

# Strategic Environmental Assessment

## Guidance for Practitioners



## SEA Topic: Material Assets

Countryside Council for Wales



## Foreword

This Guidance Note forms one of a series which covers eight of the topics which need to be taken into account when undertaking Strategic Environmental Assessment (SEA) of plans and programmes. The topics covered are:

- Air
- Biodiversity
- Climate Change
- Cultural Heritage
- Landscape
- Material Assets
- Soil
- Water

Guidance Notes on the remaining SEA Topics of Population and Human Health have not been produced as the topics are outside the remit of CCW.

The aim of the Guidance Notes is to highlight the key topic related issues that need to be considered by practitioners who are carrying out or providing input into SEA. The notes have been written in non-technical language in order that they are accessible to a wide audience.

The Guidance Notes have been produced for CCW by the Centre for Sustainability (C4S) in association with ADAS for some of the topics. They have been written in consultation with the Environment Agency (Wales) and Cadw, the Welsh Assembly Government's historic environment service.

It is intended that the Notes will be updated periodically in order that they remain current and relevant, taking into account changes in legislation, guidance and baseline trends.

The authors would like to thank officers from CCW, the Environment Agency and Cadw for the topic specific input they have provided in the preparation of the Guidance Notes. They would also like to acknowledge the contributions provided by officers from Department of Communities and Local Government (DCLG) and the Welsh Assembly Government (WAG) in relation to the generic text and document structure, and to officers from local authorities for providing input from their perspective as potential users of the guidance.

Lead Editors: Charlotte Brannigan, Rob Gardner and Clare Harmer (C4S)

© CCGC/CCW August 2007

You may use and reproduce this document free of charge for non-commercial and internal business purposes, except where other copyright is stated. You may reproduce it in any format or medium, provided that you do so accurately, acknowledging both the source and CCW's copyright, and do not use it in a misleading context.

This is a report of research commissioned by CCW. However, the views and recommendations presented in this report are not necessarily those of CCW and should, therefore, not be attributed to CCW.

*Images on Front Cover: CCW Images*

## Purpose and Structure of the SEA Topic Guidance Notes

This is one in a series of guidance notes from the Countryside Council for Wales (CCW) on topics to be covered in Strategic Environmental Assessment (SEA) under the SEA Regulations for Wales<sup>1</sup> which implement the European Directive on SEA<sup>2</sup>. The aim of these notes is to provide guidance to Welsh **Responsible Authorities** (the authorities by which, or on whose behalf the SEA is prepared) and others conducting SEA of plans and programmes, how issues related to certain SEA topics can be considered in the SEA of plans and programmes. These Guidance Notes also aim to help Responsible Authorities provide robust and sound reports which will enable CCW to comment and advise during the SEA process.

CCW provides information and advice related to the Habitats Directive and Regulations, and to protected species, designated sites including Sites of Special Scientific Interest (SSSIs) (including geological SSSIs), National Nature Reserves (NNR), Special Areas of Conservation (SAC) and candidate SACs, Special Protection Areas (SPA) and proposed SPAs.

### Consultation in the SEA Process

CCW, Cadw and the Environment Agency (EA), have been designated as statutory '**Consultation Bodies**' in Wales in relation to the SEA Directive, and must be consulted at a number of stages during the SEA process (adapted from *The Practical Guide*):

- **Screening** – Determining whether a plan or programme requires SEA (NB: this is only required in a small number of cases – see box on Screening below);
- **Scoping** – Deciding on the scope, extent and level of detail of the information that must be included within the Environmental Report;
- **Reporting** – During full public consultation on the draft plan or programme and the Environmental Report; and

The advice that the Consultation Bodies aim to provide during periods of consultation is detailed in the '*Consultation Bodies' Services and Standards for Responsible Authorities in Wales*' (Environmental Agency *et al*, 2005).

NB: Where a plan or programme is likely to have significant effects on the environment in another Member State of the European Union, the SEA Directive requires that transboundary consultation should take place.

Annex 1(f) of the SEA Directive outlines the environmental topics that should be covered by the SEA process wherever relevant. These include Air, Biodiversity, Climatic Factors, Cultural Heritage, Human Health, Landscape, Material Assets, Population, Soil and Water. CCW is the statutory body responsible for advising on countryside, access, landscape and wildlife conservation in Wales. As regards SEA, CCW is primarily responsible for providing SEA consultation feedback and information on Biodiversity (including flora and fauna), Landscape and some aspects of Cultural Heritage issues, but also has an interest in the Soil, Water, Air, Climatic Factors and Material Assets topics. Therefore, SEA topic guidance notes have been produced for these eight environmental topics.

Particular reference has been made to the requirements of "The SEA Regulations for the implementation of the Directive in Wales" and to the "Practical Guide to the SEA Directive" produced by ODPM<sup>3</sup>, the Administrations in Wales, Scotland and Northern Ireland (referred to hereafter as *The Practical Guide*). This guidance note uses the SEA process as set out in *The Practical Guide* as a framework for the topic-related guidance (see Figure 1).

<sup>1</sup> The SEA Regulations for the implementation of the Directive, 'Welsh Statutory Instrument 2004 No. 1656 (W.170): *The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004*'.

<sup>2</sup> 'Directive 2001/42/EC of the European Parliament and of the Council on the Assessment of the Effects of Certain Plans and Programmes of the Environment' (June, 2001)

<sup>3</sup> ODPM, the Office of the Deputy Prime Minister, was superseded by DCLG, the Department for Communities and Local Government, in May 2006

## Link to the Environment Strategy for Wales

The Environment Strategy for Wales was published in May 2006 and includes a series of procedural and environmental 'outcomes' which the Welsh Assembly Government aims to achieve in the period up to 2026. Many of the Environment Strategy 'outcomes' are closely linked to the SEA topics and they have indicators which will be used to measure progress towards achieving the 'outcomes'.

The Strategy is supported by an Action Plan that provides details of the actions that will be taken to deliver the Strategy. This Action Plan includes milestones and responsibilities. It is also accompanied by a policy map which identifies the various influencing factors that will help in successful implementation of the Strategy. One of the contributory tools that is listed is Strategic Environmental Assessment.

Environmental Strategy outcomes which are linked to the SEA topics include:

- Climate change (outcomes 7 & 8); Material assets (waste) (9, 10, 11 & 39);
- Material assets (resources) (12, 17 & 18); Water (13, 14, 15, 31, 32, 35 & 36);
- Soil (16); Biodiversity (19, 20, 21 & 22); Landscape (23); Cultural Heritage (26);
- Air quality (33); Human health (37 & 38).

NB: There are also other outcomes which cut across more than one SEA topic.

The 'outcomes' from the Strategy could be used when developing objectives for the plan that is subject to SEA.

Where appropriate the Indicators that are included in the Strategy should be considered for incorporation into the SEA assessment and monitoring frameworks.

Environment Strategy outcomes and indicators relating to the Landscape topic can be seen in

The Environment Strategy can be found at:

[http://new.wales.gov.uk/topics/environmentcountryside/epq/Environment\\_strategy\\_for\\_wales/About\\_the\\_strategy/?lang=en](http://new.wales.gov.uk/topics/environmentcountryside/epq/Environment_strategy_for_wales/About_the_strategy/?lang=en)



|  |   |
|--|---|
| <b>STAGE A: Setting the context and objectives, establishing the baseline and deciding the scope</b> | A1: Identifying other relevant plans, programmes, and environmental protection objectives       |
|  | A2: Collecting baseline information   |
|  | A3: Identifying environmental problems  |
|  | A4: Developing SEA Objectives   |
|  | A5: Consulting on the scope of SEA  |
| <b>STAGE B: Developing and refining alternatives and assessing effects</b>                           | B1: Testing the plan or programme objectives against the SEA objectives                         |
|  | B2: Developing strategic alternatives   |
|  | B3: Predicting the effects of the draft plan or programme, including alternatives               |
|  | B4: Evaluating the effects of the draft plan or programme, including alternatives               |
|  | B5: Considering ways of mitigating adverse effects  |
|  | B6: Proposing measures to monitor the environmental effects of plan or programme implementation |
| <b>STAGE C: Preparing the Environmental Report</b>   | C1: Preparing the Environmental Report  |
| <b>STAGE D: Consulting on the draft plan or programme and the Environmental Report</b>               | D1: Consulting on the draft plan or programme and the Environmental Report                      |
|  | D2: Assessing significant changes   |
|  | D3: Decision making and providing information   |
| <b>STAGE E: Monitoring implementation of the plan or programme</b>                                   | E1: Developing aims and methods for monitoring  |
|  | E2: Responding to adverse effects   |

Figure 1: SEA Process and Stages (Adapted from *The Practical Guide*)

This Guidance Note focuses primarily on the topic specific advice at SEA Stages A, B and E and is supplementary to guidance on the SEA stages as set out in *The Practical Guide*.

Responsible Authorities should refer to *The Practical Guide* at all stages of undertaking SEA for Plans and Programmes, which sets out the SEA Directive legal requirements, procedures and methods.

See also *References and Further Reading* at the end of this note, for more topic specific information.

## Material Assets in the context of the CCW Remit

In relation to SEA, Material Assets is considered to be a secondary SEA topic for CCW, and CCW is a secondary level information provider<sup>4</sup>. CCW has interpreted the Material Assets topic to encompass a wide variety of assets and resources, but CCW is primarily concerned with the physical infrastructure, related to the landscape, cultural heritage assets, geodiversity and biodiversity (habitats and species).

## Background to the Topic: Material Assets

Although Material Assets are listed as a topic to be addressed in SEA, there is no definition as to what they might encompass. A common interpretation of Material Assets includes housing and infrastructure relating to areas such as energy, water and transport networks, it also includes social infrastructure such as schools, hospitals and other public buildings.

This guidance focuses on the Material Assets that are the most relevant to CCW and therefore contains little reference to many areas of social infrastructure such as hospitals and education facilities.

Topics covered in this guidance note include:

- Social Infrastructure;
- Previously Developed Land;
- Minerals and Aggregates;
- Transport and Transport Infrastructure;
- Water Infrastructure;
- Energy Infrastructure;
- Environmental Infrastructure;
- Tourism and Recreation Infrastructure;
- Telecommunications; and
- Waste and Waste Infrastructure.

## Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope

### A1: Identifying other relevant plans, programmes and environmental protection objectives

Table 1 below lists plans, programmes, objectives, policies and legislation that should be taken into account in relation to SEA work on the Material Assets topic and Table 2 provides an example of a review of a key document. It should again be noted that the list below is not definitive as legislation and guidelines are subject to change.

<sup>4</sup> SEA topic responsibility for each of the Welsh Consultation Bodies is outlined in the following: Environment Agency Wales, Welsh Assembly Government, Cadw, and CCW (2005) *Strategic Environmental Assessment: Consultation Bodies' Services and Standards for Responsible Authorities in Wales*, Environment Agency Wales, Welsh Assembly Government, Cadw, and CCW, UK.

**Table 1: Potential plans, programmes, objectives, policies and legislation to be taken into consideration for the Material Assets Topic**

| <b>International</b>   |
|--|
| <ul style="list-style-type: none"> <li>• Johannesburg Renewable Energy Coalition – JREC (2002)</li> <li>• EU Waste Framework Directive (91/156/EEC)</li> <li>• EU Waste to Landfill Directive (99/31/EC)</li> <li>• European Commission White Paper on the European Transport policy (EC, 2001)</li> <li>• EU Council Directive on Waste (75/442/EEC)</li> <li>• EU Biofuels Directive (2003/30/EC)</li> <li>• EU Biomass Action Plan 3 (2005)</li> <li>• Energy for the Future: Renewable Sources of Energy.</li> <li>• EU White Paper for a Community Strategy and Action Plan</li> </ul>  |
| <b>National</b>  |
| <ul style="list-style-type: none"> <li>• Valuing our Environment: Economic Impact of the Environment of Wales 2003 WAG, WDA, EAW, RSPB, CCW, WTB, HLF and National Trust Wales.</li> <li>• UK Fuel Poverty Strategy (2001)</li> <li>• The Future of Transport (2004) UK White Paper on transport</li> <li>• Nuclear Decommissioning Authority Strategy</li> <li>• Our Energy Future – Creating a Low Carbon Economy (2003)</li> <li>• Agricultural Waste Regulations (2004)</li> <li>• Energy Wales: Route Map (published for consultation June 2005)</li> <li>• Waterways for Wales (2003)</li> <li>• The Wales Transport Strategy (WTS 2006) (Accompanied by 4 Regional Transport Plans, RTP)</li> <li>• Broadband Wales Programme Strategy 2005-2007</li> <li>• Wise about waste – The National Strategy for Wales (2002)</li> <li>• TAN8 – Renewable Energy (2005)</li> <li>• Draft TAN 18 – Transport (2001)</li> <li>• TAN19 – Telecommunications (2002)</li> <li>• TAN21 – Waste (2001)</li> <li>• TAN2 – Planning and Affordable Housing (2000)</li> <li>• TAN15 – Development and Flood Risk</li> <li>• Planning Policy Wales (2002)</li> <li>• Better Homes for People in Wales – A National Housing Strategy for Wales (2001)</li> <li>• Minerals Planning Policy Wales (2000)</li> <li>• Minerals Technical Advice Note (MTAN) 1 – Aggregates (2004)</li> <li>• Woodlands for Wales (2001)</li> <li>• Tir Gofal (1999)</li> <li>• TAN13 – Tourism (1997)</li> <li>• TAN14 – Coastal Planning (1998)</li> </ul> |
| <b>Regional/Local</b>  |
| <ul style="list-style-type: none"> <li>• South East Wales Regional Waste Plan (2003)</li> <li>• South West Wales Regional waste Plan (2003)</li> <li>• North Wales Regional Waste Plan (2003)</li> <li>• Cross-Border Waste Strategies (Various dates)</li> <li>• Regional Minerals Plans (in preparation)</li> <li>• Regional Transport Plans (in preparation)</li> </ul>   |

**Table 2: Example of review of relevant plans, programmes, objectives etc**

| <b>Wise About Waste – The National Waste Strategy for Wales (2002)</b>  |   |
|---|---|
| This document sets out the way Wales will deal with its waste in the next 10 years. It aims to move Wales away from an over-reliance on landfill to a more sustainable way of waste management. This will be achieved by adopting a sustainable, integrated approach to waste production by minimising waste production, reducing its environmental impacts and maximises the use of unavoidable waste as a resource. |   |
| <b>Objectives, requirements and targets</b>   | <b>Implications for the Plan or Programme</b>   |
| <ul style="list-style-type: none"> <li>To re-use and recycle at 85% of construction and demolition waste by 2010</li> <li>To reduce the amount of hazardous waste generated by at least 20 % by 2010</li> </ul>   | Increased resource efficiency and the reduction of (construction) waste should be aims of the plan. This could be achieved by e.g. replacing primary with secondary aggregates. |

Informal consultation, with statutory consultees (referred to here as 'Consultation Bodies') and non-statutory consultees, is also a useful tool for identifying relevant plans, programmes, objectives etc (see Stage A5 for more information on consultation).

## A2: Collecting Baseline Information

The sections below provide summaries of the Material Assets topics which are of relevance to CCW.

**Social Infrastructure:** Social infrastructure includes housing, healthcare facilities (hospitals, GP surgeries, pharmacies, opticians and dentists) and schools. *The Practical Guide* refers to the Material Assets topic as being related primarily to housing, including aspects such as housing completions, tenant satisfaction, vacant properties and quality of housing. The Assembly Government's objectives for housing are to provide:

- Homes that are in good condition, in safe neighbourhoods and sustainable communities; and
- Greater choice for people over the type of housing and the location they live in, recognising the needs of all, including those in need of affordable or special needs housing in both urban and rural areas (NAW, 2001a).

CCW is interested in the access that these neighbourhoods have to greenspace, or the greenfield land used when creating these neighbourhoods and the possible impacts of housing on Wales' natural heritage and cultural landscapes. CCW has developed the Accessible Natural Greenspace Toolkit which is designed to help local authorities plan and improve natural green areas for people in their communities<sup>5</sup>.

### **Social Infrastructure**

- Just over one third (34%) of Wales' housing stock was built before 1919.
- 955,000 dwellings (74% of the Welsh housing stock) were owner occupied in 2004 (ONS, 2005).
- The Local Authority housing stock fell by almost 50% from 1981, to 162,000 dwellings in 2004.
- Construction began on 9,900 dwellings in 2003 (95% of which were in the private sector).
- 17,100 dwellings were reported to be under construction by the end of 2003 (ONS, 2005).
- £26.5m was spent by Local Authorities during 2003-04 on renovation and other grants and on group repair schemes. £1.1m was spent on environmental works (ONS, 2005).
- There were 4,300 vacant local authority dwellings at the end of March 2004, of which 2,100 had been vacant for more than 6 months. 8,500 households were unintentionally homeless and in priority need in 2003 (ONS, 2005).

**Area of Previously Developed Land/Brownfield Land:** Previously Developed Land (PDL) or brownfield land might be considered as material assets in the context of their potential re-use in future development. Derelict land has historically been a major issues in parts of Wales. The majority of reclaimed and derelict

<sup>5</sup> The Accessible Natural Greenspace Toolkit can be obtained by contacting CCW.

land is associated with coal and heavy industry, including mining and slate quarrying spoil heaps. An area of Wales with a particularly high concentration of derelict and reclaimed land is the South Wales Valleys, which has a history of coal mining and heavy industry. Some brownfield sites may have biodiversity or geodiversity interest associated with them; please see the topic note on Biodiversity and Geodiversity.

Due to its long history of industrial activity, there is also a substantial amount of contaminated land in Wales. Each local authority is required to develop a Contaminated Land Strategy to detail how they intend to identify and inspect potentially contaminated land within their area, and how to satisfactorily remediate the land. This land can then be considered as a material asset. Please also see the Soil topic paper for more information on contaminated land.

### **Previously Developed Land**

- In 1988, a survey identified 6,800ha of land that had been reclaimed in Wales. 10,900ha were in need of reclamation, of which 8,400ha were judged to need major work. Almost 6,300ha were reclaimed between 1988 and 1997 (EA, 2006).
- Each local authority is required to develop a Contaminated Land Strategy.

**Minerals and Aggregates:** There are extensive resources of minerals and aggregates in Wales, such as sand/gravel, crushed rock/slate, clay, shale and chert. The extraction and processing of aggregates (e.g. for the construction or maintenance of infrastructure) can have a variety of environmental, social and economic effects. Five percent of all permitted reserves of primary aggregates in Wales are situated at least partly within SSSIs (WAG, 2003a). In addition a considerable amount comes from marine sites in Welsh territorial waters which could potentially be adversely affected by extraction.

Quarries have the potential to both positively and negatively affect species and habitats, prior, during and after their operational life-span. Habitats may be removed during the pre-operational phase, but then evolve into valuable alternative habitats during operation which can become ecologically important (although sometimes temporary). The greatest opportunities for long-term ecological benefits are provided in the post-operational period through restoration (e.g. restoring quarries to open water is important for breeding water birds). Quarries may also present issues on the visual amenity (changes in views and effects on people) and landscape character (changes to the nature and distinctiveness of an area) (QPA *et al*, 2006).

Where marine extraction issues are concerned, the main issues relate to negative effects on the flora and fauna of the seabed, fish populations, marine mammals and seabirds. The impacts on marine designations therefore need to be taken into consideration (see Biodiversity and Geodiversity topic paper) Offshore activities also have the potential to change patterns of erosion or deposition along the shoreline, which is potentially an issue where parts of the coast and marine environment are designated as Special Areas of Conservation (SAC) or Special Protection Areas (SPA) (QPA *et al*, 2006) or Ramsar sites.

Although minerals exploitation is usually considered detrimental to geodiversity, there are occasions where mineral workings can enhance knowledge and interpretation of geodiversity. This can happen for example where geological features are exposed by mineral extraction. Sterilisation of mineral resources by developments directly over a resource, or development which prevents access to the resource can be an issue. The extent of mineral sterilisation in Wales is currently unknown.

### **Minerals and Aggregates – Facts and Figures**

- In 2002, 21m tonnes of aggregates were produced in Wales; thereof, 3m tonnes (14%) were recycled or secondary aggregates.
- The total area of dredged seabed during 2005 was 10.24km<sup>2</sup> in Wales (licensed area in the South West of Wales) (Crown Estate, 2006).
- There are 110 active quarries in Wales
- 110 active quarries.
- 15 marine aggregate wharves.
- 36 asphalt plants.
- 89 ready-mixed concrete plants.
- 3,000 mainly rural jobs (QPA, 2003).

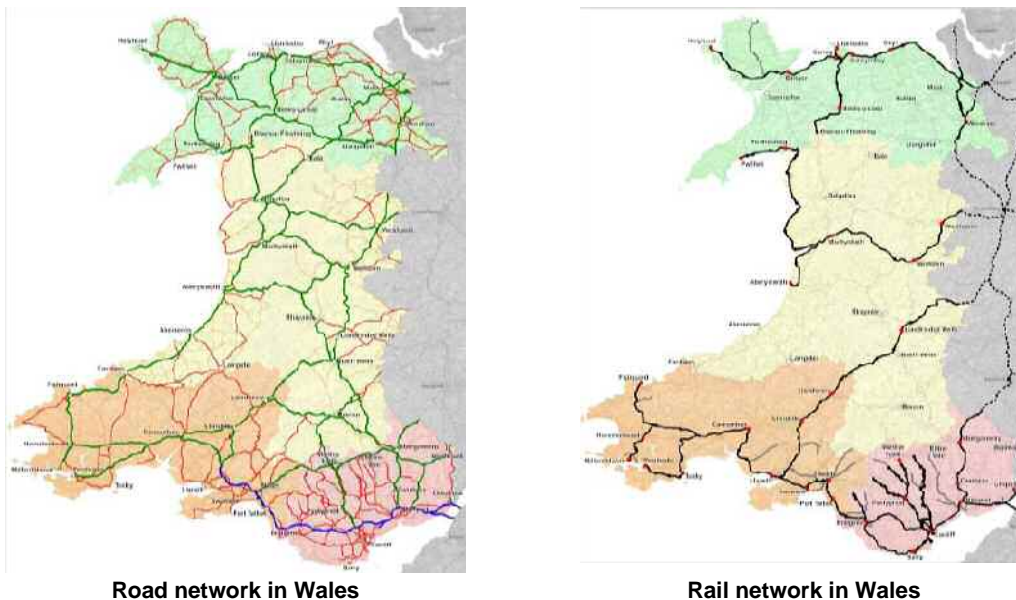
## ***Transport and Transport Infrastructure:***

### **Roads**

The Welsh road network is shown in Figure 2. In 2006, Wales had a total of 34,062 km of roads. Approximately half of the total road length in Wales is made up of unclassified minor surfaced roads (DfT, 2006). The private car is the most used mode of travel in terms of distance travelled in Wales, and is also used for the vast majority of tourist journeys. An estimated 72 per cent of trips were made by car or van in 2004/05, compared to 63 per cent in the period 1995/97 (WAG, 2006a).

Road transport dominates the movement of freight, accounting for over 80% of goods moved and upwards of 60% of goods lifted in Wales. The heaviest vehicles are responsible for the vast majority of wear and tear to road surfaces compared to cars and vans (WAG, 2007a).

There were an estimated 118 million passenger journeys on local bus services in 2005-06. This is an increase from a recent low of 108 million in 2001-02, but is a significant decrease from 1986-87, when the figure stood at 155 million (WAG, 2006a).



**Figure 2: Welsh Road and Rail Network (WAG, 2006b)**

Roads are an important material asset and their condition is of economic importance. In 2006 7.9% of the motorway network and 11.1% of the trunk road network required close monitoring of structural condition<sup>6</sup> (DfT, 2006). For the 'A county road network' the figure was 17% in 2005 (WAG, 2006a).

### **Footpaths and Cycle Paths**

Across the UK in 2006, 25.7% of footways on non-trunk roads were subject to deterioration. There was a steady decline in condition between 1995 and 2004, represented by a 9 per cent overall increase in percentage of footways affected by deterioration. There was a steady rise in the number of footway trip hazards from 1996 to 2000 but this trend was reversed up to 2006 (DfT, 2006). Figures relating to footpath condition in Wales are currently not available.

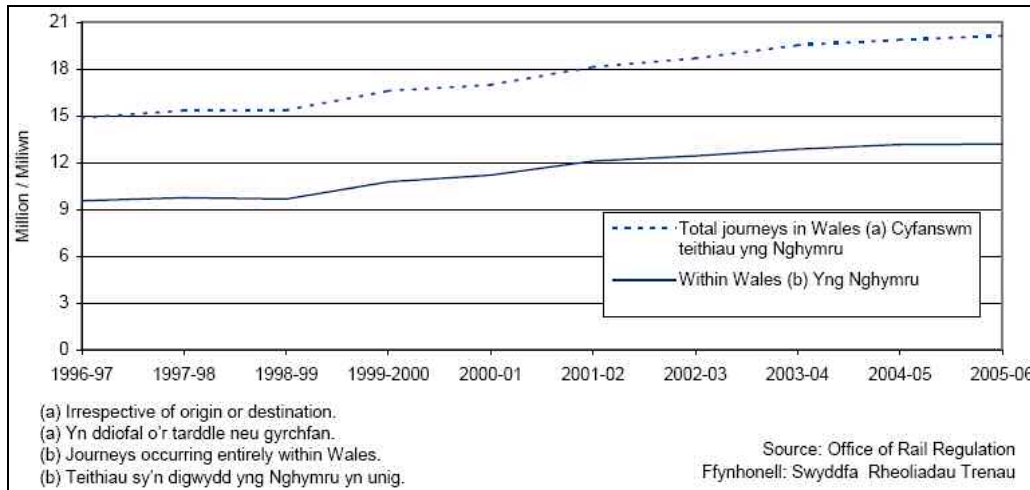
Wales contains 1,000 miles of the 10,000 mile National Cycle Network, examples being the Celtic Trail (Lôn Geltaidd) from Fishguard to Chepstow and Lôn Las Cymru which runs all the way from Holyhead to Cardiff and Chepstow (Sustrans, 2007).

<sup>6</sup> DfT has been producing structural survey indicators, based on data from local engineering surveys. These indicators have been used to report on the proportion of the major road network where structural condition has deteriorated to the point at which close monitoring is needed to see whether maintenance is required (DfT, 2006).

## Rail

Wales' rail network is shown in Figure 2. Wales generates 2% of national passenger rail journeys in the UK, and 15% of rail freight. To travel north to south in Wales it is necessary to go through England to complete the journey as there is no direct rail link.

There were approximately 20.1 million rail passenger journeys which either started or ended in Wales in 2005-06 this having increased from 14.9 million in 1996-97 (Figure 3).



**Figure 3 Rail Journeys in Wales (WAG, 2006a)**

Current rail freight services in Wales mostly run in South Wales, with some services in North Wales and very limited operations in Mid Wales. Over 8 million tonnes of freight uses the South Wales main line between Newport and Swansea, whereas less than 1 million tonnes is carried by the North Wales Coast line. The line through the Marches also has significant freight, with over 2 million tonnes per annum between Newport and Shrewsbury/Crewe (WAG, 2007a).

## Water Transport

There were just fewer than 10,000 ship arrivals in Wales in 2005 a decline of over 10% from 2003. In 2005 there were 59.3 million tonnes of goods on foreign and domestic traffic at ports in Wales, 1 per cent less than in 2004 (WAG, 2006a) and compared to 60.8 million tonnes in 1991. Milford Haven and Port Talbot accounted for over 75% of the freight handled.

Ports in Wales play a crucial role in both a national context and as a key element of sustainable development. They play an important role in the movement of freight, particularly to Ireland (Holyhead to Dublin, and Fishguard to Rosslare) and other locations within Europe. Due to this importance, ferry infrastructure and road routes leading to the ports within and outside of Wales are therefore important material assets. Most ports in Wales are located within, or close to sites of international (SAC, SPA, Ramsar) or national (SSSI, MNR, NNR) nature conservation importance. It is important to find sustainable development solutions that will enable a sustainable/effective ports sector whilst preserving biodiversity and the natural beauty of the maritime environment (CCW, 2004).

There are very few sections of navigable canal in Wales. Those still in use today include Llangollen Canal (46 miles in total, stretches across the border into Shropshire), the Montgomery Canal (35 miles in total, although large sections of the canal are not navigable), and the Monmouthshire, Brecon and Abergavenny Canal (44 miles in total, of which 33 miles are navigable). Three other canals remain in a non-navigable state, but are used for other recreational purposes such as walking and cycling, and as a haven for wildlife (Aberdare, Glamorganshire and Neath and Tennant canals). Canals (and other inland waterways) have great heritage value. Although man-made, they used natural and locally-found materials and over the last 200 years have blended into the landscape. They often incorporate many historically important waterside buildings, including mills, maltings, warehouses and depots. In north Wales, UNESCO World Heritage status is being sought for the Pontcysyllte Aqueduct on the Llangollen Canal.

Canals are also responsible for contributing to the amenity of the landscape and provide a rich and diverse environmental resource. They can provide a sanctuary for wildlife, sometimes providing habitats for species that have become rare in other areas due to loss of more natural habitats. Waterway corridors can form an important linear wildlife habitat through built up areas or in intensively farmed countryside (Defra, 2000). Parts of Wales' canal network have been designated as Natura 2000 sites, e.g. part of the Montgomery Canal.

A negligible amount of freight is carried on Wales' inland waterways (WAG, 2007a).

## **Air**

Cardiff International Airport is the only major airport in Wales. The total number of passengers using Cardiff International Airport increased from 513,000 in 1991 to a peak of 1.9 million in 2003, decreasing to 1.78 million in 2005. Over the same period total aircraft movements decreased from 53,412 (1991) to 43,040 (2004), indicating a changing make-up of the types of aircraft using the airport.

Air freight movements have increased significantly from 506 tonnes handled in 1991 to 2,564 tonnes in 2005. There was however a decrease of 2% between 2004 and 2005. Freight movement from Cardiff International Airport is constrained because the runway is too short for the largest freighter aircraft to operate with full loads on a long haul basis (WAG, 2007a).

In addition to Cardiff International Airport, Wales is also served by various airports in England, notably Manchester, Liverpool, Birmingham, Bristol and Heathrow. Surface access road infrastructure and rail links to these airports are therefore also important in terms of material assets.

## **Pipelines**

In Wales, 6% of the total freight moved is by pipeline. There are a number of pipelines across Wales, the most significant lines transporting products from Milford Haven, linking into the wider UK network pipeline networks in the Midlands. Products transported by pipeline can include natural gas, liquid gas, ethylene and oil based commodities including fuels and lubricants (WAG, 2007a). In addition there are extensive pipeline networks carrying gas, water and sewage

## **Other Transport Related Infrastructure**

The bridges, viaducts, and aqueducts that are associated with the road, rail and waterway networks are important assets both in terms of the role they play in supporting the networks and also for their contribution to the cultural heritage of an area.

Also of relevance to the material assets topic are the street lighting, signage, bus shelters, and other associated infrastructure that supports the transport network. These too play an important role in contributing to the character of an area.

## **Sustainable Travel**

The Welsh Assembly Government has published a document which provides examples of best-practice in adopting more sustainable methods of travel. The document, "*Smarter Choices: Wales*" covers a range of methods and initiatives which reduce the negative impacts of travel on congestion, carbon emissions, the environment and health. It also covers many of the supporting factors which influence travel choice such as public transport, cycling and walking information. The document can be accessed at:

<http://new.wales.gov.uk/topics/transport/IntegratedTransport/SmarterChoices/?lang=en>

## Transport – other facts and figures

- Approximately half the total road length in Wales is made up of unclassified minor surfaced roads. Powys accounts for the highest proportion of all A trunk roads (27%), B and C roads (21 %) and minor surfaced roads (12%) resulting in an overall 16% of the total road length of Wales (DfT, 2005).
- Merthyr Tydfil, Blaenau Gwent and Torfaen each account for around 1% of the total road length in Wales (DfT, 2005).
- Newport has the greatest length of motorways, 19% of the total motorway in Wales, whereas the greatest length of dual carriageway is in Flintshire, which accounts for 11% of the total dual carriageway in Wales (DfT, 2005).
- Maintenance expenditure (including bridges) for all purpose trunk roads and motorways in Wales in 2003-04 totalled £54.7million (£24m structural, and £30.7m for routing and other costs), a decrease of £4.8m from the previous year (DfT, 2005).
- 1.67 million vehicles were licensed in 2005, an increase of 3% compared with the previous year (WAG, 2006a)
- Road traffic increased by 3.5%, roughly in line with the UK average (WAG, 2005).
- 86% of Wales' population live within six minute walking distance to a bus stop (WAG, 2005).

| Country  | ROAD  |     | RAIL |     | INLAND WATER |     | PIPELINE |    | Total | Ratio* |
|----------|-------|-----|------|-----|--------------|-----|----------|----|-------|--------|
| Wales    | 8     | 84% | 1    | 10% | -            | -   | 0.5      | 6% | 9.5   | -      |
| UK       | 149   | 82% | 20   | 11% | -            | -   | 12       | 7% | 181   | 85     |
| Belgium  | 40    | 70% | 7    | 12% | 8            | 14% | 2        | 4% | 57    | 95     |
| France   | 274   | 78% | 50   | 14% | 7            | 2%  | 21       | 6% | 352   | 94     |
| Germany  | 353   | 69% | 75   | 15% | 65           | 13% | 16       | 3% | 509   | 105    |
| Portugal | 15    | 88% | 2    | 12% | -            | -   | -        | -  | 17    | 118    |
| EU       | 1,392 | 75% | 242  | 13% | 125          | 7%  | 87       | 5% | 1,846 | 100    |

\* Ratio of tonne-km to GDP, indexed to 1995 (=100)

Source: Estimated from WAG, DfT & EU, 2004 [2003, million tonne kilometres]

**Figure 4: Modal Split of Freight Moved in selected EU countries (figures in billion tonne-km) (Source: WAG, 2007a)**

**Flood Defences:** Increased flooding and coastal erosion has highlighted the need for mitigation and adaptation to associated impacts, including better flood defences. A three year programme, led by the Welsh Assembly Government, has recently been announced to refresh current policy related to flood defences, and to define future service and delivery, considering future funding and monitoring mechanisms. It is anticipated that this new framework for flood and coastal risk management will be issues in Spring 2008. Please see the Water topic paper for more information on flooding and flood defences (WAG, 2007b).

**Water Infrastructure:** Of particular importance to the material assets topic is Wales' water infrastructure, which delivers clean water to homes and industry, and removes the waste water/sewage. It also includes reservoirs and inland waterways, such as canals (mentioned in the transport section above).

Four water companies currently provide water services for Wales: Dwr Cymru (Welsh Water), Dee Valley, Severn Trent and United Utilities. Each company is required to prepare a water resource management plan, which includes issues such as water usage and leakage. United Utilities and Severn Trent Water failed their leakage targets for 2003/04. The target for United Utilities was failed by 35 ml/d, which was due to various reasons, including freeze/thaw cycles and soil shrinkage due to dry weather conditions (EA, 2004).

Over 150 reservoirs have been constructed in Wales to help overcome the lack of natural storage in many of the river catchments (EA, 2001c). A considerable amount of Wales' water resource is exported to England, with nearly half of the water abstracted in Wales for public water supply being transferred for consumption in Merseyside and the West Midlands (EA, 2001c).

Dwr Cymru: <http://www.dwrcymru.com/index.asp>

Dee Vallley: <http://www.deevalleywater.co.uk/DVW/DVW.htm>

Severn Trent: <http://www.stwater.co.uk/>

United Utilities: <http://www.unitedutilities.com/>

The CCW SEA and Water Guidance Note contains further information regarding CCW's nature conservation interests and water. The Guidance Note also considers flood defences in Wales.

### Water – Facts and Figures

- In June 2006 the reservoirs in Wales were at 92% of their total capacity (EA, 2007).
- The average daily output for water in Wales increased from 1,642 mega litres per day (MI/d) in 1970 to 2,280 in 1996, then falling to 2,087 MI/d in 2001 (WAG, 2003).
- Of this, 652 MI/d was supplied to England in 1970, increasing to 1,055 MI/d in 2001.
- Dwr Cymru delivers an average of 850 mega litres of drinking water a day.
- Dwr Cymru operates 850 wastewater treatment works (Dwr Cymru, 2007).
- Around a third of Dwr Cymru's 27,000km water mains network was in poor condition in 2004 (Dwr Cymru, 2004).
- Around 15% of Dwr Cymru's 18,700km sewer network was in poor condition in 2004 (Dwr Cymru, 2004).
- Dwr Cymru reduced mains water supply leakage from 225 MI/d in 2005-06 to 209 MI/d in 2006-07.

**Energy Infrastructure:** Energy Infrastructure includes the infrastructure that enables the delivery of energy resources (gas, electricity, coal, oil nuclear and renewable energy), such as power stations, pylons, wind turbines and pipelines. Table 3 provides a list of power stations operational at the end of May 2006 by type in Wales. The table includes most of the stations in Wales of more than 1 MW capacity.

**Table 3: Power Stations in Wales (DTI, 2006)**

| Type of Power Station              | Name of Power Station  |
|------------------------------------|--|
| Coal-Fired                         | Aberthaw, Vale of Glamorgan<br>Uskmouth, near Newport  |
| Gas-Fired                          | Aberdare District Energy, Rhondda Cynon Taff<br>Aberthaw, Vale of Glamorgan<br>Baglan Bay, Neath Port Talbot<br>Barry, Vale of Glamorgan<br>Connah's Quay, Flintshire<br>Deeside, Flintshire<br>Shotton, Flintshire<br>Solutia District Energy   |
| Hydro-electric                     | Cwm Dyli, Gwynedd<br>Dinorwig, Gwynedd<br>Dolgarrog High Head, Conway<br>Dolgarrog Low Head, Conway<br>Ffestiniog, Gwynedd<br>Maentwrog, Gwynedd<br>Rheidol, Ceredigion  |
| Wind Power (generating facilities) | Bryn Titli, Powys<br>Carno, Powys<br>Cemmaes, Powys<br>Llangwryfon, Ceredigion<br>Llyn Alaw, Anglesey<br>Mynydd Gorddu, Ceredigion<br>North Hoyle (Offshore)<br>Penryddian & Llidiartywaun<br>Rheidol, Ceredigion<br>Rhyd-y-Groes, Anglesey<br>Taff Ely, Rhondda Cynon Taff<br>Trysglwyn, Anglesey<br>Tyr Mostyn and Foel Goch, Denbighshire |
| Nuclear                            | Wylfa  |

There are currently 24 onshore and 1 offshore operational wind farms in Wales (June 2007). There are 3 onshore wind farms under construction, and 6 onshore and 2 offshore consented projects in Wales. There are a further 19 onshore wind farms in the planning stages (BWEA, 2007 – see Figure 5). The development of wind farms can be an important issue for CCW because of possible adverse effects on landscape and biodiversity. The location of designated sites and non-statutory sites for nature conservation and protected landscapes must be taken into account when developing wind farms. Technical Advice Note 8 advises on onshore and offshore wind energy. TAN 8 has identified strategic areas for wind farm development and these are often in designated upland habitats. A range of impacts can be imposed on natural heritage interests through the development of on and offshore windfarms and their ancillary developments, including the following:

- Direct habitat loss and associated biological impacts;
- Habitat damage;
- Introduction of new substrate/habitat;
- Interference with geological/geomorphological processes;
- Interference with hydrological processes;
- Interference with coastal processes;
- Interference with sediment transport;
- Pollution;
- Sediment disturbance;
- Disturbance to mobile species (shadow effects, noise, vibration, lighting);
- Bird collision; and
- Landscape/seascape and cultural impacts (EN, 2001).

Currently, there are no wave or tidal devices operating, consented or under consideration for consent in Wales' waters. Wales is fortunate to have a large wave and tidal energy resource and consequently at least 5 projects are at the pre-planning stage (June 2007).

The network of electricity transmission lines and its accompanying pylons and poles are critical material assets, but ones which have a significant effect on landscape.





Figure 5: Operational, under construction, consented, submitted on and offshore wind farms in Wales (BWEA, 2007)

### Energy

- Power stations in Wales have a capacity of 8,198 megawatts (MW). The four largest power stations are Aberthaw B (1,455MW), Dinorwig (1,728MW), Connahs Quay (1,380MW), and Wylfa (980MW).
- In 2005 34,825 GWh of electricity were generated in Wales (2004: 35,494 GWh)
- In 2005 4,311 GWh (net) were transferred to England (2004: 6,096 GWh)
- In 2005, 3.5% of electricity produced in Wales was generated from renewable sources compared to 2.8% in 2000 (WAG, 2007).
- Domestic gas sales increased from 131 million therms in 1973 to 515 million therms in 1994 (WAG, 1998).

**Environmental Infrastructure and Agriculture:** Environmental infrastructure that might be considered as material assets, include woodland and forests, and agricultural land. The area of woodland in Wales is shown in Table 4.

**Table 4: Forestry Commission and Non-Forestry Commission Woodland in Wales (thousands of hectares) (Forestry Commission, 2006)**

|                                | Conifers | Broadleaves | Total Woodland |
|--------------------------------|----------|-------------|----------------|
| <b>Forestry Commission</b>     | 95       | 12          | 108            |
| <b>Non-Forestry Commission</b> | 64       | 113         | 178            |

Income is generated from the National Forest estate in Wales through timber harvesting and other activities. This income is reinvested in projects to deliver social and environmental goals across the publicly-owned resource (WAG owned woodlands). Sustainable woodland management is encouraged for other woodlands in Wales. Woodlands can provide environmental and social benefits to local communities. Woodland industries contribute approximately £400m a year to the Welsh economy (including agriculture, timber production and tourism). Over 11 million visits are made to Welsh woodlands each year, as people make use of the woodlands for exercise and enjoyment (WAG, 2001).

Agriculture is very important to the Welsh economy, and in terms of jobs, agriculture is the largest industry in Wales. In 2000, agriculture (and fishing) accounted for 36,548 jobs, with an output of £1,364 million (Hill and O'Sullivan, 2003). Agricultural land in Wales accounted for 1,63 million ha in 2005 (WAG, 2005) in Wales. Agriculture is vital to Wales and the industry has shaped and managed the Welsh landscape for several thousand years. It can help to conserve the historic landscape by protecting features such as historic field patterns (DEFRA, 2005). Tir Gofal and Tir Cynnal are agri-environment schemes operating in Wales. They are specifically aimed at enhancing the agricultural resource while protecting and maintaining natural heritage.

Tir Gofal has the objectives:

- To protect and enhance habitats of importance to wildlife;
- To protect and enhance the beauty of the landscape;
- To protect and enhance historic and archaeological features; and
- To provide opportunities for new public access to the countryside.

Tir Cynnal has the objective of:

- Protecting and improving the quality of soil, water and air.

The infrastructure associated with agriculture such as field boundaries (hedges, stone walls etc.) and buildings may also be considered under the material assets topic, although equally to be considered under the Cultural Heritage topic.

### **Environmental Infrastructure**

- In 2006, there were 285,000 hectares of woodland in Wales, of which 160,000ha was conifers and 126,000 broadleaves (Forestry Commission, 2004).
- In the year ending 31 March 2006, the area of land in Wales used for new planting/restocking was 2,927 hectares (1574ha conifers and 1353ha broadleaves) (Forestry Commission, 2006).
- In 2005 there were 1,629,000ha of agricultural land (including arable land, permanent grass, rough grazing, and woodland/other land) in Wales, which had declined from 1,679,000 in 1995 (WAG, 2006b).
- The most notable area of decline is the area of rough grazing land, which has fallen from 494,000ha in 1995 to 401,000ha in 2005 (WAG, 2006b).

**Tourism and Recreation Infrastructure:** Tourism infrastructure can include a wide variety of assets, including caravan parks, camping sites, marinas, vacation chalets, and leisure activity developments, including theme parks, attractions and activities (e.g. ski slopes). Tourism is a major element in the Welsh economy, particularly in coastal and rural areas, contributing to economic development, conservation, rural diversification, urban regeneration and social inclusion.

Tourism in Wales is highly dependant on the quality of the Welsh environment. The environment in Wales has been cited as the main motive for 40% of 'staying holiday tourist' and 'tourist leisure day trips' to the country. It is also estimated that tourism and leisure accounted for 23,600 jobs in Wales in 2000 (Hills and O'Sullivan, 2003).

Although tourism infrastructure is vital to the tourism industry and Wales' economy, it also has the potential to affect Wales' natural assets, including landscape, cultural heritage and biodiversity, which are tourism assets in their own right. New tourism related development may need to be limited in some areas of Wales, for example in undeveloped coastal areas, so that damage to the environment is avoided. Tourist development may be encouraged in other areas, through the provision of well-designed facilities to help bring about regeneration, particularly of former industrial areas (NAW, 2002a).

**Telecommunications:** Telecommunications infrastructure refers to the infrastructure for public telecommunications (telephone), satellite television broadcasting, terrestrial broadcasting, and the reception of signals. The Welsh Assembly Government recognises the need for access to modern, high-speed telecommunications and services throughout Wales. Information and Communications Technologies (ICT) has been found to assist those living and working in remote rural areas (NAW, 2002a). Environmental considerations may arise from the introduction of telecommunications infrastructure and facilities. For example, masts and antennas often require a particular operating height to allow signals to clear trees and buildings. Challenges may arise relating to the siting of such infrastructure and the protection of high quality landscapes (NAW, 2002b). Similar to the electricity distribution network, the network of telephone wires has a relationship with local landscapes.

The potential affect of mobile phone masts on health is an issue of concern for some. The Health Protection Agency (HPA) provides information relating to this subject:

[http://www.hpa.org.uk/radiation/understand/information\\_sheets/mobile\\_telephony/base\\_stations.htm](http://www.hpa.org.uk/radiation/understand/information_sheets/mobile_telephony/base_stations.htm)

### **Telecommunications**

- Broadband access among Welsh residential users was 25% of the population in 2005, an increase of 10% from 2004 (where usage was at 15%) (WDA, undated).
- Almost one third of Welsh businesses have broadband in the workplace, and Wales exceeds the UK average uptake figure of 20% (WDA, undated).

**Waste and Waste Infrastructure:** Waste management infrastructure and methods vary greatly and include:

- Re-use facilities;
- Waste collection facilities;
- Waste separation and recycling/recovery facilities;
- Composting facilities;
- Waste transfer stations;
- Waste to energy facilities (energy recovery);
- Incinerators; and
- Landfill or land raising operations.

The Welsh Assembly Government aims to maximise waste prevention, recycling and composting, and to minimise incineration and disposal of waste to landfill. There may be environmental and health impacts associated with various waste facilities, including impacts on biodiversity and landscape, visual intrusion, loss of land and odour/noise nuisance (NAW, 2001b).

There is currently only one operational nuclear power station in Wales, Wylfa, which is located on Anglesey (programmed for decommissioning). The main issue surrounding nuclear power is the large proportions of the waste that remain radioactive for long periods of time. Nuclear waste is primarily the responsibility for the Environment Agency and requires long term management to meet safety and environmental requirements.

## Waste

- In 2004/5 1,928,000 tonnes of municipal waste were generated representing an increase of 5% compared with the previous year.
- A total of 418,000 tonnes (22%) of municipal waste were recycled or composted in 2004/5 representing an increase of 295 tonnes compared with the previous year.
- A total of 303,000 tonnes of hazardous waste were produced in Wales in 2003, a slight increase from 2002. South West Wales produced the most hazardous waste (123,000 tonnes) and North Wales the least (71,000 tonnes).
- In general, hazardous waste quantities have declined by approximately 20% since 1999. Nearly one quarter (23%) of hazardous waste produced in Wales was oil wastes, 17% was waste from thermal processes and 10% was from construction and demolition (including asbestos).
- Excluding waste transferred, 38% of hazardous waste was landfilled, 37% treated, and 25% recycled/reused (EA, 2003).

Figure 6 below describes some potential sources of baseline data for the Material Assets topic. Figure 3 provides some key facts and figures about this topic. Once again, consultation bodies and non-statutory consultees may be good sources of data.

### Figure 6: Relevant and Appropriate Sources of Baseline Data – Material Assets

- Welsh Assembly Government: [www.wales.gov.uk](http://www.wales.gov.uk) – (Electricity supply, domestic gas sales, water usage, aggregates and minerals, educational institutions and statistics, transport use)
- National Assembly for Wales: [www.wales.gov.uk](http://www.wales.gov.uk) (Key environmental Statistics – waste, Welsh Transport Statistics)
- Office for National Statistics: [www.ons.gov.uk](http://www.ons.gov.uk) (trends in waste and recycling)
- Environment Agency: [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk) (landfill waste, hazardous waste)
- National Health Service (NHS) Wales: [www.wales.nhs.uk](http://www.wales.nhs.uk) (Healthcare facilities)
- Welsh Development Agency (WDA): [www.wda.co.uk](http://www.wda.co.uk) (ICT data)
- Welsh Transport Statistics: Chapter 1: Road Lengths and Condition (WAG, annually)
- Department for Transport (DfT): [www.dft.gov.uk](http://www.dft.gov.uk) (Road Maintenance Condition Survey)

## A3: Identifying Environmental Issues and Opportunities

Environmental issues and opportunities are identified further to work done in stages A1 and A2 and this stage often benefits from stakeholder workshops. Table 5 provides examples of various Material Assets issues in Wales and their trends, based on available baseline information.

**Table 5: Examples of Material Assets Issues in Wales**

| Material Assets Issues affecting Wales | Description  |
|--|--|
| Energy                                 | <ul style="list-style-type: none"> <li>On and off shore wind farms and infrastructure generating energy may have negative impacts on landscape, biodiversity and culture.</li> <li>TAN 8's strategic areas for wind farm development are often in designated upland habitats. Wind farms also have landscape, cultural landscape impacts.</li> <li>Infrastructure associated with energy transmission i.e. access roads etc can have landscape, cultural heritage, biodiversity effects (often in designated landscapes/habitats).</li> <li>Oil/gas pipelines, oil/gas terminals and refining infrastructure are also likely to have negative environmental effects in Wales.</li> <li>Nuclear power stations and nuclear waste pose potential hazards to the environment.</li> </ul>  |
| Water                                  | <ul style="list-style-type: none"> <li>Many freshwater bodies are designated sites for wildlife etc e.g. river SACs, river and lake SSSIs. Many are also used for water supply.</li> <li>Wales exports a large proportion of its water to England. Issues arise when some areas of Wales are at capacity, whereas others are experiencing summer deficits in water supply.</li> <li>In some areas of Wales there are issues related to water infrastructure, e.g. leakage and water treatment works reaching capacity.</li> </ul>  |
| Waste                                  | <ul style="list-style-type: none"> <li>Landfill sites are quickly becoming full in Wales, which leads to problems with the disposal of waste in the future.</li> <li>Fly-tipping is a problem for landscape and biodiversity in Wales.</li> <li>There are some issues with the disposal of casualty livestock and slaughterhouse waste.</li> </ul>   |
| Aggregates and Minerals                | <ul style="list-style-type: none"> <li>Construction and maintenance of development and infrastructure require the extraction of aggregates that in turn causes environmental effects. Five percent of all permitted reserves of primary aggregates in Wales are situated at least partly within SSSIs (WAG, 2003a) (not marine) and a considerable amount comes from marine sites, which could be adversely affected by extraction.</li> <li>Many mineral reserves are in areas which are of high value for biodiversity and landscape, which could therefore lead to disruption or destruction (e.g. Pembrokeshire Coast National Park (NAW, 2004)</li> <li>Marine aggregate extraction can have the following effects on species:               <ul style="list-style-type: none"> <li><i>Plankton</i> – the ability of plankton to survive and reproduce is decreased by an increase of particles (created by dredging) reducing light penetration.</li> <li><i>Seabed plants and animals</i> – species can be removed, their habitats altered or oxygen levels reduced by dredging activities.</li> <li><i>Fish populations</i> – fish activity may be impaired, or behaviour influenced as a result of dredging activity (e.g. noise)</li> <li><i>Marine mammals</i> – noise from dredging activities can affect sea mammals, whereas the activity can degrade habitats and reduce available food sources.</li> <li><i>Seabirds</i> – dredging plumes can affect the ability of fish-feeding birds to catch their prey through reducing the visibility of the water.</li> </ul> </li> </ul> |
| Transport                              | <ul style="list-style-type: none"> <li>Canals (and other inland waterways) have the potential provide habitats for a variety of species, and may also form part of cultural heritage in Wales and should be protected (e.g. part of the Montgomery canal is an SAC).</li> <li>Much of the North Wales and Cambrian Coast rail network is at potential risk of marine flooding.</li> <li>Wales suffers from poor rail links between the north and south, with routes going outside of Wales into England.</li> <li>Poor public transport infrastructure and road/rail infrastructure in rural areas.</li> <li>North Wales is major transport route to Dublin and the Continent. There are key sea links from Holyhead to Dublin and Fishguard to Rosslare.</li> </ul>   |
| Others                                 | <ul style="list-style-type: none"> <li>Legacy of extractive industries and metal working industries.</li> </ul>  |

Table 6 below is a non-exhaustive list of potential Material Assets-related environmental issues that plan-makers may identify in the preparation of various plans and programmes.

**Table 6: Potential Material Assets - Related Environmental Issues and Opportunities**

| Type of Plan or Programme          | Environmental Issues and Opportunities  |
|------------------------------------|---|
| Transport                          | <ul style="list-style-type: none"> <li>• The provision of transport infrastructure can help to ease some transport problems such as congestion, accessibility etc.</li> <li>• New infrastructure can also result in additional 'induced' traffic, leading to further environmental problems.</li> <li>• Although adequate infrastructure should be implemented to ensure that access is possible, the construction of new transport infrastructure to meet demands can have a range of environmental effects, including the loss of land, damage or loss of species and their habitats, noise, safety and human health effects (related to road traffic accidents and air quality effects of increased traffic).</li> </ul> |
| Urban expansion / new development  | <ul style="list-style-type: none"> <li>• New development can create additional pressures on water resources, waste water treatment and the use of water and land/agric resource. Loss of greenfield, loss of recreational land etc.</li> </ul>  |
| Mineral/Aggregates                 | <ul style="list-style-type: none"> <li>• Infrastructure to move excavated materials.</li> <li>• Offshore aggregate extraction can have a number of negative effects on seabed flora and fauna, fish populations, marine mammals and seabirds</li> </ul>   |
| Waste Management                   | <ul style="list-style-type: none"> <li>• Opportunities to improve waste infrastructure.</li> </ul>  |
| Agriculture / Forestry / Fisheries | <ul style="list-style-type: none"> <li>• Agricultural land and woodlands can be protected through a variety of plans and programmes, and opportunities arise to increase the land area, or introduce sustainable management practices.</li> <li>• Diffuse pollution from agricultural practices may affect the quality of water resources and fisheries (See Map 24 in EA, 2005 – '<i>surface water bodies at risk from diffuse source pollution pressures</i>').</li> </ul>  |
| Energy / Industry                  | <ul style="list-style-type: none"> <li>• Energy or industry plans or programmes may require the implementation of new energy infrastructure.</li> <li>• Loss of or disruption to land/habitats/species.</li> <li>• Energy installations, such as wind farms, can have adverse effects on the visual landscape and negatively affect biodiversity.</li> <li>• Opportunities for improved infrastructure.</li> <li>• There are concerns over the health impacts of high voltage electricity cables.</li> </ul>  |
| Telecommunications                 | <ul style="list-style-type: none"> <li>• Telecommunications equipment can result in visual intrusion.</li> </ul>  |
| Tourism                            | <ul style="list-style-type: none"> <li>• The relevant infrastructure needs to be in place to ensure that needs of Wales' tourists are met, including transport infrastructure (enabling access), and infrastructure relating to energy and water supply/removal.</li> <li>• The provision of tourism infrastructure, for example caravan parks, chalets, marinas, attractions etc, may have detrimental effects on the landscape, cultural heritage and biodiversity of Wales.</li> </ul>   |
| Water and Flood Management         | <ul style="list-style-type: none"> <li>• Seasonal changes in population and influxes in tourists visiting Wales may place pressures on water supply, treatment and removal.</li> <li>• Due to the supply of water across the border to England, water capacity issues may arise at certain times during the year.</li> <li>• Many of the rivers and water supply sources in Wales are of high ecological value and have therefore been designated as European sites.</li> <li>• Introduction of flood defences can impact on biodiversity.</li> <li>• Flooding poses a risk to transport infrastructure.</li> </ul>   |

## A4: Developing SEA Objectives

### Link to Welsh Assembly Government Sustainable Development (SD) Indicators

As part of its commitment to achieving sustainable development the Welsh Assembly Government has developed a series of indicators which will be used to measure progress towards that commitment<sup>7</sup>.

Some of these indicators may not be suitable for many SEAs, particularly those for plans at a local level, as they are fairly 'broad-brush' and will not be able to either be measured at a local level, or respond to the policies and measures included within individual plans and programmes. Nevertheless they should be considered for inclusion wherever appropriate.

NB: a revised set of indicators is currently being developed and some of these are likely to be more appropriate for incorporation into SEAs.

Other indicators reported by the Welsh Assembly Government at a national level include those in the Environment Strategy (WAG, 2006) and those from the Key Environment Statistics Indicators.

WAG reports each year on its suite of sustainable development indicators, some of which include environmental indicators. It also reports separately on progress in implementing its Environment Strategy using a number of ES indicators, some of which overlap with its suite of SD Indicators. These reporting mechanisms provide useful data which can be used to inform SEA scoping and environmental reports. They also help to form a framework against which environmental indicators for the plan or programme can be developed.

SEA Objectives are not a legal requirement but are a useful way of analysing the environmental affects of a plan or programme. Tables 7 and 8 below describe some possible Material Assets-related outcomes, objectives, sub-objectives and indicators.



<sup>7</sup> Sustainable Development Indicators for Wales can be found at:  
<http://new.wales.gov.uk/topics/statistics/headlines/sustain-2007/?lang=en>

**Table 7: Wales Environment Strategy Outcomes and Indicators: Material Assets**

NB: some of these indicators are still under development or are being investigated for their feasibility.

| Environment Strategy Outcomes  | Indicators  |
|--|---|
| The amount of waste that is generated in Wales is minimised  | <ul style="list-style-type: none"> <li>Quantity of municipal waste per person per annum</li> <li>Quantity of industrial and commercial waste produced per annum</li> <li>Public sector waste arisings indicator to be developed</li> </ul>  |
| Reduce, re-use and re-cycle is universally accepted in government, business, industry and home life  | <ul style="list-style-type: none"> <li>Proportion of municipal waste recycled or composted</li> <li>Proportion of industrial and commercial waste recycled</li> <li>Indicator of proportion of public sector waste recycled (to be developed)</li> <li>Indicator of reuse (to be investigated/developed)</li> </ul>                                       |
| Appropriate waste management facilities are in place to minimise the amount of waste going to landfill   | <ul style="list-style-type: none"> <li>Amount of municipal waste landfilled</li> <li>Amount of industrial and commercial waste landfilled</li> <li>Indicator of the amount of public sector waste that is landfilled (to be developed)</li> </ul>   |
| Businesses produce well designed products that require less resources in their production, use and end of life, that create minimal waste and are easily reused or recycled  | <ul style="list-style-type: none"> <li>Proportion of End of Life Vehicles waste re-used and recycled in the UK</li> <li>Proportion of packaging waste recovered in the UK</li> <li>Proportion of construction and demolition waste reused and recycled</li> <li>Uptake of lifecycle analysis in business (explore development of an indicator)</li> </ul> |
| The extraction of minerals and aggregates minimises the impact on the environment and local communities  | <ul style="list-style-type: none"> <li>Number of sites complying with standards as set out in Minerals Policy and the associated Technical Advice Note for the protection of the environment and local communities (to be applied in 2007)</li> </ul>   |
| The use of alternative materials, secondary and recycled aggregates is maximised where possible in the construction industry   | <ul style="list-style-type: none"> <li>Proportion of construction and demolition waste that is re-used and recycled</li> <li>The proportion of aggregates used from secondary and recycled sources (from 2009)</li> </ul>   |
| Radioactive discharges in Wales and doses to the public will be minimised. Discharges to the marine environment will be minimised to the extent that additional concentrations in the marine environment above historic levels are close to zero | <ul style="list-style-type: none"> <li>Trends in radioactive discharges from major sources in Wales</li> <li>Doses to most exposed receptors</li> </ul>   |



**Table 8: Example of SEA Objectives/Sub-Objectives and Indicators for Material Assets**

| Example Objectives (in bold) and Sub-Objectives (in italics)   | Example Indicators   |
|--|--|
| <b>Make sustainable use of natural resources</b>   |  |
| <i>Promote alignment of resource provision (e.g. water) with planning activities</i>   | <ul style="list-style-type: none"> <li>• Number of strategic and local development plan policies taking explicit account of water resource management plans and drought management plans</li> <li>• Number of strategic and local development plan policies restricting allocations of land for development because of water resource provision issues</li> <li>• Number of consents granted that are conditional on water resource issues (i.e. water provision and foul water treatment) being resolved</li> </ul>   |
| <i>Minimise the use of finite resources and promote higher resource efficiency and the use of secondary and recycled materials</i> | <ul style="list-style-type: none"> <li>• Proportion of journeys on foot or by cycle (ODPM, 2005)</li> <li>• Percentage of waste in Wales/region recycled.</li> <li>• Percentage of waste Wales/region composted.</li> <li>• Total (i) household waste and (ii) household waste recycled or composted per person per year (kg) (ONS, 2006)</li> <li>• Percentage electricity produced in Wales generated from renewable sources (ONS, 2006)</li> <li>• Proportion of construction and demolition waste that is re-used and recycled</li> <li>• Water metering</li> <li>• Control of leakage</li> <li>• Per capita consumption of water</li> <li>• Proportion of aggregates used from secondary and recycled aggregates</li> <li>• Area of contaminated land remediated</li> <li>• Percentage of new development on brownfield land</li> </ul> |
| <i>Minimise energy consumption, promote higher energy efficiency and promote renewable energy sources</i>                          | <ul style="list-style-type: none"> <li>• Percentage of new homes built to BREEAM standards of (i) very good and (ii) excellent</li> <li>• Percentage electricity produced in Wales generated from renewable sources (ONS, 2006)</li> <li>• Total (i) household waste and (ii) household waste recycled or composted per person per year (kg) (ONS, 2006)</li> <li>• Proportion of construction and demolition waste that is re-used and recycled</li> <li>• Proportion of aggregates used from secondary and recycled aggregates</li> </ul>  |
| <i>Avoid, reduce, reuse and recycle waste</i>  | <ul style="list-style-type: none"> <li>• Percentage of waste in Wales/region recycled</li> <li>• Percentage of waste Wales/region composted</li> <li>• Waste arisings by sector (ONS, 2006)</li> <li>• Waste arisings by disposal (ONS, 2006)</li> <li>• Percentage of (i) hazardous waste and (ii) nuclear waste exported from Wales per year</li> <li>• Percentage of (i) hazardous waste and (ii) nuclear waste imported to Wales per year</li> <li>• Total (i) household waste and (ii) household waste recycled or composted per person per year (kg) (ONS, 2006)</li> <li>• Proportion of construction and demolition waste that is re-used and recycled</li> <li>• Proportion of aggregates used from secondary and recycled aggregates</li> </ul>  |
| <i>Build and maintain environmentally-friendly, high quality services and infrastructure</i>                                       | <ul style="list-style-type: none"> <li>• Incidence of sewage pollution</li> <li>• Quality of water management</li> <li>• Water leakage (litres per property per day)</li> <li>• % developments with Sustainable Urban Drainage Systems (SUDS)</li> <li>• Percentage of the road network which requires close monitoring structural condition</li> <li>• Maintenance expenditure for trunk roads and motorways</li> <li>• Length of navigable canal</li> <li>• Area of woodland in Wales (conifers/broadleaves/total)</li> <li>• Number of visits to woodlands</li> <li>• Area of agricultural land</li> </ul>  |
| <i>Encourage local needs be met locally</i>  | <ul style="list-style-type: none"> <li>• Winter storage facilities for water</li> <li>• Annual amount of water transferred across the border to England</li> <li>• Inter river/catchment transfer in Wales</li> <li>• Access to local green space</li> </ul>   |
| <i>Promote the principles of sustainable</i>   | <ul style="list-style-type: none"> <li>• Percentage of new homes built to BREEAM standards of (i) very good and (ii) excellent</li> </ul>  |

|   |   |
|---|---|
| <i>development through all new services and infrastructure</i>  | <ul style="list-style-type: none"> <li>• Percentage of new houses built on previously developed land per year</li> <li>• Area of soil lost to impermeable surfaces</li> <li>• Area of proposed new development on Greenfield sites</li> <li>• New homes built on previously developed land (although this is not always indicative of soil protection – e.g. Where 2 homes with impermeable paving are built where there was one with a grass garden. However, does imply that the development did not take place on prime agricultural, functioning soils</li> <li>• Loss of land to development (data on loss of soil to development is not compiled in Wales, although some authorities do compile data on loss of land to development)</li> </ul> |
| <i>Promote the adjustment of existing services and infrastructure to be more environmentally-friendly</i> | <ul style="list-style-type: none"> <li>• Number of properties with water meters</li> </ul>  |
| <i>Promote the use of more sustainable resources</i>  | <ul style="list-style-type: none"> <li>• Proportion of journeys on foot or by cycle (ODPM, 2005)</li> <li>• No of wind farms (planned, under construction, onshore, offshore)</li> <li>• No of tide and wave energy plants</li> </ul>   |

## A5: Consulting on the Scope of SEA

In addition to the three statutory Consultation Bodies (CCW, Cadw and EA) there are other organisations or bodies who could be consulted on the scope of the SEA, and on the Environmental Report. For the Material Assets topic, these may include:

- Utility providers;
- Regional Transport consortia;
- Tourist boards; and
- Crown Estates.

## Stage B: Developing and Refining Alternatives and Assessing Effects

### B4: Evaluating the effects of the draft plan or programme, including alternatives

This stage evaluates the significance of the environmental effects predicted previously. Part of this concerns the inter-relationship of the Materials Assets topic with other SEA topics and Table 9 below describes some of these inter-relationships.

**Table 9: Interrelationships with other SEA topics**

| SEA Topic                | Interrelationship with Material Assets Topic  |
|--------------------------|---|
| <b>Air Quality</b>       | Existing road infrastructure and new road developments will impact on local air quality. A wide variety of pollutants are emitted from petrol and diesel vehicles, including oxides of nitrogen (NOx), particulates (PM10), carbon monoxide (CO) and volatile organic compounds (VOCs). The incineration of waste, mineral extraction and operational power stations could impact on local air quality.   |
| <b>Biodiversity</b>      | The development of new transport and energy infrastructure and the extraction of minerals and aggregates could affect designated and non-designated habitats and species. Water abstraction and discharge could affect designated and non-designated habitats and species. This is particularly an issue as many water resources are derived from designated sites.   |
| <b>Climatic Factors</b>  | Climate change may affect materials assets via flooding and warmer temperatures causing disruption to transportation services. Increased temperatures may also attract higher volumes of tourists, placing additional pressures on material assets. Transport and energy production both have the potential to have a significant effect on climate change. Both industries should be aiming towards the use of cleaner/alternative fuels to reduce this impact.  |
| <b>Cultural Heritage</b> | Extraction of minerals and aggregates will potentially lead to the discovery of archaeological remains. Damage to archaeology may also occur. Maintaining and regenerating historic assets, such as buildings within conservation areas may require the use of certain minerals and aggregates. Transport can affect heritage resources through decreased air quality and also as a result of schemes having direct impacts on assets. Inappropriate signage and road pavement materials can also have adverse effects on heritage. |
| <b>Soil</b>              | Minerals extraction may involve soil stripping and storage – at this stage, soil may suffer erosion from surface water run-off. Poorly stored soil may be more liable to erosion by water or wind. The extraction of peat is rarely, if ever, acceptable.   |
| <b>Water</b>             | The provision and/or extension of water utilities could impact on the water environment. Minerals extraction can affect hydrological regimes. Water pollution can result from a variety of activities associated with material assets. Flooding and flood hazard can pose a risk to infrastructure (e.g. transport, energy, housing etc).   |
| <b>Landscape</b>         | The development of new transport, energy and/or water infrastructure and the extraction of minerals and aggregates could affect landscape quality through visual intrusion. New development will also lead to land take. In particular, minerals extraction will often occur on greenfield land. Changing agricultural processes are likely to have an effect on the landscape, as is the development of tourism infrastructure.  |

## Stage C: Preparing the Environmental Report

No topic-specific guidance on this Stage.

## Stage D: Consulting on the Draft Plan or Programme and the Environmental Report

No topic-specific guidance on this Stage.

## Stage E: Monitoring Implementation of the Plan or Programme

### E2: Responding to Adverse Effects

Plans can respond to adverse effects identified during SEA in a number of ways. Specific examples of how the plan may respond to adverse Material Assets effects include:

- Ensure that schemes for waste management are environmentally acceptable and do not adversely affect the environment, heritage or countryside;
- Promote higher resource efficiency;
- Promote the use of secondary and recycled materials (preferably sourced locally) to grow the market for recycled goods, for example in the construction and maintenance of developments and infrastructure projects;
- Promote energy conservation, higher energy efficiency and carbon neutral energy sources;
- Encourage the collection and use of landfill gas for renewable energy;
- Encourage the reduction, reuse, recycling of waste, especially in relation to new developments;
- Encourage integrated planning to reduce the reliance on private motor vehicles and encourage more sustainable transport modes; and
- Promote the development of new green infrastructure.

### References and Further Reading

#### SEA Specific Guidance:

#### Topic Specific References and Further Reading:

- BDS (2007) *Uses for Reservoirs – Hydroelectric Power*, British Dam Society, UK. Available at URL: [http://www.britishdams.org/about\\_dams/hydroelectric.htm](http://www.britishdams.org/about_dams/hydroelectric.htm)
- BWEA (2007) *Statistics*, British Wind Energy Association, UK. Available at URL: <http://www.bwea.com/statistics/>
- CCW (2004) *Ports and the Environment*, Coastal Management and Sustainability, UK. Available at URL: <http://www.coastms.co.uk/PortsandtheEnvironment/Advice%20Organisations%20CD/CCW%20Advice.pdf>
- Countryside Agency, English Heritage, English Nature, Environment Agency (2005) *Environmental Quality in Spatial Planning*. Available at URL: [http://www.english-heritage.org.uk/upload/pdf/Envir\\_Quality.pdf](http://www.english-heritage.org.uk/upload/pdf/Envir_Quality.pdf)
- Crown Estate (2006) *Mineral Aggregate Dredging 2005: The Area Involved – 8<sup>th</sup> Annual Report*, Crown Estate, UK. Available at URL: [http://www.bmapa.org/pdf/8th\\_folder.pdf](http://www.bmapa.org/pdf/8th_folder.pdf)
- Defra (2000) *Waterways for Tomorrow*, TSO, UK. Available at URL: <http://www.defra.gov.uk/Environment/water/iw/tomorrow/>
- Defra (2005) *Agriculture in the United Kingdom*, TSO, UK. Available at URL: <http://statistics.defra.gov.uk/esg/publications/aug/2005/default.asp>
- DfT (2006) *National Road Maintenance Condition Survey 2006*, TSO, UK. Available at URL: [http://www.dft.gov.uk/stellent/groups/dft\\_transstats/documents/downloadable/dft\\_transstats\\_611559.pdf](http://www.dft.gov.uk/stellent/groups/dft_transstats/documents/downloadable/dft_transstats_611559.pdf)
- DTI (Department for Trade and Industry) (2006) *Digest of United Kingdom Energy Statistics 2006*. Available at URL: <http://www.dti.gov.uk/energy/statistics/publications/dukes/page29812.html>
- Dwr Cymru (2004) *Final Strategic Business Plan 2005-2010*, Dwr Cymru, UK. Available at URL: <http://www.dwrcymru.com/English/library/Reports/companyreports/investmentplans/>
- Dwr Cymru (2007) *Report and Accounts 2007*, Dwr Cymru, UK. Available at URL: <http://www.dwrcymru.com/English/library/Reports/companyreports/>
- English Nature, RSPB, WWF-UK and BWRA (2001) *Wind farm development and nature conservation*, English Nature, UK. Available at URL: <http://www.bwea.com/pdf/wfd.pdf>
- Environment Agency (2001b) *Local Waste Interrogator*. Available at URL: [www.environment-agency.gov.uk/apps/wastesurvey3/](http://www.environment-agency.gov.uk/apps/wastesurvey3/)
- Environment Agency - EA (2001c) *Water Resources for the Future – a Summary of the Strategy for Wales*.

- Environment Agency Wales. Cardiff.
- Environment Agency – EA (2003) *Hazardous waste disposal and recovery, Wales 2003*. Available at URL: [http://www.environment-agency.gov.uk/regions/wales/816243/1220048/1220052/1224692/?version=1&lang=\\_e](http://www.environment-agency.gov.uk/regions/wales/816243/1220048/1220052/1224692/?version=1&lang=_e)
  - Environment Agency (2004) *Review of Water Company Water Resources Plans, 2004*, Environment Agency, UK. Available at URL: [http://www.environment-agency.gov.uk/commondata/105385/ar\\_wcwrp\\_2004\\_907590.pdf](http://www.environment-agency.gov.uk/commondata/105385/ar_wcwrp_2004_907590.pdf)
  - Environment Agency (2005) *Water Framework Directive: River Basin District – supporting maps (Western Wales, Dee, Severn)*, Environment Agency, UK.
  - Environment Agency (2006) *Previously Developed Land*, Environment Agency, UK. Available at URL: [http://www.environment-agency.gov.uk/yourenv/eff/1190084/land/213950/dev\\_land/?version=1&lang=\\_e](http://www.environment-agency.gov.uk/yourenv/eff/1190084/land/213950/dev_land/?version=1&lang=_e)
  - Environment Agency (2007) *Reservoir Storage Table – June 2007*. Available at URL: [http://www.environment-agency.gov.uk/subjects/waterres/457898/458132/?version=1&lang=\\_e](http://www.environment-agency.gov.uk/subjects/waterres/457898/458132/?version=1&lang=_e)
  - Forestry Commission (2001) *Woodlands for Wales*, Forestry Commission, UK. Available at URL: [http://www.forestry.gov.uk/pdf/woodwaleseng.pdf/\\$FILE/woodwaleseng.pdf](http://www.forestry.gov.uk/pdf/woodwaleseng.pdf/$FILE/woodwaleseng.pdf)
  - Forestry Commission (2006) *Forestry Facts and Figures 2006: A Summary of Statistics about Woodland and Forestry in Great Britain*, Economics and Statistics Forestry Commission, UK. Available at URL: [http://www.forestry.gov.uk/pdf/fcfs206.pdf/\\$FILE/fcfs206.pdf](http://www.forestry.gov.uk/pdf/fcfs206.pdf/$FILE/fcfs206.pdf)
  - Hill, S and O'Sullivan, D (2003) *Valuing Our Environment: A Regional Analysis of Wales*, NAW, UK.
  - NAW (2001a) *Better Homes for People in Wales – A National Housing Strategy for Wales*, National Assembly for Wales, UK.
  - NAW (2001b) *TAN (Wales) 21 – Waste*, National Assembly for Wales, UK. Available at URL: <http://new.wales.gov.uk/docrepos/40382/4038231121/403821/403821/40382/403825/tan21-e.pdf?lang=en>
  - NAW (2002a) *Planning Policy Wales*, National Assembly for Wales, UK. Available at URL: <http://new.wales.gov.uk/docrepos/40382/4038231121/403821/403821/403828/planningpolicy-e.pdf?lang=en>
  - NAW (2002b) *TAN 19 – Telecommunications*, National Assembly for Wales, UK. Available at URL: <http://new.wales.gov.uk/docrepos/40382/4038231121/403821/403821/40382/403823/tan19-e.pdf?lang=en>
  - NAW (2004) *MTAN 1 – Aggregates*, National Assembly for Wales, UK. Available at URL: <http://www.planningportal.gov.uk/wales/professionals/en/1114102232434.html>
  - National Health Service (NHS) Wales (2006) *NHS Wales Directory*. Available at URL: [www.wales.nhs.uk/directory.cfm](http://www.wales.nhs.uk/directory.cfm)
  - Office of National Statistics (2006) *Sustainable Development Indicators for Wales*, Available at URL: <http://new.wales.gov.uk/docrepos/40382/40382313/403824/sustain-2006/sb21-2006?lang=en>
  - Office of National Statistics (2005) *Welsh Housing Statistics 2004*, Statistical Directorate National Assembly for Wales, UK.
  - Quarry Products Association – QPA (2003) *Quarrying Today: Winning in Wales*. Available at URL: <http://www.qpa.org/downloads/qttoday14.pdf>
  - QPA, BMAPA, and Entec (2006) *Planning4Minerals: A Guide on Aggregates*, QPA, UK. Available at URL: [http://www.bgs.ac.uk/planning4minerals/assets/downloads/86210\\_P4M\\_A\\_Guide\\_On\\_Aggregates.pdf](http://www.bgs.ac.uk/planning4minerals/assets/downloads/86210_P4M_A_Guide_On_Aggregates.pdf)
  - RCEP (2002) *Environmental Planning: Summary of the Royal Commission on Environmental Pollution Report*, RCEP, London.
  - Sustrans (2007) URL : <http://www.sustrans.org.uk/webfiles/leaflets/GofreerangeWales.pdf>
  - The Countryside Agency, English Heritage, English Nature and Environment Agency (2005) *Environmental Quality in Spatial Planning*. Available at URL: [http://www.english-heritage.org.uk/upload/pdf/Envir\\_Quality.pdf#search=%22environmental%20quality%20in%20spatial%20planning%22](http://www.english-heritage.org.uk/upload/pdf/Envir_Quality.pdf#search=%22environmental%20quality%20in%20spatial%20planning%22)
  - Welsh Assembly Government – WAG (1998) *Digest of Welsh Historical Statistics 1974 to 1996*. Available at URL: <http://new.wales.gov.uk/topics/statistics/publications/dwhs1974-1996/?lang=en>
  - Welsh Assembly Government – WAG (2003) *A living and working environment for Wales: the state of the Welsh Environment 2003*. Available at URL: <http://www.wales.gov.uk/subienvironment/topics-e.htm>
  - Welsh Assembly Government (2003) *Digest of Welsh Statistics*: Available at URL: <http://new.wales.gov.uk/topics/statistics/publications/dws2003/?lang=en>
  - Welsh Assembly Government – WAG (2005) *Welsh Transport Statistics 2005*. Available at URL: <http://www.wales.gov.uk/keypubstatisticsforwales/content/publication/transport/2005/wts2005/wts2005-e.htm>

- Welsh Assembly Government – WAG (2006a) *Welsh Transport Statistics 2006*. Available at URL: <http://new.wales.gov.uk/topics/statistics/headlines/trans-2007/hdw200706281/?lang=en>
- Welsh Assembly Government – WAG (2006b) *Farming Facts and Figures Wales 2006*, WAG, UK. Available at URL: <http://new.wales.gov.uk/docrepos/40382/40382313/403824/agriculture/agric-2006/farm-fact-2006-e.pdf?lang=en>
- Welsh Assembly Government – WAG (2006c) *Statistics for Wales: Topic Index – Education/school Address List*. Available at URL: [www.wales.gov.uk/keypubstatisticsforwales/topicindex/topicindex-e.htm#E](http://www.wales.gov.uk/keypubstatisticsforwales/topicindex/topicindex-e.htm#E)
- Welsh Assembly Government (2007a) *Wales Freight Strategy: Connecting Wales – Pre-Consultation Draft Document 2007*. Available at URL: [www.confor.org.uk/timber\\_transport/pages/download.asp?file=WFS\\_DRAFT\\_02\\_02\\_2007\\_no%20foreword.pdf](http://www.confor.org.uk/timber_transport/pages/download.asp?file=WFS_DRAFT_02_02_2007_no%20foreword.pdf)
- Welsh Assembly Government (2007b) *New Approach to Flood Defence in Wales*, 23<sup>rd</sup> July 2007, Available at URL: <http://new.wales.gov.uk/news/presreleasearchive/1578120/?lang=en>
- Welsh Assembly Government (2007c) *Sustainable Development Indicators for Wales, 2007*. Available at URL: <http://new.wales.gov.uk/topics/statistics/headlines/sustain-2007/hdw200703292/?lang=en>
- Welsh Assembly Government (2007d) *Smarter Choices: Wales*. Available at URL: <http://new.wales.gov.uk/topics/transport/IntegratedTransport/SmarterChoices/?lang=en>
- Welsh Development Agency – WDA (undated) *Ubiquitous Broadband Infrastructure for Wales*. Available at URL: [www.wda.co.uk/resources/broadband\\_complete.pdf](http://www.wda.co.uk/resources/broadband_complete.pdf)