Planning for Renewable Energy Developments

Interim Planning Document

East Riding of Yorkshire Council

Volume One **April 2009**

EAST RIDING OF YORKSHIRE COUNCIL

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Appendices

1 Introduction

1.1.1 This Interim Planning Document (IPD) sets out East Riding of Yorkshire Council's approach to planning for renewable energy. It aims to promote the development of renewable energy technology, in those locations in the East Riding of Yorkshire which are identified as having the capacity to accommodate such development, and to set out how the East Riding of Yorkshire Council will assess planning applications for renewable energy proposals. It relates to grid-connected, on-shore renewable energy developments only, such as wind farms and biomass energy plants.

What is Renewable Energy?

1.1.2 Planning Policy Statement 22: Renewable Energy (PPS 22) sets out the Government's national policies on planning for renewable energy. Renewable energy is defined in PPS 22: as "*those energy flows that occur naturally and repeatedly in the environment – from the wind, the fall of water, the movement of the oceans, from the sun and also from biomass*[1]".

The benefits of Renewable Energy

1.1.3 Increasing the level at which we harness renewable energy resources is vital in ensuring that as a country we can deliver the Government's commitments to tackling climate change, and to increasing the proportion of the energy we consume which is generated from renewable sources. The Government's energy strategy is also concerned with security of supply and to avoid over-reliance on imported energy, and it sees renewable energy as making a significant contribution to UK-generated and secured supply. Positive planning for renewable energy developments can contribute towards all four elements of the Government's strategy for sustainable development. PPS 22 sets these elements out as follows:

- *Social progress which recognises the needs of everyone* – by contributing to the nation's energy needs, ensuring all homes are adequately and affordably heated; and providing new sources of energy in remote areas;
- *Effective protection of the environment* – by reducing greenhouse gas emissions we can reduce the potential impacts of climate change;

[1] Biomass is the biodegradable fraction of products, waste and residues from agriculture (including plant and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste.

- *Prudent use of natural resources* – by reducing the nation's reliance on ever diminishing supplies of fossil fuels; and,
- *Maintenance of high and stable levels of economic growth and employment* – through the creation of jobs in the renewable energy sector and in the development of new technologies. In rural areas such as the East Riding of Yorkshire, renewable energy projects have the potential to play an increasingly important role in the diversification of rural economies.

1.1.4 The development of a renewable energy supply will lead to a more stable fuel supply for the nation and the region. The Hull Competitive Assessment[2] stated that the Humber Sub Region should develop renewable energy sectors and has the potential to be internationally recognised in the renewable energy sector, leading to multiple economic and social benefits.

1.2 Purpose and coverage of the IPD

1.2.1 The IPD provides advice for all those involved in the preparation, submission and determination of planning applications for grid-installed, on-shore renewable energy developments. It sets out East Riding of Yorkshire Council's locational considerations on the siting of wind farms and biomass plants in particular. It explains how applications for renewable energy developments will be assessed, and the information that will be required from applicants to undertake this assessment.

1.2.2 A further, and very important purpose of this IPD, is to assist East Riding of Yorkshire Council to meet its local targets for the production of energy from renewable sources for 2010, 2021 and beyond; and collectively with other local authorities in Yorkshire and the Humber, to assist in meeting regional and national targets for renewable energy production.

1.2.3 In preparing the IPD, the East Riding of Yorkshire Council has assessed the viability of a number of renewable energy technologies, and their potential to contribute to meeting renewable energy generation targets. This assessment has taken into account issues such as the potential impacts on the local landscape and visual amenity, biodiversity and nature conservation, and impacts on local communities, amongst other planning considerations.

1.2.4 The IPD classifies landscape areas within the East Riding of Yorkshire according to their sensitivity to renewable energy developments, and identifies areas of low, high and medium sensitivity to development. The sensitivity of a particular area to renewables development will be taken into account in assessing applications for planning permission.

[2]Hull Competitiveness Assessment, Report by IBM, 2004

1.2.5 The majority of the renewable energy sources considered by this guidance are also appropriate for development and use at the domestic scale. However the use of such technologies at the domestic scale, within urban environments in particular, creates a number of additional and specific planning issues that are beyond the scope of this guidance. Furthermore, energy generated by domestic developments does not count towards meeting local, regional or national targets, unless these developments are connected to the national grid. Therefore, energy developments that are not connected to the national grid are not covered by this guidance, though applicants may find it of interest. The Government has signalled its intention to make grid connection easier, particularly for small scale energy generators. In future individual households may be able to contribute surplus energy they generate (whether by renewable energy or otherwise). The Council will monitor such developments.

1.2.6 With respect to wind energy, this IPD applies to all schemes of less than 50MW. Schemes above 50MW are determined by the Department for Business, Enterprise and Regulatory Reform (BERR) and are not covered by this guidance. In the medium term they will be determined by the proposed independent Infrastructure Planning Commission (IPC) instead of Government ministers.

1.2.7 Off shore renewable energy developments are not covered by the land use planning system and are therefore also not covered by this guidance. They also come under the DBERR/IPC consent process. However, where infrastructure associated with an off-shore development is proposed on land, this guidance will apply. When considering the cumulative impact of onshore energy development near the coast, offshore developments will also be taken into account.

1.3 Renewable Energy Targets for Yorkshire and the Humber, the Humber and East Riding

1.3.1 The Government has set a target to generate 10% of the UK's electricity from renewable energy sources by 2010. The Energy White Paper (2003) sets out the Government's aspiration to double that figure to 20% by 2020, and indicates that still more renewable energy will be required beyond 2020, with continuing growth of renewables in the long term. In addition, the Government has signed up to the legally binding Kyoto Protocol, which requires a reduction of greenhouse gas emissions by 12.5% of 1990 levels by 2008-2012 and a reduction of CO^2 emissions by 20% of 1990 levels by 2010.

1.3.2 Regional and local authorities are required to contribute to the delivery of these national targets, and to establish regional targets for renewable

energy generation. The minimum targets for renewable energy generation for the Yorkshire and the Humber Region are set out in policy ENV5 of the Yorkshire and Humber Regional Plan (Regional Spatial Strategy, May 2008). The targets are derived from an assessment of the region's renewable energy resource potential, taking into account any regional environmental, economic and social impacts - both positive and negative, arising from the exploitation of that potential[3].

1.3.3 The targets do not include non grid connected developments although it is acknowledged that they will play an important role in reducing climate change.

1.3.4 The regional target is to achieve an installed renewable energy generation capacity of at least 708MW by 2010 and 1862MW by 2021 (including provision offshore) as stated in the Yorkshire and Humber Plan (RSS). Sub-regional targets and a breakdown of the sub-regional targets to individual Local Authority areas have also been included in the RSS (2008)[4]. The East Riding of Yorkshire is set a target of 41 MW by 2010, and a target for 2021 of 148 MW for installed grid-connected renewable energy.

1.3.5 A separate target is also specified for off-shore renewable energy production in the RSS, but this is not dealt with in this guidance as meeting the off-shore target is not the responsibility of the Council.

1.3.6 The following tables provide a summary of the renewable energy potential estimated for the East Riding of Yorkshire, the sub-region of the Humber and the wider region as a whole. These figures were set out in a Sub Regional Renewable Energy Assessment and Targets Study (SREAT)[5] carried out to inform the RSS in 2004. The discussion of the potential of each renewable energy technology throughout this IPD is based on the findings in this study. These tables should be used as a guide to the capacity that is expected rather than specific targets as technologies will develop at different rates and this may lead to changes in the potential for some technologies.

Extract from Table 6 (SREAT 2004): Refined Renewable Energy Potential for 2010 (excluding off-shore wind)

Sub-region/ LA	Wind	Biomass	Co-firing	Hydro	PV	Total
East Riding	40				0.69	40.7
Humber	108	14			1.8	124
Regional	341	14	100	4	9	468

[3] This assessment is set out in: Development of a Renewable Energy Assessment and Targets for Yorkshire and the Humber – Final Report to the Government Office Yorkshire and the Humber (July 2002)
[4] See Table 10.2 of the Yorkshire and Humber Plan, May 2008
[5] Planning for Renewable Energy Targets in Yorkshire and Humber, report by Future Energy Solutions for the Government Office for Yorkshire and the Humber and the Yorkshire and Humber Assembly, December 2004.

Total						

Extract from Table 7 (SREAT 2004): Refined Renewable Energy Potential for 2021 (excluding off-shore wind, biomass co-firing and marine)

Sub-Region/ LA	Wind	Biomass	Co-firing	Hydro	PV	Total
East Riding	120	4.1	13.3		10.8	148.2
Humber	273	11.3	36.6	0	28.8	350
Regional Total	725	65	210	4	138	1142

1.3.7 The quantity and delivery timetables for these targets are ambitious, especially when considered against the traditional development programmes for conventional energy infrastructure. These targets should therefore be viewed as important milestones in an on-going and fundamental shift towards ever increasing renewable energy generation. This guidance therefore adopts a long-term view as to the energy needs and infrastructure development of the East Riding of Yorkshire, the Humber and the wider region as a whole.

1.4 Status of the IPD

1.4.1 Planning authorities are encouraged to produce guidance to expand or provide further detail on policies contained within Development Plan documents. This can be prepared in the form of Supplementary Planning Documents (which replace Supplementary Planning Guidance prepared prior to the Planning and Compulsory Purchase Act 2004). However, at present Planning Policy Statement 12 Local Spatial Planning does not allow for guidance to be referred to a Supplementary Planning Document unless it relates to policy in a Development Plan Document (DPD). As East Riding of Yorkshire Council does not yet have any DPD's the document cannot be an SPD and is therefore called an Interim Planning Document (IPD).

1.4.2 This IPD will provide further guidance on the renewable energy policy Env5 in the RSS and the relevant saved Local Plan policies[6]. The IPD will be kept under review to ensure it remains in conformity with the emerging East Riding Core Strategy and other Development Plan Documents within the Council's Local Development Framework.

1.4.3 This IPD is not intended to create new planning policy or allocations outside the Local Development Framework, but rather to summarise and clarify matters. It is not a Local Development Framework document. It is intended to provide clarity on the issues that may need to be considered in applications for renewable energy developments in the period in

[6] Local Plan policies are listed in paragraph 2.4.

advance of the LDF. Paragraph 10.31 in RSS encourages local planning authorities to prepare supplementary locational and environmental criteria to be used in assessing renewable energy developments, and that is the primary purpose of this IPD.

1.4.4 This IPD has been prepared in accordance with the procedures in the Town and Country Planning (Local Development) (England) Regulations 2004 and Planning Policy Statement 12 Local Spatial Planning. The preparation of this document has been informed by a Sustainability Appraisal (see paragraphs 1.5 and 2.2 below) undertaken in accordance with the SEA Regulations, 2004 and a Habitat Regulations Assessment, prepared in accordance with the Habitat Regulations 2007. These documents are available to view alongside the IPD.

1.4.5 Whilst this guidance does not form part of the statutory Development Plan, it has been subject to rigorous procedures of community involvement and is accompanied by a sustainability appraisal. As such, it be an important material consideration in the decision making process for planning applications when adopted.

1.5 Sustainability Appraisal

1.5.1 Under the Planning and Compulsory Purchase Act 2004 guidance that the Council wishes to give weight to should undergo Sustainability Appraisal (SA), an on-going scrutiny of the potential social, environmental and economic effects of implementing the guidance. Early identification of these effects ensures that they can be taken into account in revising the document, in order to ensure that the guidance fully addresses the multiple objectives of sustainable development. An SA has been prepared to accompany this document.

1.6 Consultation on the IPD

1.6.1 The Draft Interim Planning Document was subject to a 6-week period of public consultation. Any comments or responses received during this period were considered and changes made to the draft document as the Council considered appropriate. Following revisions to the document, the document was adopted.

1.6.2 The Council's Statement of Community Involvement (SCI) was adopted in March 2007. The consultation on this IPD was undertaken in accordance with the SCI.

1.7 Monitoring and Review

1.7.1 The renewable energy policy framework is constantly evolving, and the Government is currently revising its policy framework on energy. In response, renewable energy generation and consumption targets at the regional, sub-regional and local level are likely to shift upwards over time. As a result, revisions to this guidance may be required in the future. The Government also keeps state subsidy, technology development grants or financial inducements under review, and these may affect the scale, type and rate of development of renewable energy.

1.7.2 East Riding of Yorkshire Council will keep this document under review and update and republish it as necessary, in order to address significant changes in national or regional policy and/or targets for renewable energy production/consumption.

1.7.3 Advances in renewable energy technology may mean that in the future it will be possible to reduce or mitigate some of the potential effects of the current renewable energy technology. This may also lead to future reviews of East Riding of Yorkshire Council's approach in assessing applications, and subsequent amendments to the contents of this IPD.

2 The Policy Framework

2.1.1 This section sets out a summary of the national, regional and local policy context for considering renewable energy developments. Further detail is provided in Appendix One.

2.2 National Policy

2.2.1 The Government's current energy policy is set out in the **Energy White Paper of May 2007- 'Meeting the Energy Challenge',** building on previous policy including the **2003 Energy White Paper** and the **Energy Review Report 2006**. This adopts a triple strategy of promoting energy efficiency, at the same time as facilitating the increasing use of renewable energy, and promoting security of supply.

2.2.2 There are a number of national government strategies that make up part of the wider framework for renewable energy policy. These include the **Sustainable Development Strategy, 'Securing the Future' (2005)**, which aims to change the way we generate and use energy, in order to reduce the effects of climate change and **PPS 1 Delivering Sustainable Development** which requires local planning authorities to ensure that development plans address the impact of climate change through policies that reduce energy use and promote the development of renewable energy resources. A supplement to PPS1 on **Planning and Climate Change** was published in December 2007. More detail on this supplement is provided in Appendix One.

2.2.3 **Planning Policy Statement 22: Renewable Energy** sets out the Government's planning policy on renewable energy. PPS 22 positively promotes renewable energy development in suitable locations. The PPS requires Regional Spatial Strategies and Local Development Documents to contain criteria based policies to encourage the development of renewable energy resources.

2.3 Regional Policy

The Regional Spatial Strategy for Yorkshire and the Humber

2.3.1 The RSS (adopted in May 2008) sets out the region's commitment to sustainable development, with a twin policy of reducing greenhouse gas emissions and adapting to the predicted impacts of climate change. **Policy YH2A** in particular addresses the issue of reduction of greenhouse gas emissions, with a target of reducing emissions by at least 20-25% below 1990 levels by 2016. **Policy YH2B** addresses adaptation to the effects of climate change.

2.3.2 In order to implement **Policy YH2** and achieve the greenhouse gas emission targets, the RSS relies on the implementation of a number of actions, including increasing renewable energy capacity.

2.3.3 In addition to policies YH2 and ENV5 (see paragraph 1.3.2 above), the RSS includes various policies that seek to balance the need for development over the next 15 to 20 years with those to protect the natural and built environment and the quality of life. **Policy ENV10,** for instance, seeks to safeguard the region's important distinctive landscape characters, **ENV9** seeks to protect the historic environment and **ENV8** seeks to safeguard and enhance elements of biodiversity importance.

The Regional Economic Strategy for Yorkshire and Humber 2006 – 2015

2.3.4 The Regional Economic Strategy identifies that as a major producer of energy for the nation (Yorkshire and the Humber presently contributes 17-18% of the UK's total energy production, and consumes 7- 8%) regional agencies must work with the energy industry to ensure its long-term success. The Strategy sets a target to reduce greenhouse gas emissions by 20-25% by 2016 from the 1990 baseline. The Strategy Promotes energy security and reduced fossil fuel dependency by more energy efficiency and clean and renewable energy generation.

2.4 Local Policy Context

2.4.1 At the local level, the relevant saved Development Plan policies are contained in the Joint Structure Plan for Kingston upon Hull and the East Riding of Yorkshire (JSP) (Adopted June 2005) and the four Local Plans.

2.4.2 Policy NAT11 on Renewable Energy in the JSP has been superseded by RSS policy ENV5. Consequently the policies in the Regional Spatial Strategy will apply, alongside the Local Plan policies, until such time as East Riding of Yorkshire has prepared replacement policies on renewable energy, in its new Development Plan Documents.

2.4.3 A number of 'saved' Joint Structure Plan policies will still impact on the assessment of renewable energy developments. These include:

- Policy ENV4 - integrity of strategic habitat corridors along the River Derwent, River Hull, Humber estuary and the coastline; and
- Policy SP4 - protection of the distinctive character of the Yorkshire Wolds, Jurassic Hills, Vale of York, Holderness, Humber Estuary and Ouse and Trent Levels' Regional Landscape Character Areas.

2.4.4 Each of the four Local Plans for East Riding contains one or more policies on renewable energy. The relevant policies are listed here. Details of the relevant policies are set out in Appendix One.

- Beverley Borough Local Plan (1996) – Policy In13
- Boothferry Borough Local Plan (1999) – Policies EN72, En73, En73a
- East Yorkshire Borough Wide Local Plan (1997) – Policy EN25, CZ8
- Holderness District Wide Local Plan (1999) – Policy U16, U17, U18, U19 (which refers to the need to meet policies Env5, Env8-9, Env12-17, Env22, Env24, Env28, Env29 and Env31), U20

3 Wind Power

3.1.1 The following section provides a brief description of wind power, identifies broad locations where constraints affect the location of wind turbines and discusses the potential of wind power to contribute to meeting regional and local targets for renewable energy generation. This section also identifies a number of important planning issues that need to be taken into account in preparing applications for wind energy developments and provides guidance on considering these issues, including best practice guidance available at the national, regional or local level.

- A summary of broader planning issues for renewable energy developments is provided in Appendix 2.
- Further guidance for developers applying for planning permission for renewable energy developments is provided in Chapter 6 and Appendix Three.

3.1.2 Wind turbines use movement of the wind to generate mechanical power for the generation of electricity or water pumping, either through a single turbine or a number of turbines (a 'wind farm'). Wind power is currently the single most important renewable technology for the Yorkshire and Humber region, and indeed for most other regions in the UK. Factors that may influence the size of a wind farm development include their proximity to dwellings, high average wind speed, proximity to the National Grid and landscape and ecological designations. Wind turbines can have a considerable visual impact on the local landscape. Visual impact and technical objections (for example from the Ministry of Defence) are often the most important constraints on their development. Whilst it is usually possible to mitigate the effects on MoD or civil aerodrome radar installations, for example, the visual effects of turbines on the landscape are usually harder to disguise.

3.1.3 Wind power is widely cited as the technology which is expected to be the primary contributor to meeting the regional targets, and indeed, the East Riding of Yorkshire is singled out as being one of two Authorities (the other is North Lincolnshire) with considerable potential for exploiting this resource. However, it should be recognised that the exact composition of the technologies that comprise the local renewable energy infrastructure will change over time. So while this may mean pressure for development of wind power in the short to medium term, account should be taken of the fact that wind power may eventually be replaced by other technologies. Wind turbines should not, therefore, be necessarily viewed as permanent installations - wind turbines for example, may only have a

lifespan of 25 years, after which they may be removed, updated or replaced.

3.2 Potential Capacity for Wind Farm Developments

3.2.1 The East Riding of Yorkshire Council contains areas of low, medium and high sensitivity to wind development, as well as areas of very high sensitivity. There are operational wind farms at Out Newton (north of Easington and north of the Humber estuary), single turbines at the Waste Water Treatment Works at Saltend (east of Hull) and at Loftsome Bridge Water Treatment Works (north of Barmby on the Marsh). In addition, a number of other wind developments (both within and near to the East Riding boundary) have either been given permission or are applying for permission. As a result, the area of land available for further wind farm developments may be reduced, in order to prevent potential adverse cumulative effects on landscape and local visual amenity, as well as avoiding unacceptable impacts on biodiversity and sites of important nature conservation.

3.2.2 The 2004 SREAT study identified the East Riding of Yorkshire as having:

> "… *an above average potential to generate renewable electricity for LA's in the region due its large wind potential. However given the large size of the district this should not result in an unacceptably high concentration of wind developments*" (SREAT, 2004, Vol. 1, p.53).

3.2.3 It should be kept in mind that meeting the overall renewable energy target is of the greatest importance, not the method of renewable energy used to reach it. The development of a variety of renewable energy sources is encouraged, as the achievement of a greater diversity in our energy mix is vital to ensuring security and continuity of supply, in a climate where fossil fuels continue to be depleted.

3.2.4 Within East Riding of Yorkshire, there was by Late February 2009 existing developed capacity, or planning approval for 140MW of renewable energy to be generated from wind farm developments. The overall renewable energy target for 2010 and 2021 as set out in Regional Spatial Strategy policy ENV5 (of 41MW) has therefore already been exceeded by wind energy proposals alone, assuming some of these schemes will be operational by 2010. The Council has also exceeded 148MW, when other renewable energy types are included in the calculation. There were a number of further planning applications lodged with the planning authority by that date awaiting a decision or at appeal.

3.2.5 Although most of the capacity for wind technology in the East Riding of Yorkshire is assumed to come from developments in open rural spaces,

smaller wind schemes are also possible in pockets of land within urban, sub-urban and other rural locations (such as a small scheme at a community hall in Skeffling). The SREAT (2004) identified capacity in the East Riding of Yorkshire for small schemes of 10MW in 2010 and 15 MW in 2021 – equivalent to 5 or 6 large wind turbines (2/2.5MW each). The potential capacity identified above is set out in the two following tables, alongside those for the Humber and the region as a whole.

Extract from Table 4 (SREAT 2004, Vol. 1, p.22): Wind Potential 2010 (MW)

Sub/region / LA	Potential resource				Refined Potential	Illustration	
	Rural 2MW turbines	Small schemes, semi-urban & urban*	Existing wind farm capacity	Maximum Potential		Approx no. of turbines (existing & new)	Indicative Wind farm sizes**
East Riding	101	10	9	120	40	23	1M
Humber Sub-region	323	35	9	367	108	59	4M, 1S
Region	545	199	25	769	341	187	0L, 10M,15S

S = small wind farms: 1-5 turbines, M= medium: 5-25 turbines, L = large: >25 turbines

* This includes schemes in the Green Belt (East Riding of Yorkshire does not have any formal Green Belt).

** This refers to the size of wind farm that would be most appropriate.

Extract from Table 5 (SREAT 2004, Vol. 1, p.23): Wind Potential 2021 (MW)

Sub/region / LA	Potential resource			Refined Potential	Illustration	
	Rural 2MW turbines	Small schemes, semi-urban & urban*	Maximum Potential		Equiv no. 2.5MW turbines	Indicative Wind farm mix
East Riding	690	15	705	120	48	1L, 1M
Humber Sub-region	1155	60	1215	273	109	2L,3M,3S
Region	1638	315	1953	725	290	3L,8M,31S

S = small wind farms: 1-5 turbines, M= medium: 5-25 turbines, L = large: >25 turbines

* This includes schemes in the Green Belt (East Riding of Yorkshire does not have any formal Green Belt).

3.3 Principal Constraints on Wind Energy Development

3.3.1 There are a number of constraints that affect the potential for wind energy development in the East Riding of Yorkshire and these will need to be assessed thoroughly for any potential site. These include both a number of principal and detailed constraints. These are discussed in this section and the next. The principal constraints include:

3.3.2 **Wind Speed** – a nominal figure of 6.5 m/s at 45m height is usually adopted as the minimum commercially viable wind speed. However, this is a relatively crude guide to potential viability and areas with lower wind speeds may still be viable, especially as the technology becomes more sophisticated.

3.3.3 **Existing Wind Energy Developments** – a separation distance between established schemes and potential schemes should be provided for, in most cases, in order to avoid negative cumulative impacts, particularly visual impacts. Developments should be assessed using site specific considerations such as landscape and cumulative visual impacts and the height of the turbines. This may mean that a lager separation distance is appropriate in some locations, particularly where the landscape is relatively flat.

3.3.4 Cumulative impact is a significant consideration that will severely constrain suitable locations for further wind turbine development in the East Riding of Yorkshire, even if other considerations are supportive. Off shore wind developments should be taken into account when considering the cumulative visual effects on shore applications.

3.3.5 It may be possible to locate multiple developments in one landscape view, particularly if they appear as a cohesive unit. However, cumulative effects will need to be considered.

3.3.6 **Proximity to Residential Development** –The distance between a wind turbine and residential development can be varied, depending on the scale of development proposed and the nature of the land-uses at the settlement boundary. Until such time as there is a more up to date standard the Council will expect developers to use ETSU-R-97: “The Assessment and Rating of Noise from Wind Farms (1996) ”as the appropriate assessment too..

3.3.7 The central-south part of the East Riding of Yorkshire, around Kingston-upon-Hull, Borough and Beverley, is the most densely populated part of the East Riding of Yorkshire, meaning large-scale wind energy developments may often be more difficult to locate in this area.

3.3.8 **Landscape Character Areas** – wind turbines can have a significant visual impact on the landscape around them. It is important to identify which landscapes have a high or medium sensitivity to wind energy developments in order to protect these from inappropriate development. Once again, the Zones of Natural Heritage Sensitivity have been used to classify the sensitivity of the range of landscape character areas present in East Riding, where Zone 1 includes landscapes of greatest sensitivity, Zone 2 includes those of high sensitivity, Zone 3 those of medium sensitivity and Zone 4 those will little or no sensitivity to wind power developments.

3.3.9 Appendix Seven lists the Landscape Character Areas identified by the East Riding of Yorkshire Landscape Character Assessment and assigns a Natural Heritage Sensitivity Zone to these in relation to wind turbine developments, with an explanation drawn from the Landscape Character Assessment. Map Four in Appendix ten shows the Landscape Character Areas in the District and colour-codes these according to the Natural Heritage Sensitivity Zone they are assigned to. Some areas of the East Riding of Yorkshire are less sensitive to wind power developments on landscape character grounds, though other constraints will still need to be considered.

3.3.10 **Proximity to Major Roads** – wind turbines need to be sited back from a major road by at least the same distance as their vertical height, so that if a turbine was to topple over it would not land on the road. For proximity to Trunk roads the Highways Agency has determined its own standards and advice, and the Council will expect developers to take cognisance of and comply with these.

3.3.11 **Aerodromes** – The flight paths (take-off/landing) of existing aerodromes and air radar installations are a constraint for wind energy proposals, and several affect the East Riding of Yorkshire. Existing aerodromes include civil airports, RAF airfields and other private/civil airfields. Applications within these areas will need to be considered on a site-by-site basis, in consultation with the airfield controllers. The height of turbines will be an important consideration in these areas. Map 1 in Appendix ten shows the consultation zones for known facilities in the East Riding and where consultation must take place with the controller. All effects on radar will need to be mitigated to an acceptable level.

3.3.12 ***Civil Airports*** – Safeguarded civil airports generally have a 30km consultative zone centred on the airport. The two main commercial airports in proximity to the East Riding are Humberside at Kirmington, near Grimsby, and Robin Hood near Doncaster A 10km exclusion zone was used in estimating potential in the 2004 SREAT study (Vol. 2, p.15). Map 1 of Appendix ten sets out these sites and subsequent consultation zones, which are likely to be constrained. The height of turbines will be a particular consideration in these areas.

3.3.13 ***RAF Airfields*** – the three RAF airfields in the region are located in North Yorkshire at Linton-on-Ouse and Leeming and at Waddington near Lincoln. Their 10 km exclusion zone (SREAT 2004, Vol. 2 p.15), where it is likely there will be serve constraints is beyond the border of the East Riding. However, they have radar and operational range which extends into the East Riding. If turbines are to be constructed radar may need to be strengthened. Defence Estates should, therefore, be consulted on all wind energy developments.

3.3.14 ***Other Private / Civil Airfields*** – there are a considerable number of other airfields in or close to the East Riding of Yorkshire and a 5km consultation zone should be applied to these. A list of these airfields is included in Appendix Five and they are shown on Map 1 of Appendix ten. The consultation zone does not mean that planning permission for a wind turbine will automatically be refused, but it highlights the need to consult with any airfield operators in the vicinity of a proposed wind turbine before submitting a proposal. The height of turbines is likely to be an important consideration in these areas.

3.3.15 **MOD Air Defence Radar Installations** – Defence Estates should be consulted on all wind turbine developments because of their potential to affect the Staxton Wold radar installation near Scarborough.

3.3.16 **Heritage / Archaeological Assets** – There are heritage / archaeological assets across the breadth of the East Riding of Yorkshire as shown in Map 3 in Appendix ten. Wind turbines and the associated infrastructure should not be sited where they will detrimentally impact on the heritage/ archaeological value of assets such as conservation areas, listed buildings, scheduled ancient monuments, registered battlefields and registered parks and gardens or their setting. This constraint is primarily concerned with the potential visual impact on the amenity of the heritage feature. To cause a negative impact the development does not have to be within the area of importance as it can affect views and vistas of such areas. As such, a general exclusion area would not be appropriate, as each asset will be set in different contexts with their own unique concerns. Turbines themselves and the associated infrastructure can also have a direct impact on the historic environment, and archaeological remains. Wind turbines can also impair the setting of historic sites and can compromise the visual amenity of the wider landscape, detracting from the historic character, sense of place, tranquillity and remoteness. Planning Consents will be conditioned to require an archaeological investigation programme to be agreed with Humber Field Archaeology where there is a reasonable expectation of finds. Further information on the consideration of the effects of development on heritage and archaeological assets is located in appendix 4.

3.3.17 **Biodiversity Conservation** – wind turbines can clearly have an impact on the wildlife and habitats around them. Therefore, it is important that the natural heritage assets of the East Riding of Yorkshire are protected from inappropriate wind power development. The Zones of Natural Heritage Sensitivity set out in the SREAT Report (2004 Vol. 2 p.18-19) have been utilised here to assess the impact of wind power development on different types of biodiversity sites.

3.3.18 Zone 1 includes those sites that are of greatest sensitivity to wind energy development, such as sites of international nature conservation value, and these sites should have a 5km exclusion zone for such development. Zone 2 includes those sites of high sensitivity, for example those with national nature conservation designations. Zone 3 includes areas with medium sensitivity to wind energy developments, such as sites of local biodiversity value. Finally, Zone 4 incorporates those areas with the lowest sensitivity to wind power developments and of little biodiversity value. Appendix Six lists the sites included in each of these zones; however specific site assessments will still be needed when preparing planning applications.

3.3.19 East Riding is home to biodiversity values that are highly sensitive to wind energy developments, most notably sites of international nature conservation value along the western and southern border of the East Riding of Yorkshire and two sites on the eastern coastline. Map 2 in Appendix ten shows the location of various sites of biodiversity value in the East Riding of Yorkshire and what zone they are allocated to. In the areas around sites of high value consideration should be given to the effect on the surrounding areas. Alongside visual impact considerations, the location of wind energy developments near these sites should be assessed on the basis of their potential ecological impact on these sites. For example, if the development would affect ecology upstream/upwind of a site that would in turn affect the ecology of the site itself (such as the hydro-geological or other structural properties of peat sites), the wind turbine development will not be allowed if the impact cannot be mitigated. Similarly, if a wind turbine will impact on the migratory path of birds to/from/across one of these sites, on nesting birds, on roosting birds or on their feeding areas, then the development will not be allowed if the impact cannot be mitigated. Birds are protected irrespective of their location. Other highly sensitive areas include the course of the River Hull and the route of the Wolds Way.

3.3.20 All developments are likely to have some effect on ecology, the issues is whether this effect is deemed to be acceptable. The Council recognises that impacts can be potentially positive. Many locations have relatively low biodiversity value, and wind farm developments can create the opportunity for enhancements, through habitat diversification in particular. The Council will encourage developers to automatically offer biodiversity enhancement opportunities even where there are no identified negative impacts.

3.3.21 Information on biodiversity considerations is provided in appendix 4.

3.3.22 **Flood Risk** – large areas of the East Riding are identified as at high risk of flooding by the Environment Agency. In the interests of guaranteeing secure energy supplies, wind turbines should not be sited where they will

be unduly affected by potential flooding. In addition, wind energy development should not constrain potential Flood Storage Areas and Managed Realignment Sites to help deal with the increasing risks of future flooding or areas identified as being subject to high levels of coastal erosion. These areas or sites will be identified in the area's Strategic Flood Risk Assessment, various Catchment Management Plans and Flood Risk Management Strategies or the Shoreline Management Plan. Adaptation techniques may need to be put into place to take into account the flood management techniques identified. These could include measures which impact on the renewable energy infrastructure itself and/or, general infrastructure such as maintenance and access roads. The development of flood management techniques such as storage areas and managed realignment sites may also have consequential effects on other constraints listed here, for example risk of bird strike or the presence of protected species or habitats. Where a development is proposed to be located in an area of high flood risk (floodzone 3a/b) it should be subject to the sequential and exception tests.

3.4 Key Detailed Planning Issues for Wind Energy

3.4.1 Having considered the broad locations where wind power may be suitable in the East Riding, it will always be necessary to consider various planning issues for any potential site in more detail. These include those set out below.

Impacts on Local Communities

3.4.2 The long-term benefits of renewable energy developments are experienced widely, and indeed benefit the whole country. More localised impacts will however be felt by the local communities adjacent or nearby to the proposed development. These impacts can be either positive or negative.

3.4.3 On the positive side, wind energy developments can provide local jobs, particularly during construction, and opportunities for community based schemes and educational resources (further detail is provided in the subsection on *Impacts on the Local Economy* below).

3.4.4 When developing an energy scheme, developers should explore the potential for additional community benefits. Although benefits that are not required directly as a result of a planning consent and are not a material planning consideration, developers are encouraged to work more closely with local communities to explore how energy schemes can enhance community wellbeing and provide meaningful local benefits.

The Centre for Sustainable Energy has published a good practice toolkit on benefits for communities, on behalf of the Renewables Advisory Board and the former DTI. Developers should refer to this toolkit 'Delivering Community Benefits from Wind Energy Development Toolkit', October 2006 (available at: www.cse.org.uk/cgi-bin/publications.cgi?publications)

3.4.5 Several wind farm developers in the UK have worked with the local community to provide them with voluntary contributions, often in the form of a community fund or goodwill payments. Community funds can be secured through a non-planning legal agreement with a community group/trust. Developers should consider supporting the local community when engaging with community stakeholders and developing a proposal. For example Novera Energy obtained consent in July 2007 to develop a 12 turbine wind farm at Lissett near Bridlington. As part of the Section 106 Agreement it was agreed that a Community Liaison Forum be set up to deliver local community facilities and initiatives. Further information can be obtained from their website: www.noveraenergy.com. While the provision of community benefits is voluntary, engaging in such actions may help to generate community goodwill and acceptance.

3.4.6 Please note that the provision of such benefits will not affect the assessment of any significant environmental harm that might be identified when considering a planning application.

3.4.7 Applicants who intend to use goodwill payments should contact East Riding of Yorkshire Council to discuss how to contact the community, appropriate levels of contribution and the uses of such contributions.

3.4.8 Financial contributions can address a range of community benefits, and may be sought as part of the planning permission if considered relevant. For example:

- Site conservation and habitat creation;
- Improved footpath, bridleway and cycle access;
- Job creation e.g. in site management;
- Educational visits;
- Biodiversity protection and enhancement;
- Planting and woodland e.g. the HEYwoods Initiative
- Village/community hall improvements
- Grant funding for energy efficiency schemes.

3.4.9 East Riding of Yorkshire Council's Position Statement on the use of Goodwill Payments is included as Appendix ten.

More detailed advice on incorporating community benefits into wind farm developments can be found in the following resource:
'Community benefits from wind power. A study of UK practice and comparison with leading European Countries', DTI 2005 www.berr.gov.uk

3.4.10 On the negative side, communities may raise concerns about a number of potential impacts, including: changes to the landscape and visual effects, recreational impacts - in terms of impacts on the enjoyment and use of public access and rights of ways, light, adverse effects on tourism and dust associated with construction activity and shadow flicker, (further detail is provided in the subsection on *Impacts on Local Amenity-Shadow Flicker* below).

Impacts on the Local Economy

3.4.11 Consideration needs to be given to both positive and negative effects on the local economy when developing wind power schemes. Positive effects include the potential for farmers to raise income from selling or renting land to commercial developers, e.g. for the placement of wind turbines. Other benefits may arise from using local suppliers for related goods and services, and the subsequent multiplier effects on the local economy, creating additional local jobs and increasing prosperity.

3.4.12 Wind turbines can be promoted as visitor attractions - to provide educational opportunities as well as additional income and grant aid.

3.4.13 Consideration should be given to employing local labour and using locally sourced and recycled materials, particularly for the construction of necessary infrastructure, access roads and other ancillary features. Investment could also be made in training the local workforce in undertaking maintenance and repair. When tendering a scheme, local businesses should be invited to tender for relevant aspects of a scheme.

Impacts on Local Amenity – Noise

3.4.14 Renewable energy schemes should be sited at an appropriate distance from noise sensitive development to ensure that increases in ambient noise levels are acceptable. There will always be some background noise in any environment, even in rural areas, where noise is experienced from farm machinery, local traffic, animals and the wind interacting with trees and buildings. Developers should identify any noise sensitive development, such as residences or quiet leisure based businesses, and carry out a noise assessment to determine whether or not there might be any potential impacts on them. If impacts cannot be avoided, developers should carry out design alterations to mitigate any unacceptable noise impacts, or provide sound proofing to affected properties. If necessary, the Council will attach conditions to the consent for a scheme, to ensure noise limits are not exceeded.

3.4.15 Noise is produced from wind turbines in two ways:

- Mechanically from the internal gearbox and generator, and
- Aerodynamically from the movement of the blades through the air.

Technological improvements to wind turbines have significantly reduced mechanical noise levels, and in most cases turbines can be sited at a suitable distance from noise sensitive development so as not to cause undue harm.

3.4.16 A noise assessment should be carried out against existing background noise, in accordance with advice in the Companion Guide to PPS22 and ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms (1996)'. If revised guidance is issued by the UK government on the assessment of noise, development will be expected to accord with this.

3.4.17 If consultation with the local community identifies that noise is a significant concern for a local community, developers could consider taking community members to visit a nearby operational scheme so that they can assess this impact for themselves.

The following guidance should be followed:

• PPG24 Planning and Noise
• The assessment and rating of noise from wind farms, ETSU-R-97, DTI: http://www.berr.gov.uk/energy/sources/renewables/explained/wind/onshore-offshore/page21743.html

More good practice advice can be found in the following resources:

• Guidelines for Community Noise World Health Authority: www.who.int/docstore/peh/noise/guidelines2.html
• Health and Safety Executive Noise information: www.hse.gov.uk/noise

3.4.18 Planning conditions relating to wind farm operational noise should always make reference to ETSU-R-97, as it provides the definitive guidance on appropriate techniques to rate and assess wind farm noise. However noise limits will vary for each application, and indeed can vary between the nearest neighbouring properties within an application. Planning conditions relating to noise limits will therefore vary on a site-by-site basis.

Impacts on Local Amenity - Shadow Flicker

3.4.19 Under certain combinations of geographical position, time of day and year, the sun may pass behind the rotor of a wind turbine and cast a shadow. When blades rotate and the shadow passes a narrow window then a person within that room may perceive that the shadow appears to

flick on and off; this effect is known as shadow flicker. It occurs only within buildings where the shadow appears through a narrow window opening. Only dwellings within 130 degrees either side of north relative to a turbine can be affected and the shadow can be experienced only within 10 rotor diameters of the wind farm. It is possible to calculate the number of hours per year that shadow flicker may occur at a dwelling from the relative position of a turbine to a dwelling, the geometry of the wind turbine and the latitude of the wind farm site.

3.4.20 The operating frequency of a wind turbine will be relevant in determining whether or not shadow flicker can cause health effects in human beings. Some believe that shadow flicker from wind turbines can affect epileptic conditions; however, this is yet to be proven. If turbines can affect epilepsy they will only do so in the minority of cases due to the slow speed at which they rotate. The frequency at which photosensitive epilepsy may be triggered varies from person to person but generally it is between 2.5 and 30 flashes per second (hertz). Most commercial wind turbines in the UK rotate much more slowly than this, at between 0.3 and 1.0 hertz. Therefore, health effects arising from shadow flicker is unlikely to have the potential to occur unless the operating frequency of a particular turbine is between 2.5 and 30 hertz and all other pre-conditions for shadow flicker effects to occur exist.

3.4.21 Shadow flicker is therefore more likely to be relevant in considering the potential effects on residential amenity. Where wind turbines lie within the geographical range which may be affected by shadow flicker it will not be possible to determine whether or not shadow flicker effects will actually be felt until an assessment has been made of window widths, the uses of the rooms with potentially affected windows and the effects of intervening topography and other vegetation. Where it has been predicted that shadow flicker effects may occur in theory, East Riding of Yorkshire Council may impose a planning condition. This condition will state that wind turbines should operate in accordance with a shadow flicker mitigation scheme which shall be submitted to and approved by the Local Planning Authority prior to the operation of any wind turbine, unless a survey carried out on behalf of the developer in accordance with a methodology approved in advance by the local planning authority, confirms that shadow flicker effects would not be experienced within habitable rooms within any dwelling.

Landscapes and Visual Impacts

3.4.22 Wind turbines are tall, highly visible structures and their introduction inevitably leads to effects on the local landscape. Wind energy developments may impact upon landscape designations at a national, regional or local level, in addition to impacting on the visual amenity of the area.

3.4.23 The visual effects of wind turbines will vary depending on the size and number of turbines (larger turbines are likely to be more dominate on the landscape) in a scheme, location, the landscape characteristics and the sensitivity of viewpoints or visual receptors. Effects may be reduced through careful siting and design. Visual impacts can have an effect over a wide area and a variety of landscapes. Wind energy developments are often sited in open countryside, in high or exposed locations. Such areas may be valued for their wildness, remoteness, tranquillity or well preserved historic remains and effects on these need to be assessed carefully. Development may also affect the settings of historic sites and the associated visual amenity of a landscape. Although the footprint of wind turbines are small and often require areas open land around them, they do not blend naturally into the landscape and, therefore, would not be regarded as 'development of an open nature'.

3.4.24 It is likely that planning conditions will be used to reduce impacts on landscapes and visual impacts, including finishes, colour of turbines, screening and other mitigations.

Impacts on Biodiversity, Habitats and Nature Conservation

3.4.25 Effects on biodiversity, habitats and nature conservation can take place during the construction, operation or decommissioning phases of a wind energy scheme. They can arise from any element of the development including the foundations, access roads, moving turbines and ancillary buildings. It is vital that the indirect impacts posed by such developments are also considered.

3.4.26 Infrastructure and ancillary development associated with wind energy installations, including road access, foundations, transformers, substation buildings, fencing and electrical connections can generate a number of environmental impacts on sensitive vegetation, and wildlife which may be vulnerable in both ecological and landscape terms, and which may not recover easily from construction activity.

3.4.27 Wind turbines are mounted on reinforced concrete bases. As turbines have increased in size, so have the bases that support them, typically these are now 16-17m in diameter by 2-3m deep. Temporary features include a construction compound and hard standings next to each turbine, which serve as bases during turbine erection and as component lay down areas (typically 50 x 50m). Although temporary they will still have implications for sensitive vegetation and wildlife.

3.4.28 Where possible mitigation measures should be used to compensate and even improve biodiversity and habitats. More information on this is available in appendix 3 and 4.

Impacts on Soils and Hydrology

3.4.29 Developers should consider the effect a scheme might have on the soils, hydrology and water quality of a site and its surrounding watercourses. East Riding of Yorkshire has areas of soils that can be easily harmed or made unstable and that can take a long time to regenerate, such as peat. Disturbances to peat, for example, can in fact release CO^2 into the atmosphere, thereby undermining the CO^2 savings from renewable energy generation itself, leading to a longer energy payback time.

3.4.30 Infrastructure and ancillary development associated with wind energy installations can generate environmental impacts on sensitive soils such as peat, which may not readily recover from construction disturbance. Ongoing consequences may arise from erosion or disruption to the integrity of natural drainage patterns. Natural England are developing guidance on developing near to peat soils, for more information on this matter contact Natural England.

3.4.31 Proposals that are being developed in areas with sensitive soils will need to identify any potential impacts, and should avoid areas with such soil if they are identified as being of principal importance for the conservation of biodiversity, and the effects cannot be mitigated.

3.4.32 For further information on the impacts on soil and hydrology contact Natural England.

3.4.33 A significant part of the East Riding is covered by Source Protection Zones to help ensure there are no adverse effects on drinking water supplies provided by the underlying water-bearing geology, or to maintain water flows in sensitive watercourses. Developers will be expected to liaise wit the Environment Agency so that it may judge the potential impacts form turbine installations or associated infrastructure.

Impacts on Bats, Birds and other wildlife

3.4.34 The impact on bats and birds is of particular relevance for wind energy development. All bats and birds are protected species, some to a very high level, and they are potentially at risk from wind turbines. However, RSPB are generally in favour of wind turbines as the effects of climate change will devastate bird habitats and harm more birds than wind turbines will damage. The RSPB may be able to assist with maps of key species and their assessment, as may the BTO (British Trust for Ornithology).

3.4.35 In areas where bat and/or other wildlife activity is likely, investigations will need to determine roosts, flight lines, feeding areas, hibernation or swarming sites in the vicinity of a proposal, as part of an EIA or planning

statement. The results of such surveys should assist in identifying the appropriateness of the scheme, its design and layout. If a foraging habitat is likely to be affected by a scheme, then mitigation measures would need to be addressed, to ensure additional habitat is provided for within the locality. It should be remembered that it will take time to establish a new habitat. Such work, including bats, should be carried out in accordance with the *Bat Mitigation Guidelines, English Nature, 2005 and Bat Survey Guidelines, Bat Conservation Trust, April 2007.* Data and information on bat roosts, flight lines, feeding areas, hibernation or swarming sites in support of a renewable energy proposal can be obtained by contacting the North and East Yorkshire Ecological Data Centre and the East Riding Bat Group although it may be necessary to commission bespoke survey work at appropriate times of year.

3.4.36 Scottish National Heritage has produced detailed guidance on assessing the potential impacts on birds from wind farms (see the box below for details). This includes guidance on how to determine the potential loss of habitat as a result of infrastructure, displacement of birds due to disturbance to feeding and breeding grounds, and the potential mortality due to collision with turbine blades. Such risks need to be determined for any wind energy development.

3.4.37 An appropriate assessment will need to be carried out to establish any protected, priority or rare species in or within the vicinity of a site, and any migratory routes and any habitats related to such species. Careful consideration needs to be given to SSSI, SPA, SAC, and RAMSAR sites and species which are often associated with coastal areas, along with those species associated with areas off the site for feeding, roosting and over wintering. Some of the sites of particular importance are set out below.

3.4.38 The Lower Derwent Valley National Nature Reserve (NNR) comprises a series of flood meadows, pastures and woodlands supporting a rich diversity of plant species and outstanding populations of breeding and wintering birds and thus the reserve has been declared a SPA, a SAC and a RAMSAR site.

3.4.39 Flamborough Headland Local Nature Reserve is part of one of the finest stretches of coastland on the east coast, and is the most northerly outcrop of coastal chalk in the British Isles. This unique sea and cliff environment is protected as a Site of Special Scientific Interest (SSSI) and its seabird colonies mark it as a SPA. The offshore environment has been identified as a Sensitive Marine Area (SMA) and a SAC.

3.4.40 Spurn Point is nationally designated as part of the Humber Estuary SSSI, Geological Conservation Review (GCR) and a NNR and internationally designated as a SPA and RAMSAR site. Spurn Point is

sustained by coastal processes, which feed it with sand, cobbles and silt and in turn creates one of the most dynamic and changeable sites in England. With sandy beaches and the North Sea on its eastern side, and areas of saltmarsh and extensive mudflats, the Spurn peninsula attracts thousands of birds.

3.4.41 The Humber Estuary supports a number of internationally important birds populations, many of which are in danger of extinction, are rare, or are considered vulnerable within the European Union. Such populations include: Breeding species - Avocet (Recurvirostra avosetta), Little tern (Sterna albifrons) and Marsh harrier (Circus aeruginosus) and Wintering species - Bar-tailed godwit (Limosa lapponica), Bittern (Botaurus stellaris), Golden plover (Pluvialis apricaria) and Hen harrier (Circus cyaneus). The Estuary is protected by every national and European biodiversity designation.

3.4.42 In coastal and estuarine locations attention needs to be paid to issues of collision with migratory birds, as many fly along the coastal areas to reach feeding/breeding grounds in protected habitats. An assessment of potential impacts will need to be carried out and any mitigation measures determined to remove the potential for harm. These may relate to micro siting and design or the creation of supporting habitat within the locality. This information should be part of the EIA or planning statement.

3.4.43 The cumulative impacts on bats and birds must also be assessed in relation to other proposed, approved or operational wind energy schemes and other non wind developments, in line with the Habitat Regulations (2004).

3.4.44 The habitats in the East Riding of Yorkshire which are most likely to be affected by wind farm developments are coastal and estuarine habitats, general open farmland, and connecting habitats such as hedgerows and small woods. Urbananised habitats and farmland can provide high densities of features that support bat roosts, (such as old buildings, derelict sites, agricultural buildings and barns, old houses and schools) and nesting bird populations. Many estuary birds roost on inland sites.

3.4.45 The development of flood management techniques such as Flood Storage Areas and Realignment Sites may have consequential effects in terms of the impact of wind farm developments on habitats and biodiversity. For example, bird habitats may be created or altered as a result of the presence of new bodies of water. This may result in additional risk of bird strike or the presence of protected species where once these did not exist, and may subsequently result in changes to the biodiversity and habitat constraint zones as currently shown.

3.4.46 It may be necessary to add conditions to a planning approval requiring the monitoring of birds and bats during the life of the development.

Developers should follow the good practice advice contained in:

• Bats and onshore wind turbines Interim guidance, Natural England Technical Information Note TIN051, 2009, available at: www.snh.org.uk/pdfs/strategy/renewable/B259918.pdf

• Assessing ornithological impacts associated with wind farm developments: surveying recommendations, Natural England technical Information Note TIN008, 2007, available at: http://naturalengland.etraderstores.com/NaturalEnglandShop/Product.aspx?ProductID=7c217b7a-c119-41d8-b3e2-9a2410754b72

•Survey methods for use in assessing the impacts of onshore wind farms on bird communities, Scottish National Heritage Guidance November 2005, available at: www.snh.org.uk/strategy/renewable/sr-we00.asp

• Wind Turbines and Sensitive Bird Populations, RSPB, 2007

• Wind farm development and Nature Conservation, English Nature, RSPB,
WWF and BWEA, 2001 www.bwea.com/ref/reports-and-studies.html

• Bat Survey Guidelines, Bat Conservation Trust, 2007 www.bats.org.uk/news_events/BatSurveys.asp

• Bat Mitigation Guidelines, English Nature, 2005 http://naturalengland.twoten.com/naturalenglandshop/ docs/IN13.6.pdf

Impacts on Highways, Road Networks and Rights of Way

3.4.47 For public rights of ways, care should be taken to ensure an adequate distance is provided between these and the wind turbines. Fall over distance of a turbine (to maximum blade height) is often considered a minimum distance, but consultation with East Riding of Yorkshire Council should be carried out to determine what is most appropriate on any particular scheme. Developers should consider the *British Horse Society Advisory Statements 'No.4 Width of Bridleways' and 'No. 5 Standards and Dimensions'* for guidance on siting distances from bridleways.

3.4.48 Access to a site is a particularly important consideration for wind farm developments, as the local road network will need to accommodate the large vehicles needed to transport the turbine components to the site. Road access to a wind turbine site needs to be able to accommodate trailers carrying long loads (rotor blades can be up to 45m long) as well as very heavy and wide loads (generally cranes of 30 tonnes plus). In some rural locations these access requirements can lead to significant 'indirect' impacts on the local road network. For example the widening of lanes (typically to 6m) or easing of bends can require the removal of

boundary features such as stone walls or hedges or loss of roadside verges. Depending on site-specific considerations, these alterations may be left in place for the life span of the development, or conditions may be sought to ensure temporary remediation – (as it will be necessary to ensure that the site can be reached in order to undertake major repairs and decommissioning). This requirement should be considered from the onset of the project. Wherever possible roadways created or widened as part of the construction phase of a development should be removed or reinstated as construction is completed, leaving only the minimum necessary access for service vehicles.

3.4.49 Traffic is unlikely to have any major impact on the road network during the operational phase of a wind development. However, the Council may require a traffic assessment for the construction of the development and may use planning conditions to control the number of vehicle movements to and from the site during the construction and decommissioning of a site.

3.4.50 Applicants are encouraged to contact the Highways Agency at an early stage in developing any proposal close to the trunk road network, as it has explicit guidelines on the location of wind farms.

3.4.51 On-site access tracks need to be constructed carefully, but will also need to meet the same weight and dimensional requirements as above. Access tracks are typically 5-6m wide but it may be possible to reduce some in width after construction (typically to 3-4m) to facilitate access by light maintenance vehicles. Inevitably however, full width tracks will be required for repairs and decommissioning. Impacts are likely to be greater where tracks must cross steep slopes requiring zig zag routes, cut and fill and drainage channels above the track; or wet marshy ground - where more extensive foundations are likely to be required. They are also likely to be more visible in open featureless landscapes.

3.4.52 An assessment of the full route to be used, including site access, needs to be undertaken to ensure that the road network can accommodate the loads. When considering such measures from a highway point of view, consideration should also be given to any potential impacts on nature conservation interests, landscape and visual amenity, including any impact on the nature conservation values of roadside verges.

3.4.53 Applicants may wish to consider the use of inland waterways such as the Aire and Calder Navigation, the Pocklington Canal and River Ouse, to transport machinery and turbines during the construction phase of a development.

Impacts on Telecommunications and other Networks

3.4.54 Wind turbines have the potential to cause interference with radio signals, local TV reception (analogue and digital) and telecommunication systems, including those used by the police and emergency services.

3.4.55 Many telephone and other communications systems rely on microwave radio links, which can be affected by wind turbines. The Office of Communications (Ofcom) has information on licensed telecommunication systems and protects radio systems against interference. Developers should contact Ofcom to establish what systems might be affected by their proposal. Developers are also expected to contact all radio operators: police, ambulance, coastguard, and the fire and rescue service to determine potential impacts. This information should be submitted with the planning application.

3.4.56 Operators may impose a clearance zone around their systems or require re-routing to prevent interference. Careful siting can usually mitigate these problems, and repositioning of a turbine by a few hundred metres can remove the interference. If this is not feasible, developers may be able to pay for the re-routing of a signal around a development.

3.4.57 Conditions are likely to be attached to any consent to ensure the above issues are addressed during the construction phase. However, if negative impacts cannot be mitigated against, it is unlikely that approval will be given for a scheme. Again, as communications systems switch to digital links this issue may become less important in the future.

Further guidance can be obtained from Ofcom by contacting windfarmenquiries@ofcom.org.uk

The Impact of Large Buildings and Structures (including Wind Farms) on Terrestrial Television Reception, BBC and Ofcom, 2006. Available from:
http://www.bbc.co.uk/reception/info/pdf/buildings_factsheet.pdf

Impacts on Navigation and Radar Systems

3.4.58 Wind energy developments may impact on the use of aerodromes and radar and other navigation systems used for air traffic control and aircraft instruments. The movement of a wind turbine can interfere with radar, as it may be interpreted as a moving object or give false returns. This could cause it to be mistaken for an aircraft or reduce the ability to track aircraft by radar in the vicinity of a wind energy development. Flight paths will need to be determined and consideration given as to what action can be taken to mitigate against collision risks. Developers must consult with the Safeguarding body (Humberside Airport, Robin Hood Airport or Civil Aviation Authority) and the MoD to determine such issues and liaise with

airfield management at civilian airfields. Developers should also consult with NATS En Route (an organisation which provides air traffic control services to aircraft flying in the East Riding of Yorkshire), Associated British Ports (ABP) (which operates the shipping radar in the Humber) and Defence Estates.

3.4.59 Developers will need to consult with radar operators if a proposal falls within a 30km consultation zone of civil air traffic radar, or the 74km advisory zone around military air traffic radar. A list of active and inactive airfields within the East Riding of Yorkshire and within a 15km radius of the East Riding of Yorkshire has been compiled and is included in Appendix Five. Map1 in Appendix ten sets out these airfields and their relevant exclusion/consultation zones. These appendices should be consulted when considering potential locations. A 5km consultation zone should generally be adopted when considering local airfields.

3.4.60 Early consultation between developers and statutory authorities can help with siting and mitigation measures. The British Wind Energy Association (BWEA) has produced a proforma for undertaking consultation with stakeholders. Developers are advised to use this proforma, which is available from the BWEA website (www.bwea.com/aviation). If, as a result of the above consultation, a negative impact is likely, a developer will need to prove whether or not there will be an adverse effect on aviation interests, including cumulative effects. In some circumstances an objection on the grounds of aviation safety could lead to a refusal of planning permission if the effects can be satisfactorily mitigated.

3.4.61 A generic aeronautical condition may be required if the Ministry of Defence (MOD) or the Civil Aviation Authority (CAA) have requested detailed information that is not included within the planning application or accompanying documents. This information usually relates to the date of commissioning of the first turbine or the date of erection of the first turbine. This information is required to ensure the MoD and CAA are aware of the first date when the turbine[s] would be possibly present on radar, or physically visible by pilots. This date is rarely included within the planning application as such a date cannot be accurately predicted, due to variables outside the control of the developer, for example weather conditions.

3.4.62 This generic aeronautical condition will only be applied when it has not been feasible to resolve the issue prior to the permission and the condition is deemed necessary for aeronautical safety reasons.

Developers should follow good practice advice found in the following resources published by BERR and its predecessor the DTI:

DTI AMS Feasibility Study, June 2005.

www.dti.gov.uk/renewables/publications/pdf/windenergyaviation.pdf

Wind farm impact on aviation radar interests BERR
www.berr.gov.uk/energy/sources/renewables/planning/onshore-wind/aeronauti

Wind energy and aviation interests: an interim guide, DTI
http://www.berr.gov.uk/files/file17828.pdf

'Temporary' development

3.4.63 Wind energy developments are often promoted on the basis that they have a limited existence, with 25 years being mentioned as a likely 'lifespan'. Applicants sometimes invite a condition to be attached to any planning consent for removal after that period and suggest this limited lifespan alleviates any adverse impacts. However, guidance in Circular 11/95 clarifies that the reason for granting a temporary permission can never be that a time limit is necessary because of the effect of the development on the amenities of the area. If it is not possible to overcome the adverse effect on amenity by conditions, and if the damage cannot be mitigated, then the only course open is to refuse permission.

Connections to the Electrical Grid

3.4.64 Routing and design of the electrical connection from the site sub-station to the local electricity distribution network is the responsibility of the electricity Distribution Network Operator (DNO) – [CE Electrical for the majority of the East Riding area] and does not require planning permission from the Local Planning Authority. Connection will either be by overhead power lines mounted on single or double poles, or by lines laid underground. Underground lines are 6-20 times more expensive, so are likely to only be used for limited lengths or in special circumstances. The effects of connections should be regarded as material to the overall scheme design.

3.4.65 Under grounding of power lines may be preferable for landscape and visual impact reasons, however there may be other negative environmental effects as a result, for example disruption to sensitive soils or vegetation or archaeology. This should be factored in when determining the best approach to take for any particular scheme. Where cabling is required to be located underground, which is usually the case in the interests of visual amenity; this will be the subject of a planning condition. The cabling condition may also require that, following the installation of cables, the ground be re-instated to its former condition for both ecological and visual amenity reasons, in a given time period, to the satisfaction of the Local Planning Authority. Full re-instatement may not be required in all circumstances, for instance if the land is arable farmland.

Cumulative Impacts

3.4.66 Cumulative impact is a complex planning issue that is becoming increasingly relevant to the assessment of renewable energy schemes, particularly wind energy schemes, within East Riding. It is probably the most difficult and contentious issue.

3.4.67 Cumulative impact may occur as a result of more than one scheme being constructed within a particular area, and is defined as the combined effect of all the developments taken together.

3.4.68 Where a renewable energy development is being proposed or extended in an area, alongside another proposed, consented or operational scheme, a cumulative impact assessment should be carried out. This information should be included as part of the Environment Impact Assessment, if an EIA is required, or set out in the planning statement to accompany the application and is required by the Habitat Regulations. Cumulative impact assessments should also assess the impact in conjunction with non renewable energy developments, as noted in Habitat Regulations Guidance Note 4: Alone or in Combination (HRNG4) (English Nature, 2001).

3.4.69 Developers should adequately address the additional cumulative impact that their proposal would have on an area, along with other plans and proposals. Consideration should be given to static and sequential cumulative visual impacts and cumulative landscape impacts, and steps taken to ensure that these are minimal. Consideration should be given to potential cumulative impact on hydrology, hydrogeology, ecology, traffic and transport, aviation and defence, recreation, and local amenity.

3.4.70 Issues that will need careful consideration by developers include:

- The degree of acceptable landscape change in a particular landscape character area and the wider area-having regard to the Zones of Natural Heritage Sensitivity.
- Effects on international, national, Regional and local designations and their settings, including landscape, nature and the historic environment and their location within the Zones of Natural Heritage Sensitivity.
- The need to maintain the integrity and quality of a landscape.
- Whether developments could be experienced as being overbearing or dominant.
- Effects on local communities - residents and visitors.
- Compatibility between existing and proposed developments, in terms of scale.

- Effects on seascape character.
- Potential for skyline clutter.

3.4.71 Cumulative impacts such as noise and aviation should be assessed using British standards, best practice guidance or protocols (as outlined earlier in this guidance) identified by the developer and agreed with by the East Riding of Yorkshire Council. Unacceptable cumulative effects may provide sufficient justification to refuse a scheme that would otherwise when assessed on its own be considered acceptable. Information should be provided with the application to address:

- The degree or magnitude of change to an area, feature or species; and
- The nature of the potential change reflecting the inherent sensitivity of the effected area, feature or species.

3.4.72 The consideration of cumulative effects can only be undertaken on a case-by-case basis, in the light of existing baseline conditions, accurate descriptions and visualisations of effects on key receptors, and relationships with other developments. These are impossible to predict at a broader level. East Riding of Yorkshire Council will make a decision on each individual scheme following careful consideration of the information provided. Cumulative effects will also be considered in terms of facilities and impact on adjacent neighbouring areas across the boundary from the East Riding of Yorkshire.

Scottish Natural Heritage has developed considerable experience in dealing with the cumulative effects of wind energy development. See 'Guidance -Cumulative Effect Of Windfarms' which can be found at: http://www.snh.org.uk/pdfs/strategy/Cumulativeeffectsonwindfarms.pdf Information on what to include in Cumulative Impact Assessment's can be found in Habitat Regulations Guidance Note 4 (HRGN4) 'Alone or in Combination' which can be found at: http://www.mceu.gov.uk/MCEU_LOCAL/Ref-Docs/EN-HabsRegs-InComb.pdf

3.4.73 Further guidance for developers applying for planning permission for renewable energy developments is provided in **Appendix Three**.

4 Biomass and Energy Crop Conversion

4.1.1 The following section provides a brief description of the processing of biomass and energy crops as a source of renewable energy, and discusses the potential of biomass conversion to contribute to meeting regional and local targets for renewable energy generation. This section also identifies planning issues that need to be taken into account in preparing applications for biomass plant developments.

- Appendix Two provides a summary of broader planning issues for renewable energy developments.
- Appendix Three provides further guidance for developers applying for planning permission for renewable energy developments. .

4.1.2 Biomass fuels fall into two main types: dry or wet. Each type utilises a distinct technological approach; energy conversion of dry biomass generally involves heat, whereas the conversion of wet biomass generally involves fermentation or digestion. Biomass is appropriate for both the domestic and non-domestic energy sectors. Wet biomass technologies will be dealt with in the 'Waste Related Technologies' section in Chapter 5 of this guidance.

4.1.3 Biomass is a general term that covers a wide range of natural materials from which energy can be extracted. The principal dry biomass fuel sources include:

- Forestry – co-product from existing forestry operations;
- Energy crops i.e. Short Rotation Coppice willow or poplar (SRC);
- Primary processing co-product;
- Clean wood waste from industry;
- Other crops and bi-products, - straw and miscanthus are notable potential sources in East Riding;
- Poultry litter;
- Biodegradable fraction of Municipal Solid Waste (MSW).

4.1.4 Source material ('feedstock') may come from locally grown crops or imported from elsewhere in the country or further afield. Concerns have been raised about the potential negative impacts of biomass crops on the displacement of other crops or the loss of valuable habitats, particularly from overseas where there may be less environmental protection. Whereas this Interim Planning Document does not seek to limit the choice of feedstock, and applies irrespective of its source, the Council has a preference for using locally sourced feedstock as far as practicable

as this can provide local economic advantage, reduce transport movements, and where local habitat concerns may be better addressed.

4.1.5 Energy generation based on biomass is technologically well advanced and widely used. There are three main methods for converting dry biomass fuels into energy:

- Direct combustion, in order to heat water or raise steam, to drive a steam engine or turbine to generate electricity (steam cycle).
- Gasification - the solid fuel undergoes incomplete combustion in a limited air supply to produce a combustible gas that can be burned in a boiler, or used as fuel for an engine or gas turbine.
- Pyrolysis - heating in the absence of oxygen (rather like traditional charcoal production) to produce a combustible gas or liquid, which is used in a similar way to gas produced from gasification.

4.1.6 The three technologies appear similar externally in terms of their size, extent and appearance; similar amounts of fuel feedstock will be required, and emissions and other waste products will be similar. Pyrolysis and gasification plants may have a smaller footprint, as the process is more compact.

4.1.7 There are three main types of biomass plant:

- Plant designed primarily for electricity production. Often larger schemes, in the range 10 to 40MW (though larger or smaller schemes are possible), and excess heat from the process is not utilised. Typically, 1 MW of electricity generated would require around 4MW of thermal input;
- Combined Heat and Power (CHP) plant. The primary product is electricity, but excess heat is used productively, for instance as industrial process heat or in a district heating scheme. The typical size range for CHP is 5 to 30 MW total thermal energy output, but smaller schemes of a few hundred kilowatts have been built in the UK; and,
- Plant designed for the production of heat. These cover a wide range of applications, including single dwelling domestic or district heating, commercial and community buildings, and industrial process heat. The size can range from a few kilowatts, to above 5MW thermal.

4.1.8 As a result of EU directives and Government incentives, it is likely that liquid transport fuels produced from biomass sources (such as biodiesel and bioethanol) will become more common in the future.

4.1.9 Most biomass plants require fuel to be provided in a chipped form, and chipping often occurs close to where the crop is grown. Once chipped, the fuel tends to deteriorate fairly quickly. Fuel may be left in long term storage in the 'as harvested' state, either in situ, or in converted agricultural buildings, or loaded directly onto lorries for delivery to the energy plant. Generally, only short-term storage facilities are provided at the energy plant, and regular fuel deliveries are needed. A useful rule of thumb for fuel deliveries is two 38 tonne lorry deliveries per day, per MW thermal continuous heat input. For example, a 10MW plant producing electricity continuously would require around 20 deliveries a day.

4.1.10 Within East Riding of Yorkshire, there was by early March 2009 planning approval for 23.7MW of renewable energy to be generated from biomass development and an appeal outcome awaited for a further 10MW plant. Discussions had taken place over a number of further planning applications for biomass development.

4.2 Potential Capacity for Biomass Crop Production

4.2.1 Market forces and an immature supply infrastructure are identified as the main factors holding up early development of biomass technology. AEAT Technology identified short rotation coppice as potentially the most important source of fuel for the Yorkshire and the Humber region. In East Riding, straw and miscanthus may also become important sources. Existing managed woodlands are likely to be a significant contributor of biomass fuel, at least in the short term. Other sources of biomass are likely to be significant for smaller biomass generation and CHP plants; they may include forestry, farm woodland and waste wood.

4.2.2 The land use demand for energy crops will have an impact mainly on agricultural land, but brownfield sites can also be used. Prior to 2010, co-firing of wood biomass in existing coal-fired power stations is likely to be the primary use of biomass crops grown in East Riding of Yorkshire and the wider region. Some small independent biomass schemes may be operational by 2010. By 2021 biomass technology and the market should have developed sufficiently to provide significant opportunities for biomass energy generation. A regional potential of 65MW by 2021 is identified (SREAT study, 2004). AEAT Technology estimated that the Yorkshire and Humber region as a whole would require about 30,000 hectares of energy crop to be established beyond 2010 to meet this target.

4.2.3 In 2005 the Tyndall Centre and Manchester Business School published research on “Indicative 2030 Bioenergy scenarios for Yorkshire and Humber”. This report looked at a number of scenarios for both biomass burning and supply, including options incorporating importing willow from overseas.

Co-firing of Biomass in Coal fired Power Stations

4.2.4 Current Co-firing Regulations allow coal fired power stations to burn biomass with coal. Although there are no coal-fired power stations located within East Riding of Yorkshire, biomass crops are being grown within the East Riding of Yorkshire to supply the Drax power station in North Yorkshire. No biomass or co-firing capability has been identified within the East Riding of Yorkshire to meet the 2010 target, but some potential (4.1MW wood biomass and 13.3MW other sources of biomass) has been identified within the East Riding of Yorkshire by 2021.

Locational Issues

4.2.5 Three main considerations impact on locational decisions for biomass-fuelled power plants: feedstock availability, availability of customers and proximity to the national grid. For economic and environmental reasons, the ideal maximum transport distance for biomass fuel is about 40 km (this is not a planning consideration but best practice); this may be greater for larger plants where fuel can be transported by rail or sea. Generally it is preferable to locate the proposed plant near the 'centre' of the proposed feedstock source, and therefore it may not always be practical for them to be located on previously developed land. To ensure security of supply and meet regulatory policy where a variety of feedstocks are utilised, this 'centre' will be influenced by the location of the various different feedstocks. Locations close to ports or railheads will be preferred locations for larger plants, particularly for those plants that use widespread and/or overseas fuel sources. However, these may not be so ideal for locally produced biomass plants which are served by crops from the Energy Crops Scheme, which requires the crops to serve a sustainable catchment area.

4.2.6 Where plants are located in rural areas it will be important to ensure that cumulative effects do not lead to a perception of industrialisation, either within a landscape or a wider area.

Emissions and Waste Products

4.2.7 Biomass energy production can produce three types of emissions or waste products; emissions to air, watercourses and ash. The Environment Agency (EA) has responsibility for the control of water quality, water abstraction and emissions – but a brief discussion of these issues is included here.

4.2.8 **Airborne Emissions** - Emissions from biomass fuel combustion include limited quantities of gaseous nitrogen and sulphurous oxides and carbon dioxide. Emissions of nitrogen and sulphurous oxides are significantly less than those from comparable fossil fuel stations. Flue gas is discharged from the plant via a chimney. Under certain conditions

(particularly in cold weather) a steam plume may emanate from the chimney. This is non-polluting, so the only impact is visual.

4.2.9 Biomass fuel combustion may also give rise to particulate emissions from the chimney, known as 'fly ash'. This is controlled to within UK and European particulate emission limits using techniques such as cyclone separation, or electrostatic precipitation in the flue.

4.2.10 **Emissions to Watercourses** - A generating station may require a supply of water for steam production and condensing. Air-cooling can be used where water supplies present a problem, in order to reduce net abstraction. Advanced conversion processes such as gasification and pyrolysis may need lower levels of water use, depending on the technology.

4.2.11 A generating plant will also release treated boiler drainings and condensate, effluent from the water treatment process and surface water run-off to the public sewer system. Effluent from gasification plants may need treatment to remove organic contamination before release to the sewer.

4.2.12 Large wood chip piles can produce liquids that can leach to watercourses, requiring a collection ditch around the storage area. Recent research indicates that nitrate and other concentrations in the run-off water from wood stores are likely to be well below the maximum level for drinking water specified in the Nitrate Directive.

4.2.13 The Biological Oxygen Demand (BOD) values of run-off water are also likely to be low in comparison with other agricultural effluent such as manure slurry.

4.2.14 **Ash -** The main solid bi-product of the conversion of biomass into energy is ash, which is produced at a rate of around 1 per cent of the total weight of the biomass burned. If residues from forests are used, the inclusion of materials such as soil may increase this ash level to 3-4 per cent. The ash from most fuels can be safely returned to the soil as a fertiliser.

4.3 Key Detailed Planning Issues for Biomass and Energy Crop Conversion Developments

4.3.1 This guidance note covers planning issues associated with potential power plants and not the production of the fuel source. However, while the impacts of growing and collecting the fuel are not planning issues, they are key to ensuring the successful development of a facility. Many of the environmental issues associated with the fuel supply (e.g. impact on landscape, ecology, archaeology, land use etc) may be covered by an

Environmental Impact Assessment (EIA) undertaken by other bodies in connection with the scheme - for instance by the Natural England (NE) for all applications submitted in England under the Energy Crops Scheme.

4.3.2 Further assistance on assessing the environmental impact of a development can be found by using the Biomass Environmental Assessment Tool (BEAT2) (www.biomassenergycentre.org.uk/portal/page?_pageid=74,153193&_dad=portal&_schema=PORTAL).

4.3.3 New electricity generation plants with capacity of more than 50MW need to obtain consent from the Secretary of State for Energy under Section 36 of the Electricity Act 1989. The Council will be a statutory consultee. Heat only plants, and electricity plants or CHP with an electrical output of 50MW or less will require planning permission under the Town and Country Planning Act 1990.

Impacts on Local Communities

4.3.4 The long-term benefits of renewable energy developments are experienced widely, and indeed benefit the whole country. More localised impacts will however be felt by the local communities adjacent or nearby to the proposed development. These impacts can be either positive or negative.

4.3.5 On the positive side, biomass can provide opportunities for rural economic diversification, generate local jobs, and opportunities for community based schemes and educational resources (further detail is provided in the subsection on *Impacts on the Local Economy* below).

4.3.6 On the negative side, communities may raise concerns about a number of potential impacts, for example impacts on traffic and the transport network from transporting biomass crops, pollution of air or waterways, disposal of waste products, diesel spillage, noise, odour, light and dust associated with construction activity and the operation of plants. Effects on the health of local people from emissions, and impacts on local ecology or conservation from airborne and water borne emissions may be other concerns.

4.3.7 The construction of a plant can also have a negative impact if it reduces access to, or enjoyment of, rights of way and important or popular views. However, local generation will lead to shorter fuel travel distances.

4.3.8 It should be noted that the above positive and negative impacts are not exhaustive.

4.3.9 The above impacts can be reduced by careful planning, which respects these concerns, and is undertaken in consultation with the affected local

groups, residents and stakeholders. Planning conditions will usually include one to ensure that construction work is carried out in accordance with a method statement agreed by the Council.

Impacts on the Local Economy

4.3.10 Consideration needs to be given to both positive and negative effects on the local economy. Positive effects include the potential for farmers to secure a long-term income from selling biomass crops. Growing energy crops can provide a viable use for under-utilised/marginal agricultural land, the land suggested for biomass production by the Gallagher Review. Local labour/supplier chains should be investigated for the construction phase.

4.3.11 Agricultural contractors, forestry owners and contractors, plant and transport operators, can be employed in a range of skilled and un-skilled jobs generated by the industry. Other benefits arise from using local suppliers for related goods and services, and the subsequent multiplier effects on the local economy. Some 80 to 90% of operational expenditure on biomass fuel supply can accrue to the local economy.

Impacts on Local Amenity

4.3.12 Environmental impacts associated with the construction and operation of processing plants and associated infrastructure are important planning issues, and proposals will need to address the requirements of planning and other statutory regulations in terms of the generation of noise, dust, light, odour, waste products production and disposal. Energy plants are industrial in nature and will include a chimney, they will therefore have a certain visual impact. In certain weather conditions a steam plume may be evident from the chimney and/or drying equipment depending upon the design of the equipment. Noise will be emitted from traffic and plant operations - BS4142 which relates to industrial operations is likely to be the applicable standard.

Landscape and visual impacts

4.3.13 Where a large scale processing plant is proposed, it is particularly important to recognise the character and quality of the recipient landscape, the extent of physical change involved, and the ability of the landscape to accommodate this change. All these factors should be taken into account in scheme design.

4.3.14 The appearance and site footprint will depend on the scale of the plant. In the case of a large electricity generating plant, a medium sized industrial building of two-storey height is likely to be required, with a slender chimney of 25 or more metres in height. A barn scale building may be required for on-site storage of fuel, and additional buildings for offices and workshops. An extensive area for lorry manoeuvring will be

needed. Typically, a 1.5MW plant producing electricity using gasification technology will require a site area of some 0.5 hectares and a 40MW plant may require 5 hectares.

4.3.15 Planning conditions are likely to cover the layout and appearance of plant and drying/storage facilities to be approved, and screening of plant and/or drying or storage facilities.

Impacts on Cultural Heritage

4.3.16 The East Riding of Yorkshire area has a varied historical and architectural heritage, which has played a key part in the development of the area's character, culture and economy.

4.3.17 When scoping and designing biomass processing plants consideration needs to be given to potential effects on cultural heritage and the historic environment. Archaeological remains can be vulnerable to destruction from construction.

Impacts on Biodiversity, Habitats and Nature Conservation

4.3.18 The main issues are likely to be the effect of airborne and waterborne emissions on local ecology or conservation. Map 2 of Appendix Ten identifies the nature conservation sites at highest risk, these are sites of international designation along the western and southern borders of the East Riding of Yorkshire, two sites on the eastern coastline and sites of high sensitivity along the course of the River Hull. In the areas around these sites consideration should be given to the effect development will have on the sites.

4.3.19 Alien, exotic and genetically altered biomass fuel varieties have the potential to escape into the wider countryside, where they could potentially hybridise with native varieties and result in a loss of biodiversity through the elimination of native gene pools. Effective control measures should be put in place to prevent potential escapes or the release of non-native pollens.

4.3.20 Further information on Biodiversity, habitat, nature and heritage conservation is available in appendix 4.

Impacts on Highways, Road Networks and Rights of Way

4.3.21 The location of biomass energy plants requires careful consideration of road usage requirements. Appropriate sites may be existing industrial estates or sites well served by the primary road network. Deliveries management should mitigate the problems of traffic flow around the plant itself, where it will be likely to have the greatest impact, and avoid the queuing of lorries. A dedicated fleet of lorries may help ensure that only a limited number of heavy vehicles are involved, but the viability of this

depends on the scale of the plant. Assessments of the existing background movements of HGVs compared to the potential movements post development may be necessary to assess the impact a plant will have on the road network. The baseline and the increase in traffic above the base line and in comparison to the base line should be considered. The number of vehicles loaded with crop going through settlements and other sensitive areas should be minimised, and care should be taken to avoid mud on roads from vehicles coming directly from fields.

4.3.22 The biomass plant will generate traffic from the transport of biomass fuel and subsequent by-products, as well as movement of employees and visitors. Large schemes may require a continuous fuel supply, which will increase traffic volumes and noise considerably. The scale of traffic generated by employee movements will depend on the size of the plant, but ways to reduce this impact should be considered though the preparation of a green travel plan. The details of any scheme will need to satisfy the relevant highway authorities.

4.3.23 Consideration of archaeology, ecology, hydrology, landscape and visual effects must be taken into account in any works to the transport network that are required in order to provide access to or transport crops.

4.3.24 Applicants are advised to consult the Highways Agency at an early stage when it is proposed to locate a biomass energy plant close to the trunk road network or where vehicles involved in a biomass development are to be routed via the trunk road network.

4.3.25 Planning conditions on traffic impacts are likely to cover issues such as traffic movements (e.g. limiting the maximum number of deliveries or the delivery times), delivery routes, size and types of vehicles.

4.3.26 The possible effects of development are not exhaustive, those listed and any other issues should be considered on a case by case basis.

4.3.27 Developers should also refer to **Appendix Two**, which provides a summary of the key planning issues of renewable energy developments and **Appendix Three**, which contains advice for developers applying for planning permission for renewable energy developments.

5 Other Renewable Energy Sources

5.1.1 Currently wind power and biomass and energy crops hold the most potential for meeting the regional and local targets for renewable energy generation in the East Riding of Yorkshire. However the exact composition of the technologies that comprise the local renewable energy infrastructure is likely to change over time, and the longer term the importance of other renewable energy sources is likely to increase. This section provides a brief description of a number of other renewable energy sources and discusses their potential to contribute to future renewable energy generation in the East Riding of Yorkshire. Where particular types of technology raise specific or unique planning issues, these issues are discussed in further detail.

- Further information in relation to broader planning issues for renewable energy developments can be found in Appendix Two.
- Further guidance for developers applying for planning permission for renewable energy developments is provided in Appendix Three.

5.2 Hydropower

5.2.1 Hydropower systems convert potential energy stored in water held at height to kinetic energy (or the energy used in movement) to turn a turbine to produce electricity. The energy available in a body of water depends on flow rate and the height (or head) that the water falls. The scheme's actual output will depend on how efficiently it converts the power of the water into electrical power (maximum efficiencies of over 90% are possible but for small systems 60 - 80% is more realistic).

5.2.2 Hydropower is well established in England and most sites with a potential greater than 1 MW have already been developed. Largely in response to Government initiatives encouraging the greater use of renewable energy sources, interest in the development of small-scale hydropower schemes has increased. The term “small-scale” applies to developments of about 100KW to 5 MW. Improvements in small turbine and generator technology mean that small-scale hydro schemes are an attractive means of producing electricity, and useful power may be produced from even a small stream. There is also significant potential for small-scale hydro to be installed in water supply reservoirs to take advantage of compensation water.

5.2.3 No sites have been identified exclusively within the East Riding of Yorkshire due to the low lying and relatively flat topography of the Humber region, which results in the lack of a hydraulic head. One

potential site exists in the north of the East Riding of Yorkshire close to the boundary with Ryedale, however at present technology is not advanced enough to capture the slow flow of the watercourse in question. Two additional potential sites are located on the borders of the East Riding of Yorkshire, one on the boundary between East Riding and York, at the site of Elvington Weir (where the lock is in York, but the most likely grid connection would be in the East Riding of Yorkshire). A similar situation occurs at Stamford Bridge - a site on the borders of York, East Riding of Yorkshire and Ryedale.

5.2.4 It is likely that other 'weaker' watercourses may have potential for the future, but at present there is little or no hydro resource in the Humber region which, using existing technology and financing routes, could be utilised to meet the 2010 and 2021 targets. Opportunities to harness hydropower are only likely to be taken up with greater government incentives, suitable financing agreements, and substantial investment in water turbine technology.

Tidal Power

5.2.5 Tidal power is a form of hydropower that exploits the movement of water caused by tidal currents and the rise and fall in sea levels which result from the gravitational attraction of the moon and the sun acting upon the oceans of the earth as it rotates.

5.2.6 There are two quite distinct categories of tidal resource: tidal stream and tidal range. The tidal stream resource is the kinetic energy contained in fast-flowing tidal currents, which are generally found in constrained channels. The tidal range resource refers to the gravitational potential energy that can be found in estuarine areas that exhibit a large difference in water height (their 'tidal range') between high and low tides.

5.2.7 The technology used to exploit each of these resources is quite different. Tidal stream devices rely on capturing some of the energy contained in the currents passing by them, whereas tidal range devices seek to impound large volumes of water at high tide, and then release the water through turbines at low tide.

5.2.8 The long term potential for tidal power both in terms of its contribution to UK electricity supply, and its export potential is considerable and thus in the long term opportunities to harness tidal power may develop within the East Riding of Yorkshire.

5.2.9 Whilst offshore tidal stream and tidal range renewable energy projects are not covered by the land-use planning system, the placement of a tidal energy scheme in waters close to the shore may have an impact on the

landscape and seascape of the area, particularly where the scheme results in onshore structures. Likewise the visual effects of supporting infrastructure such as substations and pylons will also be a key planning issue. Developers should enter into early dialogue with the Council to identify any key issues that need to be addressed. The same sensitivity issues will be applied to hydro and tidal power schemes as to other forms of energy development.

5.3 Active Solar Heating- Photovoltaics

5.3.1 There are two broad categories of active solar technology: Photovoltaic (PV) and Solar Water Heating (SWH). Solar Water Heating is discussed later in this section. PV systems exploit the direct conversion of sunlight into electricity in a semi-conductor device. The most common form of device comprises a number of semi conductor cells, which are interconnected and encapsulated to form a solar panel or module. Other forms of solar PV technology such as solar tiles are becoming more common in the UK, which can be integrated into new buildings or refurbishments alongside conventional roofing tiles or slates.

5.3.2 There are two types of PV system; stand-alone and grid connected schemes. Stand-alone systems are widely used to provide power for communications systems, domestic dwellings and monitoring systems either in remote areas or locations where connection to the grid is expensive or otherwise problematic. In grid-connected PV systems any surplus electricity not being consumed within the building can be exported to the local distribution network.

5.3.3 Buildings are convenient structures on which to place PC panels as the structure already exists and the power can be consumed directly within the building. PV panels need to be placed to face a southerly direction in order to maximise absorption of solar energy.

5.3.4 There is some potential for the exploitation of PV in the built-up areas of the East Riding of Yorkshire and by 2021 PV technologies will provide significant opportunities for East Riding of Yorkshire to supplement its power supply. Growth in PV is expected to be driven by future revisions to the Building Regulations. PV is an excellent technology but currently has a relatively longer pay-back period, and tends to be less favoured over shorter pay-back forms of technology. As research and development and manufacturing costs reduce, significant growth in the technology is expected. The potential identified for the area reflects house building and local population size – which is above average for the region.

5.3.5 The potential for PV has been split into two sectors, domestic and commercial. The domestic potential was estimated using the rate of new housing development (the Regional Planning rate as issued by the

Yorkshire Regional Assembly). The commercial sector potential was estimated on the basis of local population levels as a comparative indicator of future new commercial buildings within the local authority area. The consultants assumed that 9% of new build domestic property would include PV systems in the period up to 2010, and that this figure would increase to 50% from 2010 to 2021. This increase is based on predicted changes to planning and building regulations, as well as the availability of more cost-effective hardware.

5.3.6 **Table 4.1: Total PV Potential for Local Authorities in the Yorkshire and Humber Region (Extract from SREAT 2004, pg 29, Vol 2)**

Local Authority	Total PV Potential 2010 (kWp)	Total Anticipated Output 2010 (MWh)	Total PV Potential 2021 (kWp)	Total Anticipated Output 2021 (MWh)
East Riding	689	517	10846	8134
Total for the Yorkshire & Humber Region	8712	14629	138120	103590

5.4 Geothermal Technology

5.4.1 Geothermal energy is derived from the thermal energy stored in the earth's crust and can be used for electricity production, for direct heating purposes, and for home heating via Geothermal Heat Pumps (more commonly known as ground source heat pumps). Geothermal heat pumps are devices that take advantage of the relatively constant temperature below ground, using this as a source and sink of heat, i.e. for both heating and cooling. Ground source heat pump systems consist of a heat pump, an air delivery system and a heat exchanger - a system of pipes buried in the shallow ground near the building. In the winter, the heat pump removes heat from the heat exchanger and pumps it into the indoor air delivery system. The process is reversed in the summer and the heat pump moves heat from the indoor air into the heat exchanger. The heat removed from the indoor air during the summer can also be used to provide a free source of hot water.

5.4.2 Worldwide, geothermal energy is the third largest renewable energy contributor following hydroelectricity and biomass, and produces more energy than both solar and wind technologies. Despite this, the current level of geothermal use is tiny in comparison to its potential.

5.4.3 Geothermal energy has significant potential because such systems are cost effective and reliable, as well as being clean in terms of emissions. Geothermal energy systems have low maintenance costs; they do not require any external fuel or storage requirements and do not create any

noise nuisance. However, this method of heat transfer is not suitable for large-scale power generation and due to its dependency on the sun, its applicability is limited in cooler areas.

5.4.4 Some geothermal installations are available in the UK. The use of geothermal energy is likely to be more cost-effective at the small-scale community level provision, rather than for individual or large-scale applications.

5.5 Air Source Technology

5.5.1 Air Source energy operates on similar principles to geothermal technology, but the energy is derived from pumps that draw heat from the outside air during the heating season and reject heat outside during the summer cooling season. The use of air source energy is growing strongly at the domestic and small-scale community level, but with technology advances there is potential in the future for it to be used in larger-scale applications.

5.6 Energy Efficiency Technologies – Reducing the Need for Energy Generation

5.6.1 Renewable energy power generation is only one of several groups of energy technology measures that have a vital role to play in reducing the use of conventional fossil fuel derived energy and moving to a low carbon economy. Achieving a more efficient end use of energy is also an essential element of achieving national and regional targets for reducing carbon emissions. Incorporating energy efficiency measures into all forms of development is therefore part of a combined strategy to meet national and regional objectives for energy management.

5.6.2 Technologies such as those described below are not strictly renewable energy technologies, but all will have an important role to play in reducing energy consumption in the future.

Waste Related Technologies

5.6.3 There are a number of methods that can be employed to extract energy from waste. These can be broadly subdivided into thermal and biological processes.

5.6.4 Systems that use biological processes to extract energy from waste may use a range of fuel sources including: landfill gas; sewage gas; biogas from agricultural waste; digestible domestic or industrial waste. All these gases are products of an anaerobic digestion process. Anaerobic digestion (AD) is the bacterial fermentation of organic waste in warm, oxygen-free conditions. This process converts complex organic

molecules into a flammable gas comprising methane and carbon dioxide, leaving liquid and solid residues.

5.6.5 The main types of feedstock employed in anaerobic digestion are:

- Farm slurry – generated by the intensive rearing of livestock.
- Sewage sludge
- Catering/food waste.
- Green waste.

5.6.6 Systems that use thermal processes to extract energy from waste use a high temperature process to release chemical energy from the biodegradable fraction of municipal solid waste (MSW), business waste, sewage sludge and wood processing waste. Conventional incineration and advanced conversion technologies such as pyrolysis and gasification are the two most frequently used methods.

5.6.7 The most efficient energy from waste schemes generate both electricity and heat, and are called Combined Heat and Power (CHP) plants. This method is the most efficient in that most of the energy in the waste can be utilised.

5.6.8 A typical waste-fuelled combined heat and power process involves the following:

- Waste reception and storage;
- Waste processing, material sorting and recovery;
- Feeding of waste into the combustion, pyrolysis or gasification chamber;
- Combustion, pyrolysis or gasification;
- Generation of heat and power using steam turbines, gas engines or gas turbines;
- Treating the waste gases to reduce emissions;
- Handling, storage and disposal of ash residues;
- Handling, storage and disposal of liquid effluents such as boiler water and surface water.

5.6.9 Waste incineration technology uses large centralised plants. Such plants are best sited near to the main sources of feedstock, i.e. major urban areas, reducing the need for long distance waste transportation. The Hull & East Riding Joint Waste Local Plan (2004) does not permit the incineration of waste without heat recovery.

5.6.10 Many of the issues will be similar to those for biomass developments.

Table 4.2: Waste Related Technologies in East Riding of Yorkshire

Feedstock	Current situation	Future potential
Landfill Gas	There are four landfill sites in the East Riding of Yorkshire that capture landfill gas and use it for power generation. These are located at Carnaby (near Bridlington), Gallymoor (near Market Weighton), Humberfield (near Hessle) and Catwick Grange (near Leven). In total, they generated 3.7 MW of energy in 2007 for the national grid.	The exploitation of landfill gas is expected to increase in the short term in the region, but to be in decline by 2020 as alternative means of waste disposal are introduced. Landfill gas is not emitted from sites indefinitely and the gas is normally depleted within 5-15 years. For these reasons landfill gas was not included in the renewable energy targets SREAT 2004 study.
Sewage Gas	The technology currently makes a small contribution to electricity generation in the region, but currently this technology is not being utilised in the East Riding of Yorkshire.	
Waste Incineration	No current use of this technology in the East Riding of Yorkshire. Total municipal waste arising in 2005/06 for East Riding was 204,872 tonnes, of which 143,854 tonnes went to landfill, and 60952 tonnes (29.8%) was recycled or composted. 65 tonnes was burnt without obtaining Energy from Waste. Source: (http://www.defra.gov.uk/environment/statistics/ wastats/archive/mwb200506a.xls)	Proposed CHP plant at Salt End programmed for 2009/10 will be capable of burning 240,000 tonnes of waste and generate approximately 18 MW of power each year, enough energy to supply electricity to approximately 20,000 households all year round, which equates to a town the size of Bridlington[7]. Planning permission has been granted for construction at Salt End.

Hydrogen

5.6.11 Hydrogen is often referred to in the context of renewables. Hydrogen is not a renewable energy source although it can be generated from water using renewable sources of electricity. The hydrogen can be stored and then burned to release heat, or to generate electricity from a CHP plant or a fuel cell. Hydrogen is likely to become an important medium (or vector) for storing renewable energy and is particularly useful for intermittent technologies such as wind and PV. Hydrogen is a clean fuel and may have a role as a transport fuel in the future.

Coal Mine Methane

5.6.12 Coal mine methane (CMM) or mine gas can be extracted from both operating and abandoned coalmines. There are currently seven sites within the Yorkshire and Humber region with CMM licences, however none of these are currently located in the East Riding of Yorkshire, but

7 Target 45+ Joint Sustainable Waste Management Strategy for East Riding and Kingston upon Hull.

testing for the presence of coal bed methane took place in 2007 with the drilling of a borehole near Rawcliffe in the west of the East Riding.

Passive Solar Design

5.6.13 The utilisation of solar energy in buildings to provide light and heat and to drive natural ventilation is known as passive solar design (PSD). According to PPS 22 passive solar design cannot be considered a 'technology', however it does involve the utilisation of natural renewable energy (from the sun) and reduces the need for power generation. Passive solar design provides better daylighting, improves solar gains and facilitates natural ventilation, reducing energy requirements. It is thus commonly regarded as an energy efficiency measure. In general there is no additional cost in incorporating passive solar design principles, but design specifications must be incorporated from the beginning, as retrofitting is not generally an option.

Solar Hot Water

5.6.14 Solar hot water is a heat transfer system, which is well established, reliable and can provide a reasonable return on investment, especially if grant aided. Solar panels absorb heat from the sun to heat hot water for general use. Solar water heating systems can be used to heat water for a variety of purposes, including domestic use, light industrial and agricultural use and the heating of swimming pools.

5.6.15 The key component in a solar water heating system is the collector. Two main types are common in the UK: flat plate collectors and evacuated tube collectors. Radiation from the sun is collected by an absorber and is transferred as heat to a fluid, which conveys the energy to the domestic system using a heat exchanger.

Biomass Heating

5.6.16 The simplest utilisation of biomass is for direct heating in boilers. The main difference from conventional boilers is that provision must be made for fuel storage adjacent to the boiler to enable automatic feed. Although the market is still in its infancy there is a significant potential for wood heating boilers in the UK. A gradual growth in the wood fuel market is anticipated as conventional (fossil) fuels become more expensive and wood fuel infrastructure develops. The Government's Building Schools for the Future programme actively encourages the consideration of wood fuel (and dual fuel) heating plants as part of a wider green construction agenda.

6 Guidance for Developers – Applying for Planning Permission for Renewable Energy Developments

6.1.1 This section of the guidance provides advice for developers on the preparation and submission of planning applications for renewable energy developments. It includes guidance on pre-application discussions with the Council, best practice and information requirements for submission with applications.

General Requirements for Renewable Energy Development Planning Applications

6.1.2 In submitting a planning application, developers should be able to demonstrate that the proposal:

- Meets the requirements of the relevant and current development plan policies – including the Yorkshire and Humber Plan (RSS), the Joint Structure Plan for East Riding and Hull (JSP), and the relevant Local Plan, and any emerging policies in the Local Development Framework;
- Does not (alone or in combination with other developments or plans) compromise the reasons behind any relevant international, national or regional designation (i.e. for landscape, ecological, scientific, historic, cultural or other reasons), or if it does, can demonstrate a substantive case for allowing the project to proceed (e.g. by demonstrating that any economic, social or environmental benefits clearly outweigh the reasons for the designation); in line with the Habitat Regulations 2004;
- Addresses the issue of visual impact, cumulative visual impact, impact on biodiversity and cumulative impact on biodiversity, where this is relevant; and
- Describes any environmental, social and economic benefits that are specific to the proposal (as opposed to, for example, broader environmental benefits that could be applicable to any renewable energy project).

How the application will be assessed:

6.1.3 In considering an application, East Riding of Yorkshire Council will consider the following questions:

- Does the proposal satisfy the relevant criteria-based policies in the Yorkshire and Humber RSS and detailed policies in the

Structure Plan, Local Plans and emerging Local Development Framework?

- How significant is any non-compliance and to what extent are area- based planning designations compromised?
- What is the extent of any positive or negative impacts, and how can these be mitigated? Are conditions or a Section 106 Agreement required, in order to mitigate adverse impacts? If the application may affect a designated site for nature conservation determination will be made under the Habitat Regulations.
- Have application-specific matters such as traffic impacts, landscape impacts and cumulative visual impact been properly addressed?
- Could measures be taken to mitigate impacts during construction and after the technology is in operation?
- Can a condition be applied to cover restoration of the site should operations cease?
- What contribution does the application make towards meeting the local, regional and national targets?

The Renewables Advisory Board and BERR have recently published useful guidance on preparing planning conditions for wind energy developments: "Onshore Wind Energy Planning Conditions Guidance Note", October 2007. This can be found on their website at: http://www.planningrenewables.org.uk/cgi-bin/resource.cgi. This guidance will assist both developers and the East Riding of Yorkshire Council in considering appropriate conditions for individual developments.

Pre-Application Discussions

6.1.4 Applicants are encouraged to engage with East Riding of Yorkshire Council and consultees at the pre-application stage. This will be particularly important in determining an agreed approach for undertaking a landscape and visual impact assessment or ecological field surveys (where these are required), and what particular information should be submitted with the planning application.

6.1.5 When a development is close to or intends to use the strategic highway network the Highways Agency should be consulted. If a planned development will have an affect on a national or internationally designated site for nature conservation English Nature should be consulted. A list of typical consultees is included in appendix 8.

6.1.6 A list of the type of information that may be required is set out below.

Information Requirements

6.1.7 The companion guide to Planning Policy Statement 22: Renewable Energy sets out the relevant information that will be required to accompany a planning application for a renewable energy development. This can be accessed on the Department for Communities and Local Government website: http://www.communities.gov.uk/publications/planningandbuilding/planningrenewable

6.1.8 Additional information may be required for developments affecting designated sites for nature conservation. In these cases early discussion with Natural England is advisable.

Additional information requirements for wind turbines - impacts on aviation

6.1.9 For wind turbine applications, the following additional information is required:

- Information should be provided as to the nature of any correspondence entered into with the relevant authorities in relation to aviation.
- Details of pre-application discussions with Defence Estates (Ministry of Defence), National Air Traffic Safeguarding (NATS), the Civil Aviation Authority (CAA) (or Humberside/Robin Hood Airport).
- *Details of the full height of turbines* (to blade tip not just hub height) - so that airport authorities can determine if take off and landing surfaces are pierced, and any potential effects on radar systems.
- *Six figure grid references and the elevation of the ground* - noted clearly on the proposal. If the exact location of the wind turbines has not been determined, a worst-case scenario should be adopted, whereby the highest point of the potential site is used as the base for radar modelling.

Developers should enter into early dialogue with aviation stakeholders to identify any key issues that need to be addressed. The former DTI have prepared draft Guidelines (DTI "Wind Energy and Aviation Interests: an interim guide' DTI/Pub URN 02/1287) http://www.berr.gov.uk/files/file17828.pdf. The proforma included in the guide should be used by developers to consult with aviation interests when lodging proposals. Pre-planning consultations can be submitted Defence Estates safeguarding by the standard aviation Performa available from BWEA (www.BWEA.com).

6.1.10 For biomass plant applications, the following additional information is required:

- Maps, diagrams and drawings showing the location and design of the plant, and the general location of fuel sources;
- Details of the technology to be employed;
- In the case of large schemes, a Zone of Visual Impact map of the chimney, and photomontages of the plant from selected viewpoints;
- Details of vehicular access and movements, and principal transport routes for fuel supply;
- Landscaping provisions;
- Details of noise emissions;
- Site Management measures during construction; and,
- Although consent may be required under Section 37 of the Electricity Act 1989, indicative details of grid connection works, including transmission lines and transformers.

Environmental Impact Assessment

6.1.11 Environmental Impact Assessment (EIA) is a systematic procedure by which information about the scope and likely environmental impacts of a proposed development are assessed and presented to the Local Planning Authority, relevant stakeholders and the public, in order to inform the decision on whether the development should be granted planning permission.

6.1.12 Developers are advised to contact East Riding of Yorkshire Council at an early stage to discuss whether an EIA is required, as there are formal procedures to determine the need for, and scope of, an Environmental Statement, as part of the planning application.

Developers should refer to **Appendix Three**, which provides more detailed guidance in relation to the EIA process.

Post consent

6.1.13 Should consent be granted applicants should expect a number of conditions to be set. These may cover a wide range of issues, possibly including issues such as shadow flicker mitigation, aviation concerns, TV

interference, transport and traffic impacts, monitoring the effects on biodiversity and landscape character and noise etc.

7 Where to go for further information and advice

For further advice on how to interpret the contents of this Interim Planning Document, please contact the Council's Forward Planning Team at:

Asset Strategy
East Riding of Yorkshire Council
County Hall
Beverley
HU17 9BA

Tel: 01482 391737/40
Fax: 01482 391731
Email: forward.planning@eastriding.gov.uk

Sources of further information and advice have been provided throughout this document in relation to each section of this guidance. Further sources of useful information are:

Name	**Biomass Energy Centre**
Address	Biomass Energy Centre Alice Holt Lodge Farnham Surrey GU10 4LH
Website	http://www.biomassenergycentre.org.uk
Telephone	01420 526197

The Biomass Energy Centre draws together information from existing sources into one easy to use service based around a website and an information enquiry service. The website focuses on the various biomass fuel types that are commercially available or being researched.

Name	**British Wind Energy Association**
Address	Renewable Energy House 1 Aztec Row, Berners Road London, N1 0PW, UK
Website	http://www.bwea.com
Telephone	020 7689 1960

The British Wind Energy Association is the trade and professional body for the UK wind and marine renewables industries.

Name **BRE Environmental Assessment Method** (BREEAM)
Address BREEAM Centre
BRE
Garston
Watford
WD25 9XX
Website http://www.breeam.org
Telephone 01923 664462

The BREEAM family of assessment methods and tools are all designed to help construction professionals understand and mitigate the environmental impacts of the developments they design and build. The website provides information about the Code for Sustainable Homes which replaced Ecohomes in April 2007 for the assessment of new housing in England.

Name **East Riding of Yorkshire Biodiversity Partnership**
Address C/o Mr David Renwick
Biodiversity Officer
East Riding of Yorkshire Council
County Hall
Beverley
East Riding of Yorkshire
HU17 9BA
Email: david.renwick@eastriding.gov.uk
Tel**:** 01482 391718

To develop and implement the plan The East Riding Biodiversity Partnership will include the Council, statutory organisations such as the Environment Agency and Natural England, voluntary and non-governmental organisations like the Yorkshire Wildlife Trust and the RSPB. Local wildlife and countryside groups, amateur naturalists, local landowners, interest groups and other stakeholders will also be members of the group. The first key role for the Partnership is to assist in the development of the Biodiversity Action Plan into a working document.

Name **Highways Agency**
Address Yorkshire North East Highways Agency
Lateral
8 City Walk
Leeds
LS11 9AT
Website http://www.highways.gov.uk

Where development is close to or will use the strategic road network.

Name **Humberside Airport Safeguarding**
Address C/o East Midlands Airport
Building 34
East Midlands Airport
Castle Donnington

Derby
East Midlands
DE74 2SA

Humberside Airport should be contacted before applications within 30km of the airport are submitted. They are also willing to discuss proposals further afield.

Name **Humber Ecological Data Partnership**
Website http://www.humber-edc.org.uk

For ecological data on the Humber

Name **Humber Industry and Nature Conservation Association Humber** (INCA)
Address Waters Edge
Maltkiln Lane
Barton upon Humber
DN18 5JR

May be a useful source of information within 10km of the Humber Estuary.

Name **Natural England**
Yorkshire and the Humber Region
Government East and Maritime Team
Bullring house
Northgate
Wakefield
WF1 3BJ
Telephone 0300 060 0430
Email govteast.y&h@naturalengland.org.uk
Website http://www.naturalengland.org.uk

Maps are available on the Natural England website relating to designated sites. Where it is found that any development will have an affect on a designated site Natural England should be contacted.

Name **North and East Yorkshire Ecological Data Centre**
Website http//:www.neyedc.org.uk

For ecological data on the East Riding of Yorkshire.

Name '**Our Energy Future: Creating a Low Carbon Economy**' (DTI, 2003)
Website http://www.berr.gov.uk/energy/policy-strategy/energy-white-paper-2003/page21223.html

Our Energy Future – Creating a Low Carbon Economy defines a long-term strategic vision for national energy policy combining national environmental, security of supply, competitiveness and social goals.

Name **Public Protection**
Address East Riding of Yorkshire Council
County Hall
Cross Street
Beverley
East Yorkshire
HU17 9BA
Tel 01482 396301

Applicants are advised to contact Public Protection who can help minimise any effects of development and construction on communities.

Name **Royal Society for the Protection of Birds** (RSPB)
Address C/O The Priory Centre
15 Priory Street
York
YO1 6ET
Telephone 01904 613121

RSPB can be contacted in relation to potential surveying for and assessing the potential impacts on sensitive birds and post construction monitoring.

Name **The British Hydropower Association**
Address 12 Riverside Park
Station Road
Wimbourne
Dorset
BH21 1QU
Website <http://www.british-hydro.org/>
Telephone 01202 880333

The British Hydropower Association (BHA) is a trade association, which represents the interests of the hydropower industry. The website provides a large variety of useful information, particularly in relation to small-scale hydro schemes.

Name **The Carbon Trust**
Address 8th Floor
3 Clement's Inn
London
WC2A 2AZ
Website http://www.carbontrust.co.uk/about/contact/
Telephone 0800 085 2005

The Carbon Trust is a private company set up by the government to offer help to the private and the public sector to reduce carbon emissions and capture the commercial opportunities of low carbon technologies.

Name **The Centre for Sustainable Energy**

Address 3 St Peter's Court
Bedminster Parade
Bristol BS3 4AQ
Website http://www.cse.org.uk
Telephone 0117 934 1400

The Centre for Sustainable Energy works with individuals and organisations from public, private and voluntary sectors on a wide range of sustainable energy initiatives at a local, regional and national level.

Name **The Countryside Character Network**
Address Rachael Mills
Natural England
John Dower House
Crescent Place
Cheltenham
Glos.
GL50 3RA
Email coordinator@landscapecharacter.org.uk
Website http://www.ccnetwork.org.uk
Telephone 01242 533338

The Countryside Character Network is a discussion forum on landscape issues in the UK, and may be a useful source of further information especially in relation to landscape character assessment. A list of all the LCA topic papers is available from the website.

Name **The Department for Business, Enterprise & Regulatory Reform (BERR)**
Address Ministerial Correspondence Unit
Department for Business, Enterprise & Regulatory Reform
1 Victoria Street
London
SW1H 0ET
Website http://www.berr.gov.uk/energy/sources/renewables/
Telephone 020 7215 5000

The website provides information about renewable energy, the UK Government policy and the Renewables Obligation, UK planning policy and planning processes, and the various financial support programmes for investing in renewables.

Name **The Energy Savings Trust**
Address 21 Dartmouth Street
London
SW1H 9BP
Website http://www.energysavingtrust.org.uk/
Telephone 0800 512 012

The Energy Saving Trust is a non-profit organisation, funded by the government and the private sector to address the damaging effects of climate change. The trust offers free and impartial advice in relation to sustainable and efficient use of energy.

Name	**The North and East Yorkshire Ecological Data Centre**
Address	St William's College 5 College Street York YO17JF
Website	http://www.neyedc.co.uk/
Telephone	01904641631

The North and East Yorkshire Ecological Data Centre (NEYEDC) is the operating name of the North and East Yorkshire Ecological Data Trust. The aim of NEYEDC is to inform environmental planning in north and East Yorkshire via the collation, management and distribution of biodiversity information.

Name	**The Renewable Energy Association**
Address	Renewable Energy Association 17 Waterloo Place London SW1Y 4AR
Website	http://www.r-p-a.net
Telephone	020 7747 1830

The Renewable Energy Association was established in 2001 to represent British renewable energy producers and promote the use of sustainable energy in the UK.

Name	**The Renewable Energy Centre**
Address	1 Alpha House Farmer Ward Road Kenilworth Warwickshire CV8 2ED
Website	http://www.therenewableenergycentre.co.uk
Telephone	01926 865835

Name	**Yorkshire Wild Life Trust**
Address	1 St George's Place York YO24 1GN
Telephone	01904 659570
Website	http://www.ywt.org.uk

Yorkshire Wildlife trust can advice on nature conservation.

8 Glossary

Biomass: The biodegradable fraction of products, waste and residues from agriculture (including plant and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste.

Climate Change: A process of changes to weather patterns and temperatures largely caused by the emission of certain 'greenhouse gases' from earth, principally associated with the burning of fossil fuels.

CO2 Carbon Dioxide: The main, greenhouse gas, formed by the combustion of all fossil fuels.

Cumulative Effects: This is the result of more than one scheme being constructed and is the combined effect of all the developments, taken together. This may be in terms of their effect for example, on landscape and visual amenity, bird populations, the local economy, etc.

Energy Conservation: The reduction of energy consumed - usually achieved by changing habits or patterns of use and not requiring significant investment.

Environmental Impact Assessment: The process used for describing, analysing and evaluating the range of environmental effects that are caused by a proposal.

Environmental Statement: The document supporting a planning application that sets out the findings of the Environmental Impact Assessment.

Greenhouse Gases: The six main gases contributing to climate change found in the upper atmosphere. They prevent some energy being re-transmitted into space. The gases include carbon dioxide CO2, methane CH4, nitrous oxide N20, hydroflurocarbons, perfluorocarbons and sulphur hexafluoride SF6.

Habitat Regulations: The Conservation (Natural Habitats, &c.) Regulations 1994 transpose Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law. The Regulations came into force in1994, and have been subsequently amended, most recently in 2000. The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites. Under the Regulations, competent authorities i.e. any Minister, government department, public body, or person holding public office, have a general duty, in the exercise of any of their functions, to have regard to the EC Habitats Directive.

Micro-generation: Very small scale power generation schemes, typically providing energy to a single household/office.

Mitigation: The act of amending a development proposal to reduce/remove harmful impacts.

Enhancement: To improve the quality of an area affected by a renewable energy development.

Landscape Capacity: The extent to which a landscape is able to accommodate development without key characteristics being adversely affected and the values attached to it being compromised.

Landscape Capacity Assessment: The process of describing, analysing and evaluating the extent to which the landscape can accommodate development without compromising its landscape character.

Landscape Character: A distinct pattern or combination of elements that occurs consistently in a particular landscape.

Landscape Character Classification: An assessment that classifies the landscape character into a number of distinct types reflecting the distinct pattern or combination of elements that occurs consistently in a particular landscape.

Landscape Sensitivity: The extent to which the character and visual amenity of a landscape is susceptible to change brought about by the introduction of a development.

Landscape Value: The relative importance that stakeholders attach to a landscape for a verity of reasons including scenic quality, perceptual aspects such as wildness, remoteness or tranquillity that contribute to a sense of place, rarity, presence and influence of other conservation interests and special cultural associations.

Mega Watt (MW): A watt is an electrical unit of power. A mega watt is a million watts.

Ramsar Sites: Wetlands of international importance designated under the Ramsar convention 1971, which requires signatory countries to protect international important wetlands, especially those used by migratory water birds, and to use wetlands wisely.

Renewable Energy: Collective term for energy flows that occur naturally and repeatedly in the environment. It includes energy derived by the sun, such as wind, solar hot water, solar electric (photo-voltaics), hydro power, wave, tidal, biomass, biofuels, and from geothermal sources, such as ground source heat pumps. Energy from waste is not regarded as a renewable energy as it is not capable of being renewed by the natural ecological cycle.

Special Area of Conservation (SAC): Strictly protected sites designated under the EC Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in the Directive.

Special protection Area (SPA): Strictly protected sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species.

Site of Special Scientific Interest (SSSI): A conservation designation denoting a protected area in the United Kingdom. SSSIs are the basic building block of site-based nature conservation legislation and most other legal nature/geological conservation designations in Great Britain are based upon them, including National Nature Reserves, Ramsar Sites, Special Protection Areas, and Special Areas of Conservation.

Wind Energy Development: Development consisting of one or more wind turbines, access tracks, ancillary buildings, substation, anemometer masts and supporting infrastructure.

Zone of Visual Influence: The area for which a development is potentially visible as determined by topography and other intervening features on the ground.

Abbreviations

AA	Appropriate Assessment
AONB	Area of Outstanding Natural Beauty
AD	Anaerobic Digestion
BAP	Biodiversity Action Plan
CO2	Carbon Dioxide
CHP	Combined Heat and Power
EIA	Environmental Impact Assessment
GCR	Geological Conservation Review
IPD	Interim Planning Document
LCA	Landscape Capacity Assessment
LDD	Local Development Documents
MW	Mega Watt
PV	Photovoltaic
PPS	Planning Policy Statement
RSS	Regional Spatial Strategy
SA	Sustainability Appraisal
SAC	Special Area of Conservation
SMA	Sensitive Marine Area
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
ZVI	Zone of Visual Influence

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