout and design offer scope for integrating onshore and offshore developments into the landscape/seascape, and to prevent, reduce and mitigate landscape/seascape visual effects. The identification of potential key issues in Chapter 7 leads us to advise on potential measures that should, in the interest of Natural England, be considered by the developer.

Mitigation

8.2. The purpose of mitigation is to avoid, reduce and where possible remedy or offset, significant negative (adverse) effects on the environment arising from the proposed development (LI/IEMA 2002). Good project design is a more effective, and often cheaper, way to minimise negative and optimise positive landscape/visual impacts than post-hoc "landscaping".

8.3. The likely significant effects are listed in Chapter 7 above. Mitigation could include:

- Minimising the footprint of construction compounds/areas at the rockhead to minimise the impact of construction on the *Somerset Levels and Moors* countryside character area and *Stear/Berrow Seascape Unit*;
 - Avoiding a harsh engineered appearance to the rockhead at Brean to minimise the impact of the barrage structure on the rural character of the *Somerset Levels and Moors* countryside character area and Brean foreshore;
 - Avoiding significant engineered structures (associated with increased recreational use of the estuary) along the upper estuary shoreline in landscape types 7: Drained Riverine Farmland and Grazed Saltmarsh and 8: Littoral Sands and Rock Outcrops in South Gloucestershire;
 - Minimising loss of rhynes and ditches, pollarded willows and grassland associated with the barrage and any associated development, and maintaining the rural character and sense of isolation as far as possible (particularly in area A5: Bleadon Moor, in North Somerset);
 - Minimising loss or fragmentation of pasture, rhynes, hedgerows, unimproved grassland, wetland and woodland habitats associated with any road proposal, power lines or on-shore built development in area C1 Weston Bay Settled Coastal Edge, in North Somerset;
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- Ensuring tall elements such as lighting and power lines do not become intrusive in views inland from the Intertidal Bays (character areas L1: Weston Bay, L2: Sand Bay, and L3: Woodspring Bay in the North Somerset Landscape Assessment);
 - Screening new low level development where possible, particularly in the Estuarine Levels landscape sub-type in Sedgemoor District, and taking account of views from high ground (e.g. Brean Down) when designing the development;
 - Maintaining a relatively undeveloped coastline when viewed from the beach in the Sea Edge and Intertidal Zone sub-type in Sedgemoor District, and taking account of views (especially from Brean Down, Steart bird hides, the beaches and the Parrett Trail) when designing the different aspects of the development;
 - Minimising the height of the barrage to minimise visual impact;
 - Minimising loss of mudflats, sand, shingle, and dunes, and pre-17th century anciently enclosed land at the Brean rockhead;
 - Avoiding or minimising lighting at night – particularly if a road is proposed over the barrage with a link to the A370 – to minimise effect of night time lighting on views from the Mendip Hills AONB, Quantock Hills AONB and key viewpoints such as the seafronts at Clevedon and Weston Super Mare, as well as minimising impact on seascape character;
 - Consideration of the appearance of the barrage and possible link road from key recreational viewpoints, including Weston-Super-Mare, Brean Beach, Brean Down, Bleadon Hill and Brent Knoll;
 - Undergrounding associated power lines to minimise visual impact of the proposal and its impact on the rural landscape;
 - Ensuring that any new recreational facilities/land based built development associated with increased recreational use of the estuary and shoreline is sensitively sited to avoid the most tranquil areas of shoreline, and takes account of guidance provided in relevant landscape assessments in terms of siting and design;
 - Consideration of the barrage design in terms of its fit with landscape and seascape character - possible inclusion of bays and promontories in the barrage design to provide landscape and visual interest;
 - If a road is proposed on top, an opening bridge would reduce necessary height of road bridge over shipping locks and reduced visual impact.
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Landscape Enhancement

- 8.4. It is good practice to consider landscape enhancement in addition to landscape mitigation. Landscape enhancement explores opportunities for the development to contribute positively to the landscape and may include enhancing landscape quality and character through meeting landscape management objectives for the area, restoring historic landscapes, restoring habitats or features, or reclaiming derelict land.
- 8.5. Landscape/seascape enhancement could include:
- management of river corridors including grazing of commons and management of grassland & wetlands in Severn and Avon Vales CCA;
 - conservation of hedgerows and hedgerow trees in Severn and Avon Vales and the Bristol, Avon Valleys & Ridges CCAs;
 - woodland expansion in the Bristol & Avon community forest in Bristol, Avon Valleys & Ridges CCA;
 - management of pastures and calcareous grassland in Bristol, Avon Valleys & Ridges CCA;
 - conservation of, and provision of interpretation for, historic features and reservoirs in Bristol, Avon Valleys & Ridges CCA;
 - management of water levels (which should integrate landscape, nature conservation, urban drainage and agricultural objectives) and wetland restoration in the Somerset Levels and Moors CCA;
 - conservation of orchards on the fringes of the Mid Somerset Hills (CCA 143);
 - management of hedgerows, trees, copses and woods, and re-planting of traditional orchards in CCA 146 Vale of Taunton & Quantock Fringes;
 - restoration of derelict 'Pills' and Wharves in landscape types 7: Drained Riverine Farmland and Grazed Saltmarsh and 8: Littoral Sands and Rock Outcrops in South Gloucestershire;
 - restoration of scrubbed over ditches back to open water, planting and management of distinctive pollarded willows, grazing management of archaeological sites, managing water levels to maintain high water tables to preserve organic cultural and palaeoenvironmental evidence, and providing public access while retaining a sense of remoteness in landscape type A: The Moors in Sedgemoor District;
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- conservation and management of remnant pasture, rhyes, hedgerows, ecologically rich wetland and woodland habitats, creation of unimproved grassland, wetland and woodland habitats for linking existing habitats together and for screening, restoration of scrubbed over ditches back to open water, and retaining and enhancing public access provision in landscape type C: Settled Coastal Edge (character area C1 Weston Bay Settled Coastal Edge).
 - conservation of historic seaside structures such as piers, stone sea walls, seats and shelters, in landscape type L: Intertidal Bays of the Sedgemoor District assessment (areas L1: Weston Bay, L2: Sand Bay, and L3: Woodspring Bay);
 - maintenance of traditional patterns of summer grazing and pattern and systems of land drainage, pollarding of willows, maintenance and re-planting of orchards, hedge laying, maintenance of diversity in woodland and individual tree species, an integrated approach to wetland management (which protects nature conservation interests and vulnerable archaeological deposits), and maintenance of dew ponds in the Estuarine Levels sub-type in Sedgemoor District;
 - taking the opportunity to screen caravan sites which are currently very visually dominant from Brean Down in the Sea Edge and Intertidal Zone sub-type in Sedgemoor District.
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9. RECOMMENDATIONS FOR FURTHER WORK

9.1. The results of this study should enable Natural England to focus on the key issues in relation to a proposal of this type, and to focus further work in the areas required. There are some areas where additional work may help Natural England in understanding the potential impacts of such as proposal. This might include:

- Public consultation on perceptions/values of the existing seascape/estuarine character. What is the general opinion about the existing mud flats in the Severn Estuary and tributaries (e.g. the Avon through Bristol)? Are they seen in a positive or negative light? Understanding public perceptions of the baseline landscape and seascape may help inform assessment of the likely effects.
- Additional field work to consider potential viewpoints from Mendip Hills and the area around Hinkley Point Power Station, using the more detailed ZTVs produced following the field visit.
- Further work on type and extent of flooding expected as a result of climate change in this area to provide a more accurate baseline upon which to predict likely changes.
- Updating the assessment (particular prediction of the future baseline) in the light of the new Shoreline Management Plans when they are produced (currently under review).
- Investigation of typical visibility and meteorological conditions around the year in the Severn Estuary/Bristol Channel to determine typical extents of visibility (during the 2 days of field work that formed part of this study the weather was sunny, but hazy).
- If potential impact on historic landscape and cultural heritage features is deemed to be important to Natural England, an assessment of potential impacts on historic landscapes and cultural heritage resources should be undertaken by a trained archaeologist.
- Possible assessment of the impact on historic seascapes using EH's new England's Historic Seascapes method (currently being piloted in 4 areas around England's coast). This may be of interest to English Heritage rather than Natural England.

9.2. In the event that a proposal is brought forward the following areas should be covered by a developer as part of the EIA:

- Assessment of lighting impacts on the Mendip Hills AONB, Quantock Hills AONB and local viewpoints;
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- Potential impacts on water-based viewpoints and viewers and viewpoints and viewers on islands (not covered as part of this assessment);
- Assessment of the effect of construction and operation of the barrage on landscape and seascape character;
- Assessment of indirect effects on landscape and seascape resulting from geomorphological changes to the Estuary and its tributaries (the Parrett, Axe, Yeo, Avon and Wye);
- A detailed assessment of seascape character and an assessment of the direct and indirect effect of the barrage on seascape character;
- Assessment of the loss of the Severn Bore phenomenon and its implications from natural, cultural and recreational points of view;
- Consideration of the sourcing of construction materials and impacts related to this;
- Consideration of the effect of any associated development such as substations, transmission lines, recreational facilities, road schemes.

9.3. It might also be useful to address public perception of such a proposal on seascape and landscape character.

APPENDIX 1: GLOSSARY

GLOSSARY OF TERMS AND ABBREVIATIONS

Term	Definition
AOD	Above Ordnance Datum (sea level).
AONB	Area of Outstanding Natural Beauty
Ancient woodland	Woods that are believed to have been continuous woodland cover since at least 1600 AD.
Assart	The informal enclosure of private farmland by encroachment into woodland or heath.
Assessment (landscape)	An umbrella term for description, classification and analysis of landscape.*
CCA	Countryside Character Area
Change (landscape or visual)	Changes occur to a particular element of the environment and they can be described factually by the nature and degree of change. Changes can also be referred to as 'impacts' and therefore reference may be made to impacts within the context of guidelines and legislation.
Characteristic	A distinctive element of the landscape that contributes to landscape character for instance a particular hedgerow pattern or sense of tranquillity.
Direct effect	A direct (or primary) effect may be defined as an effect directly attributable to a defined element or characteristic of the proposed development.*
Effect (landscape or visual)	These occur as a broad culmination of one or more changes, incorporating professional judgement to extrapolate and/or generalise on the nature of these.
EIA	Environmental Impact Assessment
Element	A component part of the landscape or visual composition.
Enclosure	The placing in private hands of land to which there was previously common rights.
Environmental Impact Assessment	The evaluation of significant effects on the environment of particular development proposals.

Term	Definition
GIS	Geographic Information System.
Guidelines	Guidelines outline the actions required to ensure that distinctive character is maintained.
HLC	Historic landscape characterisation – interactive GIS-based descriptions of the historic dimension - the 'time-depth' - that characterises the rural landscape.
Indirect effect	An indirect (or secondary) effect is an effect that is not a direct result of the proposed development but is often produced away from the site of the development – these may be delayed in time or located some distance from the source of effect, for example alterations to the drainage regime in the vicinity of a site. Indirect effects may also result from associated development, including upgrading of transport infrastructure, associated mineral extraction and new or improved off-site utilities such as an electricity substation or transmission lines.*
Landscape	<p>Human perception of the land conditioned by knowledge and identity with a place.*</p> <p>A zone or area as perceived by local people or visitors, whose visual features and character are the result of the action of natural and/or cultural (that is, human) factors.**</p>
Landscape character	The distinct, recognisable and consistent pattern of elements that occur in a particular landscape and how these are perceived. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement.
Landscape character areas	Single unique areas that are the discrete geographical area of a particular landscape type.
Landscape character types	Distinct types of landscape that are relatively homogenous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but share broadly similar combinations of geology, topography, drainage patterns, vegetation, historic land use and settlement pattern.

Term	Definition
Landscape feature	A prominent eye-catching element, for example, wooded hilltop or church spire.*
Landscape resource	The combination of elements that contribute to landscape context, character and value.*
LCA	Landscape character assessment.
Magnitude	A combination of the scale, extent and duration of any change (or impact).
Mitigation	Measures, including any process, activity or design to avoid, reduce, remedy or compensate for adverse landscape and visual effects of a development project.
Panorama	An image, covering a field of view wider than a single frame. Panoramic photographs may be produced using a special panoramic camera or put together from several photographic frames.
Photomontage	A visualisation based on the superimposition of an image onto a photograph for the purpose of creating a realistic representation of proposed or potential changes to a view.
Receptor	<p>This term is used in landscape assessments to mean an element, or assemblage of elements, that will be directly or indirectly affected by the proposed development.</p> <p>This term is used in visual assessments to mean a viewpoint, or people, which will be affected by views of the proposed development.</p>
SAM	Scheduled Ancient Monument
Seascape	Human perception of visual areas of sea surface, coastline, and hinterland.
Sensitivity	A judgement of how sensitive or vulnerable a landscape component is to change.
Skyline	The outline of a range of hills, ridge or group of buildings seen against the sky.
SU	Seascape unit

Term	Definition
Visual Amenity	The value of a particular area or view in terms of what is seen.*
Visualisation	Computer simulation, photomontage or other technique to illustrate the appearance of a development. *
Zone of Theoretical Visibility (ZTV)	This represents the area over which a development can theoretically be seen, based on digital terrain data. This information is usually presented on a map base (also known as the zone of visual influence, or ZVI).

** As defined by the Landscape Institute and Institute of Environmental Management and Assessment (2002)*

*** As defined by the European Landscape Convention*