

Welsh Government

M4 Corridor around Newport

Assessment of Implications (of
highways and/or roads projects)
on European Sites

Screening Report

M4CaN-DJV-EAC-ZG_GEN-RP-EN-0001

| 10 August 2015

Draft

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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CVJV/AAR
3rd Floor
Longross Court,
47 Newport Road,
Cardiff
CF24 0AD

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1 Introduction and Purpose of the Assessment

1.1 Purpose of this report

- 1.1.1** This report has been prepared to provide information to the Welsh Ministers (“the Competent Authority”) on the implications of the M4 Corridor around Newport (M4 CaN) on European Sites as required by Regulation 61 of the Conservation of Habitats and Species Regulations 2010 (as amended) (the ‘Habitats Regulations’). This report provides the initial Stage 1: Screening Assessment to determine the likelihood of significant effects.

1.2 Justification for the Project

- 1.2.1** The existing M4 is critical to the Welsh economy. It forms part of the Trans European Transport Network (TEN-T) and is the gateway to Wales, transporting people and goods to homes, industry and employment. It provides access to ports and airports and serves the Welsh tourism industry. The existing M4 Motorway between Magor and Castleton is the most heavily trafficked section of road in Wales, forming part of strategic routes to the Midlands and the South East of England. However, it does not meet modern motorway design standards. This section of the M4 is often congested, especially during weekday peak periods, resulting in slow and unreliable journey times, stop-start conditions, and with incidents frequently causing delays. Existing problems relate to capacity, resilience, safety and issues of sustainable development. Traffic forecasts show that the problems will worsen in the future.

1.3 Legislation

- 1.3.1** The Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna provides legal protection for habitats and species of European importance. The Directive is transposed into UK law by the Conservation of Habitats and Species Regulations 2010 (hereafter referred to as the ‘Habitats Regulations’). Regulation 61 of the Habitats Regulations requires the competent authority, to consider whether the plan or project:
- a) is not directly connected with or necessary to the management of that site, and
 - b) is likely to have a significant effect on a European site (either alone or in combination with other plans or projects).
- 1.3.2** Where there is a likely significant effect (or such an effect cannot be discounted) and the plan or project is not connected with or necessary to the management of the site then the competent authority must make an ‘appropriate assessment’ of the implications for that site in view of its conservation objectives.
- 1.3.3** In the light of the conclusions of the assessment, the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site. The only exceptions are where there are no alternatives and there are imperative reasons of overriding public interest, in

which case all compensatory measures necessary to ensure that the overall coherence of natura 2000 is protected must be adopted.

- 1.3.4** This report sets out an initial Stage 1: Screening Assessment of the implications of the M4 CaN on European sites, using currently available information. This initial screening assessment will be updated as the M4 CaN develops and will take account of any relevant information that has the potential to alter the assessment.

1.4 Report Structure

- 1.4.1** The structure of this report includes:

- Section 1: Introduction
- Section 2: Project Description
- Section 3: Methodology
- Section 4: Identification of European/International Protected Sites
- Section 5: Identification of In-Combination Projects and Plans
- Section 6: Stage 1: Screening Assessment (alone and in-combination effects)
- Section 7: Conclusions (with screened in likely significant effects)

2 The Project

2.1 Aims and Goals for the M4 Corridor around Newport

2.1.1 The Welsh Government's aims for the M4 Corridor around Newport (M4 CaN) are:

- To make it easier and safer for people to access their homes, workplaces and services by walking, cycling, public transport or road;
- To deliver a more efficient and sustainable transport network supporting and encouraging long-term prosperity in the region, across Wales, and enabling access to international markets; and
- To produce positive effects overall on people and the environment, making a positive contribution to the overarching Welsh Government goals to reduce greenhouse gas emissions and to making Wales more resilient to the effects of climate change.

2.1.2 The Welsh Government, through the M4 Corridor Enhancement Measures Programme (M4 CEM) and the subsequent M4 CaN draft Plan, identified 15 goals to address transport related problems in this area. These are as follows with the top four, as prioritised by the public, shown in bold:

- 1. Safer, easier and more reliable travel east-west in South Wales.**
2. Improved transport connections within Wales and to England, the Republic of Ireland and the rest of Europe on all modes on the international transport network.
3. More effective and integrated use of alternatives to the M4, including other parts of the transport network and other modes of transport for local and strategic journeys around Newport.
- 4. Best possible use of the existing M4, local road network and other transport networks.**
- 5. More reliable journey times along the M4 Corridor.**
6. Increased level of choice for all people making journeys within the transport corridor by all modes between Magor and Castleton, commensurate with demand for alternatives.
- 7. Improved safety on the M4 Corridor between Magor and Castleton.**
8. Improved air quality in areas next to the M4 around Newport.
9. Reduced disturbance to people from high noise levels, from all transport modes and traffic within the M4 Corridor.

10. Reduced greenhouse gas emissions per vehicle and/or person kilometre.
11. Improved travel experience into South Wales along the M4 Corridor.
12. An M4 attractive for strategic journeys that discourages local traffic use.
13. Improved traffic management in and around Newport on the M4 Corridor.
14. Easier access to local key services and residential and commercial centres.
15. A cultural shift in travel behaviour towards more sustainable choices.

2.2 Project Description

2.2.1 The project includes:

- A new section of 3-lane motorway between Junctions 23 and 29 south of Newport (between Magor and Castleton);
- Complementary measures which include:
 - Reclassification of the existing M4 between Magor and Castleton: Reclassification as a trunk road could enable traffic management, safety and revised access arrangements;
 - A M48-B4245 link: This will involve a connection between the M4, M48 and B4245 which would provide relief to Junction 23A and to the local road network. It would also provide improved access to proposed park and ride facilities at Severn Tunnel Junction;
 - Provision of cycle friendly infrastructure: promoting the use of cycling as an alternative to the car for journeys of up to three miles by providing new infrastructure or improving existing infrastructure; and
 - Provision of walking friendly infrastructure: promoting the use of walking as an alternative to the car for journeys of up to three miles by providing new infrastructure or improving existing infrastructure.

2.2.2 The new section of motorway would be within the 'Black Route' corridor as considered in the 2014 M4 CaN Strategic Habitats Regulations Assessment.

2.2.3 The design of the new section of motorway in terms of its proposed horizontal and vertical alignment, carriageway construction type, form of structures including a new bridge crossing over the River Usk, junction layouts, drainage attenuation/pollution control measures and lighting, is currently being developed. It is anticipated that the new River Usk crossing will comprise a single span bridge, with no support structures within the wet river channel. There will also be a small bridge constructed to cross the River Ebbw. The M4 CaN 'footprint' as currently designed is shown on Figure 2.1.

2.2.4

This initial assessment has been based on the current design and to the fullest extent reasonably possible based upon what is ascertainable at this stage. It will be revised as necessary in line with further development of the design and environmental mitigation.

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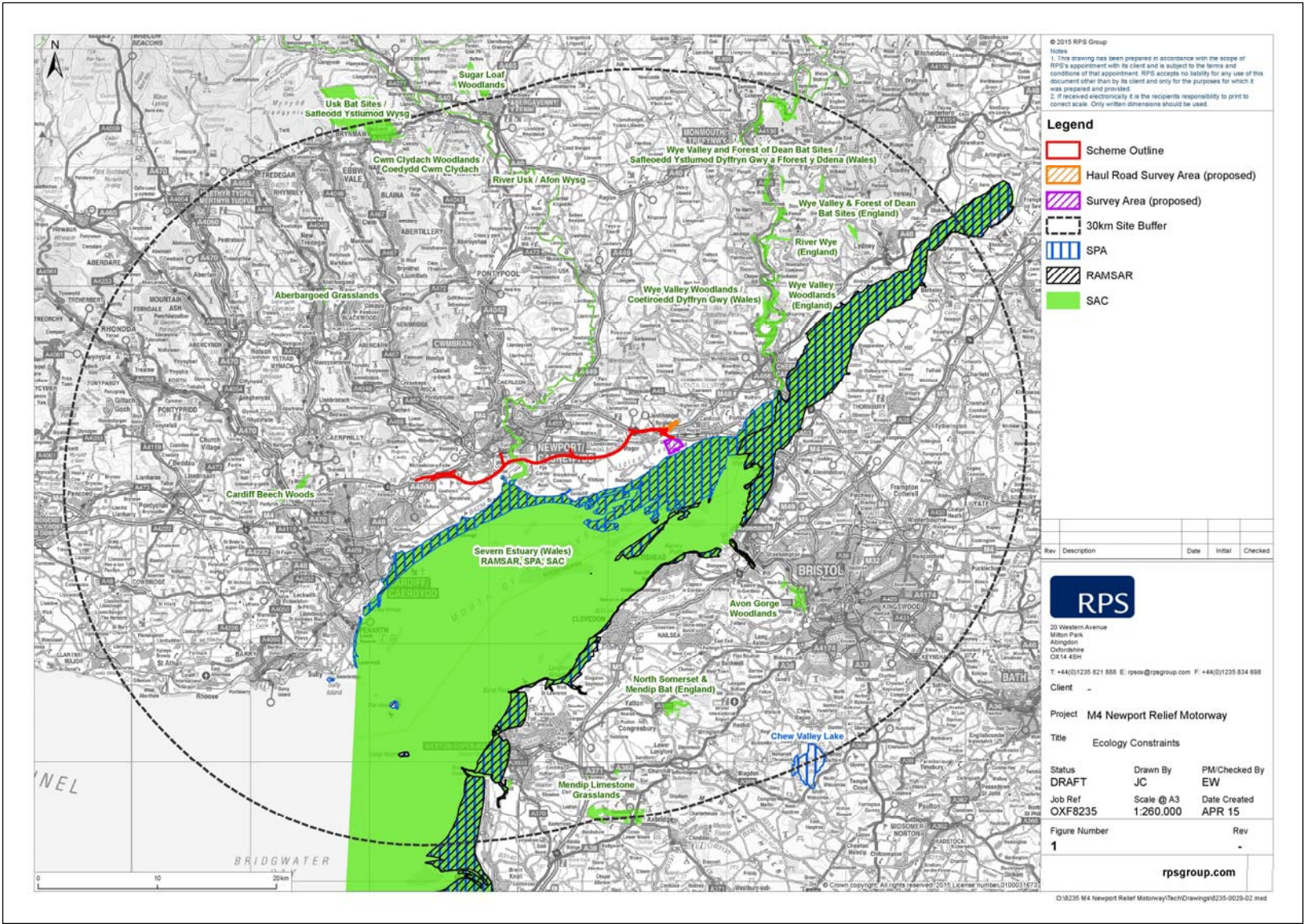


Figure 2.1 Location of M4 CaN in Relation to European and Ramsar Sites

2.3 Key stages of the Project and Timescales

2.3.1 Potential programme dates for the project include:

- Autumn 2015: Approval of preliminary design
- Spring 2016: Publication of Orders
- Autumn 2016: Anticipated Public Inquiry if required
- Spring 2018: Start of construction
- Autumn 2021: End of construction of new section of motorway and start of reclassification works
- Autumn 2026: End of Aftercare

2.4 Relationship between the Project and European/International Sites

2.4.1 The boundaries of the European/International sites in the vicinity of the Project are shown in Figure 2.1. The M4 Corridor passes through the River Usk/ Afon Wysg SAC and passes near to the Severn Estuary/ Môr Hafren SAC, SPA and Ramsar sites (0.4km away).

2.4.2 All other European/International sites shown in Figure 2.1 are located beyond 7km and extend out to a distance of 30km. Further detail is provided in Table 4.1.

2.5 Physical land-take of the Project

2.5.1 At this stage of the assessment process, it is not possible to provide area calculations for land-take and subsequent habitat loss/fragmentation as the project design is currently being developed. Nevertheless, it is known that the new section of motorway would pass through the River Usk/Afon Wysg SAC. The eastern pylon of the bridge would be located within the SAC within salt marsh habitat (not a qualifying feature of the SAC). Temporary works required for the construction of the eastern Pylon may also involve the loss/fragmentation of saltmarsh habitat within the SAC.

2.5.2 There would also be some loss/fragmentation of other habitats outwith the European/International sites that may support some qualifying features of the nearby Severn Estuary/ Môr Hafren SAC, SPA and Ramsar sites. Further afield there may be some loss or severance of habitat that supports lesser horseshoe bat, a feature of the Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumo Dyffryn Gwy a Fforest y Ddena SAC the closest component of which is the Mwyngloddfa Mynydd Bach SSSI some 7.1km from the project.

2.6 Resource Requirements

2.6.1 Resource requirements are likely to include, but not be limited to:

- Materials for construction;
- Manpower resources; and

- Water abstraction for dust suppression.

2.6.2 Imported material would include road construction aggregates together with reinforcement steel, concrete, cement, pipes and fencing materials.

2.6.3 Standard highway operation and maintenance procedures would be carried out during the lifetime of the M4 CaN. Typical activities would be likely to include, but are not limited to:

- Winter maintenance, such as de-icing/gritting;
- Painting (line and bridge);
- Resurfacing;
- Repairs to damage;
- Maintenance of the highway drainage network;
- Management and maintenance of roadside grass areas and vegetation trimming to comply with the environmental objectives; and
- Management of nature conservation (habitat and protected species) measures

2.7 Waste Products (construction and operation)

2.7.1 Details of waste product arisings will be determined during design of the M4 CaN.

2.8 Other Services

2.8.1 Services information is currently being collected. Services will include, but are not limited to:

- Road lighting, gantries or traffic information equipment; and
- Services (e.g. electricity, gas).

3 Methodology

3.1.1 This section provides information on the methodology followed in carrying out this initial Stage 1: Screening Assessment for the M4 CaN Project.

3.2 Policy and Guidance

3.2.1 Relevant policy and guidance documents have been taken into account in production of this report, including:

- Design Manual for Roads and Bridges (DMRB), Volume 11, Section 4, Part I, HD44/09 *Assessment of implications (of highways and/or roads projects) on European Sites (including appropriate assessment)* (Highways Agency, 2009).
- WG TAN 5: *Nature Conservation and Planning, in particular Section 5: Development affecting designated sites and habitats.*
- Interim Advice Note (IAN) 116/08(W) *Nature Conservation Advice in Relation to Bats* (Welsh Government, 2009).
- *The Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (European Commission, 2000).
- Tyldesley, David, (2011). *Assessing Projects under the Habitats Directive. Guidance for Competent Authorities.* David Tyldesley and Associates for the Countryside Council For Wales

3.3 Data Sources

3.3.1 The following organisations websites were used to gather information on the European protected sites that may be potentially affected by M4 CaN :

- Natural Resources Wales (NRW);
- Joint Nature Conservation Committee (JNCC); and
- Natural England.

3.3.2 These data sources were utilised to obtain information on European/International Sites, including the Core Site Management Plans. These provide details of NRW's approach to managing the protected sites and sets out what needs to be achieved on the sites, the results of monitoring and advice on the actions required (Appendix A).

3.3.3 The Geographical Information Systems (GIS) datasets for European Sites used were downloaded from the NRW and Natural England websites in April 2015 to ensure all relevant European sites and their updated boundaries were taken into consideration.

3.3.4 A Strategic Habitat Regulation Assessment (SHRA) for the M4 Corridor around Newport (Draft Plan) (Welsh Government, 2014) was carried out by the Welsh Government in considering whether to publish a draft Plan and adopt the Plan. This provided valuable details of the consultation carried out to date.

- 3.3.5** Further desk study information is currently being sought from NRW in relation to any further studies and/or data that may not have been captured in the draft SHRA (Welsh Assembly Government, 2014). If further information is made available that is relevant to the designated sites and/or features assessed and it has potential to alter the overall conclusions of this screening assessment, then this assessment will be updated accordingly and included in the subsequent Stage 2: Appropriate Assessment.

3.4 Evidence Base

- 3.4.1** Information from previous environmental surveys was utilised in the SHRA (Welsh Government, 2014) to inform the baseline, which included:

- Wintering bird surveys in 2007/8;
- Bat surveys in 2007/8;
- Amphibian surveys in 2007 (which found eels on the levels); and
- Hydrological modelling of the River Usk.

- 3.4.2** Species specific surveys were not undertaken as part of the SHRA; however, surveys were carried out in 2014 and further surveys will be undertaken in 2015 to inform the AIES and Environmental Impact Assessment (EIA) for the M4 CaN.

3.5 Assessment Methodology

- 3.5.1** This section sets out the applicable methodologies and assumptions for the consideration of the M4 CaN with regard to the requirements of the Habitats Regulations (2010) and the AIES process as detailed in DMRB HD44/09 guidance (Highways Agency, 2009).

AIES Process

- 3.5.2** The AIES is principally a five stage process (as explained below) involving one or more of the following stages:

- Stage 1: Screening
- Stage 2: Appropriate Assessment
- Stage 3: Alternative Solutions
- Stage 4: Imperative Reasons of Overriding Public Interest (IROPI)
- Stage 5: Compensatory Measures

- 3.5.3** Figure 3.1 shows a flow diagram of the relationship between these various stages in the overall AIES process.

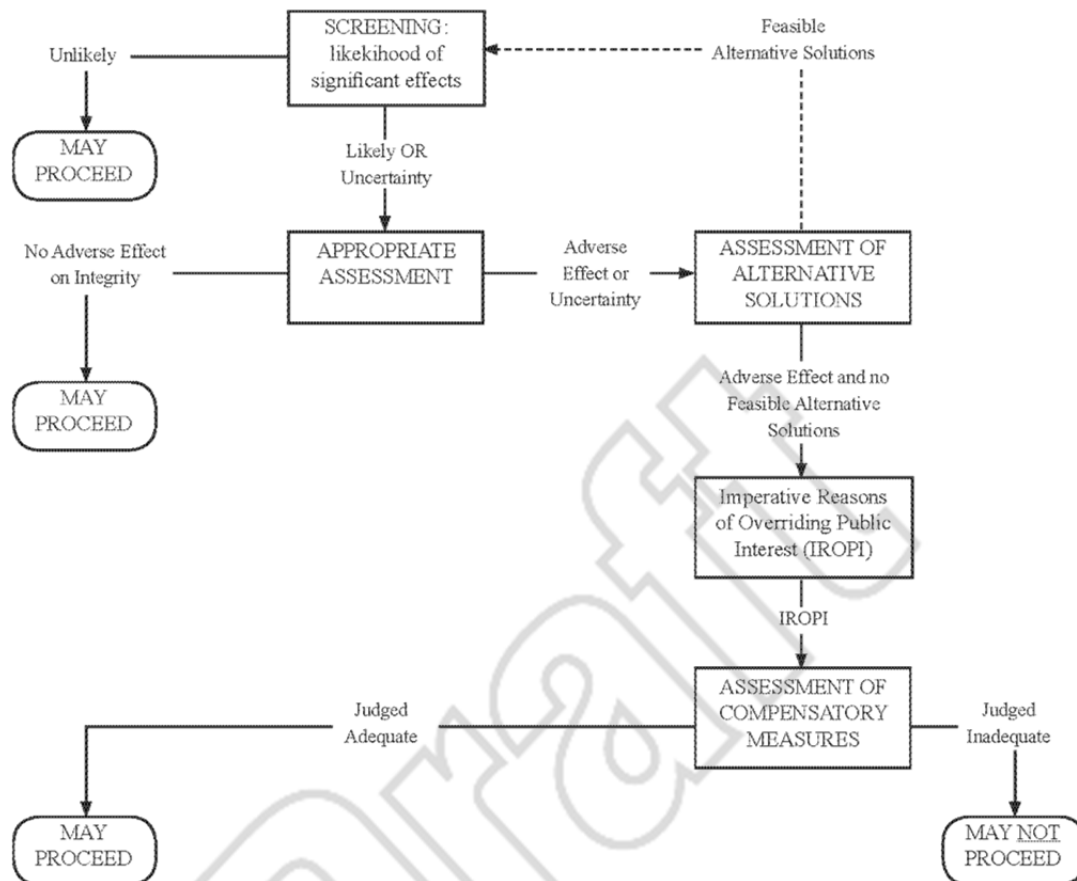


Figure 3.1 Flow diagram of the stages of the AIES process

3.5.4

This preliminary assessment comprises the Stage 1: Screening Assessment to determine whether likely significant effects on the features of European sites could occur. If the outcome of the Stage 1: Screening Assessment determines that there could be a Likely Significant Effect (or such an effect cannot be discounted) then a Stage 2: Appropriate Assessment is triggered and determination of whether there will be an effect on the integrity of the European site is undertaken. At this stage of the Project, it is not possible for the findings to be conclusive as further Project information is required and consequently all five stages are shown above. Should the eventual conclusion at the end of Stage 2 indicate that there would be no likely significant effect on the features of the European Sites then Stages 3 to 5 would not be necessary. Stages 3 to 5 can also be avoided with appropriate design and mitigation.

Stage 1: Screening Assessment-Identification of European/International Sites

3.5.5 The first step of the process was to identify all of the European sites that could potentially be affected. These include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). Government policy in England and Wales also requires Wetlands of International Importance (Ramsar sites), potential SPAs (pSPA), candidate SACs (cSAC), and possible Ramsar sites to be included.

3.5.6 In accordance with DMRB HD44/09 guidance, these include:

- All European sites within 2km of the M4 CaN;
- SACs within 30km that include bats as a qualifying feature; and
- For projects that cross or lie adjacent to, upstream of, or downstream of, a watercourse which is designated in part or wholly as a SAC or Special Protection Area (SPA), potential impacts on European Sites within the same river, lake or reservoir catchment, or at greater distance if an effect pathway exists (for example, in respect of flight paths or feeding areas of birds, outside an SPA).

3.5.7 For sites requiring assessment in terms of air quality effects, these are considered to be those that are located within very close proximity to the affected road network as set out in HA207/07 (HA, 2007).

3.5.8 Consultation carried out as part of the SHRA for the M4 CaN draft Plan (Welsh Government, 2014) has also informed the selection of European sites and features to include in this project level Stage 1: Screening Assessment.

Conservation objectives

3.5.9 Following identification of the European/International sites that could be potentially affected, the conservation objectives for each of the qualifying features were obtained.

3.5.10 In Wales, the conservation objectives are considered to consist of the vision and performance indicators as stated in the relevant Core Management Plans available from the NRW website. For European Sites situated in England, conservation objectives are developed from the relevant Site of Special Scientific Interest (SSSI) objectives which are within the relevant site area (Appendix A).

Identification of plans or projects considered for in-combination effects

3.5.11 A requirement of the Habitat Regulations (2010) is to also examine the potential for a plan or project to have a significant effect either alone or in combination with other plans and projects. It is therefore necessary to identify other plans and projects which may give rise to in-combination effects for this draft Stage 1: Screening Assessment for the M4 CaN.

3.5.12 In undertaking the in-combination assessment, only plans and projects which have a spatial and/or temporal overlap with M4 CaN require consideration, these are to include:

- Developments and other projects which are currently under construction; and

- Proposed developments which are currently under consideration with the local planning authority or other determining bodies.

3.5.13 The identification and assessment of in-combination effects at the plan level was undertaken as part of the draft SHRA for the M4 CaN draft Plan (Welsh Government, 2014), with information obtained from the following sources:

- Welsh Government – strategies, plans and guidance;
- Local Authority/National Plan Authorities – LDP/UDP;
- Statutory Environment Bodies – Management Plans; and
- Regional Authorities – Regional Transport Plans (RTP).

Test of Likely Significant Effect

3.5.14 The screening stage, that assesses the potential effects produced by the proposed development against the interest features of each European site, to determine whether there is a Likely Significant Effect (LSE), is essentially a risk based process to decide whether a more detailed assessment is required (alone and in-combination).

3.5.15 The screening for LSE involves identifying whether the proposed development is a source of potential effects that might affect any of the interest features of the relevant European sites. If there is such an effect, it is then necessary to determine whether there is a potential pathway through which the proposed development could affect the interest features of relevant European sites, the length of those pathways and what may reduce or prevent the potential effect reaching the relevant European sites. Where there is a source, a pathway and an effect that reaches the interest feature, it is judged that there is a LSE that requires more detailed assessment (i.e. appropriate assessment stage).

3.5.16 When carrying out screening at this LSE stage, account is taken of the avoidance and mitigation measures that have been built into the proposed design. Mitigation measures considered in this assessment are those which are plainly established and uncontroversial.

3.5.17 The screening for LSE identifies those aspects of the proposed development, and those interest features of each relevant European site, where there is confidence that they are not likely to be significantly affected, and which therefore need not be considered further. If it cannot be concluded with confidence that LSEs are unlikely, then under the precautionary principle, it is assumed that the issue requires more detailed consideration.

Professional Judgement

3.5.18 It is impractical to have perfect evidence and knowledge of the effects on species populations and the efficacy of mitigation measures, for example as used on other highway schemes. Consequently professional judgement has been used in the interpretation of results in relation to assessment of potential impacts, the significance of impacts and consequences for conservation objectives.. The reliability of professional judgment can be quantified to some extent by reference to the experience of the professionals concerned.

4 European/International Protected Sites Potentially Affected by the Project

4.1 Identification of European/International Sites

4.1.1 In accordance with sections 4.9 and 4.10 of HD/44/09, sixteen European/International sites were identified within 30km of the M4 CaN. Table 4.1 sets out the qualifying features for each of the sites identified, status and distance from the M4 CaN. The locations of the sites are shown in Figure 2.1.

4.1.2 European/International sites within 2km of the site include the River Usk/Afon Wysg SAC and the Severn Estuary/Môr Hafren SAC, SPA and Ramsar sites.

4.1.3 The remaining 12 European sites extended to a distance of 30km from the M4 CaN.

Table 4.1 Qualifying Features of the European/International Sites

European Site	Qualifying Features (current status)	Distance at closest
River Usk / Afon Wysg SAC	<p>Annex I habitats that are present as a qualifying feature, but not a primary reason for selection of the site: Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [unfavourable: unclassified]</p> <p>Annex II species that are a primary reason for site selection: Sea lamprey (<i>Petromyzon marinus</i>) [unfavourable: unclassified] Brook lamprey (<i>Lampetra planeri</i>) [favourable] River lamprey (<i>Lampetra fluviatilis</i>) [favourable] Twaite shad (<i>Alosa fallax</i>) [unfavourable: unclassified] Atlantic salmon (<i>Salmo salar</i>) [unfavourable: unclassified] Bullhead (<i>Cottus gobio</i>) [unfavourable: unclassified] Otter (<i>Lutra lutra</i>) [favourable]</p> <p>Annex II species present as a qualifying feature, but not a primary reason for site selection: Allis shad (<i>Alosa alosa</i>) [unfavourable: unclassified]</p>	Crossed by the draft Plan (0km)
Severn Estuary / Môr Hafren SAC	<p>Annex I habitats that are a primary reason for selection of this site: Estuaries Mudflats and sandflats not covered by seawater at low tide Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)</p> <p>Annex I habitats present as a qualifying feature, but</p>	0.4km

European Site	Qualifying Features (current status)	Distance at closest
	<p>not a primary reason for selection of this site: Sandbanks which are slightly covered by sea water all the time Reefs</p> <p>Annex II species that are a primary reason for selection of this site: Sea lamprey River lamprey Twaite shad</p>	
Severn Estuary SPA	<p>During passage: Ringed plover (passage) (<i>Charadrius hiaticula</i>)</p> <p>Over wintering: Bewick's swan (wintering) (<i>Cygnus columbianus bewickii</i>) Dunlin (<i>Calidris alpina alpina</i>) Redshank (<i>Tringa totanus</i>) Shelduck (<i>Tadorna tadorna</i>) Curlew (<i>Numenius arquata</i>) Pintail (<i>Anas acuta</i>)</p> <p>Assemblage of nationally important populations of wintering waterfowl</p>	0.4km
Severn Estuary Ramsar Site	<p>Habitats: Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)</p> <p>Migratory fish: Salmon Sea trout (<i>Salmo trutta</i>) Sea lamprey River lamprey Allis shad Twaite shad European eel (<i>Anguilla anguilla</i>)</p> <p>Bird assemblages of international importance Species with peak counts in winter: Bewick's swan European white-fronted goose (<i>Anser albifrons albifrons</i>) Shelduck Gadwall (<i>Anas strepera</i>) Dunlin Redshank</p>	0.4km

European Site	Qualifying Features (current status)	Distance at closest
	<p>Species regularly supported during the breeding season: Lesser black-backed gull (<i>Larus fuscus graellsii</i>)</p> <p>Species with peak counts in spring/autumn: Ringed plover</p> <p>Species with peak counts in winter: Eurasian teal (<i>Anas crecca</i>) Pintail</p>	
Wye Valley and Forest of Dean Bat Sites / Safleoedd Ystlumod Dyffryn Gwy a Fforest y Ddena SAC	<p>Annex II species that are a primary reason for selection of this site: Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>) [unfavourable] Greater horseshoe bat (<i>Rhinolophus ferrumequinum</i>) [unfavourable declining]</p>	7.1km
Cardiff Beech Woods SAC	<p>Annex I habitats that are a primary reason for selection of this site: <i>Asperulo-fagetum</i> beech forest (EU Habitat Code 9130) [unfavourable: unclassified]</p> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: Tilio-acerion forest of slopes, screes and ravines (EU Habitat Code 9180) (Priority habitat) [unfavourable: recovering]</p>	8.9km
River Wye / Afon Gwy SAC	<p>Annex I habitats that are a primary reason for selection of this site: Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [unfavourable: unclassified]</p> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: Transition mires and quaking bogs [unfavourable: unclassified]</p> <p>Annex II species that are a primary reason for selection of this site: White-clawed (or Atlantic stream) crayfish <i>Austropotamobius pallipes</i> [unfavourable: declining] Sea lamprey [favourable: unclassified] Brook lamprey [unfavourable: unclassified] River lamprey [unfavourable: unclassified] Twaite shad [unfavourable: unclassified] Atlantic salmon [unfavourable: unclassified] Bullhead [unfavourable: unclassified] Otter [unfavourable]</p>	9.6km

European Site	Qualifying Features (current status)	Distance at closest
	Annex II species present as a qualifying feature, but not a primary reason for site selection: Allis shad [unfavourable: unclassified]	
Wye Valley Woodlands / Coetiroedd Dyffryn Gwy SAC	Annex I habitats that are a primary reason for selection of the site: <i>Asperulo-Fagetum</i> beech forests [unfavourable] <i>Tilio-Acerion</i> forests of slopes, screes and ravines [unfavourable] <i>Taxus baccata</i> woods of the British Isles (Priority habitat) [favourable] Annex II species present as a qualifying feature, but not a primary reason for site selection: Lesser horseshoe bat [unknown] (not a primary reason for site selection)	10.2km
Aberbargoed Grasslands SAC	Annex I habitats that are a primary reason for selection of the site: Molinia meadows on calcareous, peaty or clayey silt-laden soils (<i>Molinion caeruleae</i>) [unfavourable] Annex II species that are a primary reason for selection of this site: Marsh fritillary butterfly (<i>Euphydryas aurinia</i>) [unfavourable]	16.7km
Avon Gorge Woodlands SAC	Annex I habitats that are a primary reason for selection of the site: <i>Tilio-Acerion</i> forests of slopes, screes and ravines (Priority habitat) Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) (Priority habitat)	14.8km
North Somerset and Mendip Bats SAC	Annex I habitats that are a primary reason for selection of the site: Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) (Priority habitat) <i>Tilio-Acerion</i> forests of slopes, screes and ravines (Priority habitat) Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: Caves not open to the public Annex II species that are a primary reason for selection of this site: Lesser horseshoe bat Greater horseshoe bat	20.1km

European Site	Qualifying Features (current status)	Distance at closest
Usk Bat Sites / Safleoedd Ystlumod Wysg SAC	<p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: European dry heaths [unfavourable] Degraded raised bogs still capable of natural regeneration [unfavourable] Blanket bogs (Priority habitat) [unfavourable] Calcareous rocky slopes with chasmophytic vegetation [favourable] Caves not open to the public [favourable] <i>Tilio-Acerion</i> forests of slopes, screes and ravines (Priority habitat) [favourable]</p> <p>Annex II species that are a primary reason for selection of this site: Lesser horseshoe bat [favourable]</p>	26.1km
Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	<p>Annex I habitats that are a primary reason for selection of the site: <i>Asperulo – Fagetum</i> beech forests [favourable]</p> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrub layer (<i>Quercion robori-petraeae</i> or <i>Ilici-Fagenion</i>) [favourable]</p>	27.6km
Mendip Limestone Grasslands SAC	<p>Annex I habitats that are a primary reason for selection of the site: Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) (Priority habitat)</p> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: European dry heaths Caves not open to the public <i>Tilio-Acerion</i> forests of slopes, screes and ravines (Priority habitat) Greater horseshoe bat</p>	24.1km
Chew Valley Lake SPA	Overwinter: Northern shoveler (Non-breeding) (<i>Anus clypeata</i>)	28km
Sugar Loaf Woodlands SAC	<p>Annex I habitats that are a primary reason for selection of this site: Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles</p>	30km

4.1.4

In accordance with DMRB (2009), sites up to 30km should be considered only where they contain bats or other species where a pathway exists. Consequently, five of these sites are excluded from further assessment as they comprise features that are considered to be beyond the Zone of Influence (ZoI) of potential impacts, with a large distance of separation from the Scheme, these are Cardiff Beech Woods SAC, Aberbargoed Grasslands SAC, Avon Gorge Woodlands

SAC, Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC and Sugar Loaf Woodlands SAC.

4.1.5 In relation to European sites containing bats as qualifying features, five SACs were identified as having Greater and/or Lesser Horseshoe bats as qualifying features. These are the Wye Valley and Forest of Dean Bat Sites SAC, Wye Valley Woodlands SAC, North Somerset and Mendip Bats SAC, Usk Bat Sites SAC and Mendip Limestone Grasslands SAC.

4.1.6 Greater Horseshoe Bats may travel long distances between roosts used at different times of year, although most feeding activity is concentrated in an area 3km from a roost. Lesser Horseshoe Bats also typically forage up to 3km from their roosts. Given the large distance of separation between the M4 corridor and many of these SACs, it is considered unlikely that there is a potential pathway for interaction and hence these are screened out of further assessment. The only exception to this is the Wye Valley and Forest of Dean Bat Sites SAC, as Lesser Horseshoe bats have been recorded at the eastern edge of the M4 CaN during previous studies. Further surveys will be undertaken to investigate the activity of bats, including Lesser horseshoe in the vicinity of the M4 CaN during 2015 to further inform the EIA and AIES with respect to the Wye Valley and Forest of Dean Bat Sites SAC.

4.1.7 European sites within river catchment areas and within close proximity to the M4 CaN are the River Usk SAC and the Severn Estuary SAC, SPA and Ramsar sites, consequently these are screened in for further assessment.

4.1.8 Other water courses initially identified include the River Wye SAC and Chew Valley Lake SPA, located 9.6 km and 28km away respectively from the M4 CaN. Due to the large distances between the M4 CaN and Chew Valley Lake SPA, which is in a completely different river catchment, this is excluded from further assessment. Similarly, for the River Wye SAC, there is considered to be a sufficient distance of separation and no overlap with the river catchment, hence no potential pathways for effects that could significantly affect the qualifying features. Therefore this site is also screened out of further assessment.

4.1.9 Consequently, the European/International Sites screened in for further assessment are the River Usk/Afon Wysg SAC, Severn Estuary/Môr Hafren SAC, SPA, Severn Estuary Ramsar Site, and the Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumod Dyffryn Gwy a Fforest y Ddena SAC.

4.2 Conservation Objectives of European/Ramsar Sites

4.2.1 The conservation objectives for those European/International sites taken forward for further assessment are provided in Appendix A.

5 Identification of In-Combination Projects

5.1.1 Following guidance in Tyldesley (2011), it is considered reasonable to include the following projects in the in-combination assessment:

- a) All projects started but not yet completed;
- b) All projects with consent but not yet started;
- c) All projects subject to ongoing review e.g. annual licences;
- d) All applications lodged but not yet determined;
- e) All refusals subject to appeal procedures not yet completed;
- f) All known projects that do not need consent;
- g) All proposals in adopted plans
- h) All proposals in draft plans formally published for consultation.

5.1.2 It is not considered reasonable to include projects that have not yet been submitted for consent. In some instances, however, it may be the case that there are known to be projects that will inevitably and necessarily follow on from other projects which have been formally proposed, and in such cases it is necessary to consider these where they are necessary future requirements of the original development.

5.1.3 Following a judgment of the ECJ in October 2005, it is also necessary to include as part of in-combination checks, the following proposals:

- i) Allocations or other forms of proposals in adopted development plans; and
- j) Allocations or other forms of proposals in draft development plans which have been published for consultation purposes.

Projects

5.1.4 Section 2 Gilwern to Brynmawr of the A465 Heads of the Valley Road Scheme (consented in 2014 and currently under construction) is identified as having the potential for an in-combination effect with the M4 CaN.

5.1.5 The HRA for Section 2 of the Heads of Valleys Road Scheme identified likely significant effects on the following European and Ramsar Sites:

- Usk Bat Sites/ Safleoedd Ystlumod Wysg SAC
- Cwm Clydach Woodlands/ Coedydd Cwm Clydach SAC
- River Usk/ Afon Wysg SAC

5.1.6 Likely significant effects identified during the screening stage are summarised in Table 5.1.

Table 5.1: Summary of likely significant effects of Section 2 of the A465 Heads of Valleys road scheme identified at screening stage

Site	Feature	Likely Significant Effect
Usk Bat Sites/ Safleoedd Ystlumod Wysg SAC	Lesser Horseshoe Bat	Habitat loss – loss of roosts
		Habitat loss – loss of foraging habitat
		Disturbance to species – mortality during construction
		Disturbance to species – damage or obstruction of access to roosts
		Disturbance to species – noise and vibration during construction
		Disturbance to species – lighting during construction
		Habitat fragmentation – severance of flightlines
		Habitat deterioration – dust generation during construction
		Habitat deterioration – discharge of pollutants to watercourses during construction
		Disturbance to species – mortality during operation
		Disturbance to species – noise during operation
		Disturbance to species – lighting during operation
		Habitat deterioration - discharge of pollutants to watercourses during operation
		Habitat deterioration – aerial emissions during operation
	Tilio-acerion Woodland	Habitat loss – direct land take
		Habitat loss - changes in hydrology during construction
		Habitat deterioration – dust generation during construction
		Habitat deterioration – aerial emissions during operation
	Caves not open to the public	Habitat loss – direct land take
		Habitat loss – indirect construction effects
		Habitat deterioration – changes in hydrology during construction
		Habitat deterioration – changes in air flow during construction
		Impacts on bats (construction / operation)
Cwm Clydach Woodlands/ Coedydd Cwm Clydach SAC	<i>Asperulo-Fagetum</i> beech Forest and Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrub layer	Habitat deterioration – dust generation during construction
		Habitat deterioration – aerial emissions during operation

Site	Feature	Likely Significant Effect
River Usk/ Afon Wysg SAC	Water courses of plain to montane levels	Habitat deterioration – discharge of silt and chemical pollutants to watercourses during construction
		Habitat deterioration – discharge of chemical pollutants to watercourses during operation
	Sea Lamprey, Brook Lamprey, River Lamprey, Twaite Shad, Allis Shad, Atlantic Salmon, Bullhead	Mortality and habitat deterioration – discharge of silt and chemical pollutants to watercourses during construction
		Mortality and habitat deterioration – discharge of chemical pollutants to watercourses during operation
	Otter	Disturbance to species – noise and vibration during construction
		Disturbance to species – lighting during construction
		Mortality and habitat deterioration – discharge of silt and chemical pollutants to watercourses during construction
		Disturbance to species – noise and vibration during operation
		Disturbance to species – lighting during operation
		Disturbance to species – mortality during operation
		Mortality and habitat deterioration – discharge of chemical pollutants to watercourses during operation

5.1.7 The Statement to inform an Appropriate Assessment (SIAA) for Section 2 of the Heads of Valleys scheme (RPS 2013) determined that the Scheme would not affect the achievement of any of the conservation objectives set for the Usk Bat Sites SAC, the Cwm Clydach Woodlands SAC or the River Usk SAC. Any risks to site integrity are extremely small and it was concluded beyond reasonable scientific doubt that there would be no impact on integrity. Therefore, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010, it was concluded that the A465 Heads of Valleys scheme would not give rise to an adverse effect on the integrity of the European Sites.

5.1.8 Subsequent to submission of the SIAA Natural Resource Wales (NRW) questioned whether the conclusion provides a sufficient level of certainty that an adverse effect on the integrity of the Usk Bat Sites SAC would be avoided. In particular, on a precautionary basis their view was that there was a reasonable potential for more than a short term drop in the population of Lesser Horseshoe Bats in the Clydach Gorge part of the SAC.

5.1.9 After discussions with NRW as to the reason for their view, Welsh Government concluded, in line with advice in HD 44/09, that as the relevant Statutory Environmental Body was not in agreement regarding the level of confidence in an absence of adverse effects on the Usk Bat Sites SAC then for the purposes of

Regulation 61 of the Conservation of Habitats and Species Regulations 2010 there was a need to proceed on the basis that it cannot be ascertained that the project will not adversely affect the integrity of the site. As such there was a need to proceed to the later stages of AIES, namely considering alternative solutions, Imperative Reasons of Overriding Public Interest (IROPI) and compensatory measures.

- 5.1.10** A Statement about Alternative Solutions, Imperative Reasons of Overriding Public Interest and Compensatory Measures (SASICOM) was therefore prepared (RPS, 2014). This explained that Stages 3 to 5 of the AIES process had been undertaken in accordance with Regulations 62 and 66 of the Conservation of Habitats and Species Regulations 2010, which require any Competent Authority that intends to consent a scheme that could have an adverse effect on the integrity of a European Site to demonstrate that there are no alternative solutions, that it must be carried out for 'imperative reasons of overriding public interest', and that it can secure that any necessary compensatory measures will be taken to ensure that the overall coherence of Natura 2000 is protected.
- 5.1.11** The SASICOM report concluded that there were no alternative solutions that would achieve the Scheme Objectives whilst also having a lesser effect upon the integrity of the SACs (by having a lesser effect on the conservation objectives).
- 5.1.12** No priority habitats or species would be adversely affected by the proposal.
- 5.1.13** There were three imperative reasons of overriding public interest. The first relates to the inclusion of the Scheme in agreed Welsh Government national policy, the second relates to public safety and the third relates to economic benefits.
- 5.1.14** Compensatory measures were developed to provide additional opportunities for lesser horseshoe bats to roost between the SAC population in the Clydach Gorge and populations known to be present in the Ebbw Valley. These opportunities would potentially support and enhance the ability of the species to remain in favourable conservation status. It was proposed to provide artificial "stepping stone" roosting opportunities within the embankments of the A465 Heads of the Valleys Section 3 scheme which runs between Brynmawr and Tredegar that was currently under construction. The compensatory measures were sufficiently extensive and reliable to ensure that the coherence of the Natura 2000 network was protected.
- 5.1.15** Given these conclusions, the Welsh Ministers (as the Competent Authority) were able to agree to the project in accordance with Regulations 62 and 66 of the Conservation of Habitats and Species Regulations 2010.
- 5.1.16** In terms of potential in-combination effects, currently there is no likely overlap in the timing of construction periods between Section 2 of the A465 Heads of Valleys scheme and the M4 CaN Project. The A465 is scheduled to be finished by the time construction commences for the M4 CaN Project in 2018. The two schemes will however, be in operation together and therefore potential operational in-combination effects require further consideration.
- 5.1.17** For the European sites identified and requiring further consideration, the Usk Bat Sites SAC has been screened out for the M4 CaN Project (see Section 4), consequently, there will be no in-combination effects with the A465 Heads of Valleys scheme for this European site and therefore this site is screened out of further assessment.

- 5.1.18** Both schemes have potential to affect some features of the River Usk SAC, however, due to the large distance of separation of 24.6 km between them along with the implementation of the proposed measures for the A465 Heads of Valleys, section 2, the potential for in-combination effects is screened out of further assessment.
- 5.1.19** Two further projects requiring consideration within this AIES, include the proposed Cardiff and Newport Tidal Lagoon Schemes which are both at the pre-application stage for a Nationally Significant Infrastructure Project (NSIP) (i.e. the applicant has notified the Planning Inspectorate (PINS) of its intention to submit an application).
- 5.1.20** The application for a proposed Cardiff tidal lagoon renewable energy generation scheme near Cardiff is expected to be submitted in Q2 2017 to the PI, with consent determination in 2018 and first power output predicted in 2022. A scoping report was been submitted to the PINS in March 2015 (Tidal Lagoon Cardiff Ltd, 2015).
- 5.1.21** The Project would generate electricity using kinetic energy captured by hydro turbines from the large tidal range of the Severn Estuary. It would have a generating capacity of 1800 to 2800 megawatts (MW). The Project is proposed on the northern shore of the Severn Estuary, between Cardiff Bay and the River Usk. The length of the breakwater is expected to be approximately 25km. The western and eastern breakwater landfalls are expected to be approximately 2km from the entrance to Cardiff Bay and 2km from the mouth of the River Usk, respectively. At its furthest point from land, the breakwater is likely to extend 8km into the Severn Estuary.
- 5.1.22** The Scoping report includes a HRA Selection of European Sites (pre-screening) assessment which identifies a number of potential impacts on the interest features of a number of European/International sites. Focusing on the designated sites carried forward in this AIES, the following impact pathways were identified:
- Probable impact pathways from alteration of coastal processes/sediment transport, changes water quality, habitat loss/ degradation/ fragmentation, noise and vibration disturbance, barrier effects and entrainment in turbines/sluice gates and possible impact pathways from electromagnetic fields and visual disturbance to migratory fish species of the River Usk SAC, Severn Estuary SAC and Severn Estuary Ramsar sites.
 - Probable impact pathways from alteration of coastal processes/sediment transport, changes in water quality, habitat loss/degradation/fragmentation and possible impact pathways from toxic contamination on the habitat features of the Severn Estuary SAC and Ramsar sites.
 - Probable and possible impact pathways were also identified on the qualifying bird species of the Severn Estuary SPA and Ramsar sites, these included all of the above with the exclusion barrier, entrainment and electromagnetic effects.
 - Only possible impact pathways from alteration of coastal processes, changes in water quality, habitat loss/degradation/fragmentation, toxic contamination, noise and vibration disturbance, visual disturbance and barrier effects on otter, a feature of the River Usk SAC.

5.1.23 Consequently, this Project is screened in for further assessment.

5.1.24 The Newport tidal lagoon project, would have a generating capacity of between 1,800MW and 2,800MW and is planned within the Severn Estuary. As with the Cardiff Tidal Lagoon Project, it will harness the power of the Severn Estuary. The Project would involve a seawall attached to the foreshore, at its western extent approximately 1km to the east of the River Usk, and at its eastern extent onto the foreshore in the area of Baldwin Sands. The furthest offshore extent is up to 8km from the foreshore towards the centre of the Severn Estuary. Proposals are at an early stage, with an intended EIA scoping submission being mid-2015 and estimated submission of the scheme to the Planning Inspectorate for consideration being 2017/2018. At this stage it is difficult to determine the precise nature of impacts, albeit some will be similar to those described previously for the Cardiff Tidal Lagoon. Consequently, this Project is screened in for further assessment and as more detail becomes available, this AIES will be updated, should it materially alter this assessment.

5.1.25 Another in-combination project considered for this AIES is that of the Great Western route modernisation. In July 2012, the Secretary of State for Transport announced the decision to electrify the railway between London and Swansea-a major enhancement programme funded by the Department for Transport. In Wales, this involves the South Wales mainline - an important rail route which runs from the Severn Tunnel in Monmouthshire, through Newport, Cardiff, Bridgend, Port Talbot, Neath and Swansea. Work in Wales will begin in 2015, with electric trains expected to run to Cardiff in 2017 and Swansea in 2018. Consequently, it is anticipated that all of the work will be completed in the Newport area, prior to the construction start date for the M4 CaN in Spring 2018 and therefore in-combination effects during construction are screened out. In terms of on-going operational impacts, it is also anticipated that the overhead cables would be too low (i.e. 4.7m generally increasing to 5.8m at level crossings) to be a significant issue for SPA birds and that bats would probably avoid the cables, therefore in-combination operational effects are also screened out of further assessment. Consequently, this Project is screened out of further assessment within this AIES.

Plans

5.1.26 In accordance with the decision of the ECJ in October 2005, consideration has also been given to adopted development plans. As identified in the SHRA for the M4 Corridor around Newport (Plan Level) (Welsh Government, 2014), the following plans (updated as necessary) have been considered within this Stage 1: Screening Assessment:

- Wales Transport Strategy (2008);
- Wales Spatial Plan Update (2008);
- National Transport Plan (2010) and the Prioritised National Transport Plan (2011);
- South East Wales Regional Transport Plan (2010);
- Newport City Council LDP 2011 – 2026 Revised Deposit Plan (2013);
- Blaenau Gwent Local Development Plan (2011);

- Caerphilly County Borough LDP up to 2021: (2010);
- Cardiff County Council Deposit Local Development Plan (2013);
- Monmouthshire Local Development Plan 2011-2021 (2014);
- Newport Local Development Plan, Revised Deposit Plan (2013);
- Powys Local Development Plan 2011-2026. Deposit Draft (2014);
- Torfaen County Borough Council Local Development Plan: (2011);
- Vale of Glamorgan Local Development Plan (2012);
- Brecon Beacons National Park Authority Local Development Plan 2007-2022 (2013);
- Newport City Council – River Usk Strategy (2009);
- Wye and Usk Catchment Flood Management Plan (2010);
- Eastern Valleys Catchment Flood Management Plan (2010);
- Taff and Ely Catchment Flood Management Plan (2010);
- Draft Shoreline Management Plan for the Severn Estuary (SMP2) (2010);
- Countryside Council for Wales – Habitats Regulation Assessment of a proposal for a continuous coastal path between Cardiff and Chepstow (2011); and
- Dwr Cymru – Final Water Resources Management Plan (2013).

5.1.27 The transport plans and local development plans for Newport and surrounding counties have been considered in this in-combination assessment.

5.1.28 Consideration has also been given to the potential effects of:

- local development plans on the River Usk SAC and Wye Valley and Forest of Dean Bat Sites SAC; and
- shoreline management plans on the Severn Estuary SPA, SAC and Ramsar Site

5.1.29 Although Plans cannot of themselves consent developments, an initial assessment has been conducted of the implications of the Plans for potential in-combination effects. Appendix C provides further details of these plans and the potential implications of these that could have in-combination effects with the M4 CaN Project on European Sites. The identified issues arise from either the supporting documents such as the HRAs for these plans or professional judgement.

6 Stage 1: Screening

6.1.1 The screening stage to determine whether there is a Likely Significant Effect (LSE) on the features of the relevant European/International sites as a result of the M4 CaN has considered potential direct, indirect or secondary impacts and these are summarised in Table 6.1.

Table 6.1: Potential Impacts, Pathways and Effects from the M4 CaN Project

Impact	Pathway	Effect
Land take for M4 CaN	Direct habitat loss.	Loss of SAC/SPA/Ramsar habitat feature. Loss of habitat for SAC/SPA/Ramsar species feature (e.g. foraging, breeding, resting and roosting sites). Reduction in natural range of SAC/SPA/Ramsar species. Reduced numbers of SAC/SPA/Ramsar species features.
	Habitat fragmentation.	Reduced habitat for SAC/SPA/Ramsar species feature (e.g. foraging, breeding, resting and roosting areas). Reduction in natural range of SAC/SPA/Ramsar Species. Reduced number of SAC/SPA/Ramsar features.
Physical presence	Permanent/temporary habitat loss/fragmentation. Barrier to movement.	Loss of SAC habitat feature. Reduced number of SAC species features.
Hydrological change	Indirect habitat loss. Alteration in flow regime and levels.	Loss of SAC/SPA/Ramsar habitat feature. Loss of habitat for SAC species feature. Reduction in natural range for SAC/SPA/Ramsar species. Reduced numbers of SAC/SPA/Ramsar species features. Change in SAC/SPA/Ramsar species composition.
Dust deposition	Damage to surrounding habitats.	Damage to SAC/SPA/Ramsar habitat features. Change in SAC/SPA/Ramsar species composition.
Discharge of pollutants	Deterioration in water	Damage to SAC/SPA/Ramsar

Impact	Pathway	Effect
to watercourses	quality.	habitat features. Physiological effects in SAC/SPA/Ramsar species. Reduction in the natural range of species. Reduced species numbers in SAC/SPA/Ramsar sites. Change in SAC/SPA/Ramsar species composition.
Aerial emissions	Increase in atmospheric deposition.	Damage to SAC/SPA/Ramsar habitat features. Change in SAC/SPA/Ramsar species composition.
Changes to traffic flows / speeds and utilisation of the site	Collision risk. Disturbance/displacement.	Reduced species numbers in SAC/SPA/Ramsar sites. Barrier to movement of SAC/SPA/Ramsar features. Change in SAC/SPA/Ramsar species composition.
Noise and vibration	Disturbance/displacement. Barrier to movement.	Reduction in the natural range of SAC/SPA/Ramsar species features (e.g. foraging, breeding, resting, roosting and migratory routes). Barrier to movement of SAC/SPA/Ramsar features. Reduced SAC/SPA/Ramsar species numbers. Mortality/injury/behavioural changes to SAC/SPA/Ramsar species features.
Visual and Lighting	Disturbance/displacement. Barrier to movement.	Reduction in the natural range of SAC/SPA/Ramsar species features (e.g. foraging, breeding, resting and roosting areas). Barrier to movement of SAC/SPA/Ramsar features. Reduced SAC/SPA/Ramsar species numbers. Change in SAC/SPA/Ramsar species composition.

6.2 Avoidance/Mitigation Measures

6.2.1 The measures which have been adopted as part of the design of the M4 CaN to avoid potential impacts, and would further be developed and adopted during construction to avoid and mitigate potential effects, are summarised below.

6.2.2 Key designed-in measures to avoid or minimise potential impacts include:

- A single span bridge across the River Usk SAC, thereby avoiding installation of support structure within the wetted channel and avoids the need for watercourse diversions.
- In accordance with the mitigation measures proposed in the draft SHRA (Welsh Assembly Government, 2014) screening assessment construction will be carried out in accordance with guidance outlined within CIRIA best practice guidance and the Environment Agency (EA) Pollution Prevention Guidelines (PPGs) including:
 - PPG1 General Guide to the Prevention of Pollution;
 - PPG5 Works and Maintenance in or near water; and
 - PPG6 Working Construction and Demolition Sites.
- In line with other measures normally incorporated as part of other road schemes a series of further measures will also be implemented which are considered integral to the M4 CaN Project. These are highlighted in this Stage 1: Screening assessment, so that they can be considered, developed and consequently built into the design process at an early stage, these include:
 - A Construction Environmental Management Plan (CEMP) will be produced and implemented, according to industry best practice techniques to prevent significant effects on qualifying features;
 - The Project will include a drainage scheme that will include interceptors and other measures to remove pollutants from the run-off, and will include measures to prevent accidental spillages from reaching watercourses;
 - Effective design to maintain hydrological connectivity of the reed system of the Gwent Levels during construction and operation;
 - Implementation of an effective lighting strategy during construction and operation;
 - Effective design of highway lighting to avoid or minimise effects on adjacent watercourses and sensitive features;
 - Limitations, if required, on night working in sensitive areas;
 - Programming of works in sensitive locations, if required, to minimise construction effects;
 - Provision of replacement resting habitat, holts or hovers for otters, if required;

- Project design to include otter fencing and underpasses to provide safe crossing points, thereby preventing potential mortality during operation and to maintain connectivity;
- The Project Design will aim to retain or replace lesser horseshoe flight lines where necessary (to be informed by subsequent bat surveys); and
- There will also be provision of replacement bat roost sites and foraging habitat.

6.2.3 For these further measures, the detail of how these will be implemented effectively will be provided in the Stage 2: Appropriate Assessment. Consequently, a precautionary approach has been taken in this assessment for many effects until these measures are further developed. The only exception is related to hydrological changes leading to alteration of flows/barrier (see Table 6.2) whereby no LSE is predicted, as maintaining hydrological connectivity is considered fundamental to the success of the M4 CaN project.

6.3 Potential Impacts on Protected Sites/Stage 1: Screening Assessment Matrix (alone)

6.3.1 The initial screening matrices (based on Annex C of DMRB Vol.11 Section 4) for the M4 CaN are provided in Appendix B.

6.3.2 More detailed screening matrices setting out each potential effect for the River Usk SAC, Severn Estuary SAC, Severn Estuary SPA, Severn Estuary Ramsar Site and the Wye Valley and Forest of Dean Bat Sites SAC are provided in Table 6.2.

6.3.3 An explanation is provided where a potential effect and/or feature has been screened out or in. Those screened in will be considered in more detail at the appropriate assessment stage and reported in the SIAA.

6.3.4 Those sites and features where likely significant effects have been predicted in Table 6.2 are taken forward to the next stage.

Table 6.2 Identification of Impacts, Pathways and Effects (Alone)

Potential Impacts/Pathways and Effects									
Qualifying Features	Direct land take-habitat loss/fragmentation	Physical Presence-displacement/barrier/flight lines/collision	Hydrological change-alteration of flows/barrier	Dust deposition-habitat damage	Release of pollutants (water quality changes)-physiological/barrier	Aerial emissions (increase in atmospheric deposition)-habitat degradation	Change in traffic flows/speed-use of area-disturbance/displacement/collision	Noise and vibration-disturbance/displacement/barrier	Visual and Lighting-disturbance/behavioural/flight paths
River Usk / Afon Wysg SAC									
Migratory Fish: Sea lamprey, River lamprey, Twaite shad, Allis shad, Atlantic salmon	No permanent bridge structures within the River Usk. No loss/fragmentation of key sensitive habitats (i.e. spawning areas located upstream in the freshwater areas) or barrier effects. No Likely Significant Effects (LSE) are anticipated.	No permanent bridge structures within River Usk, thus no barrier to the migration of fish. No LSE is expected.	No significant hydrological changes are anticipated in the River Usk SAC, therefore no barrier to migration and/or loss of key sensitive habitats anticipated. Therefore, no LSEs anticipated.	Due to the mobile nature of these features and subtidal environment. No LSE anticipated.	Construction of the new River Usk bridge and on-going maintenance of the new bridge could lead to the release of pollutants. Effects on features may include physiological/behavioural/barrier effects. Measures will reduce effects, however, as a precautionary approach until these are fully developed a LSE is derived.	Expected reduction in aerial emissions upstream of the new crossing and any significant effects normally expected within 200m (HA, 2007). Due to the mobile nature of these species through the area, no LSEs are anticipated.	No pathway. No LSE.	Potential for noise and vibration during construction of new River Usk bridge from land sources. Construction of the bridge in the River Ebbw is not within the SAC, but may also lead to some disturbance of features within the River Usk. There is potential for disturbance /barrier effects to fish. As a precautionary approach a LSE is derived.	Possible effect from highway/bridge lighting shining on water causing behavioural changes/barrier effects in fish during migration. As a precautionary approach a LSE is derived.
Bullhead and Brook Lamprey	Feature is located in freshwater areas (River Usk is tidal for approximately 21km upstream),	Feature is located beyond the Zone of Influence (Zol) of potential	Feature is located beyond the Zol of potential impacts. No LSE	Feature is located beyond the Zol of potential impacts. No	Feature is located beyond the Zol of potential impacts. No LSE expected.	Feature is located beyond the Zol of potential impacts. No LSE expected.	No pathway. No LSE.	Feature is located beyond the Zol of potential impacts. No LSE	Feature is located beyond the Zol of potential impacts. No LSE

Qualifying Features	Potential Impacts/Pathways and Effects								
	Direct land take-habitat loss/fragmentation	Physical Presence-displacement/barrier/flight lines/collision	Hydrological change-alteration of flows/barrier	Dust deposition-habitat damage	Release of pollutants (water quality changes)-physiological/barrier	Aerial emissions (increase in atmospheric deposition)-habitat degradation	Change in traffic flows/speed-use of area-disturbance/displacement/collision	Noise and vibration-disturbance/displacement/barrier	Visual and Lighting-disturbance/behavioural/flight paths
	no LSE expected.	impacts. No LSE anticipated.	anticipated.	LSE.				anticipated.	anticipated.
European otter	Potential for habitat loss/fragmentation of potential otter habitat (e.g. resting areas in the dense wet scrub areas next to the River Usk leading to a temporary restriction in movement during construction. Potential for LSE.	Potential for barrier to movement of otters. Installation of fencing and underpasses in line with DMRB to enable passage. Potential for LSE during construction and operation.	It is anticipated that there will be no significant alterations of the hydrological regime within the River Usk SAC or the wider Gwent Levels as the hydrological connectivity will be maintained. Thus no LSE is anticipated.	No pathway. No LSE.	As there is potential for water quality effects on the migratory fish species within the River Usk, there is potential for nearby otters to also be affected leading to physiological changes. Thus, there is potential for a LSE.	It is considered unlikely that aerial emissions will lead to direct or indirect effects on these mobile features, thus no LSE is anticipated.	Potential disturbance/collision risk of areas adjacent to the River Usk and across the Gwent Levels. Newport is a heavily used area, with otters continuing to move along the River Usk and the centre of the city. Although measures will be implemented to allow safe passage, a precautionary LSE is derived for those on the Gwent Levels.	Potential for disturbance and barrier effects to the movement of otters during construction and operation. Potential for LSE.	Potential for disturbance and barrier to the movement of otters during construction and operation. Potential for LSEs.
Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation	Habitat feature is located upstream in the freshwater areas (the River Usk is tidal for approximately 21km), therefore beyond the Zol of potential impacts	No pathway-as feature beyond the Zol of potential impacts. No LSE.	No pathway-as feature beyond Zol. No LSE.	No pathway-as feature beyond the Zol. No LSE.	No pathway- as feature beyond Zol of potential impacts. No LSE.	No pathway-expected reduction in aerial emissions in upstream and due to localised effects. No	Not applicable	Not applicable	No pathway-as feature beyond the Zol. No LSE.

Potential Impacts/Pathways and Effects									
Qualifying Features	Direct land take-habitat loss/fragmentation	Physical Presence-displacement/barrier/flight lines/collision	Hydrological change-alteration of flows/barrier	Dust deposition-habitat damage	Release of pollutants (water quality changes)-physiological/barrier	Aerial emissions (increase in atmospheric deposition)-habitat degradation	Change in traffic flows/speed-use of area-disturbance/displacement/collision	Noise and vibration-disturbance/displacement/barrier	Visual and Lighting-disturbance/behavioural/flight paths
	from the Project. No LSE.					LSE anticipated. No LSE.			
Severn Estuary/Mor Hafren SAC									
Migratory fish: River lamprey, Sea lamprey, Twaite shad	There will be no direct habitat loss/fragmentation within this SAC or a significant loss elsewhere that it is important to these features. No barrier effects expected. No LSE.	There will be no construction within this SAC. Potential impacts will only occur during upstream migration of adults and emigration of juveniles through the River Usk SAC. No planned structures within the River Usk. No LSEs are anticipated.	There will be no hydrological changes within this SAC or within the River Usk SAC. Thus no LSEs are anticipated.	Dust emissions will not affect features within the SAC and due to feature's mobile nature through the River Usk, no LSEs are anticipated.	It is not anticipated that there will be any water quality changes within this SAC. However, migratory fish have potential to be affected by a change in water quality (e.g. physiological/behavioural/barrier) as they migrate through the R. Usk SAC, thus they are screened in for further assessments as potential for LSE.	Effects may occur during the operation of the Project within 200m of roads (HA, 2007). Winds are likely to take emissions away from this SAC. These migratory features are also expected to be transient through this area and thus, no LSEs are anticipated.	No pathway. No LSE.	Noise and vibration will not lead to effects within this SAC. However as the features migrate through the River Usk SAC there is potential for a LSE (disturbance/barrier effects) during construction.	Lighting from the bridge will not cause disturbance to features within this SAC. However, there is potential for LSEs (barrier effects) as the features migrate through the River Usk SAC during construction and operation.
Estuaries	Habitat feature is located outside of the construction footprint, therefore no LSE.	No pathway. No LSE.	Habitat is located beyond the Zol. No LSE.	Habitat is located beyond the Zol. No LSE.	Habitat is considered to be located beyond the Zol and due to the large dilution available, no	Habitat is located beyond the Zol. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.

Potential Impacts/Pathways and Effects									
Qualifying Features	Direct land take-habitat loss/fragmentation	Physical Presence-displacement/barrier/flight lines/collision	Hydrological change-alteration of flows/barrier	Dust deposition-habitat damage	Release of pollutants (water quality changes)-physiological/barrier	Aerial emissions (increase in atmospheric deposition)-habitat degradation	Change in traffic flows/speed-use of area-disturbance/displacement/collision	Noise and vibration-disturbance/displacement/barrier	Visual and Lighting-disturbance/behavioural/flight paths
					LSE is expected.				
Mudflats and sandflats not covered by seawater	As above for estuaries. No LSE.	No pathway. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.
Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>)	As above for estuaries. No LSE.	No pathway. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.
Sandbanks which are slightly covered by seawater all the time	As above for estuaries. No LSE.	No pathway. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.
Reefs	As above for estuaries. No LSE.	No pathway. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.

Potential Impacts/Pathways and Effects									
Qualifying Features	Direct land take-habitat loss/fragmentation	Physical Presence-displacement/barrier/flight lines/collision	Hydrological change-alteration of flows/barrier	Dust deposition-habitat damage	Release of pollutants (water quality changes)-physiological/barrier	Aerial emissions (increase in atmospheric deposition)-habitat degradation	Change in traffic flows/speed-use of area-disturbance/displacement/collision	Noise and vibration-disturbance/displacement/barrier	Visual and Lighting-disturbance/behavioural/flight paths
Severn Estuary SPA									
Ringed plover (during passage), Bewick's swan, Dunlin, Redshank, Shelduck, Curlew, Pintail, Assemblage of nationally important populations of wintering waterfowl.	No loss within the SPA. But potential for loss of roosting or foraging areas if located in the vicinity of the route and outside of the SPA. Potential for LSEs during construction and operation.	Potential for displacement of these features if located in the vicinity of route. Potential interruption of flight lines/collision risk depending on bridge design. It is likely that species would habituate to the presence of any structure. However, as a precautionary measure, potential for LSEs.	No pathway. No LSE.	No pathway. No LSE.	Not anticipated to result in LSEs.	No pathway. No LSE.	Potential for disturbance/displacement and interruption of flight lines/collision risk. Potential for LSEs.	Potential for disturbance/displacement if roosting or foraging sites within close proximity. Potential for LSEs.	Potential disturbance of night behaviour patterns by construction and highway lighting. Potential for LSEs.
Severn Estuary Ramsar Site									

Qualifying Features	Potential Impacts/Pathways and Effects								
	Direct land take-habitat loss/fragmentation	Physical Presence-displacement/barrier/flight lines/collision	Hydrological change-alteration of flows/barrier	Dust deposition-habitat damage	Release of pollutants (water quality changes)-physiological/barrier	Aerial emissions (increase in atmospheric deposition)-habitat degradation	Change in traffic flows/speed-use of area-disturbance/displacement/collision	Noise and vibration-disturbance/displacement/barrier	Visual and Lighting-disturbance/behavioural/flight paths
Bewick's swan, Wintering European white-fronted goose, Dunlin, Redshank, Gadwall, Shelduck. Assemblage of nationally important populations of waterfowl.	No loss within the Ramsar site. Potential for loss of roosting/foraging areas, if located in the vicinity of the route. Potential for LSEs.	Disturbance/displacement of features if located in the vicinity of the route. Potential interruption of flight lines and collision risk depending on bridge design, however, species would habituate to the presence of any structure. However, as a precaution potential for LSEs.	No pathway. No LSE.	No pathway. No LSE.	Not anticipated to result in LSEs.	No pathway. No LSE.	Potential for disturbance/displacement and interruption of flight lines. Potential for LSEs	Potential for disturbance/displacement if roosting or foraging sites within close proximity. Potential for LSEs.	Potential disturbance of night behaviour patterns by construction and highway lighting. Potential for LSEs.
Assemblage of migratory fish including: Salmon, Sea trout, Sea lamprey, River Lamprey, Allis shad, Twaite shad,	No habitat loss/fragmentation of key habitats within this site. Potential for loss/fragmentation of eel habitat across the Gwent Levels, which could result in	No physical structures within this site or within the subtidal River Usk. The physical presence of the new motorway may	No hydrological changes within this site and no significant hydrological changes within the River Usk SAC or Gwent Levels to	No pathway. No LSE.	No change in water quality within this site. Although, there is potential for water quality effects (e.g. physiological/behavioural and barrier) as	The new M4 would not transverse this site. Any significant effects during the operation are normally expected to be limited and	No pathway. No LSE.	Noise and vibration will not directly affect the features within this site. However, there is potential for disturbance/behavioural/	Lighting will not directly affect the features within this site, only during their migration through the River Usk SAC. Potential for behavioural/

Potential Impacts/Pathways and Effects									
Qualifying Features	Direct land take-habitat loss/fragmentation	Physical Presence-displacement/barrier/flight lines/collision	Hydrological change-alteration of flows/barrier	Dust deposition-habitat damage	Release of pollutants (water quality changes)-physiological/barrier	Aerial emissions (increase in atmospheric deposition)-habitat degradation	Change in traffic flows/speed-use of area-disturbance/displacement/collision	Noise and vibration-disturbance/displacement/barrier	Visual and Lighting-disturbance/behavioural/flight paths
European Eel*	barrier effects. Potential for a LSE on eels only.	pose a barrier to the movement of eels across the Gwent Levels, thus there is potential for LSEs on eels only.	significantly present a barrier to migratory species. Consequently, no LSEs are anticipated.		they migrate through the River Usk SAC and for eels as the migrate across the Gwent Levels. Therefore potential for LSEs.	within 200m of roads (HA, 2007). Furthermore due to the mobile nature of the features, no LSEs are anticipated.		barrier effects as the features migrate through the River Usk SAC. As a precautionary approach LSEs are derived.	barrier effects and therefore LSEs on these features.
Estuaries	Habitat feature is not located within the construction footprint. No LSE anticipated.	No pathway. No LSE.	Habitat is located beyond the Zol. No LSE anticipated.	Habitat is located beyond the Zol. No LSE expected.	Habitat is considered to be located beyond the Zol and thus no LSE expected.	Habitat is located beyond the Zol. No LSE expected.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.
Atlantic salt meadows	As above for estuaries. No LSE.	No pathway. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.
Mudflats and sandflats not covered by seawater at low tide	As above for estuaries. No LSE.	No pathway. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	As above for estuaries. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.
Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumo Dyffryn Gwy a Fforest y Ddena SAC									
Lesser horseshoe bat	Recorded during bat activity surveys. Potential for habitat loss/loss or fragmentation of roosts/ foraging routes/severance of flight lines.	Potential for restriction in movement through the severing of flight lines/ collision risk. Potential for LSEs.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.	Effects normally only expected within 200m of roads affected by changes in traffic volumes (HA, 2007), therefore no	No pathway. No LSE.	Noise and vibration levels not anticipated to result in LSE.	Potential to restrict bat movement during construction and operation. Potential for LSEs.

Qualifying Features	Potential Impacts/Pathways and Effects								
	Direct land take-habitat loss/fragmentation	Physical Presence-displacement/barrier/flight lines/collision	Hydrological change-alteration of flows/barrier	Dust deposition-habitat damage	Release of pollutants (water quality changes)-physiological/barrier	Aerial emissions (increase in atmospheric deposition)-habitat degradation	Change in traffic flows/speed-use of area-disturbance/displacement/collision	Noise and vibration-disturbance/displacement/barrier	Visual and Lighting-disturbance/behavioural/flight paths
	Potential for LSEs.					LSE.			
Greater horseshoe bat	No pathway – no established link between roost at Ruperra and Wye Valley.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.	No pathway. No LSE.

6.4 Potential Impacts on Protected Sites/Stage 1: Screening Assessment Matrix (in-combination)

6.4.1 For the in-combination assessment of likely significant effects, for those features where no significant effects are anticipated from the M4 CaN Project, a further screening exercise has been undertaken for in-combination assessment against the projects and plans that could have an effect on the features as shown in Table 6.3.

6.4.2 The majority of possible in-combination impacts relating to plans were predicted to be centred on the issues of air pollution (Welsh Government, 2014). As part of this AEIS, we have updated the plans and undertaken a review of these plans. In accordance with the SHRA for the draft M4 plan, it is acknowledged that while some strategies could lead to an increase in the amounts of airborne pollutants produced, the new M4 CaN Project would be expected to deliver improvements in air quality in comparison to the existing M4 corridor. It is therefore considered that there are not likely to be any significant effects in terms of air pollution as a result of the M4 in combination with other projects and plans.

6.4.3 Table 6.3, shows no pathway has been identified by which the effects of the new M4 CaN Project could lead to likely significant in-combination effects on the features which have been screened out as provided in Table 6.2.

Table 6.3 In-combination Screening Assessment of Project and Plans for those features not significantly affected by the M4 CaN Project

European/International Site	Feature	In-combination plans/projects	Potential for in-combination impacts	Likely Significant Effects
River Usk / Afon Wysg SAC	Bullhead	The Local Development Plans of Monmouthshire, Torfaen, Blaenau Gwent and the Brecon Beacons National Park Authority have the potential to affect one or more of these freshwater species and habitats. Effects could also be predicted from certain elements of the South East Wales Regional	As stated in Table 6.2, there is no pathway to link the effects of the M4 CaN Project to these features and therefore there is no mechanism through which in combination impacts might occur with the plans and projects.	No
	Brook lamprey			No
	Water course habitats			No

European/International Site	Feature	In-combination plans/projects	Potential for in-combination impacts	Likely Significant Effects
		Transport Plan, although air quality impacts would be limited to the immediate vicinity of roads which experience changes in traffic volumes. Cardiff Tidal Lagoon and Newport Tidal Lagoon Projects are not anticipated to affect these features.		
Severn Estuary SAC	Reefs	The Shoreline Management Plan 2, Cardiff and Newport Tidal Lagoon Projects have the potential to affect intertidal and sub-tidal features of the estuary. Monmouthshire Local Development Plan, also has the potential to affect features.	As stated in Table 6.2 above there is no pathway to link the effects of the M4 CaN Project to these features. Therefore there is no mechanism through which in combination impacts might occur with the plans.	No
	Sandbanks which are slightly covered by sea water all times			No
	Estuaries			No
	Mudflats and sandflats not covered by seawater at low tide			No
	Atlantic salt meadows			No
Severn Estuary Ramsar Site	Estuaries	The Shoreline Management Plan 2, Cardiff and Newport Tidal Lagoon Projects have the potential to affect intertidal and sub-tidal	As stated in Table 6.2 above there is no pathway to link the effects of the M4 CaN Project to these features. Therefore there is no mechanism through which in	No
	Mudflats and sandflats not covered by seawater at low tide			No
	Atlantic salt meadows			No

European/International Site	Feature	In-combination plans/projects	Potential for in-combination impacts	Likely Significant Effects
		features of the estuary. Monmouthshire Local Development Plan, also has the potential to affect features	combination impacts might occur with the plans.	
Wye Valley and Forest of Dean Bat Sites / Safleoedd Ystlumod Dyffryn Gwy a Fforest y Ddena SAC	Greater Horseshoe bat	The Monmouthshire Local Development Plan has the potential to affect this species in terms of the loss of flight routes and foraging area and the effects of lighting restricting movement of bats.	As stated in Table 6.2 above there is no pathway to link the effects of the M4 CaN Project to these features. Therefore there is no mechanism through which in combination impacts might occur with the plan.	No

7 Conclusions

7.1.1 HD44/09 recommends that answers to the following four questions (a to d) should be provided (based on the information presented) when concluding. These are addressed in turn here.

a) Is the proposal directly connected with or necessary to site management for nature conservation?

7.1.2 The proposals in question relate to a new section of 3-lane motorway between Junctions 23 and 29 of the M4 Motorway and complementary measures, thus they are neither connected with nor necessary to the management of the River Usk SAC, Severn Estuary SAC, Severn Estuary SPA, Severn Estuary Ramsar Site and Wye Valley and Forest of Dean Bat Sites SAC.

7.1.3 In addition, the proposals are not emergency works, but relate to a planned road infrastructure project, and can therefore be described as "...the execution of construction works or of other installations or schemes".

b) Is the proposal likely to have a significant effect on the features of the site of European Importance, alone or in combination with other plans and projects?

7.1.4 The preliminary screening of the M4 CaN Project has determined, on the basis of available information, that likely significant effects cannot be excluded on the River Usk SAC, Severn Estuary SAC, Severn Estuary SPA, Severn Estuary Ramsar Site and Wye Valley and Forest of Dean Bat Sites SAC.

7.1.5 For the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations (2010), it is therefore concluded at the screening stage that there is a likely significant effect from the project on these European sites.

7.1.6 Those combinations of interest features and potential effects that have been 'screened in' as identified in Table 6.2 are carried forward to the next stage, an "appropriate assessment" to determine whether the new M4 CaN would adversely affect the integrity of any of the European sites.

7.1.7 Tables 7.1 to 7.5 list all of the 'screened in' potential effects and outlines the information required in order to carry out the more detailed assessment. Potential mitigation measures are also outlined, although these will be subject to more detailed work at the Appropriate Assessment stage.

c) What are the implications of the effects of the proposal on the site's conservation objectives and will it delay or interrupt progress towards achieving the objectives?

d) Can it be ascertained that the proposal will not adversely affect the integrity of the site beyond reasonable scientific doubt?

7.1.8 These questions will be addressed in the appropriate assessment stage of the AIES process.

Table 7.3 Screened in for LSE in the River Usk SAC

Feature	Likely Significant Effect	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
Migratory Fish: Sea lamprey, River lamprey, Twaite shad, Allis shad, Atlantic salmon	Release of pollutants leading to water quality changes - physiological/behavioural and barrier effects on features during construction and operation.	<ul style="list-style-type: none"> Final scheme design (e.g. works required on the landward side for new River Usk crossing, bridge in the River Ebbw and details of the drainage and treatment systems). Method statements for works on and near the River Usk SAC during construction and operation. Results of water quality assessment. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a Construction Environmental Management Plan (CEMP). Follow best practice guidance and Environment Agency Pollution Prevention Guidelines (PPGs). Programming of works in sensitive locations to minimise effects if necessary.
	Noise and vibration-disturbance and barrier effects during migration, during construction.	<ul style="list-style-type: none"> Final scheme design. Work programme. Assessment of noise and vibration during construction. 	<ul style="list-style-type: none"> Construction to minimise noise and vibration, where necessary. Monitoring of noise and vibration levels during construction on the landward side of the new River Usk crossing. Avoidance of works which could cause significant effects (if any) during main migratory window (March to June).
	Lighting-behavioural and barrier effects during construction and operation.	<ul style="list-style-type: none"> Details of proposed lighting scheme. Assessment of change in light levels on the River Usk SAC. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Use of directional lighting that will minimise spillage on to the River Usk SAC.

Feature	Likely Significant Effect	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
European otter	Direct land take-habitat loss/fragmentation of otter habitat (e.g. resting areas) during construction.	<ul style="list-style-type: none"> Final scheme design. Work programme. Results of otter surveys to determine presence and utilisation within the M4 CaN. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Maintain other areas suitable for otters (e.g. as potential resting habitat). Effective design of river crossings and other structures to maintain connectivity for otters during construction and operation. Provisions of means of escape for larger excavations. Provisions of replacement holts or hovers, if required. Installation of fences and underpasses in accordance with DMRB guidance.
	Physical presence-barrier to the movement and collision risk leading to mortality of otters during construction and operation.	<ul style="list-style-type: none"> Final scheme design. Results of otter surveys to determine presence and utilisation within the M4 CaN. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Effective design of river crossings and other structures to maintain connectivity during construction and operation. Installation of fences and underpasses in accordance with DMRB guidance to provide safe crossing points.
	Release of pollutants leading to water quality changes-physiological effects during construction and operation.	<ul style="list-style-type: none"> Final scheme design (including details of the drainage and treatment systems). Method statements for works on and near the River Usk SAC. Results of otter surveys within M4 CaN. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Use of best practice guidance and Environment Agency Pollution Prevention Guidelines (PPGs).

Feature	Likely Significant Effect	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
	Change in traffic flows/speeds/use of area-collision risk/disturbance.	<ul style="list-style-type: none"> Final scheme design. Results of otter surveys to determine presence and utilisation within the M4 CaN. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Effective design of river crossings and other structures to maintain connectivity during construction and operation. Installation of fences and underpasses in accordance with DMRB guidance to provide safe crossing points.
	Noise and vibration-disturbance and barrier effects during construction and operation	<ul style="list-style-type: none"> Final scheme design. Results of otter surveys within M4 CaN to determine presence and utilisation. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Construction to minimise noise and vibration. Use of low noise equipment near to River Usk and River Ebbw.
	Visual and lighting-disturbance and barrier effects during construction and operation	<ul style="list-style-type: none"> Final scheme design. Results of otter surveys within M4 CaN to determine whether otter utilise the area. 	<ul style="list-style-type: none"> Implementation of appropriate measures within CEMP. Implementation of an effective lighting strategy during construction and operation. Use of directional lighting to minimise light spillage on adjacent watercourses. Limitations on night working.

Table 7.4 'Screened in' for LSE in the Severn Estuary SAC

Feature	Likely Significant Effect	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
Migratory fish: River lamprey, Sea lamprey, Twaite shad	Release of pollutants leading to water quality changes in the River Usk SAC- physiological/behavioural/barrier effects in features as they migrate during construction and operation	<ul style="list-style-type: none"> Final scheme design (e.g. works required for the bridge in the River Ebbw and Usk, details of the drainage and treatment systems). Method statements for works on and near the River Usk SAC during construction and operation. Results of water quality assessment. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Use of best practice guidance and Environment Agency Pollution Prevention Guidelines (PPGs). Programming of works in sensitive locations to minimise effects.
	Noise and vibration- disturbance and barrier effects, outside of the SAC during construction	<ul style="list-style-type: none"> Final scheme design. Work programme. Assessment of noise and vibration during construction. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Programming of works in sensitive locations to minimise effects. Construction to minimise noise and vibration effects, where necessary.
	Lighting- disturbance/behavioural and barrier effects, during bridge construction and operation.	<ul style="list-style-type: none"> Assessment of change in light levels on the River Usk SAC. Details of proposed lighting scheme. Lighting study. 	<ul style="list-style-type: none"> Minimise light spillage into the River Usk SAC during construction and operation. Implementation of appropriate measures within a CEMP.

Table 7.5 Screened in for LSE in the Severn Estuary SPA

Feature	Likely Significant Effect	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
Ringed plover (during passage), Bewick's swan, Dunlin, Redshank, Shelduck, Curlew, Pintail. Assemblage of nationally important populations of wintering waterfowl	Direct land take leading to habitat loss /fragmentation of roosting and foraging areas of features outwith of the Severn Estuary SAC during construction and operation	<ul style="list-style-type: none"> Final scheme design. Bird surveys to confirm presence of roosting and/or foraging area and utilisation. Distribution maps overlaid on to M4 CaN route. 	<ul style="list-style-type: none"> Implementation of appropriate measures within CEMP. Programming of works in sensitive locations to minimise effects.
	Physical presence leading to disturbance/displacement/interruption of flight lines/collision risk during construction and operation.	<ul style="list-style-type: none"> Final scheme design. Bird surveys. Mapping of flight paths. Bird studies and assessment to be undertaken as part of the EIA. 	<ul style="list-style-type: none"> Implementation of appropriate measures within CEMP. Sensitive bridge design.
	Change in traffic flows/speeds and use of the area- disturbance and displacement of species and interruption of flight lines, outside of site, during construction and operation	<ul style="list-style-type: none"> Results of bird surveys to determine use of the site in proximity to the scheme. Final scheme design. 	<ul style="list-style-type: none"> Implementation of appropriate measures within the CEMP. Sensitive bridge and road design. Programming of works in sensitive locations to minimise effects during construction.
	Noise and vibration-disturbance/displacement and barrier effects.	<ul style="list-style-type: none"> Final scheme design. Bird surveys. Noise and vibration study. 	<ul style="list-style-type: none"> Implementation of a CEMP. Programming of works in sensitive locations to minimise effects.

Feature	Likely Significant Effect	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
	Visual and lighting-disturbance of behavioural patterns during construction and operation.	<ul style="list-style-type: none">• Final scheme design.• Bird surveys.• Lighting study.	<ul style="list-style-type: none">• Minimise light spillage into the River Usk SAC during construction and operation.• Implementation of a CEMP.

Table 7.6 'Screened in' for potential LSE in the Severn Estuary Ramsar Site

Feature	Likely Significant Effects	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
Bewick's swan, Wintering European white-fronted goose, Dunlin, Redshank, Gadwall, Shelduck, Assemblage of nationally important populations of waterfowl.*	Direct land take- habitat loss /fragmentation of roosts and foraging habitat outside of the Severn Estuary Ramsar site.	<ul style="list-style-type: none"> Final scheme design. Results of bird surveys to confirm presence/absence of roosting and/or foraging areas in land take areas. 	<ul style="list-style-type: none"> Programming of works in sensitive locations to minimise effects if necessary (e.g. avoid or minimise construction within close proximity to sensitive areas during the overwintering period or undertake in the summer months). Implementation of effective measures to discourage birds from using construction areas (as set out in a CEMP). There are areas throughout Gwent Levels that could provide alternative roosting/feeding areas.
	Physical presence- leading to interruption of flight lines/collision risk outside of the Ramsar site during construction and operation.	<ul style="list-style-type: none"> Results of bird surveys to determine use of the site (e.g. flight paths). Final scheme design. 	<ul style="list-style-type: none"> Implementation of appropriate measures within the CEMP. Sensitive bridge design. Programming of works in sensitive locations to minimise effects.
	Change in traffic flows/speeds and use of the area- disturbance and displacement of species and interruption of flight lines, outside of the Ramsar site, during construction and operation.	<ul style="list-style-type: none"> Results of bird surveys to determine use of the site in proximity to the scheme. Final scheme design. 	<ul style="list-style-type: none"> Implementation of appropriate measures within the CEMP. Sensitive bridge and road design. Programming of works in sensitive locations to minimise effects during construction.

Feature	Likely Significant Effects	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
	Noise and vibration- disturbance to roosting and foraging areas, outside of the Ramsar site, during construction and operation.	<ul style="list-style-type: none"> • Final scheme design. • Results of bird surveys. • Assessment of construction and operational generated noise and vibration. • Works programme. • Location of works compounds and hours of working. 	<ul style="list-style-type: none"> • Implementation of appropriate measures within a CEMP. • Construction to minimise noise and vibration. • Locate site construction compounds away from known sensitive areas. • Programming of works in sensitive locations to minimise effects. • Use of low noise equipment during sensitive times. • Noise screening.
	Visual and lighting-disturbance to normal behavioural patterns, outside of the Ramsar site, during construction and operation.	<ul style="list-style-type: none"> • Final scheme design. • Details of construction programme- will construction be day and night? • Details of proposed lighting scheme (construction and operation). • Location of works compounds and details of proposed lighting. • Results of bird surveys. • Lighting study. 	<ul style="list-style-type: none"> • Minimise light spillage into surrounding sensitive areas during construction and operation (e.g. directional lighting). • Screen planting. • Implementation of appropriate measures in a CEMP. • Programming of works in sensitive area to minimise disturbance.

Feature	Likely Significant Effects	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
Assemblage of migratory fish: Salmon, Sea trout, Sea lamprey, River Lamprey, Allis shad, Twaite shad, European eel.	Land take-habitat loss/fragmentation of eel habitat across the Gwent Levels, outside of the Ramsar site, leading to barrier effects during construction and operation.	<ul style="list-style-type: none"> Determination of habitats loss/fragmentation and mapped. 	<ul style="list-style-type: none"> Scheme design to minimise loss of key habitat and maintain connectivity between areas important for migration. Effective construction methods to ensure the safe translocation of eels where water bodies are affected by the works. Appropriate measures to be included in a CEMP. Programming of works in sensitive locations.
	Physical presence-barrier effects to the passage of eels across the Gwent Levels and outside of the Ramsar site.	<ul style="list-style-type: none"> Results of surveys to determine habitat loss / fragmentation of suitable habitats. 	<ul style="list-style-type: none"> Programming of works in sensitive locations. Effective design to maintain hydrological connectivity of habitats in the reen system during construction and operation. Implementation of appropriate measures within the CEMP.

Feature	Likely Significant Effects	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
	Release of pollutants leading to water quality changes in the River Usk - physiological/behavioural/barrier effects in features outside of the Ramsar site, during construction and operation.	<ul style="list-style-type: none"> Final scheme design (e.g. works required on the landward side for new River Usk crossing, bridge over the in the River Ebbw and details of the drainage and treatment systems). Method statements for works on and near the River Usk SAC during construction and operation. Results of water quality assessment. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Follow best practice guidance and Environment Agency Pollution Prevention Guidelines (PPGs). Programming of works in sensitive locations to minimise effects.
	Noise and vibration-disturbance and barrier effects to migratory species, outside of the Ramsar site, during construction.	<ul style="list-style-type: none"> Final scheme design. Work programme. Assessment of noise and vibration during construction. 	<ul style="list-style-type: none"> Implementation of appropriate measures within a CEMP. Programming of works in sensitive location. Construction to minimise noise and vibration, where necessary.
	Lighting-behavioural and barrier effects, during construction and operation.	<ul style="list-style-type: none"> Assessment of change in light levels on the River Usk SAC. Details of proposed lighting scheme. 	<ul style="list-style-type: none"> Use of directional lighting that will minimise spillage on to the Rivers Usk SAC. Implementation of appropriate measures within a CEMP.

Table 7.7 'Screened in' for potential LSE on Wye Valley and Forest of Dean Bat Sites SAC

Feature	Likely Significant Effect	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
Lesser horseshoe bat	Land take - habitat loss/fragmentation (roosts) during construction	<ul style="list-style-type: none"> Location plan of all known roost sites and flight paths from bat surveys. Final scheme design. Works programme. 	<ul style="list-style-type: none"> Alignment and engineering options to minimise roost habitat loss. Carry out roost destruction when bats absent / excluded. Creation of additional roosts within soft estate to replace (at greater than 1:1 ratio) any destroyed/damaged roosts. Implementation of a CEMP. Programming of works in sensitive locations to minimise effects.
	Land take-habitat loss/fragmentation (foraging habitat) during construction	<ul style="list-style-type: none"> Map showing scheme land-take classified as high / medium / low quality bat foraging habitat and in accordance with principles developed in CCW (2012). Results of bat activity surveys. Extent to which bat foraging habitat lost may be used by bats forming part of the SAC population. 	<ul style="list-style-type: none"> Scheme design to minimise loss of good-quality bat habitat. Replacement planting along scheme within Scheme boundary, Additional land-take for habitat creation / enhancement.

Feature	Likely Significant Effect	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
	Land take - habitat loss/fragmentation (severance of flight lines) during construction.	<ul style="list-style-type: none"> Distribution map of bat foraging and commuting habitat and assessment of potential for use by bats forming part of the SAC population. Location plan of all known roost sites and flightlines following activity surveys and analysis of existing data. Final scheme design. 	<ul style="list-style-type: none"> Scheme design to minimise fragmentation by severance and maintaining existing crossing points. Interim maintenance of disrupted flightlines via temporary screens. Maintenance of flightlines via replacement planting. Provision of replacement foraging habitat. Provision of underpass crossings.
	Physical presence-disturbance to species/restriction in movement/severing of flight lines/collision risk during construction and operation.	<ul style="list-style-type: none"> Distribution map of bat foraging and commuting habitat and assessment of potential for use by bats forming part of the SAC population. Location plan of all known roost sites and flightlines following activity surveys and analysis of existing data. Final scheme design. 	<ul style="list-style-type: none"> Scheme design to minimise fragmentation by severance and maintain existing crossing points. Interim maintenance of disrupted flight lines via temporary screens. Maintenance of flight lines via replacement planting. Provision of replacement foraging habitat. Provision of underpass crossings.

Feature	Likely Significant Effect	Information required to determine whether effect would occur and to inform SIAA	Potential mitigation
	Lighting- disturbance to species /severing of flight lines during construction and operation.	<ul style="list-style-type: none"> • Results of bat activity surveys. • Assessment of change in light levels adjacent to scheme due to construction lighting (assume >1 lux is potentially significant). • Details of construction programme – will construction be day and night? • Details of proposed lighting scheme during construction after dark. • Assessment of amount of time adjacent areas would be exposed to increased light levels during active season for bats. • Location of works compounds and details of proposed lighting. 	<ul style="list-style-type: none"> • Use of directional lighting during construction. • Siting works compounds at appropriate distance from bat foraging habitat. • Timing of works adjacent to known roosts to minimise disturbance (both daily and seasonally).
	Lighting-disturbance to species during operation/severing of flight lines	<ul style="list-style-type: none"> • Assessment of change in light levels adjacent to scheme due to construction lighting (assume >1 lux is potentially significant). • Modelling of light impacts outwith scheme (>1 lux) in areas of potential bat foraging and known roost locations. • Location of works compounds and hours of working. 	<ul style="list-style-type: none"> • Directional lighting. • Screen planting. • Bunds / fences.

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Draft

Draft

Appendix A Conservation Objectives

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Conservation Objectives for European Sites

The ecological status of the water course is a major determinant of FCS for all features. The required conservation objective for the water course is defined below.

4.1 Conservation Objective for the water course

- 4.1.1 The capacity of the habitats in the SAC to support each feature at near-natural population levels, as determined by predominantly unmodified ecological and hydromorphological processes and characteristics, should be maintained as far as possible, or restored where necessary.
- 4.1.2 The ecological status of the water environment should be sufficient to maintain a stable or increasing population of each feature. This will include elements of water quantity and quality, physical habitat and community composition and structure. It is anticipated that these limits will concur with the relevant standards used by the Review of Consents process given in Annexes 1-3.
- 4.1.3 Flow regime, water quality and physical habitat should be maintained in, or restored as far as possible to, a near-natural state, in order to support the coherence of ecosystem structure and function across the whole area of the SAC.
- 4.1.4 All known breeding, spawning and nursery sites of species features should be maintained as suitable habitat as far as possible, except where natural processes cause them to change.
- 4.1.5 Flows, water quality, substrate quality and quantity at fish spawning sites and nursery areas will not be depleted by abstraction, discharges, engineering or gravel extraction activities or other impacts to the extent that these sites are damaged or destroyed.
- 4.1.6 The river planform and profile should be predominantly unmodified. Physical modifications having an adverse effect on the integrity of the SAC, including, but not limited to, revetments on active alluvial river banks using stone, concrete or waste materials, unsustainable extraction of gravel, addition or release of excessive quantities of fine sediment, will be avoided.
- 4.1.7 River habitat SSSI features should be in favourable condition. In the case of the Usk Tributaries SSSI, the SAC habitat is not underpinned by a river habitat SSSI feature. In this case, the target is to maintain the characteristic physical features of the river channel, banks and riparian zone.
- 4.1.8 Artificial factors impacting on the capability of each species feature to occupy the full extent of its natural range should be modified where necessary to allow passage, eg. weirs, bridge sills, acoustic barriers.
- 4.1.9 Natural factors such as waterfalls, which may limit the natural range of a species feature or dispersal between naturally isolated populations, should not be modified.
- 4.1.10 Flows during the normal migration periods of each migratory fish species feature will not be depleted by abstraction to the extent that passage upstream to spawning sites is hindered.
- 4.1.11 Flow objectives for assessment points in the Usk Catchment Abstraction Management Strategy will be agreed between EA and CCW as necessary. It is anticipated that these limits will concur with the standards used by the Review of Consents process given in Annex 1 of this document.
- 4.1.12 Levels of nutrients, in particular phosphate, will be agreed between EA and CCW for each Water Framework Directive water body in the Usk SAC, and measures taken to maintain nutrients below these levels. It is anticipated that these limits will concur with the standards used by the Review of Consents process given in Annex 2 of this document.
- 4.1.13 Levels of water quality parameters that are known to affect the distribution and abundance of SAC features will be agreed between EA and CCW for each Water Framework Directive water body in the Usk SAC, and measures taken to maintain pollution below these levels. It is anticipated that these limits will concur with the

standards used by the Review of Consents process given in Annex 3 of this document.

- 4.1.14 Potential sources of pollution not addressed in the Review of Consents, such as contaminated land, will be considered in assessing plans and projects.
- 4.1.15 Levels of suspended solids will be agreed between EA and CCW for each Water Framework Directive water body in the Usk SAC. Measures including, but not limited to, the control of suspended sediment generated by agriculture, forestry and engineering works, will be taken to maintain suspended solids below these levels.

4.2 Conservation Objective for Features 1-5:

- Sea lamprey *Petromyzon marinus* (EU Species Code: **1095**) ;
 - Brook lamprey *Lampetra planeri* (EU Species Code : **1096**) ;
 - River lamprey *Lampetra fluviatilis* (EU Species Code : **1099**) ;
 - Twaite shad *Alosa fallax* (EU Species Code : **1103**) ;
 - Allis shad *Alosa alosa* (EU Species Code : **1102**) ;
 - Atlantic salmon *Salmo salar* (EU Species Code : **1106**) ;
 - Bullhead *Cottus gobio* (EU Species Code : **1163**)
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Vision for features 1-5

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

FCS component	Supporting information / current knowledge
4.2.1 The conservation objective for the water course as defined in 4.1 above must be met	
4.2.2 The population of the feature in the SAC is stable or increasing over the long term.	<p>Refer to sections 5.1 to 5.5 for current assessments of feature populations</p> <p>Entrainment in water abstractions directly impacts on population dynamics through reduced recruitment and survival rates.</p> <p>Fish stocking can adversely affect population dynamics through competition, predation, and alteration of population genetics and introduction of disease.</p>
4.2.3 The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches where predominantly suitable habitat for each life stage exists over the long term. Suitable habitat is defined in terms of near-natural hydrological and geomorphological processes and forms eg. suitable flows to allow upstream migration, depth of water and substrate type at spawning sites, and ecosystem structure and functions eg. food supply (as described in sections 2.2	<p>Some reaches of the Usk SAC are more suitable for some features than others e.g. the Senni has important populations of brook/river lamprey and salmon but is not used by shad due to its small size and distance from the estuary. These differences influence the management priorities for individual reaches and are used to define the site units described in section 3.2. Further details of feature habitat suitability are given in section 5. In general, management for one feature is likely to be sympathetic for the other features present in the river, provided that the components of favourable conservation status for the water course given in section 4.1 are secured.</p> <p>The characteristic channel morphology provides the diversity of water depths, current velocities and</p>

<p>and 5). Suitable habitat need not be present throughout the SAC but where present must be secured for the foreseeable future. Natural factors such as waterfalls may limit the natural range of individual species. Existing artificial influences on natural range that cause an adverse effect on site integrity, such as physical barriers to migration, will be assessed in view of 4.2.4</p>	<p>substrate types necessary to fulfil the habitat requirements of the features. The close proximity of different habitats facilitates movement of fish to new preferred habitats with age. The presence of hard bank revetments in a number of active alluvial reaches e.g. through Brecon and upstream of Abergavenny, adversely affects the processes that maintain suitable habitat for the SAC features.</p> <p>Hydrological processes in the Usk are currently affected by large abstractions, especially at Prioress Mill and Brecon Weir. However, there are many smaller abstractions not considered to cause a problem at present.</p> <p>Shad and salmon migration can be affected by acoustic barriers and by high sediment loads, which can originate from a number of sources including construction works.</p>
<p>4.2.4 There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.</p>	<p>Allis and twaite shad are affected by range contraction due to artificial barriers to migration in the Usk. It is likely that this loss of habitat affects their maintenance in the SAC on a long-term basis.</p>

Performance indicators for features 1-5

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

Sea lamprey <i>Petromyzon marinus</i> : <i>Performance indicators for feature condition</i>			
<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>	<i>Relevant unit(s)</i>
a) Distribution within catchment	Suitable habitat adjacent to or downstream of known spawning sites should contain <i>Petromyzon ammocoetes</i> .	This attribute provides evidence of successful spawning and distribution trends. Spawning sites known to have been used within the previous 10 years and historical sites considered still to have suitable habitat, are shown in Annex 4. Spawning locations may move within and between sites due to natural processes or new sites may be discovered over time. Silt beds downstream of all sites identified in Annex 4 will be sampled for presence or absence of ammocoetes. Where apparently suitable habitat at any site is unoccupied feature condition will be considered unfavourable.	1-5

b) Ammocoete density	Ammocoetes should be present in at least four sampling sites each not less than 5km apart.	This standard CSM attribute establishes a minimum occupied spawning range, within any sampling period, of 15km. In the Usk, spawning sites within units 2 to 5 will be assessed against this attribute.	2-5
	Overall catchment mean $>0.1\text{m}^{-2}$ (Harvey & Cowx 2003) ¹	Although this attribute is not used in CSM for sea lamprey, baseline monitoring in the Usk gave an overall catchment mean of 2.27 ammocoetes m^{-2} in suitable habitat ² , therefore 0.1m^{-2} is a conservative threshold value for unfavourable condition.	

Brook lamprey *Lampetra planeri* and River lamprey *Lampetra fluviatilis* :
Performance indicators for feature condition

<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>	<i>Relevant unit(s)</i>
a) Age/size structure of ammocoete population	Samples < 50 ammocoetes ~ 2 size classes Samples > 50 ammocoetes ~ at least 3 size classes	This gives an indication of recruitment to the population over the several years preceding the survey. Failure of one or more years recruitment may be due to either short or long term impacts or natural factors such as natural flow variability, therefore would trigger further investigation of the cause rather than leading automatically to an unfavourable condition assessment.	2-10
b) Distribution of ammocoetes within catchment	Present at not less than 2/3 of sites surveyed within natural range No reduction in distribution of ammocoetes	The combined natural range of these two species in terms of ammocoete distribution includes all units above the tidal limit ie. all except unit 1 Presence at less than 2/3 of sample sites will lead to an unfavourable condition assessment. Reduction in distribution will be defined as absence of ammocoetes from all samples within a single unit or sub-unit/tributary, and will lead to an unfavourable condition assessment.	2-10
c) Ammocoete density	Optimal habitat: $>10\text{m}^{-2}$ Overall catchment mean: $>5\text{m}^{-2}$	Optimal habitat comprises beds of stable fine sediment or sand $\geq 15\text{cm}$ deep, low water velocity and the presence of organic detritus, as well as, in the Usk, shallower sediment, often patchy and interspersed among coarser substrate.	2-10

Twaite shad *Alosa fallax* and Allis shad *Alosa alosa* :
Performance indicators for feature condition

<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>	<i>Relevant unit(s)</i>
a) Spawning distribution	No decline in spawning distribution	Spawning distribution is assessed by kick sampling for eggs and/or observations of spawning adults. A representative sample of	1-5

		sites within units 2 to 5 will be monitored at 3 yearly intervals. Absence from any site in 2 consecutive surveys will result in an unfavourable condition assessment.	
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Performance indicators for factors affecting the feature

a) Flow	Targets are set in relation to river/reach type(s)	Targets equate to those levels agreed and used in the Review of Consents (see Annex 1). Shad are particularly sensitive to flow. The ideal regime is one of relatively high flows in March-May, to stimulate migration and allow maximum penetration of adults upstream, followed by rather low flows in June-September, which ensures that the juveniles are not washed prematurely into saline waters and grow rapidly under warmer conditions. The release of freshets to encourage salmonid migration should therefore be discouraged on shad rivers during this period.	1-5
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Atlantic salmon *Salmo salar* :

Performance indicators for feature condition

<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>	<i>Relevant unit(s)</i>
a) Adult run size	Conservation Limit complied with at least four years in five (see 5.4)	CSM guidance states: Total run size at least matching an agreed reference level, including a seasonal pattern of migration characteristic of the river and maintenance of the multi-sea-winter component. As there is no fish counter in the Usk, adult run size is calculated using rod catch data. Further details can be found in the EA Usk Salmon Action Plan.	All
b) Juvenile densities	Expected densities for each sample site using HABSCORE	CSM guidance states: These should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality. Assessed using electrofishing data.	6-10

Performance indicators for factors affecting the feature

Water quality

a) Biological quality	Biological GQA class A	This is the class required in the CSM guidance for Atlantic salmon, the most sensitive feature.	6-10
b) Chemical quality	RE1	It has been agreed through the Review of Consents process that RE1 will be used throughout the SAC (see Annex 3)	All

Hydromorphology

a) Flow	Targets are set in relation to river/reach type(s)	Targets equate to those levels agreed and used in the Review of Consents (see Annex 1)	All
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Bullhead *Cottus gobio* :

Performance indicators for feature condition

Attribute	Specified limits	Comments	Relevant unit(s)
a) Adult densities	No less than 0.2 m ⁻² in sampled reaches	CSM guidance states that densities should be no less than 0.2 m ⁻² in upland rivers (source altitude >100m) and 0.5 m ⁻² in lowland rivers (source altitude ≤100m). A significant reduction in densities may also lead to an unfavourable condition assessment.	2-10
b) Distribution	Bullheads should be present in all suitable reaches. As a minimum, no decline in distribution from current	Suitable reaches will be mapped using fluvial audit information validated using the results of population monitoring. Absence of bullheads from any of these reaches, or from any previously occupied reach, revealed by on-going monitoring will result in an unfavourable condition assessment.	2-10
c) Reproduction / age structure	Young-of-year fish should occur at densities at least equal to adults	This gives an indication of successful recruitment and a healthy population structure. Failure of this attribute on its own would not lead to an unfavourable condition assessment.	2-10

4.3 Conservation Objective for Feature 6:

- European otter *Lutra lutra* (EU Species Code: **1355**)

Vision for feature 6

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

FCS component	Supporting information / current knowledge
4.3.1 The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour.	Refer to section 5.9 for current assessment of feature population
4.3.2 The natural range of otters in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches that are potentially suitable to form part of a breeding territory and/or provide routes between breeding territories. The whole area of the Usk SAC is considered to form potentially suitable breeding habitat for otters. The size of breeding territories may	Survey information shows that otters are widely distributed in the Usk catchment. While the breeding population in the Usk is not currently considered to be limited by the availability of suitable breeding sites, there is some uncertainty over the number of breeding territories which the SAC is capable of supporting given near-natural levels of prey abundance. The decline in eel populations may be having an adverse effect on the population of otters in the Usk.

vary depending on prey abundance. The population size should not be limited by the availability of suitable undisturbed breeding sites. Where these are insufficient they should be created through habitat enhancement and where necessary the provision of artificial holts. No otter breeding site should be subject to a level of disturbance that could have an adverse effect on breeding success. Where necessary, potentially harmful levels of disturbance must be managed.

4.3.3	The safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable riparian habitat, and underpasses, ledges, fencing etc at road bridges and other artificial barriers.	Restrictions on the movement of otters around the SAC, and between adjoining sites are currently a particular concern in the reach through Newport as a result of a continued decrease in undisturbed suitable riparian habitat.
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Performance indicators for feature 6

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>			
<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>	<i>Relevant unit(s)</i>
a) Distribution	Otter signs present at 90% of Otter Survey of Wales sites	Ref: CCW Environmental Monitoring Report No 19 (2005) ³	All
b) Breeding activity	2 reports of cub/family sightings at least 1 year in 6	Ref: CCW Environmental Monitoring Report No 19 (2005) ³	All
c) Actual and potential breeding sites	No decline in number and quality of mapped breeding sites in sub-catchments (see Ref)	Ref: CCW Environmental Monitoring Report No 19 (2005) ³ In the Usk catchment, 77 actual or potential breeding sites have been identified, distributed throughout the catchment on the main river and tributaries.	All

4.4 Conservation Objective for Feature 7:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation

Vision for feature 7

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

FCS component	Supporting information / current knowledge
4.4.1 The conservation objective for the water course as defined in 4.1 above must be met	
4.4.2 The natural range of the plant communities represented within this feature should be stable or increasing in the SAC. The natural range is taken to mean those reaches where predominantly suitable habitat exists over the long term. Suitable habitat and associated plant communities may vary from reach to reach. Suitable habitat is defined in terms of near-natural hydrological and geomorphological processes and forms eg. depth and stability of flow, stability of bed substrate, and ecosystem structure and functions eg. nutrient levels, shade (as described in section 2.4). Suitable habitat for the feature need not be present throughout the SAC but where present must be secured for the foreseeable future, except where natural processes cause it to decline in extent.	More information is required on the natural range and distribution of this feature in the Usk. Important examples of the feature may be present outside currently known locations. Sympathetic management will be promoted wherever the feature is present. Species indicative of unfavourable condition for this feature eg. filamentous algae associated with eutrophication, invasive non-native species, should be maintained or restored below an acceptable threshold level, indicative of high ecological status, within the SAC.
4.4.3 The area covered by the feature within its natural range in the SAC should be stable or increasing.	Important stands of the feature are known to occur within site management unit nos. 2, 3 & 10. Management to maintain or increase the feature within these units will be a priority. Adverse factors may include elevated nutrient levels, shading or altered flow and/or sediment transport regimes.
4.4.4 The conservation status of the feature's typical species should be favourable. The typical species are defined with reference to the species composition of the appropriate JNCC river vegetation type for the particular river reach, unless differing from this type due to natural variability when other typical species	More information on the typical species expected to be found with each management unit in the SAC is required.

may be defined as appropriate.

Performance indicators for feature 7

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

Performance indicators for feature condition			
Attribute	Specified limits	Comments	Relevant unit(s)
a) Distribution within catchment	Distribution within site units 2,3 & 10	<i>Ranunculus</i> spp. will be present with an MTR species cover score of at least 5 in: Any three representative sample 100m stretches of suitable habitat between Usk Town bridge and the bridge at Newbridge-on-Usk: AND In one representative sample 100m stretch of suitable habitat along the Senni	2,3,10
b) Typical species	Species list for reference vegetation type	Should conform to appropriate JNCC type or other list for site unit as appropriate. Details to be confirmed	2,3,10
Performance indicators for factors affecting the feature			
Negative indicators			
a) Native species	Cover of indicators of eutrophication maintained below threshold over the medium to long term	CSM guidance states: Care should be taken with the setting of these targets as thresholds may vary considerably by site and conservation goals. For the Usk SAC: Algae indicative of eutrophication (<i>Enteromorpha</i> spp., <i>Cladophora</i> spp. and <i>Vaucheria</i> spp.) should not have an MTR cover value of greater than 5 (ie.10%) in 3 consecutive years in: Any three representative sample 100m stretches of suitable habitat between Usk Town bridge and the bridge at Newbridge-on-Usk: AND In one representative sample 100m stretch of suitable habitat along the Senni	2,3,10
b) Alien / introduced species	No impact on native biota from alien or introduced species	In the CSM guidance, the SERCON scoring system for naturalness of aquatic and marginal macrophytes and naturalness of banks and riparian zone, are used to assess this attribute. SERCON protocols have not been applied in the Usk SAC, therefore assessment of this attribute relies on locally defined thresholds and expert judgement. Details to be confirmed	

4. Conservation Objectives and Favourable Condition Tables For the European Marine Site

Severn Estuary SAC, SPA and Ramsar

4.1 Conservation objectives for the Severn Estuary / Môr Hafren SAC

The protection and management of the SAC in accordance with Article 6 of the Habitats Directive, including in particular the consideration of plans and projects under Article 6(3) and 6(4), should be carried out in view of the conservation objectives in this section.

4.1.1 SAC interest feature 1: Estuaries

The conservation objective for the “estuaries” feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes¹, each of the following conditions are met

- i. the total extent of the estuary² is maintained;
- ii. the characteristic physical form (tidal prism/cross sectional area) and flow (tidal regime) of the estuary is maintained;
- iii. the characteristic range and relative proportions of sediment sizes and sediment budget³ within the site is maintained;
- iv. the extent, variety and spatial distribution⁴ of estuarine habitat communities⁵ within the site is maintained⁶;
- v. the extent, variety, spatial distribution⁴ and community composition of hard substrate habitats and their notable communities^{5(v)} is maintained;
- vi. the abundance of the notable estuarine species assemblages⁷ is maintained or increased;
- vii. the physico-chemical characteristics⁸ of the water column⁹ support the ecological objectives described above;
- viii. Toxic contaminants in water column⁹ and sediment are below levels which would pose a risk to the ecological objectives described above.
- ix. Airborne nutrient and contaminant loads are below levels which would pose a risk to the ecological objectives described above

The meaning of terms ¹⁻⁹ above is explained in **section 4.1.1.1**

Appendix 2 shows the extent of the “estuaries” feature within the Severn Estuary SAC European Marine Site.

4.1.1.1 Explanatory information for the “estuaries” conservation objective

¹ Natural processes in respect of the SAC

Each feature may be subject to both natural processes and human influence. Human influence on the interest features is acceptable provided that it is proved to be / can be established to be compatible with the achievement of the conditions set out under the definition of favourable condition for each interest feature. A failure to meet these conditions, which is entirely a result of natural process will not constitute unfavourable condition, but may trigger a review of the definition of favourable condition.

Dynamic physical process within estuaries can stem from variable weather conditions including one off storm events, and result in changes in wave exposure, riverine floods or tidal surges. These events can move large quantities of sediments and alter channel morphology, which affect current patterns and sediment transport within the estuary.

Where these processes occur without significant anthropogenic influence they fall under the umbrella of 'natural change'. Because estuaries are dynamic systems we can expect the amount and gross distribution of habitats to change in the future. In general estuarine communities and their supporting habitats are intrinsically more dynamic over short timescales when compared to other marine and terrestrial habitats. Some estuarine communities occur in cycles dependent upon the prevailing physical conditions. Features should not necessarily be considered in unfavourable condition caused by the short term disappearance of a particular community due to natural processes.

An important example of natural processes occurring over a longer timescale is that estuaries have a natural tendency to accumulate sediment, thereby changing their form from their original glacial morphology to a state where tidal energy is dissipated by sediment banks and other features such as saltmarsh. This, with other forces of natural change, will therefore cause the width and depth of the estuary to change over time, moving towards a state of dynamic equilibrium or 'most probable state'. As part of this process, the location and extent of saltmarshes and mudflats may change, provided there is capacity to accommodate readjustment. Future developments should aim to avoid impact on the future evolution of the system as where this process is constrained by human influence, the capacity of habitats to accommodate readjustment may be affected.

²Extent of the estuary

The landward limit of the estuary feature is the limit of highest astronomical tide or the site boundary where it is below highest astronomical tide, except where the landward limit is defined as straight lines across the mouths of rivers entering the estuary. The seaward limit is as shown in the map in Appendix 2. Where other Habitats Directive Annex I habitat types occur within the estuary, they also form part of the estuary feature. In addition, there are areas of the estuary which do not form part of other Annex I habitat types.

³Sediment budget

The sediment budget refers to the total amount of sediment within the Severn Estuary taking into account the balance of sediment inputs and outputs.

⁴Spatial distribution

Spatial distribution of estuarine communities refers to the macro spatial pattern in which communities are distributed around the estuary. This statement does not require micro-distribution of communities e.g. the exact mapped positions of specific communities to be maintained.

⁵Estuarine habitat communities

***Note:** sections i – iv below list the habitat types which are also features of the Severn Estuary SAC in their own right as well as being 'sub-features' of the estuary feature. The detailed definitions of favourable conservation status for these features are provided under their respective conservation objectives.*

- i. Subtidal sandbanks (*see section 4.1.2 for the conservation objective for this feature*)
 - Sublittoral Sands and Muddy Sands
 - Sublittoral cohesive mud and sandy mud communities
- ii. Intertidal mudflats and sandflats (*see section 4.1.3 for the conservation objective for this feature*)
 - Intertidal gravel and clean sands
 - Intertidal muddy sands
 - Intertidal muds

- iii. Atlantic saltmeadows (*see section 4.1.4 for the conservation objective for this feature*)
 - Low – mid marsh communities
 - Mid – upper marsh communities
 - Transitional high marsh communities
 - Pioneer marsh communities
- iv. Reefs of *Sabellaria alveolata* (*see section 4.1.5 for the conservation objective for this feature*)
 - *Sabellaria alveolata* on variable salinity sublittoral mixed sediment (subtidal)
 - *Sabellaria alveolata* reefs on sand-abraded eulittoral rock (contiguous subtidal and intertidal)
- v. Hard substrate habitat notable communities
 - *Sabellaria alveolata* reefs on sand-abraded eulittoral rock (MLR.Sab.Salv)
 - *Hydroids, ephemeral seaweeds and Littorina littorea* in shallow eulittoral mixed substrata pools. (LR.RkpH)
 - *Balanus crenatus* and *Tubularia indivisa* on extremely tide-swept circalittoral rock. (ECR.BS.BalTub)
 - *Fucus serratus* and piddocks on lower eulittoral soft rock (MLR.Fser.Pid)
 - *Mytilus edulis* and piddocks on eulittoral firm clay (MLR.MytPid)
 - *Balanus crenatus*, *Halichondria panacea* and *Alcyonidium diaphanum* on extremely tide-swept sheltered circalittoral rock (ECR.BalHpan)
 - *Sertularia cupressina* and *Hydrallmania falcate* on tide-swept sublittoral cobbles or pebbles in coarse sand (IGS.ScupHyd).
 - *Corrallina officinalis* and coralline crusts in shallow eulittoral rockpools (LR.Rkp.Cor)
 - Eel grass (*Zostera*) beds
 - Peat and clay exposures
 - Any other notable hard substrata communities that may be identified.

⁶Maintained

Since the late 1990s Natural England's condition assessment has identified that parts of the saltmarsh within the Severn Estuary appear to be exhibiting the effects of coastal squeeze. For this reason NE and CCW do not consider it sufficient simply to seek to maintain the existing saltmarsh resource, rather it is our advice that measures will be required which seek to recreate the approximate extent of saltmarsh habitat present within the estuary in 1995 (the year the Severn Estuary was first identified as a proposed SAC); whilst at all times working within the framework of seeking a sustainable estuary form. N.B. This is based upon a site specific consideration of the state of habitats within the Severn Estuary, and should not be extended to other sites on the basis of this advice.

⁷Notable estuarine species assemblages

- i. Assemblage of fish species:
 - Migratory species
 - River and Sea Lamprey and Twaité shad (Annex 1 species) and Allis shad
 - Sea trout, salmon, eel,
 - Estuarine species
 - Species typically occurring and breeding in estuaries (Bird, 2008)
 - Marine species occurring in large numbers in estuaries (Bird, 2008)
 - Marine species
 - Predominantly marine species occurring infrequently in the Severn (Bird, 2008)
 - Freshwater species
 - Species typically occurring and breeding in freshwater and recorded within the Severn cSAC (Bird, 2008)

- ii Assemblage of waterfowl species (refer also sections 4.2 and 4.3 on the SPA and Ramsar Site):
 - Regularly occurring Annex 1 species - Bewicks' swan
 - Regularly occurring migratory species - European white-fronted goose, dunlin, redshank, shelduck, gadwall
 - Nationally important bird populations - wigeon, teal, pintail, pochard, tufted duck, ringed plover, grey plover, curlew, whimbrel and spotted redshank
- iii. Assemblage of vascular plant species:
 - Salt marsh species (refer to notes 5 and 6 in section 4.1.4.1 - explanatory information on the conservation objective for the Atlantic salt meadows feature)
 - Eel grass (*Zostera*) species.

⁸Physico-chemical characteristics

These include nutrients, oxygen, turbidity, pH, temperature and salinity.

⁹Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.1.2 SAC interest feature 2: Subtidal sandbanks which are covered by sea water all the time (subtidal sandbanks)

The conservation objective for the “subtidal sandbanks” feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes¹, each of the following conditions are met:

- i. the total extent of the subtidal sandbanks² within the site is maintained;
- ii. the extent and distribution³ of the individual subtidal sandbank communities⁴ within the site is maintained;
- iii. the community composition⁵ of the subtidal sandbank feature within the site is maintained;
- iv. the variety and distribution³ of sediment types across the subtidal sandbank feature is maintained;
- v. the gross morphology (depth, distribution and profile) of the subtidal sandbank feature within the site is maintained.

The meaning of terms ¹⁻⁵ above is explained in **section 4.1.2.1**

Appendix 3 shows the extent of the “subtidal sandbanks” feature within the Severn Estuary SAC European Marine Site.

4.1.2.1 Explanatory information for the “subtidal sandbanks” conservation objective

¹ Natural processes in respect of the SAC

The meaning of ‘natural processes’ is explained in **section 4.1.1.1**

² Extent of subtidal sandbanks

The subtidal sandbanks in the Severn Estuary change their shape over time and many are ephemeral in nature, although some are relatively stable and long established. The extent of the Annex 1 habitat is considered to include both the actual sandbanks and their associated sediments. Areas of associated sediments have been defined by using the sediment environments of the Bristol Channel Marine Aggregates Resources and Constraints project, commissioned by the National Assembly for Wales (Posford Duvivier and ABP, 2000) Associated sediments have been defined as any area of of subtidal sand-sized sediment within the same sediment environment as a subtidal sandbank. Mobile sediments that form temporary sandbanks are considered to be associated sediments that should be retained in the system, but their location may change. Areas of holocene valley infill (relict sediment) are not mobile under present day estuarine conditions. Therefore, where Holocene infill is exposed, it is not considered to form part of the associated sediments. However, any mobile sand deposited over the infill does contribute to the associated sediments.

³ Distribution

Distribution of sandbank communities and sediments refers to the macro spatial pattern in which these are distributed around the estuary. This statement does not require micro-distribution of communities or sediments e.g. the exact mapped positions of specific communities or sediments to be maintained.

The sand banks of the Middle and Welsh Grounds are relatively permanent sandbank features in the Severn Estuary, along with other long established sandbank features at Cardiff Grounds and in Bridgwater Bay. The tops of these banks are intertidal, and the permanently submerged parts of the banks are considered to contribute to the subtidal sandbanks habitat.

There are other areas of subtidal sandbank habitat within the Estuary, again sometimes the top of the bank may be exposed at low tide, with the submerged sections contributing to the subtidal sandbanks habitat. These banks are more ephemeral in nature, but are still considered part of the feature, and reflect the dynamic nature of the Severn Estuary. The areas where ephemeral subtidal sandbanks are known to occur include areas offshore from Avonmouth and at English Grounds (near Clevedon).

The macro-scale distribution of the subtidal sandbanks should be maintained, and there should be continued presence of ephemeral subtidal sandbanks in the Estuary.

⁴ Subtidal sandbank communities

There are two groups of communities comprising the ‘sub-features’ of the subtidal sandbanks feature:

- Sublittoral Sands and Muddy Sands:
 - i. Infralittoral mobile sand in variable salinity (estuaries)
 - ii. Infralittoral mobile clean sand with sparse fauna
 - iii. *Nephtys cirrosa* and *Macoma balthica* in variable salinity infralittoral mobile sand
 - iv. *Neomysis integer* and *Gammarus* spp. in fluctuating low salinity infralittoral mobile sand
- Sublittoral cohesive mud and sandy mud communities:
 - i. *Capitella capitata* in enriched sublittoral muddy sediments
 - ii. *Nephtys hombergii* and *Tubificoides* spp. in variable salinity infralittoral soft mud
 - iii. *Capitella capitata* and *Tubificoides* spp. in reduced salinity infralittoral muddy sediment*
 - iv. *Nephtys hombergii* and *Macoma balthica* in infralittoral sandy mud*

(* these records have a lower degree of confidence than the other communities listed, i.e. the biotope assessor was uncertain regarding precisely which biotope should be recorded).

⁵ Community composition

Species typical of the subtidal sandbank communities:

Aricidea minuta
Capitella capitata
Diastylis rathkei typica
Eurydice pulchra
Gammarus salinus
Harpinia pectinata
Mediomastus fragilis
Nephtys cirrosa
Nephtys hombergii
Oligochaeta
Pygospio elegans
Pontocrates arenarius
Pseudocuma longicornis
Retusa obtusa
Tubificoides amplivasatus

4.1.3 SAC interest feature 3 : Mudflats and sandflats not covered by seawater at low tide (mudflats and sandflats)

The conservation objective for “mudflats and sandflats” feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes¹, each of the following conditions are met:

- i. The total extent of the mudflats and sandflats feature² is maintained;
- ii. the variety and extent of individual mudflats and sandflats communities³ within the site is maintained;
- iii. the distribution⁴ of individual mudflats and sandflats communities³ within the site is maintained;
- iv. the community composition⁵ of the mudflats and sandflats feature within the site is maintained;
- v. the topography of the intertidal flats and the morphology (dynamic processes of sediment movement and channel migration across the flats) are maintained.

The meaning of terms ¹⁻⁵ above is explained in **section 4.1.3.1**.

Appendix 4 shows the extent of the “mudflats and sandflats” feature within the Severn Estuary SAC European Marine Site.

4.1.3.1 Explanatory information for the “mudflats and sandflats” conservation objective

¹ Natural processes in respect of the SAC

The meaning of ‘natural processes’ is explained in **section 4.1.1.1**.

²Extent of the intertidal mudflats and sandflats

The extent of the feature is defined using intertidal Phase 1 survey information, which gives the seaward limit of the feature as the low water mark of spring tides (MLWS) because that is in practice the lower limit to which Phase 1 survey is possible. The feature does not include other intertidal habitats which are not mudflats and sandflats, such as intertidal reefs and rocky shores. This is the basis on which the feature is shown in the map in Figure 4, the total extent being 20,271 ha. However in addition there will be some areas of intertidal mudflat and sandflat seaward of MLWS and down to Lowest Astronomical Tide, which is the absolute seaward limit of this habitat type.

³Mudflat and sandflat communities

There are three groups of communities comprising the “sub-features” of the “Mudflats and sandflats not covered by seawater at low tide” feature:

- Intertidal gravel and clean sand communities

- i. Barren coarse sand shores; **LGS.S.BarSnd**
- ii. Burrowing amphipods and *Eurydice pulchra* in well drained clean sand shores; **LGS.S.AEur**
- iii. Burrowing amphipods and polychaetes in clean sand shores. **LGS.S.AP**
- iv. Talitrid amphipods in decomposing seaweed on the strandline **LGS.S.Tal**
- v. Dense *Lanice conchilega* in tide-swept lower shore sand **LGS.S.Lan**
- vi. Barren shingle or gravel shores **LGS.Sh.BarSh**

- Intertidal muddy sand communities :

- i. Polychaetes and *Cerastoderma edule* in fine sand or muddy sand shores **LMS.MS.PCer**
- ii. *Bathyporeia pilosa* and *Corophium spp.* in upper shore slightly muddy fine sand shores **LMS.MS.BatCor**
- iii. *Macoma balthica* and *Arenicola marina* in muddy sand shores. **LMS.MS.MacAre**

- Intertidal mud communities:

- i. *Hediste diversicolor* and *Macoma balthica* in sandy mud shores: **LMU.SMu.HedMac**
- ii. *Hediste diversicolor*, *Macoma balthica* and *Arenicola marina* in muddy sand or sandy mud shores **LMU.SMu.HedMacAre**
- iii. *Hediste diversicolor* and *Scrobicularia plana* in reduced salinity mud shores **LMU.Mu.HedScr**
- iv. *Hediste diversicolor* and oligochaetes in low salinity mud shores **LMU.Mu.HedOl**
- v. *Hediste diversicolor* and *Streblospio shrubsolii* in sandy mud or soft mud shores **LMU.Mu Hed Str**

Appendix 4a shows the extent of the “mudflats and sandflats” subfeatures within the Severn Estuary SAC European Marine Site.

⁴ Distribution

The distribution of mudflats and sandflats communities refers to the macro spatial pattern in which these communities are distributed around the estuary. This statement does not require micro-distribution of communities e.g. the exact mapped positions of specific communities to be maintained.

⁵ Community composition

Species typical of the mudflat and sandflat communities:

Aphelocheata marioni
Arenicola marina
Bathyporeia pelagica
Corophium volutator
Enchytraeidae
Eurydice pulchra
Hediste diversicolor
Hydrobia ulvae
Macoma balthica
Nephtys cirrosa
Nephtys hombergii
Oligochaeta indet.
Pygospio elegans
Scoloplos armiger
Scrobicularia plana
Streblospio shrubsolii
Tubificoides benedii

4.1.4 SAC interest feature 4: Atlantic salt meadow

The conservation objective for the “Atlantic salt meadow” feature of the Severn Estuary SAC is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes¹, each of the following conditions are met:

- i. the total extent of Atlantic salt meadow and associated transitional vegetation communities² within the site is maintained³;
- ii. the extent and distribution⁴ of the individual Atlantic salt meadow and associated transitional vegetation communities² within the site is maintained;
- iii. the zonation of Atlantic salt meadow vegetation communities and their associated transitions² to other estuary habitats is maintained;
- iv. the relative abundance of the typical species⁵ of the Atlantic salt meadow and associated transitional vegetation communities² is maintained;
- v. the abundance of the notable species⁶ of the Atlantic salt meadow and associated transitional vegetation communities² is maintained.
- vi. the structural variation of the salt marsh sward (resulting from grazing) is maintained within limits sufficient to satisfy the requirements of conditions iv and v above and the requirements of the Ramsar and SPA features⁷
- vii. the characteristic stepped morphology of the salt marshes and associated creeks, pills, drainage ditches and pans, and the estuarine processes that enable their development, is maintained.
- viii. Any areas of *Spartina anglica* salt marsh (SM6) are capable of developing naturally into other saltmarsh communities.⁸

The meaning of terms ¹⁻⁸ above is explained in **section 4.1.4.1**.

Appendix 5 shows the extent of Atlantic salt meadow and its associated transitional vegetation communities within the Severn Estuary SAC European Marine Site.

4.1.4.1 Explanatory information for the “Atlantic salt meadow” conservation objective

¹ Natural processes in respect of the SAC

The meaning of ‘natural processes’ is explained in **section 4.1.1.1**.

² Atlantic salt meadow and associated transitional vegetation communities

The vegetation communities comprising the Atlantic Salt Meadow feature can be grouped into four ‘sub-features’, namely:

- (a) low to mid marsh communities
- (b) mid to upper marsh communities
- (c) transitional high marsh communities
- (d) pioneer saltmarsh communities

The communities in each of these sub-features are listed below.

Sub-features (a) and (b) contain the National Vegetation Classification (NVC) communities which fall within the definition of Atlantic Salt Meadow in the EU Interpretation Manual. The extent of these two sub-features within the SAC is currently estimated at 656 ha. The communities in (c) and (d) do not fall within the Atlantic Salt Meadow definition, but are considered to be important components of this feature as they represent its landward and seaward transitions to other habitat types, namely non-saline vegetation and pioneer salt marsh respectively. Atlantic salt meadow is a naturally dynamic habitat and these transitional communities are considered to be an integral part of the Atlantic Salt Meadow feature and essential elements of its structure and function. The total extent of all four of the above sub-features in the SAC is estimated to be 1400 ha, distributed in the SAC as shown in Appendix 5a.

(a) Low to mid marsh communities:

- i. Transitional low saltmarsh with *Puccinellia maritima*, annual *Salicornia* sp. and *Suaeda maritima* SM10
- ii. *Aster tripolium* (rayed) saltmarsh SM12
- iii. *Puccinellia maritima* saltmarsh SM13
 - o *Puccinellia maritima* sub-community SM13a
 - o *Glaux maritima* sub-community SM13b
 - o *Limonium vulgare* - *Armeria maritima* sub-community SM13c
 - o *Plantago maritima* - *Armeria maritima* sub-community SM13d
 - o *Plantago maritima*-*Triglochin maritima* sub-community SM13x (provisional)
 - o *Spartina anglica* sub-community SM13y (provisional)
- iv. *Atriplex portulacoides* saltmarsh SM14
 - o *Atriplex portulacoides* sub-community SM14a
- v. *Juncus maritimus* - *Triglochin maritima* saltmarsh SM15

(b) Mid to upper marsh communities:

- i. *Festuca rubra* salt-marsh SM16
 - o *Puccinellia maritima* sub-community SM16a
 - o *Juncus gerardii* sub-community SM16b
 - o *Glaux maritima* sub-community SM16c
 - o *Festuca rubra* sub-community SM16d
 - o *Leontodon autumnalis* sub-community SM16e
 - o *Aster tripolium* sub-community SM16x (provisional)
- ii. *Artemisia maritima* saltmarsh SM17
- iii. *Juncus maritimus* salt-marsh SM18
 - o *Festuca arundinacea* sub-community SM18c

(c) Transitional high marsh communities:

- i. *Spergularia marina* - *Puccinellia distans* saltmarsh SM23
 - ii. *Elytrigia atherica* saltmarsh SM24
 - iii. *Elytrigia repens* saltmarsh SM28
 - iv. *Festuca rubra* - *Agrostis stolonifera* - *Potentilla anserina* inundation grassland MG11
 - v. *Festuca arundinacea* coarse grassland MG12
 - vi. *Agrostis stolonifera* - *Alopecurus geniculatus* inundation grassland MG13
 - vii. *Phragmites australis* reedbed S4
 - o *Phragmites australis* sub-community S4a
 - xiii. *Bolboschoenus maritimus* swamp S21
 - o *B. maritimus* sub-community S21a
- Agrostis stolonifera* sub-community S21c

(d) Pioneer saltmarsh communities:

- i. *Spartina anglica* saltmarsh SM6
- ii. Annual *Salicornia* saltmarsh SM8
- iii. *Suaeda maritima* saltmarsh SM9

³Maintained

Since the late 1990s Natural England's condition assessment has identified that parts of the saltmarsh within the Severn Estuary appear to be exhibiting the effects of coastal squeeze. For this reason NE and CCW do not consider it sufficient simply to seek to maintain the existing saltmarsh resource, rather it is our advice that measures will be required which seek to recreate the approximate extent of saltmarsh habitat present within the estuary in 1995 (the year the Severn Estuary was first identified as a proposed SAC); whilst at all times working within the framework of seeking a sustainable estuary form. N.B. This is based upon a site specific consideration of the state of habitats within the Severn Estuary, and should not be extended to other sites on the basis of this advice.

⁴Distribution

The distribution Atlantic salt meadow communities refers to the macro spatial pattern in which these are distributed around the estuary. This statement does not require micro-distribution of communities e.g. the exact mapped positions of specific communities to be maintained.

⁵Typical species of the Atlantic salt meadow

Festuca arundinacea
Festuca rubra
Juncus gerardii
Triglochin maritimum
Carex extensa
Agrostis stolonifera
Juncus maritimus
Oenanthe lachenalii
Puccinellia maritima,
Salicornia spp.
Suaeda maritima
Aster tripolium
Glaux maritima
Plantago maritima
Armeria maritima
Elytrigia atherica
Atriplex prostrata
Phragmites australis
Spartina anglica
Spergularia media
Puccinellia distans
Cochlearia anglica
Cochlearia officinalis
Limonium vulgare
Atriplex portulacoides
Seriphidium maritimum
Plantago coronopus
Beta vulgaris maritima

⁶Notable Atlantic salt meadow vegetation species

Alopecurus bulbosus
Althaea officinalis
Bupleurum tenuissimum
Hordeum marinum
Puccinellia rupestris
Trifolium squamosum
Lepidium latifolium

Allium oleraceum

Petroselinum segetum

⁷ **Severn Estuary SPA and Severn Estuary Ramsar Site Conservation Objectives**

Refer to sections 4.2 and 4.3 of this document

⁸ ***Spartina anglica* SM6**

Spartina in the Severn is considered to be an invasive species and these conservation objectives do not seek the maintenance of the extent or condition of this habitat type. However, SM6 is considered to be a transitional salt marsh community and the conservation objectives seek to protect the ability of areas of *Spartina* to develop into other Atlantic Salt Meadow or transitional communities.

4.1.5 SAC interest feature 5 : Reefs

The conservation objective for the “reefs” feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes¹, each of the following conditions are met:

- i. the total extent and distribution² of *Sabellaria* reef³ is maintained;
- ii. the community composition⁴ of the *Sabellaria* reef is maintained;
- iii. the full range of different age structures of *Sabellaria* reef are present;
- iv. the physical⁵ and ecological processes⁶ necessary to support *Sabellaria* reef are maintained.

The meaning of terms ¹⁻⁶ above is explained in section 4.1.5.1 below.

Appendix 6 shows the extent of the “reef” feature within the Severn Estuary SAC European Marine Site.

4.1.5.1 Explanatory information for the “reefs” conservation objective

¹ Natural processes in respect of the SAC

The meaning of ‘natural processes’ is explained in section 4.1.1.1

² Distribution

The distribution of reefs refers to the macro spatial pattern in which the reefs are distributed around the estuary. This statement does not require micro-distribution of the reefs e.g. the exact mapped positions of specific reefs to be maintained.

³ *Sabellaria* reef

Little is known about the nature of the *Sabellaria alveolata* reef in the Severn Estuary, especially in the subtidal. However, at other sites *S. alveolata* is known to have a very variable recruitment and the cover in any one area may vary greatly over a number of years. *S. alveolata* reefs also cycle through different phases, from newly settled worms through vigorous fast growing reef to older hummocks. It is likely that subtidal *S. alveolata* reef in the Severn Estuary will exhibit reduced growth forms (lower elevation) in comparison to the intertidal reef habitat. The easiest of these phases to identify is the fast growing reef and for the purposes of these conservation objectives this is defined as a dense aggregation of worms (over 1000 per m², as a rough guide), generally forming a thick (2 cm or more) crust of tubes. The area covered by the habitat would generally exceed 25 m² although there could be patchiness within this area. The other phases of growth are also important and are encompassed in point iii of the objective.

The *S. alveolata* reef biotopes recorded in the Severn Estuary are SS.SBR.PoR.SalvMx *Sabellaria alveolata* on variable salinity sublittoral mixed sediment and LS.LBR.Sab.Salv *Sabellaria alveolata* reefs on sand-abraded eulittoral rock.

⁴ Community composition

Species associated with dense aggregations of *Sabellaria alveolata* in the Severn estuary:

Subtidal

Sabellaria alveolata
Eulalia tripunctata

Mediomastus fragilis
Typosyllis armillaris
Ampharete grubei
Harpinia pectinata
Melinna cristata
Pygospio elegans
Scoloplos armiger
Nemertea
Nucula nitidosa
Nucula nucleus
Tubificoides amplivasatus
Golfingia vulgaris vulgaris
Gammarus salinus
Tubificoides
Arenicola marina
Sphenia binghami
Eumida sanguinea
Nephtys hombergii
Autolytus prolifera
Harmothoe impar
Nematoda
Polycirrus
Dodecaceria concharum
Harmothoe
Syllidae
Enchytraeidae

Intertidal

Sabellaria alveolata,
Actinia equina
Cancer pagurus
Elminius modestus
Littorina saxatilis
L.littorea
L.obtusata
Pholas dactylus
Pomatocerus lamarcki
Porcellana platycheles
Semibalanus balanoides
Halichondrea sp
Corallina officinalis
Enteromorpha sp.
Fucus serratus
Fucus vesiculosus
Pelvetia canaliculata
Porphyra sp
Ulva sp

⁵Physical processes

- abundance of suitable coarse sediments to support reef growth (tube building)
- the availability of suitable substrates where *Sabellaria* has been known to occur in the past

⁶Ecological Processes

- supply of *Sabellaria* larvae (within the water column)
- abundance of food (suspended detritus material) within the water column to support feeding

4.1.6 SAC interest feature 6 : River lamprey *Lampetra fluviatilis*

The conservation objective for the river lamprey *Lampetra fluviatilis* feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes¹, each of the following conditions are met:

- i. the migratory passage of both adult and juvenile river lamprey through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;
- ii. the size of the river lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;
- iii. the abundance of prey species² forming the river lamprey's food resource within the estuary, is maintained.
- iv. Toxic contaminants in the water column³ and sediment are below levels which would pose a risk to the ecological objectives described above.

The meaning of terms ¹⁻³ above is explained in **section 4.1.6.1**.

Note : The river lamprey population of the Severn depends on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and therefore the Severn Estuary river lamprey feature can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC river lamprey feature are also met in full and there is a continued recorded presence of this species in the River Severn.

4.1.6.1 Explanatory information for the river lamprey *Lampetra fluviatilis* conservation objective

¹ Natural processes in respect of the SAC fish features

River lamprey population:

The size of the population is subject to non anthropogenic factors relating to natural fluctuations of external factors such as food / host availability in the Bristol Channel and more widely and breeding success in the River Severn and other rivers draining into the Severn Estuary.

Supporting habitats

The general meaning of 'natural processes' with respect to the supporting habitats of river lamprey within the estuary is explained in **section 4.1.1.1**

² Prey species

Sea trout *Salmo trutta*, shad *Alosa fallax/Alosa alosa*, herring *Clupea harengus*, sprat *Sprattus sprattus*, flounder *Platichthys flesus* and small gadoids such as whiting *Merlangius merlangus* and pout *Trisopterus luscus* are all potential prey species for the river lamprey found within the Severn Estuary (Bird 2008).

³Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.1.7 SAC interest feature 7: The conservation objective for sea lamprey *Petromyzon marinus*

The conservation objective for the sea lamprey *Petromyzon marinus* feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes¹, each of the following conditions are met:

- i. the migratory passage of both adult and juvenile sea lamprey through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;
- ii. the size of the sea lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained as is at a level that is sustainable in the long term;
- iii. the abundance of prey species² forming the sea lamprey's food resource within the estuary, is maintained.
- vi. Toxic contaminants in the water column³ and sediment are below levels which would pose a risk to the ecological objectives described above.

The meaning of terms ¹⁻³ above is explained in **section 4.1.7.1**.

Note : The sea lamprey population of the Severn depends on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and therefore the Severn Estuary sea lamprey feature can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC sea lamprey shad feature are also met in full and there is a continued recorded presence of this species in the River Severn.

4.1.7.1 Explanatory information for the sea lamprey *Petromyzon marinus* conservation objective

¹ Natural processes in respect of the SAC fish features

Sea lamprey population:

The size of the population is subject to non anthropogenic factors relating to natural fluctuations of external factors such as food / host availability in the Bristol Channel and more widely and breeding success in the River Severn and other rivers draining into the Severn Estuary.

Supporting habitats:

The general meaning of 'natural processes' with respect to the supporting habitats of sea lamprey within the estuary is explained in **section 4.1.1.1**.

²Prey species

Eel *Anguilla anguilla*, cod *Gadus morhua*, and haddock *Melanogrammus aeglefinus* are all potential prey species for the sea lamprey found within the Severn Estuary (Bird 2008)

³Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.1.8 SAC interest feature 8: The conservation objective for twaite shad *Alosa fallax*

The conservation objective for the twaite Shad *Alosa fallax* feature of the Severn Estuary SAC is to maintain the feature in a favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes¹, each of the following conditions are met:

- i. the migratory passage of both adult and juvenile twaite shad through the Severn Estuary between the Bristol Channel and their spawning rivers is not obstructed or impeded by physical barriers, changes in flows or poor water quality;
- ii. the size of the twaite shad population within the Severn Estuary and the rivers draining into it is at least maintained and is at a level that is sustainable in the long term.
- iii. the abundance of prey species² forming the twaite shad's food resource within the estuary, in particular at the salt wedge³, is maintained.
- iv. Toxic contaminants in the water column⁴ and sediment are below levels which would pose a risk to the ecological objectives described above.

The meaning of terms¹⁻⁴ above is explained in **section 4.1.8.1**.

Note : The twaite shad population of the Severn depends on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle and therefore the Severn Estuary twaite shad feature can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC twaite shad feature are also met in full and there is a continued recorded presence of this species in the River Severn.

4.1.8.1 Explanatory information for the Twaite shad *Alosa fallax* conservation objective

¹ Natural processes in respect of the SAC fish features

Twaite shad population:

The size of the population is subject to non anthropogenic factors relating to natural fluctuations of external factors such as food availability in the Bristol Channel and more widely and breeding success in the River Severn and other rivers draining into the Severn Estuary.

Supporting habitats:

The general meaning of 'natural processes' with respect to the supporting habitats of twaite shad within the estuary is explained in **section 4.1.1.1**.

² Prey species

Small crustaceans, especially mysids and copepods, small fish, especially sprats and anchovies, and fish eggs (Maitland, P.S. & Hatton-Ellis 2003).

³ Salt wedge

This the area within the estuary where fresh and saline water meet and where the abundance of prey species is particularly important to the twaite shad population. The actual position varies according to the state of the tide and volume of freshwater input to the estuary.

⁴Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.1.9 Favourable Condition Tables for the SAC interest features of the Severn Estuary European Marine Site

Background information on the role of favourable condition tables and the information provided in each column is provided in Section 1.8 of this document, and a concise glossary of terms used is provided in Section 7.

The favourable condition table is intended to supplement the conservation objectives, including with respect to the management of established and ongoing activities, future requirements of monitoring and reporting on the condition of the features of the site and, together with the conservation objectives, informs the scope and nature of any appropriate assessment that may be needed. The table **does not by itself** provide a comprehensive basis on which to assess plans and projects as required under the Habitats Regulations. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

These tables set out all the attributes that **may** be used to monitor the condition of the features of the SAC. Where possible we will seek available information from others which can inform our assessment process.

It will be possible to monitor many of the attributes at the same time or during the same survey. The frequency of sampling for many attributes may need to be greater during the first reporting cycle in order to characterise the site and establish the baseline. Where relevant, abbreviations of National Vegetation Classification (NVC) codes are used for simplicity (Rodwell, 2000).

Comprising :

Table 8 – Favourable condition table for the “estuaries” feature of the Severn Estuary SAC and (in part) for the Ramsar Site (refer to section 4.3.1)

Table 9 – Favourable condition table for the “subtidal sandbanks” feature of the Severn Estuary SAC

Table 10 – Favourable condition table for the “intertidal mudflats and sandflats” feature of the Severn Estuary SAC

Table 11 – Favourable condition table for the “Atlantic salt meadows” feature of the Severn Estuary SAC

Table 12 – Favourable condition table for the “reefs” feature of the Severn Estuary SAC

Table 13 – Favourable condition table for the “river lamprey” and “sea lamprey” features of the Severn Estuary SAC

Table 14 – Favourable condition table for the “twait shad” feature of the Severn Estuary SAC

Table 8 – Favourable condition table for the “estuaries” feature of the Severn Estuary SAC and (in part) for the Ramsar Site (refer to section 4.3.1)

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A1	SAC interest feature 1: Estuaries		Extent (Total extent of the estuaries feature - section 4.1.1.i of the conservation objectives)	Total area (ha) of estuary feature	No decrease in extent due to man induced changes from the established baseline <i>The baseline is the extent of all areas subject to tidal influence within the boundary of the designation of the pSAC in 2000 - see also map in Appendix 2</i>	Extent is an attribute on which reporting is required by the Habitats Directive.
A2		All sub-features	Morphology (Characteristic physical form and flow - section 4.1.1.ii of the conservation objectives)	Intra and inter-estuarine Tidal Prism/Cross Section ratio (TP/CS ratio) measured during the reporting cycle using remote sensing (frequency to be determined).	The intra- and inter- estuarine TP/CS relationship should not deviate significantly from an established baseline subject to natural processes (* includes recognition of fixed hard geology formations) <i>Baseline to be established :- Data to be used is Hydrological Office bathymetry data (intertidal and subtidal) and Environment Agency LIDAR survey</i>	TP = Tidal Prism = total volume of water crossing a given cross section during the flood tide (m ³). CS = Area of a given cross section at high water springs (m ²). The relationship between TP & CS provides a measure of the way the estuary has adjusted to tidal energy. Substantial departures from this characteristic relationship (determined on a regional basis) may indicate the influence of anthropogenic factors and this would trigger more detailed evaluation of potential problems. The identification of a suitable baseline for TP/CS relationship will need to take account of the highly dynamic nature of the Severn and potential impacts of natural processes (including sea level rise) in altering the profile of the estuary – with a view to maintaining or promoting the movement of the estuary towards “dynamic equilibrium”. *The hard geology formations (headlands, cliffs and rock platforms) have a major role in influencing the characteristic physical form and flow of the estuary (many are protected in their own right as geological SSSI).

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A3	SAC interest feature 1: Estuaries		<p>Tidal regime and flows (saline water and freshwater contributions)</p> <p><i>(characteristic physical form and flow - section 4.1.1.ii of the conservation objectives)</i></p>	<p>Tidal range, measured from tide gauges at specified locations, and flows measured from current estuary and river meters . Locations and frequency to be determined</p>	<p>No decrease in tidal range subject to natural processes.</p> <p>Tidal currents should not deviate significantly from an established baseline subject to natural processes</p> <p>Riverine flows (Rivers Wye, Usk and Severn) and estuarine flows must be sufficient to ensure Water Framework Directive target of Good Ecological Status (GES) is met.</p> <p><i>Baseline to be established :- Data to be used is existing tide gauge and current meter data from EA ca 2000, and agreed WFD monitoring measures.</i></p>	

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A4			Sediment budget <i>(characteristic range and relative proportions of sediment sizes and sediment budget - section 4.1.1.iii of the conservation objectives)</i>	Evaluation of the sediment fluxes, sources and sinks, using a variety of measures including bathymetry, suspended sediment concentrations, fluvial and marine influx/efflux, man-made changes (e.g. navigational dredging/marine minerals extraction), cliff erosion etc)	No decrease in sediment budget from the established baseline <i>Baseline to be established :- Data to be used is Severn Estuary Coastal Habitat Management Plan (CHaMP) Part F- Sediment Budget Analysis</i>	<p>A sediment budget is a balance of the sediment volume entering and exiting a particular section of the coast or an estuary. Sediment budget analysis consists of the evaluation of sediment fluxes, sources and sinks from different processes that give rise to additions and subtractions within a control volume (e.g. a section of coast or an estuary) in order to gain a better understanding of the estuary system.</p> <p>An estuary provides a readily defined control volume, where point sources and sinks exist in the form of rivers, other terrestrial outfalls and the open sea. Line sources and sinks may be defined in terms of erosion from cliffs and transfers to or from saltmarshes, wetlands or other intertidal areas. The subtidal beds also needs consideration as an important source/sink as does material stored in suspension within the volume of water that moves back and forth under tidal action within the estuary.</p> <p>Identification and quantification of all the mechanisms giving rise to sediment transfers can be difficult, and for the most part are approximate estimates of sediment exchange between sources and sinks.</p> <p>Reference ; ABPmer and HR Wallingford (2007).</p>
A5	SAC interest feature 1: Estuaries		Sediment size, range and distribution <i>(characteristic range and proportions of sediment sizes and sediment budget - section 4.1.1.iii of the conservation objectives)</i>	Sediment size distribution characterised and measured by particle size analysis (PSA) at a series of locations across the estuary during the reporting cycle (locations and frequency to be determined)	Sediment size distribution should not deviate from an established baseline. <i>Baseline to be established :- Data to be used is BGS seabed sediment data and other relevant datasets ?</i>	PSA measures parameters including percentage sand/silt/gravel, mean and median grain size and sorting co-efficient, used to characterise sediment type. Sediment character is key to the structure of the features and reflects the physical processes acting on it – it may vary across the estuary and can be used to indicate the spatial distribution of sediment types reflecting the stability of the features and the processes supporting it..
A6		Subtidal sandbanks	Extent, variety and spatial distribution of estuarine habitat communities <i>(section 4.1.1.iv of the conservation objectives)</i>	<i>For information on the attributes of the subtidal sandbank communities sub-feature see the sections of this table which relate to the subtidal sandbanks which are covered by seawater all the time feature, see Table 9</i>		

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A7		Intertidal mudflat and sandflat communities	Extent, variety and spatial distribution of estuarine habitat communities (section 4.1.1.iv of the conservation objectives)			<i>For information on the attributes of the intertidal mudflat & sandflat communities sub-feature see the sections of this table which relate to the intertidal mudflats and sandflats not covered by seawater at low tide feature, see Table 10</i>
A8		Atlantic salt meadow (and associated transition habitats)	Extent, variety and spatial distribution of estuarine habitat communities (section 4.1.1.iv of the conservation objectives)			<i>For information on the attributes of the Atlantic salt meadow communities sub-feature see the sections of this table which relate to Atlantic salt meadow feature, see Table 11</i>
A9		Reefs of <i>Sabellaria alveolata</i>	Extent, variety and spatial distribution of estuarine habitat communities (section 4.1.1.iv of the conservation objectives)			<i>For information on the attributes of the Reef sub-feature see the sections of this table which relate to the Reef feature, see Table 12</i>

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A10	SAC interest feature 1: Estuaries	Hard substrate habitats and their notable communities	Extent & variety <i>(extent, variety, spatial distribution and community composition of hard substrate habitats and their notable communities - section 4.1.1.v of the conservation objectives)</i>	Area (ha) and range of types of hard substrate habitats and their notable communities, measured periodically during the reporting cycle along sampling transects or grids (frequency to be determined).	No decrease in extent or range of types of hard substrate habitats and their notable communities from the established baseline subject to natural processes. <i>Baseline is the CCW and English Nature Intertidal Biotope Surveys 2006.</i>	Loss of hard substrate habitats and their notable communities is likely to be detrimental to the structure of the interest feature, e.g. associated with a change in estuary processes and may indicate long term changes in the physical conditions of the estuaries interest feature. Notable communities of the Severn Estuary comprise the following <ul style="list-style-type: none"> • <i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (MLR.Sab.Salv) • <i>Hydroids, ephemeral seaweeds and Littorina littorea</i> in shallow eulittoral mixed substrata pools. (LR.RkpH) • <i>Balanus crenatus</i> and <i>Tubularia indivisa</i> on extremely tide-swept circalittoral rock.(ECR.BS.BalTub) • <i>Fucus serratus</i> and piddocks on lower eulittoral soft rock (MLR.Fser.Pid) • <i>Mytilus edulis</i> and piddocks on eulittoral firm clay (MLR.MytPid) • <i>Balanus crenatus</i>, <i>Halichondrea panicea</i> and <i>Alcyonidium diaphanum</i> on extremely tide-swept sheltered circalittoral rock (ECR.BalHpan) • <i>Sertularia cupressina</i> and <i>Hydrallmania falcate</i> on tide-swept sublittoral cobbles or pebbles in coarse sand (IGS.ScupHyd). • <i>Corralina officinalis</i> and coralline crusts in shallow eulittoral rockpools (LR.rkp.Cor) • Eel grass (<i>Zostera</i>) beds • Any other notable hard substrata communities that may be identified.
A11			Spatial distribution <i>(extent, variety, spatial distribution and community composition of notable communities - section 4.1.1.v of the conservation objectives)</i>	Spatial distribution of notable communities measured periodically during the reporting cycle using a combination of remote sensing and ground truthing using GPS (frequency to be determined).	Macroscale distribution of notable communities should not deviate significantly from the established baselines, subject to natural processes. <i>Baseline is the CCW and English Nature Intertidal Biotope Surveys 2006.</i>	Changes in the variety or distribution of notable estuarine communities may indicate long term changes in the physical conditions of the estuary interest feature or individual subfeatures.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A12	SAC interest feature 1: Estuaries	Hard substrate habitats and their notable communities	Community composition <i>(extent, variety, spatial distribution and community composition of notable communities - section 4.1.1.v of the conservation objectives)</i>	Assessment of community quality through survey of species composition (presence of typical species) within the notable communities measured periodically	No decline in community quality due to changes in species composition or loss of typical species from an established baseline <i>Baseline to be established : Data to be used : CCW and English Nature Intertidal Biotope Surveys 2006 and future surveys</i>	Different associations of plants, animals and their habitat are an important structural and functional aspect of the feature. Changes in the communities present within an area of a particular type may indicate long-term changes in physical conditions at the site. Typical species of the notable communities to be determined.
A13		Notable estuarine species assemblages : Assemblage of fish species	Abundance <i>(abundance of notable estuarine species assemblages - section 4.1.1.vi of the conservation objectives)</i>	Numbers of species and population estimates	No significant reduction in overall diversity of species or in individual populations against an established baseline <i>Baseline to be established : Data to be used : Environment Agency and relevant Sea Fisheries Committee data</i>	Loss of notable communities may indicate long term changes in the physical conditions of the estuaries interest feature or individual subfeatures. Assemblage of fish species: (Refer to section 4.1.1 note 7) • Migratory species (see also section of this table which relates to the river lamprey, sea lamprey and twaite shad features) • Estuarine species • Marine species • Freshwater species Refer also to section 4.3.2 in relation to the assemblage of migratory fish species of the Ramsar Site.
A14		Notable estuarine species assemblages : Assemblage of waterfowl species	Abundance <i>(abundance of notable estuarine species assemblages - section 4.1.1.vi of the conservation objectives)</i>	Numbers of species and individual population sizes	No significant reduction in overall diversity of species or in individual populations against an established baseline <i>Baselines are identified in the SPA section of this advice – see section 4.2</i>	Loss of notable communities may indicate long term changes in the physical conditions of the estuaries interest feature or individual subfeatures. Refer also to section 4.2.7 in relation to the Internationally important assemblage of waterfowl of the Severn Estuary SPA and section 4.3.9 in relation to the Internationally important assemblage of waterfowl of the Severn Estuary Ramsar Site
A15		Notable estuarine species assemblages : Assemblage of vascular plant species	Abundance of saltmarsh species <i>(abundance of notable estuarine species assemblages - section 4.1.1.vi of the conservation objectives)</i>	Number of species and population sizes	No significant reduction in overall diversity of species or in individual populations against an established baseline <i>Baselines to be established: Data to be used is 1998 NVC Scarce plant survey, county botanical records and CCW/NE site records</i>	Loss of notable communities may indicate long term changes in the physical conditions of the estuaries interest feature or individual subfeatures. Assemblage of vascular plant species includes: • Salt marsh species Note : maintaining the conditions necessary for these species are covered by the Atlantic salt meadows table attributes Table 11

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A16	SAC interest feature 1: Estuaries	Notable estuarine species assemblages : Assemblage of vascular plant species	Abundance of Eel grass	Extent and density of Eel grass species	No significant reduction in overall extent and density against as established baseline <i>Baseline is CCW and English Nature Intertidal Biotope Surveys 2006 plus Severn Second Crossing monitoring data 1989-95/6</i>	Assemblage of vascular plant species includes: • Eel grass (<i>Zostera</i>) species.
A17		All sub-features	Water quality – physico-chemical parameters (Including temperature, salinity, oxygen, nutrients, pH and turbidity etc) <i>(physico chemical characteristics of the water column - section 4.1.1.vii of the conservation objectives)</i>	Physico-chemical parameters measured periodically throughout the reporting cycle (frequency to be determined).	Physico-chemical parameters should not pose a risk to the ecology* of the habitats and species of the SAC, SPA or Ramsar Site. Levels should comply with targets established under the EA Review of Consents and the Water Framework Directive.	Changes in any of the physico-chemical parameters in the water column can impact on the quality of the estuary habitat and hence could lead to changes in the presence and distribution of species (along with recruitment processes and spawning behaviour) and those at the edge of their geographic ranges and non-natives. *ie does not compromise the quality, extent, distribution or species composition of habitats or their ability to support species features (eg feeding, breeding, resting) – the outcome sought is the healthy functioning of the estuary.
A18			Phytoplankton <i>(physico chemical characteristics of the water column - section 4.1.1.vii of the conservation objectives)</i>	Average phytoplankton biomass and characteristic species in summer, measured periodically during the reporting cycle.	Growth of phytoplankton does not cause an undesirable disturbance to the estuary habitats and species Levels should comply with targets established under the EA Review of Consents and the Water Framework Directive.	
A19			Macroalgae	Average macroalgal cover and density in summer, measured periodically during the reporting cycle.	Average macroalgal cover and density should not compromise the ecology * of the estuary habitats and species Levels should comply with targets established under the EA Review of Consents and the Water Framework Directive.	*ie does not compromise the quality, extent, distribution or species composition of habitats or their ability to support species features (eg feeding, breeding, resting) – the outcome sought is the healthy functioning of the estuary.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
A20	SAC interest feature 1: Estuaries		Toxic contaminants <i>(toxic contaminants in water column and sediment - section 4.1.1.viii of the conservation objectives)</i>	Toxic contaminants measured periodically throughout the reporting cycle (frequency to be determined).	Toxic contaminants in water column and sediment should be below levels which would pose a risk to the ecology* of the estuary habitats and species Levels should comply with targets established under the EA Review of Consents and the Water Framework Directive	Elevated concentrations of toxic contaminants in the water column and sediment have the potential to cause lethal or sub-lethal harm to any features and sub-features. *ie does not compromise the quality, extent, distribution or species composition of habitats or their ability to support species features (eg feeding, breeding, resting) – the outcome sought is the healthy functioning of the estuary.
A21			Airborne nutrient and contaminants <i>(airborne contaminants - section 4.1.1.ix of the conservation objectives)</i>	Airborne contaminants measured periodically throughout the reporting cycle (frequency to be determined)	No exceedence of critical loads for: Sulphur dioxide - 20µg/m³ Nitrous Oxides - 30µg/m³ Ozone - 3000 ppb Ammonia - 3µg/m³ Nutrient Nitrogen - 30-40 kg/ha/yr.	Critical loads have been defined where possible (www.apis.ac.uk) for the conservation features of the European site. Where the critical load is exceeded features are at risk. As more in depth studies are undertaken critical loads will be altered to reflect best available scientific knowledge. The impacts of air pollution on the vegetation need further investigation. If particularly damaging, point sources (or groups of point sources) can be identified, then emissions should be regulated to reduce the impacts. It will also be very important for wider measures to be taken, at Government and international levels, to reduce air pollution. There is currently insufficient knowledge to make a judgment of the impacts on specific species. Decisions should be made at a site specific level."

Table 9 – Favourable condition table for the “subtidal sandbanks” feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
B1	SAC interest feature 2: Subtidal Sandbanks	All sub-features	Extent of feature <i>(total extent of subtidal sandbanks - section 4.1.2.i of the conservation objectives)</i>	Total extent assessed periodically against baseline map (using bathymetry data, and other geophysical techniques (e.g. sidescan sonar), and sediment grain-size data)	No decrease in extent of subtidal sandbanks features from an established baseline, subject to natural processes. <i>Baseline is taken from 1994 admiralty charts, BGS seabed sediment data and sediment environments defined in the Bristol Channel Marine Aggregates Study (Posford Duvivier and ABP Research Consultancy, 2000).</i> <i>Refer also to Map in Appendix 3</i>	Extent is an attribute on which reporting is required by the Habitats Directive. Within the Severn the subtidal sandbanks feature includes both relatively permanent and stable banks (shown in Appendix XX as subtidal sandbanks) and more ephemeral banks which contribute sediment to the sandbanks (shown in Appendix XX as associated sediments) and which are therefore considered to be an integral part of the feature In the long term loss of subtidal sandbank feature communities is likely to be detrimental to the structure of this interest feature and the intertidal mudflats and sandflats features, e.g. associated with a change in sediment budget or geomorphological regime, and may indicate long term changes in the physical conditions of the estuaries interest feature.
B2		All sub-features	Extent of the subtidal sandbank communities <i>(extent of subtidal sandbank communities -section 4.1.2.ii of the conservation objectives)</i>	Extent of subtidal sandbank communities within the site assessed periodically (method and frequency to be determined).	No decrease in extent of the communities from an established baseline subject to natural processes. <i>Baseline is data held on Marine Recorder</i>	The subtidal sandbanks feature comprises two sub-features Sublittoral sands and muddy sand : This sub-feature comprises the following four communities: <ul style="list-style-type: none">• Infralittoral mobile sand in variable salinity• Infralittoral mobile clean sands with sparse fauna• Nephtys cirrosa and Macoma balthica in variable salinity infralittoral mobile sand• Neomysis integer and Gammarus spp in fluctuating low salinity infralittoral mobile sand Sublittoral cohesive mud and sandy mud communities This sub-feature comprises the following four communities: <ul style="list-style-type: none">• Capitella capitata in enriched sublittoral muddy sediments• Nephtys hombergii and Tubificiodes spp. In variable salinity infralittoral soft mud• Capitella capitata and Tubificiodes spp. In reduced salinity infralittoral muddy sediment• Nephtys hombergii and Macoma balthica in infralittoral sandy mud

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
B3	SAC interest feature 2: Subtidal Sandbanks		Distribution of subtidal sandbank communities <i>(extent of subtidal sandbank communities -section 4.1.2.ii of the conservation objectives)</i>	Spatial distribution of subtidal sandbank communities measured periodically (frequency to be determined).	No significant change in the macro scale distribution of the communities from an established baseline subject to natural processes <i>Baseline is data held on Marine Recorder</i>	Some biotopes occur in a natural cycle linked to the dynamism of the prevailing conditions, and these may naturally appear and disappear over time. The feature should not be considered in unfavourable condition due to the short-term disappearance of such ephemeral biotopes
B4			Community composition <i>(community composition of the subtidal sandbank communities -section 4.1.2.iii of the conservation objectives)</i>	Assessment of community quality through survey of species composition within the subtidal sandbank feature measured periodically	No decline in community quality due to changes in species composition or loss of typical species from an established baseline subject to natural processes <i>Baseline is data held on Marine Recorder and EA WFD benthic sampling data</i>	Different associations of plants, animals and their habitat are an important structural and functional aspect of the feature. Changes in the communities present within an area of a particular type of sediment may indicate long-term changes in physical conditions at the site. Typical species of the subtidal sandbanks communities include: <i>Aricidea minuta</i> , <i>Capitella capitata</i> , <i>Diastylis rathkei</i> typical, <i>Eurydice pulchra</i> , <i>Gammarus salinus</i> , <i>Harpinia pectinata</i> , <i>Mediomastus fragilis</i> , <i>Nephtys cirrosa</i> , <i>Nephtys hombergii</i> , <i>Oligochaeta</i> , <i>Pygospio elegans</i> , <i>Pontocrates arenarius</i> , <i>Pseudocuma longicornis</i> , <i>Retusa obtusa</i> , <i>Tubificoides amplivasatus</i>
B5		All sub-features	Sediment character <i>(variety & distribution of sediment types - section 4.1.2.iv of the conservation objectives)</i>	Distribution of sediment types/grain sizes assessed across the site	No major change in composition of sediment type across the feature against an established baseline subject to natural processes <i>Baseline to be established Data to be used is BGS seabed sediment data and other relevant datasets</i>	

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
B6	SAC interest feature 2: Subtidal Sandbanks	All sub-features	Topography <i>(gross morphology – depth distribution and profile of subtidal sandbank feature - section 4.1.2.v of the conservation objectives)</i>	Depth distribution/profile of the sandbank feature measured across the site	No major alteration of topography of the subtidal sandbank feature against an established baseline <i>Baseline to be established Data to be used is Hydrographic Office bathymetric data and other relevant bathymetric datasets</i>	

Table 10 – Favourable condition table for the “intertidal mudflats and sandflats” feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
C1	SAC interest feature 3: Mudflats and sandflats	All sub-features	Extent of the feature <i>(total extent of the mudflats and sandflats feature - section 4.1.3.i of the conservation objectives)</i>	Total area (ha) of the intertidal mudflat and sandflat feature measured periodically during the reporting cycle using a combination of remote sensing and ground truthing of boundaries between communities using GPS (frequency to be determined).	No decrease in extent of intertidal mudflats and sandflats from an established baseline, subject to natural processes. <i>Baseline is aerial photography dated 1999 and CCW/English Nature Intertidal Biotope Surveys 2006. (Note air photo coverage from 1988 gives data for assessing trends in change of this attribute.) Refer also to maps in Appendix 4</i>	Extent is an attribute on which reporting is required by the Habitats Directive. In the long term loss of intertidal mudflat / sandflat communities is likely to be detrimental to the structure of the interest feature, e.g. associated with a change in sediment budget or geomorphological regime, and may indicate long term changes in the physical conditions of the estuaries interest feature. Some fluctuations in extent may occur which are directly attributable to natural coastal processes. These include reduced extent following storms or due to a change to another feature habitat such as saltmarsh. Such types of change in extent would form under the umbrella of ‘natural change’
C2		All sub-features	Extent and variety of the mudflats and sandflats communities comprising each sub-feature <i>(variety and extent of the mudflat and sandflats communities – section 4.1.3.ii of the conservation objectives)</i>	Extent and range of types of intertidal mudflat and sandflat communities assessed along a sampling transect or grid and rapid phase 1 survey techniques using GPS (frequency to be determined).	No decrease in the extent or range of types of intertidal mudflat and sandflat communities from an established baseline, subject to natural processes <i>Baseline is CCW/English Nature Intertidal Biotope Surveys 2006.</i>	Intertidal mudflat and sand flat feature comprises three sub-features: Intertidal gravel and clean sand communities <ul style="list-style-type: none"> • Barren coarse sand shores; • Burrowing amphipods and <i>Eurydice pulchra</i> in well drained clean sand shores; • Burrowing amphipods and polychaetes in clean sand shores. • Talitrid amphipods in decomposing seaweed on the strandline • Dense <i>Janice conchilega</i> in tide-swept lower shore sand • Barren shingle or gravel shores Intertidal muddy sand communities <ul style="list-style-type: none"> • Polychaetes and <i>Cerastoderma edule</i> in fine sand or muddy sand shores • <i>Bathyporeia pilosa</i> and <i>Corophium</i> spp. in upper shore slightly muddy fine sand shores • <i>Macoma balthica</i> and <i>Arenicola marina</i> in muddy sand shores. • <i>Arenicola marina</i>, <i>Macoma balthica</i> and <i>Mya arenaria</i> in muddy sand shores. • <i>Echinocardium cordatum</i> and <i>Ensis</i> sp. in lower shore or shallow sublittoral muddy fine sand Intertidal mud communities <ul style="list-style-type: none"> • <i>Hediste diversicolor</i> and <i>Macoma balthica</i> in sandy mud shores • <i>Hediste diversicolor</i>, <i>Macoma balthica</i> and <i>Arenicola marina</i> in muddy sand or sandy mud shores • <i>Hediste diversicolor</i>, <i>Macoma balthica</i> and <i>Mya arenaria</i> in sandy mud shores • <i>Hediste diversicolor</i> and <i>Scrobicularia plana</i> in reduced salinity mud shores • <i>Hediste diversicolor</i> and oligochaetes in low salinity mud shores

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
C3	SAC interest feature 3: Mudflats and sandflats	All subfeatures	Distribution of mudflats and sandflats communities (distribution of communities - section 4.1.3.iii of the conservation objectives)	Spatial distribution of mudflat and sandflat communities assessed along a sampling transect or grid and rapid phase 1 survey techniques using GPS (frequency to be determined).	Macro scale distribution of communities should not deviate significantly from an established baseline, subject to natural processes. <i>Baseline is CCW/English Nature Intertidal Biotope Surveys 2006.</i>	Changes in the spatial distribution of biotopes within an area of a particular type of sediment may provide the first indications of long-term changes in physical conditions at the site. Some biotopes occur in a natural cycle linked to the dynamism of the prevailing conditions, and these may naturally appear and disappear over time. The feature should not be considered in unfavourable condition due to the short-term disappearance of such ephemeral biotopes.
C4		All subfeatures	Community composition (community composition of the feature - section 4.1.3.iv of the conservation objectives)	Assessment of community quality through survey of species composition (presence of typical species) within the intertidal mudflats and sandflats feature measured periodically	No decline in community quality due to changes in species composition or loss of typical species from an established baseline, subject to natural processes. <i>Baseline is CCW/English Nature Intertidal Biotope Surveys 2006.</i>	Different associations of plants, animals and their habitat are an important structural and functional aspect of the feature. Changes in the communities present within an area of a particular type of sediment may indicate long-term changes in physical conditions at the site. Typical species of the intertidal mudflats and sandflats communities include: <i>Aphelocheata marioni</i> , <i>Arenicola marina</i> , <i>Bathyporeia pelagica</i> , <i>Corophium volutator</i> , <i>Enchytraeidae</i> , <i>Eurydice pulchra</i> , <i>Hediste diversicolor</i> , <i>Hydrobia ulvae</i> , <i>Macoma balthica</i> , <i>Nephtys cirrosa</i> , <i>Nephtys hombergii</i> , <i>Oligochaeta indet</i> , <i>Pygospio elegans</i> , <i>Scoloplos armiger</i> , <i>Scrobicularia plana</i> , <i>Streblospio shrubsolii</i> , <i>Tubificoides benedii</i>
C5			Topography (Topography and morphology of the intertidal flats -section 4.1.3v of the conservation objectives)	Tidal elevation and intertidal slope, measured along a series of transects across the estuary periodically during the reporting cycle using remote sensing or traditional surveying techniques (transect locations and survey frequency to be determined).	Intertidal profile should not deviate significantly from an established baseline, subject to natural processes. <i>Baseline to be established: Data to be used is Environment Agency LIDAR survey</i>	In the intertidal zone topography reflects the energy conditions and stability of the sediment, which is key to the structure of the interest feature. Topography is a major influence on the distribution of communities throughout the intertidal flats. Assessing topography also provides information on the position of channels through the interest feature.
C6			Sediment character	Particle size analysis (PSA). measured at a series of locations across the estuary. Locations and frequency to be determined	Average PSA parameters should not deviate significantly from an established baseline. <i>Baseline to be established Data to be used CCW/English Nature Intertidal Biotope Surveys 2006, BGS seabed sediment data and other relevant data sources</i>	Parameters include percentage sand / silt / gravel, mean and median grain size, and sorting coefficient, used to characterise sediment type Sediment character defined by particle size analysis is key to the structure of the feature, and reflects all of the physical processes acting on it. Particle size composition varies across the feature and can be used to indicate spatial distribution of sediment types thus reflecting the stability of the feature and the processes supporting it.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
C7	<i>SAC interest feature 3: Mudflats and sandflats</i>			Sediment penetrability (degree of sinking) measured at a series of locations across the estuary (methodology, locations and frequency to be determined).	Average measure should not deviate significantly from an established baseline. <i>Baseline to be established by future survey</i>	Penetrability is an indicator of sediment stability and degree of compaction; it indicates the shear strength of the sediment and thus the susceptibility of that sediment type to erosion. Compaction of the sediment influences the biological community within the sediment. Penetrability of the sediment is determined by a combination of grain size and water content, which may provide a surrogate index of the penetrability of the sediments.
C8				Sediment organic content (% carbon) measured at a series of locations across the estuary (sampling locations and frequency to be determined).	Average organic carbon content should not deviate significantly from an established baseline. <i>Baseline to be established by future survey</i>	Organic content critically influences the infaunal community and can cause deoxygenation of the feature, which can be detrimental to the biota. However, a balance needs to be struck as organic content provides a measure of the material available to detritivores. A reduction in organic content could lead to a reduction in detritivores, with subsequent knock on effects throughout the food chain.
C9				Oxidation - reduction potential (depth of black anoxic layer) measured at a series of locations across the estuary (sampling locations and frequency to be determined).	Average black layer depth should not deviate significantly from an established baseline. <i>Baseline to be established by future survey</i>	Degree of oxidation / reduction, reflecting oxygen availability within the sediment, critically influences the infaunal community and the mobility of chemical compounds. It is an indicator of the structure of the feature.

Table 11 – Favourable condition table for the “Atlantic salt meadows” feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D1	SAC interest feature 4: Atlantic salt meadows	All sub-features	Extent of Atlantic salt meadow (and transitional habitats) feature <i>(extent of Atlantic salt meadow (and transitional habitats) feature - section 4.1.4.i of the conservation objectives)</i>	Total area (ha) of the Atlantic salt meadow feature (and associated transitional habitats) within the site measured periodically during the reporting cycle using a combination of remote sensing and ground truthing of boundaries between communities using GPS (frequency to be determined).	No decrease in total extent of Atlantic salt meadow and associated transitional habitats from the established baseline. <i>Baseline is the CCW/English Nature Saltmarsh NVC survey by Dargie 1998</i> <i>Refer also to maps in Appendix 5</i>	Extent is an attribute on which reporting is required by the Habitats Directive. Monitoring will need to take account of the dynamic nature of these habitats and seasonal and periodic random variations in vegetation types. Coastal squeeze may result in the replacement of Atlantic salt meadows with pioneer saltmarsh. A reduction in extent could be further evaluated by a ground survey to assess for signs of erosion such as toppled vegetation blocks, signs of roots in intertidal mud, signs of stress/damage to plants. Extent needs to be measured at low tide.
D2		All sub-features	Extent of the Atlantic salt meadow communities and associated transitional vegetation communities <i>(extent and distribution of atlantic salt meadow and associated transitional vegetation communities - section 4.1.4.ii of the conservation objectives)</i>	Area (ha) of Atlantic salt meadow and associated transitional vegetation communities within the site measured periodically during the reporting cycle using a combination of remote sensing and ground truthing of boundaries between communities using GPS (frequency to be determined).	No decrease in extent of Atlantic salt meadow and associated transitional vegetation communities from the established baseline subject to natural processes <i>Baseline is the CCW/English Nature Saltmarsh NVC survey by Dargie 1998</i>	Assessment against this target will take account of the effects of the natural process of cyclical development and breakdown of saltmarshes within the Severn which results in the natural succession of saltmarsh communities over time ie the continued presence of all types in proportions reflecting the natural processes operating. Some individual salt marsh communities occur in a natural cycle linked to the dynamism of the prevailing conditions, and these may naturally appear and disappear over time. The feature should not be considered in unfavourable condition due to the short-term disappearance of transient communities. The outcome sought is the maintenance of the general character of the saltmarshes of the Severn in terms of the continued presence, abundance and variation of communities with local differences reflected – it is not to seek the retention of saltmarsh types in situ but to allow them to shift and evolve in line with natural processes The Atlantic salt meadow feature comprises four sub-features: Low to mid marsh communities NVC communities: SM10, SM12, SM13a, SM13b, SM13c, SM13d, SM13x, SM13y, SM14a, SM15. Mid to upper marsh communities NVC communities: SM16a, SM16b, SM16c, SM16d, SM16e, SM16x, SM17, SM18c. Transitional high marsh communities NVC communities: SM23, SM24, SM28, MG11, MG12, MG13, S4a, S21a, S21c. Pioneer saltmarsh communities NVC communities: SM6, SM8, SM9

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D3	SAC interest feature 4: Atlantic salt meadows	All sub-features	Distribution of the Atlantic salt meadow communities and associated transitional vegetation communities <i>(extent and distribution of atlantic salt meadow and associated transitional vegetation communities - section 4.1.4.ii of the conservation objectives)</i>	Spatial distribution of Atlantic saltmeadow and associated transitional vegetation communities measured along a series of fixed transects (or other suitable method to be agreed) periodically during the reporting cycle using GPS (transect locations and frequency of survey to be determined).	<p>The macro scale distribution of communities should not deviate significantly from an established baseline subject to natural processes.</p> <p><i>Baseline is the CCW/English Nature Saltmarsh NVC survey by Dargie 1998</i></p>	<p>The distribution of the Atlantic salt meadow communities refers to the macro spatial pattern in which these are distributed around the estuary. This statement does not require micro-distribution of communities (i.e. the exact mapped positions of specific communities to be maintained) but does require the distribution of some saltmarsh types which reflect the differences in estuary structure and function (eg in outer versus inner parts of the estuary, or the influence of freshwater inputs from the rivers) be taken into account.</p> <p>Consideration of this attribute needs to take account of the wider scale and long-term changes and development of saltmarshes in the Severn Estuary which shows a pattern of episodic erosion and accretion evident in a series of saltmarsh terraces. This attribute is also linked with attributes covering zonation and morphology below.</p>
D4		All sub-features	Extent of <i>Spartina anglica</i> <i>(areas of <i>Spartina anglica</i> - section 4.1.4.viii of the conservation objectives)</i>	Total extent of <i>Spartina anglica</i> measured along a series of transects (or other suitable method to be agreed) around the estuary, periodically during the reporting cycle, using a combination of remote sensing and ground survey (transect locations and frequency of survey to be determined).	<p>No increase in total extent of more than 10% over monitoring period;</p> <p><i>Baseline is the CCW/English Nature Saltmarsh NVC survey by Dargie 1998</i></p>	<p><i>Spartina anglica</i> acts as a pioneer species in the Severn and can undergo succession to other saltmarsh habitats over time. As a consequence, although it may be colonising new areas in one part of the estuary, in others it may be developing into more mixed saltmarsh communities. There will be differences in the density, height and cover of the vegetation depending on where it is in the succession. These changes will need to be monitored to establish a baseline and rates of any gross change. An increase in <i>Spartina</i> at the expense of other saltmarsh could indicate changes in the sediment regime and/or tidal levels both in response to natural or anthropogenic processes. Monitoring will only focus on areas of gross expansion of <i>Spartina</i> into intertidal mudflat and saltmarsh communities.</p>
D5		All sub-features	Zonation of vegetation <i>(zonation of Atlantic salt meadow communities - section 4.1.4.iii of the conservation objectives)</i>	Width of pioneer, low-mid marsh, mid-upper marsh, and transitional high marsh saltmarsh zones, measured along a series of transects (or other suitable method to be agreed) around the estuary, periodically during the reporting cycle, using a combination of remote sensing and ground survey (transect locations and frequency of survey to be determined).	<p>The range of variation of zonation of saltmarsh communities around the estuary should not deviate significantly from an established baseline, subject to natural processes.</p> <p><i>Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998 (and English Nature condition assessment data collected in 2002 for Gloucestershire section of the estuary).</i></p>	<p>Assessment against this target will take account of the effects of the natural process of cyclical development and breakdown of saltmarshes within the Severn which results in the natural succession of saltmarsh communities and changes to the zonation over time. ie the continued presence of all zones in proportions reflecting the natural processes operating.</p> <p>The outcome sought is the maintenance of the general character of the saltmarshes of the Severn in terms of the continued presence and variation of the saltmarsh zones with local differences reflected – it is not to seek the retention of zones in situ but to allow them to shift and evolve in line with natural processes</p>

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D6	SAC interest feature 4: Atlantic salt meadows	Low to mid marsh communities	Species composition <i>(abundance of typical species - section 4.1.4.iv of the conservation objectives)</i>	Frequency of typical species to be measured using methodology to be agreed (e.g. transects, plots etc) once during reporting cycle	Frequency of typical species of characteristic low to mid marsh communities should not deviate significantly from an established baseline. <i>Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998</i>	The typical species for these communities include: <i>Puccinellia maritima, Salicornia spp., Suaeda maritima, Aster tripolium, Spergularia marginata, Glaux maritima, Plantago maritima, Atriplex glabriuscula, Atriplex prostrata, Triglochin maritima, Limonium vulgare, Armeria maritima and Juncus maritimus</i> *This target should not however prevent the enhancement of the diversity of swards where possible eg through the encouragement of a wider range of herbs through relaxation of grazing pressure in heavily grazed areas.
D7		Mid to upper marsh communities	Species composition <i>(abundance of typical species - section 4.1.4.iv of the conservation objectives)</i>	Frequency of typical species to be measured using methodology to be agreed (e.g. transects, plots etc) once during reporting cycle	Frequency of typical species of characteristic mid to upper marsh communities should not deviate significantly from an established baseline. <i>Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998</i>	The typical species for these communities include : <i>Puccinellia maritima, Aster tripolium, Glaux maritima, Plantago maritima, Festuca rubra, Juncus gerardii, Triglochin maritima, , Agrostis stolonifera, Juncus maritimus , Spergularia marginata, Parapholis strigosa, Elymus pycnanthus,, Hordeum secalinum, Trifolium fragiferum and Atriplex glabriuscula,</i> *(see note above)
D8		Transitional high marsh communities	Species composition <i>(abundance of typical species - section 4.1.4.iv of the conservation objectives)</i>	Frequency of typical species to be measured using methodology to be agreed (e.g. transects, plots etc) once during reporting cycle	Frequency of typical species of characteristic high marsh communities should not deviate significantly from an established baseline. <i>Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998</i>	The typical species for these communities include: <i>Puccinellia distans, Puccinellia maritima, Puccinellia rupestris, Plantago coronopus, Parapholis strigosa, Atriplex glabriuscula, Spergularia marina, Festuca rubra, Agrostis stolonifera, Aster tripolium, Hordeum secalinum, Elymus pycnanthus, Elymus repens, Potentilla anserina, Lolium perenne, Alopecurus geniculatus, Phragmites australis, Bolboschoenus maritimus, Festuca arundinacea,</i> *(see note above)
D9		Pioneer saltmarsh communities	Species composition <i>(abundance of typical species - section 4.1.4.iv of the conservation objectives)</i>	Frequency of typical species to be measured using methodology to be agreed (e.g. transects, plots etc) once during reporting cycle	Frequency of typical species of characteristic pioneer marsh communities should not deviate significantly from an established baseline. <i>Baseline is CCW/English Nature Saltmarsh NVC survey by Dargie 1998</i>	The typical species for these communities include : <i>Spartina anglica, Salicornia sp, Suaeda maritima</i>

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D10	SAC interest feature 4: Atlantic salt meadows		Abundance of locally occurring scarce and notable plant species <i>(abundance of notable species - section 4.1.4v of the conservation objectives)</i>	Number of discrete locations within the estuary where scarce and notable species are found and their abundance at each location.	No decrease in abundance of scarce and notable species from an established baseline. <i>Baseline : CCW/English Nature saltmarsh rare/scarce plant survey by Dargie 1998</i> <i>Individual county based records from plant recorders/record centres</i>	Nationally scarce and notable species within the Atlantic salt meadow and associated transitional vegetation communities comprise: Nationally scarce species: <i>Alopecurus bulbosus, Althaea officinalis, Bupleurum tenuissimum, Hordeum marinum, Trifolium squamosum, Puccinellia rupestris, Polygonum raii.</i> Other notable species occurring: <i>Allium oleraceum, Lepidium latifolium, Petroselinum segetum</i> Note that some of the nationally scarce and notable plants require levels of ground disturbance (resulting in openings in the sward) to establish. Localised tight grazing and /or poaching may provide sward openings for such species as well as the wider range of herbs and unless widespread and persistent should not necessarily regarded as a problem.
D11		All sub-features	Sward structure <i>(structural variation of the salt marsh sward - section 4.1.4 vi of the conservation objectives)</i>	Sward height of Atlantic salt meadow communities measured periodically during the reporting cycle in late summer using a combination of remote sensing and field visits.	The extent and distribution of vegetation communities exhibiting different sward heights should not deviate significantly from an established set of limits. The limits will be defined to ensure that the requirements of the typical and notable plants species and birds species designated within the Severn Estuary SPA and Ramsar, can be met <i>Baselines are to be established from Nature Conservancy Council SSSI owner/occupier consent records dating from 1988 Severn Estuary SSSI notification (and subsequent consent reviews)</i> <i>CCW and EN/NE site monitoring records</i>	Vegetation structure is largely affected by the impact of grazing (of wild or domesticated herbivores) interacting with different vegetation communities and ground hydrological conditions. Not all Atlantic salt meadow within the Severn Estuary is grazed, but it is a widespread and long established practice and stocking levels need to be appropriate to the interest of the site. Over grazing can lead to a loss of structural diversity of rare plant species and affect bird use of these habitats while under grazing can lead to a loss of plant diversity by competitive exclusion. Introduction of grazing to previously ungrazed sites can result in deleterious changes to plant community composition and its value for wider conservation interests such as invertebrates. Note that some of the nationally scarce and notable plants require levels of ground disturbance (resulting in openings in the sward) to establish. Localised tight grazing and /or poaching may provide sward openings for such species as well as the wider range of herbs and unless widespread and persistent should not necessarily regarded as a problem. Disturbance is also provided in areas where natural tidal debris accumulates scattered across the salt marsh and in driftlines (often at the base and on the seaward slope of the floodbank). As well as providing seed establishment points for scarce plants the debris also plays a role in creating variation in sward structure particularly in the mid/upper and transition high marsh zones and in supporting important populations of invertebrates (notable deadwood beetles). The continued presence of tidal debris and driftlines in some locations is therefore a desirable aspect of the saltmarsh management which delivers this attribute . They may also be of value for the bird populations which roost and feed on saltmarshes of the SPA and Ramsar Site. (see sections 4.2 and 4.3)

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
D12	SAC interest feature 4: Atlantic salt meadows		Morphology <i>(characteristic stepped morphology and associated structural features - section 4.1.4.vii of the conservation objectives)</i>	Location and extent of established morphological features (saltmarsh terracing, creeks, pills, drainage ditches and pans) measured during the reporting cycle using remote sensing and field survey	No anthropogenic alteration of established morphological features from an established baseline. <i>Baselines is taken from 1999 air photos , CCW/English Nature Saltmarsh NVC survey by Dargie 1998 and English Nature condition assessment data collected in 2002 for Gloucestershire section of the estuary.</i>	This target relates to features which have developed naturally as a result of the evolution of the saltmarshes or the presence of freshwater drainage systems entering the estuary and which have established conservation value (eg pill sides of value botanically, pills used for shelter, feeding and roosting by birds). The baseline dataset will establish the location and extent of these features and identify man made features which do not need to meet this target.

Table 12 – Favourable condition table for the “reefs” feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
E1	SAC interest feature 4: Reefs		(Total) Extent and distribution <i>(total extent and distribution of reef - section 4.1.5.i of the conservation objectives)</i>	<p>Measurement of the extent and distribution of the purely subtidal part of this feature in the Severn Estuary is challenging. Remote sensing methods (such as side scan sonar) and drop down video are unreliable in these conditions. Therefore limited grab sampling may be required.</p> <p>Measurement of the subtidal component at the subtidal/intertidal interface may be possible by direct observation at very low tides.</p> <p>Extent and distribution of the intertidal <i>Sabellaria</i> reef measured using Phase 1 mapping survey techniques</p>	<p>No reduction in the extent and distribution of the reef from an established baseline</p> <p><i>Baseline is comprised of grab sampling surveys by Mettam 1988 supplemented by Environment Agency data 1999 and data from Warwick et al.2001 which provide subtidal reef records.</i></p> <p><i>CCW/English Nature Intertidal Biotope Surveys 2006 identify the distribution of intertidal Sabellaria alveolata and indication of locations for further survey for subtidal Sabellaria contiguous with these intertidal areas.</i></p>	<p>Known occurrences of subtidal and subtidal contiguous with intertidal reefs are largely limited to the outer parts of the estuary (area seaward of a line drawn between Portishead and Newport). See appendix 6. Samples show that reef formation is not continuous within this area and is in varying stages of growth. Further work is required to establish the distribution of this feature particularly with respect to the subtidal and the intertidal/subtidal interface.</p> <p>A further upstream zone of intertidal <i>Sabellaria</i> populations is recorded up to the old Severn Bridge (Beachley to Aust) . While not part of the reef feature the extent of solely intertidal <i>Sabellaria</i> is relevant as these areas will also contribute larvae to the estuary wide populations of this species.</p> <p>The populations of <i>Sabellaria</i> within the Severn (subtidal, and intertidal) should be regarded as a metapopulation.</p> <p>New technologies that may allow the measurement of <i>Sabellaria</i> reef in a non destructive way should be investigated if they present themselves.</p>
E2			Community composition <i>(community composition - section 4.1.5.ii of the conservation objectives)-</i>	<p>Measurement of the community composition of this feature in the Severn Estuary is challenging. Remote sensing methods (such as side scan sonar) and drop down video are difficult. Therefore limited grab sampling may be required.</p>	<p>New samples of reef show no significant decline in community composition from baseline records</p> <p><i>Baseline is survey by Mettam 1988 supplemented by Environment Agency data 1999 and data from Warwick et al.2001</i></p>	<p>The reefs feature comprise two communities :</p> <p><i>Sabellaria alveolata</i> on variable salinity sublittoral mixed sediment SS.SBR.PoR.SalvMx</p> <p><i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock. LS.LBR.Sab.Salv</p> <p>The typical species associated with subtidal and intertidal reefs in the Severn Estuary, derived from known samples, are listed in section 4.15.1 note 4</p>

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
E3	SAC interest feature 4: Reefs		Age structure <i>(full range of age structures - section 4.1.5.iii of the conservation objectives)</i>	Measurement of the community composition of this feature in the Severn Estuary is challenging. Remote sensing methods (such as drop down video) are difficult. Therefore limited grab sampling may be required.	Different phases from newly settled worms through vigorous fast growing reef to older hummocks are present <i>Baseline yet to be established.</i>	<i>Sabellaria alveolata</i> reefs cycle through different phases from newly settled worms through vigorous fast-growing reef to older hummocks. In a stable or increasing population all age phases are likely to be present . The presence of areas of variable stages of growth is important in ensuring larval supply and also enhances the species diversity of the reef
E4			Physical & ecological processes <i>(physical and ecological processes - section 4.1.5.iv of the conservation objectives)</i>	Abundance of coarse sediments Presence of suitable sediment grades in subtidal and intertidal sediments within the defined reefs zone (see comment on extent and distribution above) measured periodically.	No change in the abundance of suitable sediment grades within the defined reefs zone against an established baseline <i>Baseline yet to be established.</i>	An abundance of suitable coarse sediments (0.5-1mm sand) are required to support reef growth (tube building)
E5				Availability of suitable substrates Extent of available suitable (hard or long-term consolidated) substrates within the defined reef zone measured periodically	No change in overall extent of available suitable substrates within the defined reefs zone against an established baseline <i>Baseline yet to be established – data from the BGS and the CCW/English Nature intertidal biotope survey 2006 may assist</i>	Within the Severn reefs have been recorded both on solid geology and on smaller rocks and cobbles.
E6				Supply of larvae Abundance of <i>Sabellaria</i> larvae within the water column measured through plankton sampling	No decrease in the abundance of <i>Sabellaria</i> larvae against an established baseline <i>Baseline yet to be established – data may be available from existing plankton sampling surveys</i>	Area of sampling for this attribute should include both the reef zone and areas where intertidal populations are known as all areas supporting <i>Sabellaria alveolata</i> formations will be supplying larvae to the water column and hence may seed the reef feature. Recruitment is likely to be variable between years.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
E7				Abundance of food in water column Methods to be determined .	No decrease in the abundance of suspended detritus within the water column of the defined reef zone against an established baseline <i>Baseline yet to be established</i>	Area of sampling of the water column should include both the reef zone and intertidal populations (the estuary-wide metapopulation of <i>Sabellaria alveolata</i>)

Table 13 – Favourable condition table for the “river lamprey” and “sea lamprey” features of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
F1	SAC interest feature 5: River lamprey <i>Lampetra fluviatilis</i> and SAC interest feature 6: Sea lamprey <i>Petromyzon marinus</i>		Migratory access (Barriers to migration) (migratory passage not impeded - sections 4.1.6.i and 4.1.7.i of the conservation objectives)	Water quality measured regularly throughout the reporting cycle in the Bristol Channel, Severn Estuary, River Wye SAC, River Usk SAC and River Severn. (see also Table 8, lines A17-20 relating to general water quality requirements for the estuary feature (and dependant sub features))	Water quality is sufficient to support migratory passage. Levels (for temperature, salinity, turbidity, pH, and dissolved oxygen) should comply with targets established under the EA Review of Consents and the Water Framework Directive. Baseline is water quality sampling data collected by the Environment Agency	Significant variation in these physico-chemical parameters may act as barriers to migration. For example, the timing, duration and consistency of their upstream migration are believed to be closely related to temperature changes as well as pheromone triggers from the juveniles during periods of high water flow. Peak migration usually coincides with river temperatures that remain above 10°C and continues until temperatures reach 18°C. Dissolved oxygen can also be significantly reduced in stretches receiving significant BOD inputs, or through the re-suspension of organic rich sediments. Toxic contaminants may act as a barrier to migration. Environmental Quality Standards (EQSs) are set for dangerous substances as defined under the Dangerous Substances Directive or Government Policy for freshwater and marine environments
F2				Water flows measured regularly throughout the reporting cycle (frequency to be determined) in the River Wye SAC, River Usk SAC and River Severn (see also Table 8 line A3 relating to general tidal and water flow requirements for the estuary feature (and dependant sub features))	Flows from the river into the estuary must be sufficient to allow migration. Baseline is water flow sampling data collected by the Environment Agency provides a baseline. Severe low flow conditions that affect these species yet to be defined	
F3				Physical barriers Mapping and quantification of potential obstructions in relation to height, type and water depth below obstruction once during the reporting cycle.	No artificial barriers significantly impairing, adults from reaching existing and historical spawning grounds, or juveniles from moving downstream. Baseline is the Environment Agency data on structures and flood defences	Dams, navigation and other weirs may prevent lamprey from reaching their spawning grounds. In particular, sea lamprey is known to be poor at ascending obstacles.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
F4	SAC interest feature 5: River lamprey <i>Lampetra fluviatilis</i> and SAC interest feature 6: Sea lamprey <i>Petromyzon marinus</i>		Population size (returning adults) (size of populations - sections 4.1.6.ii and 4.1.7.ii of the conservation objectives)	Number of returning adults measured using fish counters on the feeding rivers (Wye, Usk and Severn) during the migratory period.	No decline in number of returning adults from established baseline. <i>Baseline is yet to be established - fish counter data may be able to provide a baseline in future years.</i>	(Note that this attribute will not be able to be measured until the technological solutions are developed.) Fish counter technology is being developed to monitor adult lampreys but is not yet installed on the feeding rivers of the Severn Estuary. Fish counter technology should be further developed to monitor migrating adult river and sea lamprey.
F5			Ammocoete population in tributary rivers (size of populations - sections 4.1.6.ii and 4.1.7.ii of the conservation objectives)	Electrofishing surveys in 1m ² quadrats at a series of locations in the Rivers Usk, Wye (and Severn)	River population targets for the Usk and Wye must be met <i>Baseline is the survey of ammocoete abundance and distribution in the Rivers Usk and Wye commissioned by CCW in 2005 (Harvey et al. 2007).</i>	(Note that this attribute will not be able to be measured until the technological solutions are developed.) During the electrofishing survey all ammocoetes should be identified as <i>Lampetra</i> or <i>Petromyzon</i> and measured (mm). Surveys should be undertaken at the earliest in July but preferably between August and October. The rivers fauna CSM state three targets which must be met for the population attribute. These are; 1. Ammocoete population age structure For samples of 50 ammocoetes or less, at least 2 distinct size classes should normally be present. If more than 50 ammocoetes are collected, at least 3 size classes should be present. 2. Ammocoete distribution within catchment Lampreys should be present at not less than 2/3 of sites surveyed. 3. Ammocoete density; a. For <i>lampetra</i> ; Optimal habitat >10m ⁻² Overall catchment mean >5m ⁻² b. For sea lamprey - Ammocoetes should be present in at least sampling sites each not less than 5km apart

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
F6			Prey species <i>(abundance of prey species - sections 4.1.6.iii and 4.1.7.iii of the conservation objectives))</i>	The abundance of key prey species measured periodically	No significant reduction in abundance of key prey species against an established baseline <i>Baseline is yet to be established Data to be used is EA monitoring of river and fish populations and future surveys</i>	River and sea lamprey require a variety of other fish species to act as hosts throughout their lifecycle. Their principal host species are part of the estuarine fish assemblage which has measures and targets included within the “estuaries” feature – Table 8

Table 14 – Favourable condition table for the “twaite shad” feature of the Severn Estuary SAC

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
G1	SAC interest feature 7: Twait shad (<i>Alosa fallax</i>)		Migratory access (Barriers to migration) (migratory passage not impeded - section 4.1.8.i of the conservation objectives)	Water quality measured regularly throughout the reporting cycle in the Bristol Channel, Severn Estuary, River Wye SAC, River Usk SAC and River Severn. (see also Table 8 line A 17-20 relating to general water quality requirements for the estuary feature (and dependant sub features))	Water quality is sufficient to support migratory passage. Levels (for temperature, salinity, turbidity, pH, and dissolved oxygen) should comply with targets established under the EA Review of Consents and the Water Framework Directive. <i>Baseline is water quality sampling data collected by the Environment Agency</i>	Significant variation in these physico-chemical parameters may act as barriers to migration. For example, the timing, duration and consistency of their upstream migration are believed to be closely related to temperature changes . Peak migration usually coincides with river temperatures that remain above 10°C and continues until temperatures reach 18°C. Dissolved oxygen can also be significantly reduced in stretches receiving significant BOD inputs, or through the resuspension of organic rich sediments. Toxic contaminants may act as a barrier to migration. Environmental Quality Standards (EQSs) are set for dangerous substances as defined under the Dangerous Substances Directive or Government Policy for freshwater and marine environments.
G2				Water flows measured regularly throughout the reporting cycle (frequency to be determined) in the River Wye SAC, River Usk SAC and River Severn (see also Table 8 line A3 relating to general tidal and water flow requirements for the estuary feature (and dependant sub features))	Flows from the river into the estuary must be sufficient to allow migration <i>Baseline is water flow sampling data collected by the Environment Agency provides a baseline. Severe low flow conditions that affect these species yet to be defined</i>	
G3				Physical barriers Mapping and quantification of potential obstructions in relation to height, type and water depth below obstruction once during the reporting cycle.	No artificial barriers significantly impairing, adults from reaching existing and historical spawning grounds, or juveniles from moving downstream. <i>Baseline is Environment Agency data on structures and flood defences</i>	Dams, navigation and other weirs may prevent shad reaching their spawning grounds. In particular, shad are known to be poor at ascending obstacles.

Ref	SAC Interest Feature	Sub-feature	Attribute	Measure	Target	Comments
G4	SAC interest feature 7: Twaite shad (<i>Alosa fallax</i>)		Population size (returning adults) <i>(size of populations - section 4.1.8.ii of the conservation objectives)</i>	Number of returning adults measured using fish counters on the Usk and Wye rivers during the migratory period.	No drop in the annual run size greater than would be expected from variations in natural mortality alone. <i>Baseline is yet to be established - fish counter data may be able to provide a baseline in future years. Noble et al. (2007) provides historical information on returning adults for the River Wye.</i>	(Note that this attribute will not be able to be measured until the technological solutions are developed.) Fish counter technology is being developed to monitor adult shad but is not yet installed on the feeding rivers of the Severn Estuary. Fish counter technology should be further developed to monitor migrating adult shad.
G5			River population <i>(size of populations - section 4.1.8.ii of the conservation objectives)</i>	Seine netting for juveniles in the lower rivers and upper estuaries and monitoring of shad eggs by kick sampling	River population targets for the Usk and Wye must be met <i>Baseline yet to be established. Noble et al. (2007) provides some information on juvenile densities.</i>	(Note that this attribute will not be able to be measured until the technological solutions are developed.) Seine netting should occur in lower rivers and upper estuaries. Netting should be carried out in late summer early autumn (July-October). For each river, juvenile densities should exceed a specified minimum target at least two years in six. The extent of spawning should be monitored by kick sampling for eggs at a proportion of known spawning sites. A reduction in the spawning distribution of more than 50 % compared with the baseline will indicate an adverse change. Kick sampling should occur during May and June.
G6			Prey species <i>(abundance of prey species – section 4.1.8.iii of the conservation objectives))</i>	The abundance of key prey species measured by EA in their routine monitoring of the rivers and estuary	No significant reduction in abundance of key prey species against an established baseline <i>Baseline is yet to be established through fish surveys in estuary and rivers</i>	Twaite shad require a variety of invertebrates including crustacean, mysids and copepods, small fish and fish eggs particularly in that section of the estuary where saline and freshwaters meet.

4.2 Conservation objectives for SPA European Marine Site interest features

The protection and management of the SPA in accordance with Article 6 of the Habitats Directive, including in particular the consideration of plans and projects under Article 6(3) and 6(4), should be carried out in view of the conservation objectives in this section.

Note : The conservation objectives for areas of the SPA which lie outside the European Marine Site boundary are provided in separate documents by CCW and Natural England which are currently in preparation and will soon be available on request.

4.2.1 SPA Interest feature 1: Internationally important population of regularly occurring Annex 1 species : Bewick's swan

The conservation objective is to maintain the Bewick's swan population and its supporting habitats¹ in **favourable condition**, as defined below

The interest feature Bewick's swan will be considered to be in favourable condition when, subject to natural processes², each of the following conditions are met:

- (i) the 5 year peak mean population size for the Bewick's swan population is no less than 289 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);
- (ii) the extent of saltmarsh at the Dumbles (Appendix 8: Map 1) is maintained;
- (iii) the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose (Appendix 8: Map 1) is maintained;
- (iv) the extent of vegetation with an effective field size of >6 ha and with unrestricted bird sightlines > 500m at feeding, roosting and refuge sites (Appendix III) are maintained;
- (v) greater than 25% cover of suitable soft leaved herbs and grasses³ in winter season throughout the transitional saltmarsh at the Dumbles (Appendix 8: Map 1) is maintained;
- (vi) aggregations of Bewick's swan at feeding, roosting and refuge sites are not subject to significant disturbance.

4.2.1.1 Explanatory information for the Bewick's swan conservation objective

¹ Key supporting habitats for the Annex I species

- Intertidal mudflats and sandflats
- Saltmarsh

² Natural processes in respect of the SPA

Each interest feature is subject to both natural processes and human influences. Human influence on the interest features is acceptable provided that it is compatible with the achievement of the conditions set out under the definition of favourable condition for each interest feature. A failure to meet these conditions which is entirely a result of natural processes will not constitute unfavourable condition, but will trigger a review of the definition of favourable condition. This qualification is necessary because:

- (a) the bird populations themselves are subject to natural factors, many of which arise outside the SPA, such as breeding success and winter temperatures;

(b) the supporting habitats of the birds are influenced by the evolution of the estuary. Natural adjustments within estuaries can take many forms. One important example is the tendency of estuaries to accumulate sediment, thereby changing their form from their original Holocene morphology to a state where tidal energy is dissipated by subtidal and intertidal sediment banks or features. This, with other natural processes, will therefore cause the width and depth of the estuary to change over time, moving towards a state of dynamic equilibrium or 'most probable state'. As part of this process, the location and extent of saltmarshes and mudflats may change, provided there is capacity to accommodate readjustment. However, where this process is constrained, the capacity of habitats to accommodate readjustment may be affected.

³Key food plants of Bewick's swan

eg *Agrostis stolonifera*, *Alopecurus geniculatus*, *Glyceria geniculatus*. (This list contains examples and is not exhaustive)

4.2.2 SPA interest feature 2: Internationally important population of regularly occurring migratory species: wintering European white-fronted goose

The conservation objective is to maintain the European white-fronted goose population and its supporting habitats¹ in **favourable condition**, as defined below.

The interest feature European white-fronted goose will be considered to be in favourable condition² when, subject to natural processes², each of the following conditions are met:

- (i) the 5 year peak mean population size for the wintering European white fronted goose population is no less than 3,002 individuals (ie the 5 year peak mean between 1988/9-1992/3);
- (ii) the extent of saltmarsh at the Dumbles (Appendix 8: Map 1) is maintained;
- (iii) the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose (Appendix 8: Map 1) is maintained;
- (iv) greater than 25% cover of suitable soft-leaved herbs and grasses³ is maintained during the winter on saltmarsh areas (Appendix 8: Map 1);
- (v) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;
- (vi) aggregations of European white-fronted goose at feeding or roosting sites are not subject to significant disturbance.

4.2.2.1 Explanatory information for the wintering European white-fronted goose objective

¹Key supporting habitats for the migratory bird species

- Intertidal mudflats and sandflats
- Saltmarsh

²Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.2.1.1**.

³Key food plants of European white-fronted goose

eg *Alopecurus bulbosus*, *Festuca rubra*, *Hordeum marinum*, *Lolium perenne*; *Puccinellia maritima*.
(This list contains examples and is not exhaustive)

4.2.3 SPA interest feature 3: Internationally important population of regularly occurring migratory species: wintering dunlin

The conservation objective is to maintain the dunlin population and its supporting habitats¹ in **favourable condition**, as defined below:

The interest feature dunlin will be considered to be in favourable condition when, subject to natural processes², each of the following conditions are met:

- (i) the 5 year peak mean population size for the wintering dunlin population is no less than 41,683 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);
- (ii) the extent of saltmarsh (Appendix 8) and associated strandlines is maintained;
- (iii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;
- (iv) the extent of hard substrate habitats (Appendix 8) is maintained;
- (v) the extent of vegetation with a sward height of <10cm is maintained throughout the saltmarsh (Appendix 8);
- (vi) the abundance and macro-distribution of suitable invertebrates³ in intertidal mudflats and sandflats (Appendix 8) is maintained;
- (vii) the abundance and macro-distribution of suitable invertebrates³ in hard substrate habitats (Appendix 8) is maintained;
- (viii) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;
- (ix) aggregations of dunlin at feeding or roosting sites are not subject to significant disturbance.

4.2.3.1 Explanatory information for the wintering dunlin objective

¹Key supporting habitats for the migratory bird species

- Intertidal mudflats and sandflats
- Saltmarsh
- Hard substrate habitats (rocky shores)

²Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.2.1.1**.

³Key intertidal invertebrate prey species of dunlin

eg *Carcinus*, *Crangon*, *Hydrobia*, *Macoma*, *Hediste*, and *Talitrus* spp.
(This list contains examples and is not exhaustive)

4.2.4 SPA interest feature 4: Internationally important population of regularly occurring migratory species: wintering redshank

The conservation objective is to maintain the redshank population and its supporting habitats¹ in **favourable condition**, as defined below

The interest feature redshank will be considered to be in favourable condition when, subject to natural processes² each of the following conditions are met:

- (i) the 5 year peak mean population size for the wintering redshank population is no less than 2,013 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);
- (ii) the extent of saltmarsh (Appendix 8) and associated strandlines is maintained;
- (iii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;
- (iv) the extent of hard substrate habitats (Appendix IV) is maintained;
- (v) the extent of vegetation with a sward height of <10cm throughout the saltmarsh (Appendix 8) is maintained;
- (vi) the abundance and macro-distribution of suitable invertebrates³ in intertidal mudflats and sandflats (Appendix 8) is maintained;
- (vii) the abundance and macro-distribution of suitable invertebrates³ in hard substrate habitats (Appendix 8) is maintained;
- (viii) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;
- (ix) aggregations of redshank at feeding or roosting sites are not subject to significant disturbance.

4.2.4.1 Explanatory information for the wintering redshank objective

¹Key supporting habitats for the migratory bird species

- **Intertidal mudflats and sandflats**
- **Saltmarsh**
- **Hard substrate habitats (rocky shores)**

²Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.2.1.1**.

³Key intertidal invertebrate prey species of redshank

eg *Carcinus*, *Crangon*, *Hydrobia*, *Macoma*, *Hediste*, and *Talitrus* spp.
(This list contains examples and is not exhaustive)

4.2.5 SPA interest feature 5: Internationally important population of regularly occurring migratory species: wintering shelduck

The conservation objective is to maintain the shelduck population and its supporting habitats¹ in **favourable condition**, as defined below:

The interest feature shelduck will be considered to be in favourable condition when, subject to natural processes², each of the following conditions are met:

- (i) the 5 year peak mean population size for the wintering shelduck population is no less than 2,892 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);
- (ii) the extent of saltmarsh (Appendix 8) is maintained;
- (iii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;
- (iv) the extent of hard substrate habitats (Appendix 8) is maintained;
- (v) the abundance and macro-distribution of suitable invertebrates³ in intertidal mudflats and sandflats (Appendix 8) is maintained;
- (vi) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;
- (vii) aggregations of shelduck at feeding or roosting sites are not subject to significant disturbance.

4.2.5.1 Explanatory information for the wintering shelduck objective

¹Key supporting habitats for the migratory bird species

- Intertidal mudflats and sandflats
- Saltmarsh
- Hard substrate habitats (rocky shores)

²Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.2.1.1**.

³Key intertidal invertebrate prey species of shelduck

eg *Carcinus*, *Corophium*, *Hydrobia*, *Macoma*, *Mytilus*, and *Hediste* spp
(This list contains examples and is not exhaustive)

4.2.6 SPA interest feature 6: Internationally important population of regularly occurring migratory species: wintering gadwall

The conservation objective is to maintain the gadwall population and its supporting habitats¹ in **favourable condition**, as defined below:

The interest feature gadwall will be considered to be in favourable condition when, subject to natural processes², each of the following conditions are met:

- (i) the 5 year peak mean population size for the wintering gadwall population is no less than 330 (ie the 5 year peak mean between 1988/9 - 1992/3);
- (ii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;
- (iii) unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;
- (iv) aggregations of gadwall at feeding or roosting sites are not subject to significant disturbance.

4.2.6.1 Explanatory information for the wintering gadwall objective

¹Key supporting habitats for the migratory bird species

- **Intertidal mudflats and sandflats**

Note : It is currently unclear what use this species is making of the estuary – they are clearly present in intertidal areas particularly around areas freshwater streams and pills enter the estuary. Although primarily freshwater plant feeders they do also take animal material including insects, molluscs, annelids and even small fish and small amphibians – it is possible that they are feeding on such matter in the freshwater influenced mud and sands. Recent evidence indicates this species is changing its general habits as it extends its range westwards. As a result the conservation objective for this species does not include a condition in respect of the key food sources as for other species at this time.

²Natural processes in respect of the SPA

The meaning of ‘natural processes’ is explained in **section 4.2.1.1**.

4.2.7 SPA interest feature 7: Internationally important assemblage of waterfowl

The conservation objective is to maintain the waterfowl assemblage and its supporting habitats¹ in **favourable condition**, as defined below:

The interest feature waterfowl assemblage will be considered to be in favourable condition when, subject to natural processes², each of the following conditions are met:

- (i) the 5 year peak mean population size for the waterfowl assemblage is no less than 68,026 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);
- (ii) the extent of saltmarsh (Appendix 8) and their associated strandlines is maintained;
- (iii) the extent of intertidal mudflats and sandflats (Appendix 8) is maintained;
- (iv) the extent of hard substrate habitats (Appendix 8) is maintained;
- (v) extent of vegetation of <10cm throughout the saltmarsh (Appendix 8) is maintained;
- (vi) the abundance and macroscale distribution of suitable invertebrates³ in intertidal mudflats and sandflats (Appendix 8) is maintained;
- (vii) the abundance and macroscale distribution of suitable invertebrates³ in hard substrate habitats (Appendix IV) is maintained;
- (viii) greater than 25% cover of suitable soft leaved herbs and grasses⁴ during the winter on saltmarsh areas (Appendix 8) is maintained;
- (ix) unrestricted bird sightlines of >500m at feeding and roosting sites are maintained;
- (x) waterfowl aggregations at feeding or roosting sites are not subject to significant disturbance.

4.2.7.1 Explanatory information for the internationally important assemblage of waterfowl

¹Key supporting habitats for the waterfowl assemblage¹

- **Intertidal mudflats and sandflats**
- **Saltmarsh**
- **Hard substrate habitats (rocky shores)**

²Natural processes in respect of the SPA

The meaning of 'natural processes' is explained in **section 4.1.1**.

³Key intertidal invertebrate prey species of the waterfowl assemblage

eg *Arenicola*, *Carcinus*, *Corophium*, *Crangon*, *Gammarus*, *Hydrobia*, *Macoma*, *Hediste*, *Notomastus* and *Talitrus* spp. - these lists are examples and are not exhaustive

⁴Key saltmarsh food plants

eg *Puccinellia maritima*, *Salicornia* spp., *Agrostis stolonifera*, *Atriplex* spp., *Hordeum marinum*, *Festuca rubra*, *Alopecurus bulbosus*, *Lolium perenne* - these lists are examples and are not exhaustive

4.2.8 Favourable Condition Tables for SPA interest features of the Severn Estuary European Marine Site

Background information on the role of favourable condition tables and the information provided in each column is provided in section 1.8 of this document, and a concise glossary of terms used is provided in Section 7.

The favourable condition table is intended to supplement the conservation objectives, including with respect to the management of established and ongoing activities, future requirements of monitoring and reporting on the condition of the features of the site and, together with the conservation objectives, informs the scope and nature of any appropriate assessment that may be needed. The table **does not by itself** provide a comprehensive basis on which to assess plans and projects as required under the Habitats Regulations. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

These tables set out all the attributes that **may** be used to monitor the condition of the features of the SPA. Where possible we will seek available information from others which can inform our assessment process.

It will be possible to monitor many of the attributes at the same time or during the same survey. The frequency of sampling for many attributes may need to be greater during the initial monitoring events in order to characterise the site and establish the baselines. Extreme events (such as storms reducing or increasing salinities, exceptionally cold winters or warm summers) also need to be recorded as they may be critical in influencing ecological issues in the Severn Estuary and may well be missed by routine monitoring.

Comprising :

Table 15 – Favourable condition table for the supporting habitats of the bird interest features in the Severn Estuary SPA

Table 16 – Favourable condition table for the qualifying bird features of the Severn Estuary SPA

Reference should also be made to Tables 8,10 and 11 - Favourable Condition Tables for the SAC habitat features relevant to the supporting habitats (intertidal mudflats and sandflats, saltmarsh and hard substrate habitats (rocky shores)) .

Table 15 Favourable Condition Table for the supporting habitats of the bird interest features in the Severn Estuary SPA European Marine Site (information on the populations of bird species using these habitats are given in Table 4)

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
<i>SPA interest feature 1:</i> Internationally important Annex 1 species: Bewick's swan	Saltmarsh	Habitat extent	Area (ha) measured once per reporting cycle.	At The Dumbles, no decrease in extent from 76 ha.	Saltmarsh provides an important feeding and roosting habitat for Bewick's swans on The Dumbles - saltmarsh/transition wet grassland in front of sea defences.
		Vegetation characteristics	Abundance of suitable soft leaved herbs and grasses - % cover (frequency to be determined)	Greater than 25% cover during the winter season.	Bewick's swans graze on soft wet meadow grasses such as <i>Agrostis stolonifera</i> , <i>Glyceria fluitans</i> and <i>Alopecurus geniculatus</i> which are found in the transition of saltmarsh to grassland.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines. Areas of vegetation with an effective field size of >6ha	Bewick's swan require unrestricted views >500m to allow early detection of predators when feeding and roosting.
	Intertidal mudflats and sandflats	Habitat extent	Area (ha), measured once per reporting cycle.	At Frampton Sands, Waveridge Sands and the Noose, no decrease in extent from 980 ha.	The intertidal mudflats and sandflats at The Noose, Frampton Sand and Waveridge Sand are used as disturbance refuge for Bewick's swan. The extent and distribution of this sub-feature are important to maintain the population in favourable condition.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Bewick's swan require unrestricted views >500m to allow early detection of predators when feeding and roosting.

Table 15 - continued

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
<p><i>SPA interest features 2 - 6:</i> Internationally important populations of regularly occurring migratory species</p> <p>and</p> <p><i>SPA interest feature 7:</i> Internationally important assemblage of waterfowl</p>	Saltmarsh	Habitat extent	Area (ha), measured once per reporting cycle.	<p>No decrease in extent from 1,400 ha.</p> <p>At The Dumbles, no decrease in extent from 76 ha.</p>	Saltmarsh and their communities are important habitats as they provide both roosting and feeding areas.
		Food availability	Presence and abundance of suitable saltmarsh food plants measured periodically (frequency to be determined).	Presence and abundance of suitable saltmarsh food plants should not deviate significantly from an established baseline ¹	European white-fronted geese graze on a range of saltmarsh grasses and herbs. Wigeon feed on well-grazed saltmarsh with <i>Puccinella maritiae</i> , <i>Salicornia</i> and <i>Agrostis</i> . Teal and pintail feed on seeds from <i>Salicornia</i> and <i>Atriplex</i> .
		Vegetation characteristics	Range of vegetation heights measured periodically (frequency to be determined).	Sward height and density throughout areas used for roosting should not deviate significantly from an established baseline ¹ .	Vegetation of <10 cm is required throughout areas used by roosting waders. This is managed by grazing.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

Table 15 - continued

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
<p><i>SPA interest features 2 - 6:</i> Internationally important populations of regularly occurring migratory species</p> <p>and</p> <p><i>SPA interest feature 7:</i> Internationally important assemblage of waterfowl</p>	Intertidal mudflats and sandflats	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 15,000 ha. At Frampton Sands, Waveridge Sands and The Noose no decrease in extent from 980 ha.	Intertidal mudflats and sandflats and their communities are important habitats as they provide both roosting and feeding areas.
		Food availability	Presence and abundance of suitable prey species measured periodically (frequency to be determined).	Presence and abundance of suitable prey species should not deviate significantly from an established baseline. ¹	Most of the waders and waterfowl within the assemblage including the internationally important regularly occurring migratory birds feed on invertebrates within and on the sediments. Diet includes <i>Arenicola</i> , <i>Crangon</i> , <i>Hydrobia</i> , <i>Hediste</i> , <i>Corophium</i> , <i>Macoma</i> , <i>Gammarus</i> , small molluscs and strandline plankton and seeds.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.
	Shingle and rocky shores	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 1,500 ha.	This habitat is used for feeding and roosting, particularly by waders.
		Food availability	Presence and abundance of suitable intertidal invertebrates, measured periodically (frequency to be determined).	Presence and abundance of suitable food species should not deviate significantly from an established baseline ¹	Waders feed on worms, crustaceans and molluscs.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

¹ Baselines to be established

Table 16 Favourable Condition Table for the qualifying bird features in the Severn Estuary European Marine Site

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
<i>SPA interest feature 1:</i> Internationally important Annex 1 species: Bewick's swan		Population size	5 year peak mean number of individuals	No less than 289 individuals [ie the 5 year peak mean between 1988/9 - 1992/3]	Mainly found in the Upper Severn Estuary at Slimbridge
		Proportion of biogeographic population	% of NW European population	1 % of NW European population	WeBS counts provide this information
		Distribution	Number and location of sectors occupied at low tide	No decrease in use of the number of sectors and their distribution established as baseline ¹	WeBS low tide counts display distribution information by sector (not annual counts) Birds use certain sectors to a greater or lesser degree from year to year
		Disturbance in feeding and roosting areas	Reduction or displacement of wintering birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline ¹	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure. Five year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.
<i>SPA interest features 2 - 6:</i> Internationally important populations of regularly occurring migratory species and <i>SPA interest feature 7:</i> Internationally important assemblage of waterfowl		Population size	5 year peak mean number of individuals	No less than 68,026 individuals in the assemblage [ie the 5 year peak mean between 1988/9 - 1992/3] For individual species - no less than the 5 year peak mean between 1988/9 - 1992/3 detailed in Table 4	Figures derived from WeBS counts. The 5 year peak means for this period for each of the internationally important populations and species with nationally important populations which make up the internationally important assemblage are detailed in Table 4
		Distribution	Number and location of sectors occupied at low tide	No decrease in use of the number of sectors and their distribution established as baseline ¹	In some years birds use certain sectors to a greater or lesser degree. WeBS low tide counts display distribution information by sector (not annual counts).

SPA interest feature	Supporting Habitat	Attribute	Measure	Target	Comments
		Disturbance in feeding and roosting areas.	Reduction or displacement of wintering birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline ¹ .	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure. Five year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.

¹ Baselines to be established

4.3 Conservation objectives for the Severn Estuary / Môr Hafren Ramsar Site

The protection and management of the Ramsar in accordance with Article 6 of the Habitats Directive, including in particular the consideration of plans and projects under Article 6(3) and 6(4), should be carried out in view of the conservation objectives in this section.

4.3.1 Ramsar interest feature 1: Estuaries

The conservation objective for the “estuaries” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SAC “estuaries” feature” (refer to section 4.1.1 and Table 8 of this document), in so far as these objectives are applicable to the area designated as Ramsar Site and as defined below.

4.3.1.1 Explanatory information for the Ramsar Site “estuaries” conservation objective

The area of the estuarine ecosystem designated as Ramsar Site is smaller than that of the SAC as it is restricted to the terrestrial and intertidal areas and excludes all subtidal areas. There are therefore aspects of the SAC “estuaries” conservation objective that are not applicable to the Ramsar Site “estuaries” feature. The following Table 17 identifies the limits and restrictions, if any, that apply in respect of the Ramsar Site. The table layout follows the numbering of the SAC “estuaries” objective conditions given in section 4.1.1.

Table 17 - Limits of the Ramsar “estuaries” feature

SAC “estuaries” objective conditions to be met	Limits, if any, of the Ramsar
i. the total extent of the estuary is maintained;	Limited to the lesser area of the Ramsar Site – excludes all subtidal areas - refer also to Appendix 2
ii. the characteristic physical form (tidal prism/cross sectional area) and flow (tidal regime) of the estuary is maintained;	These requirements are related to the estuary regime, structure and function at a whole ecosystem level
iii. the characteristic range and relative proportions of sediment sizes and sediment budget ³ within the site is maintained;	
iv. the extent, variety and spatial distribution of estuarine habitat communities within the site is maintained;	Within the Ramsar Site this is limited to the habitats listed as Ramsar “estuarine habitats communities” ¹ below
v. the extent, variety, spatial distribution and community composition of hard substrate habitats and their notable communities is maintained;	Within the Ramsar Site this is limited to the habitats listed as Ramsar “hard substrate communities” ² below
vi. the abundance of the notable estuarine species assemblages is maintained or increased;	Within the Ramsar Site this is limited to the species listed as Ramsar “notable estuarine species assemblages” ³ below
vii. the physico-chemical characteristics of the water column support the ecological objectives described above;	These requirements apply estuary wide at a whole ecosystem level
viii. Toxic contaminants in water column and sediment are below levels which would pose a risk to the ecological objectives described above.	

¹Ramsar “estuarine habitat communities”

- a. Intertidal mudflats and sandflats (refer also to maps in Appendices 4 and 4a)
 - Intertidal gravel and clean sands
 - Intertidal muddy sands
 - Intertidal muds

- b. Saltmarshes (equivalent to the Atlantic saltmeadows feature of the SAC) (refer also to maps in Appendices 5 and 5a)
- Low – mid marsh communities
 - Mid – upper marsh communities
 - Transitional high marsh communities
 - Pioneer marsh communities

²Ramsar “hard substrate communities”

These include all hard substrate (rocky shore) communities within the Ramsar Site boundary shown in the map in Appendix 7 which includes the following notable communities:

- *Sabellaria alveolata* reefs on sand-abraded eulittoral rock (MLR.Sab Salv) *
- *Hydroids, ephemeral seaweeds and Littorina littorea* in shallow eulittoral mixed substrata pools. (LR.RkpH)
- *Balanus crenatus* and *Tubularia indivisa* on extremely tide-swept circalittoral rock ECR.BS.BalTub)
- *Fucus serratus* and piddocks on lower eulittoral soft rock (MLR.Fser.Pid)
- *Mytilus edulis* and piddocks on eulittoral firm clay (MLR.MytPid)
- *Balanus crenatus*, *Halichondrea panicea* and *Alcyonidium diaphanum* on extremely tide-swept sheltered circalittoral rock (ECR.BalHpan) .
- *Sertularia cupressina* and *Hydrallmania falcate* on tide-swept sublittoral cobbles or pebbles in coarse sand (IGS.ScupHyd).
- *Corralina officinalis* and coralline crusts in shallow eulittoral rockpools (LR.Rkp.Cor)
- Eel grass (*Zostera*) beds
- Any other notable hard substrata communities that may be identified.

*Note : where this community is contiguous with the occurrence of subtidal *Sabellaria alveolata* reefs it forms part of the SAC reefs feature. Within the Ramsar it is regarded as a component of the hard substrates subfeature of the Ramsar estuaries feature .

³Ramsar “notable estuarine species assemblages”

- i. Assemblage of fish species:
- Migratory species
 - River and Sea Lamprey and Twaité shad and Allis shad
 - Sea trout, salmon, eel,
 - Estuarine species
 - Species typically occurring and breeding in estuaries (Bird, 2008)
 - Marine species occurring in large numbers in estuaries (Bird, 2008)
 - Marine species
 - Predominantly marine species occurring infrequently in the Severn (Bird, 2008)
 - Freshwater species
 - Species typically occurring and breeding in freshwater and recorded within the Severn (Bird, 2008)

- ii Assemblage of waterfowl species (refer also to section 4.3.9)

Internationally important populations of waterfowl comprising :

- Regularly occurring Annex 1 species - Bewicks’ swan
- Regularly occurring migratory species - European white-fronted goose, dunlin, redshank, shelduck, and gadwall

Internationally important assemblage of waterfowl comprising above species plus the following :

- Nationally important bird populations - wigeon, teal, pintail, pochard, tufted duck, ringed plover, grey plover, curlew, whimbrel and spotted redshank, lesser black-backed gull

- iii. Assemblage of vascular plant species:

- Salt marsh species (refer to notes 5 and 6 in section 4.1.4.1 - explanatory information on the conservation objective for the Atlantic salt meadows feature)
- Eel grass (*Zostera*) species.

4.3.2 Ramsar interest feature 2: Assemblage of migratory fish species¹

The conservation objective for the “assemblage of migratory fish species” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes², each of the following conditions are met:

- i. the migratory passage of both adults and juveniles of the assemblage of migratory fish species through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;
- ii. the size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;
- iii. the abundance of prey species³ forming the principle food resources for the assemblage species within the estuary, is maintained.
- iv. Toxic contaminants in the water column⁴ and sediment are below levels which would pose a risk to the ecological objectives described above.

The meaning of terms ¹⁻⁴ above is explained in **section 4.3.2.1**

Note : The populations of three of the assemblage species (river lamprey, sea lamprey and twaite shad) are designated as features of the SAC for which separate specific objectives have been written (refer to sections 4.1.6 to 4.1.8 of this document). The populations of these species depend on habitat in the adjacent River Usk SAC, River Wye SAC and River Severn. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species’ lifecycle and therefore these features can only be in favourable condition if the conservation objectives pertaining to the River Usk SAC and River Wye SAC are also met in full and there is a continued recorded presence of these species in the River Severn.

4.3.2.1 Explanatory information for the assemblage of migratory fish species conservation objective

¹ Assemblage of migratory fish species

Species which are designated features of the SAC and for which individual conservation objectives have been written (refer to sections 4.1.6, 4.1.7 and 4.1.8)

Sea lamprey *Petromyzon marinus*
River lamprey *Lampetra fluviatilis*
Twaite shad *Alosa. fallax*

Other migratory species in the assemblage

Allis shad *Alosa alosa*
Salmon *Salmo salar*
Sea trout *S. trutta*
Eel *Anguilla anguilla*.

²Natural processes in respect of the Ramsar fish features

Assemblage populations :

The size of the populations is subject to non anthropogenic factors relating to natural fluctuations of external factors such as food / host availability in the Bristol Channel and more widely and breeding success in the River Severn and other rivers draining into the Severn Estuary.

Supporting habitats

The general meaning of ‘natural processes’ with respect to the supporting habitats of the migratory fish assemblage within the estuary is explained in **section 4.1.1.1**.

³Prey species

Assemblage Species	Key prey species
Sea lamprey	Eel <i>Anguilla anguilla</i> , cod <i>Gadus morhua</i> , and haddock <i>Melanogrammus aeglefinus</i> are all potential prey species for the sea lamprey found within the Severn Estuary (Bird 2008)
River lamprey	Sea trout <i>Salmo trutta</i> , shad <i>Alosa fallax/Alosa alosa</i> , herring <i>Clupea harengus</i> , sprat <i>Sprattus sprattus</i> , flounder <i>Platichthys flesus</i> and small gadoids such as whiting <i>Merlangius merlangus</i> and pout <i>Trisopterus luscus</i> are all potential prey species for the river lamprey found within the Severn Estuary (Bird 2008).
Twaite shad	Small crustaceans, especially mysids and copepods, small fish, especially sprats and anchovies, and fish eggs (Maitland, P.S. & Hatton-Ellis 2003).
Allis shad	Small crustaceans, especially mysids and copepods, small fish, especially sprats and anchovies, and fish eggs (Maitland, P.S. & Hatton-Ellis 2003).
Salmon	While at sea, salmon feed on a variety of fish (e.g. herring, sprat, sand eel, mackerel, and various gadoids) and crustaceans (e.g. euphausiid shrimps, prawns, gammarid amphipods and various crabs). (Bird, 2008)
Sea trout	The diet of this species at sea has not been much studied but is believed to include a range of fish species including sprat, young herring and sand eels as well as crustaceans such as amphipods (e.g. Corophium), gammarids, decapods such as Crangon and mysid shrimps. Many of these prey items also occur in estuaries where sea trout are known to feed extensively. (Bird, 2008)
Eel	A range of benthic organisms that include crustaceans and small fish. (Bird, 2008)

⁴Water column

Water column should be read to include contributory water flows into the estuary including surface flows over mudflats and saltmarsh.

4.3.3 Ramsar interest feature 3: Internationally important populations of waterfowl : Bewick's swan

The conservation objective for the “Bewick's swan” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “Bewick's swan ” feature (refer to section 4.2.1)

4.3.4 Ramsar interest feature 4 : Internationally important populations of waterfowl : European white-fronted goose

The conservation objective for the “European white-fronted goose” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “wintering European white-fronted goose” feature (refer to section 4.2.2)

4.3.5 Ramsar interest feature 5: Internationally important populations of waterfowl : dunlin

The conservation objective for the “dunlin” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “wintering dunlin ” feature (refer to section 4.2.3)

4.3.6 Ramsar interest feature 6: Internationally important populations of waterfowl : redshank

The conservation objective for the “redshank” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “wintering redshank” feature (refer to section sections 4.2.4)

4.3.7 Ramsar interest feature 7: Internationally important populations of waterfowl :shelduck

The conservation objective for the “shelduck” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “wintering shelduck” feature (refer to section 4.2.5)

4.3.8 Ramsar interest feature 8: Internationally important populations of waterfowl : gadwall

The conservation objective for the “gadwall” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “wintering gadwall” feature (refer to section sections 4.2.6)

4.3.9 Ramsar interest feature 9: Internationally important assemblage of waterfowl

The conservation objective for the “internationally important assemblage of waterfowl” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA “internationally important assemblage of waterfowl” feature (refer to section sections 4.2.7) – with special reference to the individual species listed and their population figures given in Table 6

Note : This Ramsar Site feature incorporates both wintering and passage populations of some birds and hence some species are included more than once in lists given in Table 6

4.3.10 Favourable Condition Tables for the Ramsar Site interest features of the Severn Estuary European Marine Site

Background information on the role of favourable condition tables and the information provided in each column is provided in section 1.8 of this document, and a concise glossary of terms used is provided in Section 7.

The favourable condition table is intended to supplement the conservation objectives, including with respect to the management of established and ongoing activities, future requirements of monitoring and reporting on the condition of the features of the site and, together with the conservation objectives, informs the scope and nature of any appropriate assessment that may be needed. The table **does not by itself** provide a comprehensive basis on which to assess plans and projects as required under the Habitats Regulations. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

These tables set out all the attributes that **may** be used to monitor the condition of the features of the Ramsar Site. Where possible we will seek available information from others which can inform our assessment process.

It will be possible to monitor many of the attributes at the same time or during the same survey. The frequency of sampling for many attributes may need to be greater during the initial monitoring events in order to characterise the site and establish the baselines. Extreme events (such as storms reducing or increasing salinities, exceptionally cold winters or warm summers) also need to be recorded as they may be critical in influencing ecological issues in the Severn Estuary and may well be missed by routine monitoring.

Comprising :

Table 18 – Favourable condition table for the “estuaries” feature of the Severn Estuary Ramsar Site

Table 19 – Favourable condition table for the migratory fish assemblage of the Severn Estuary Ramsar Site

Table 20 – Favourable condition table for the supporting habitats of the bird interest features (Ramsar features 3 to 9) in the Severn Estuary Ramsar Site

Table 21 – Favourable condition table for the qualifying bird interest features in the Severn Estuary Ramsar Site

Favourable condition table for the “estuaries” feature of the Severn Estuary Ramsar Site

Reference should also be made to Tables 8,10 and 11 - Favourable Condition Tables for the SAC habitat features relevant to the supporting habitats (intertidal mudflats and sandflats, saltmarsh and hard substrate habitats (rocky shores)) .

Table 18 Favourable Condition Table for the “estuaries” feature of the Severn Estuary Ramsar Site

Ramsar interest feature	Comments
<p><i>Ramsar Interest feature 1: Estuaries</i></p>	<p>The Favourable Condition Table for the “estuaries” feature of the Severn Estuary Ramsar Site is largely the same as that for the Severn Estuary SAC “estuaries” feature (see section 4.1 : Table 8).</p> <p>However the area of the estuarine ecosystem designated as Ramsar Site is smaller than that of the SAC as it is restricted to the terrestrial and intertidal areas and excludes all subtidal areas. Table 17 identifies the limits and restrictions that apply in respect of the Ramsar Site Conservation Objective.</p> <p>There are therefore aspects of the SAC “estuaries” Favourable Condition Table that are not applicable to the Ramsar Site “estuaries” feature as follows :</p> <ul style="list-style-type: none"> • All attributes other than those referred to below - apply only in respect of the area within the Ramsar Boundary (as shown in Appendix 2) • Line A6 - which relates to the subtidal sandbanks subfeature of the estuaries feature - this does not apply as these habitats lie outside the boundary of the Ramsar Site • Line A9 - which relates to the reefs subfeature of the estuaries feature - this only applies in respect of areas where intertidal <i>Sabellaria alveolata</i> occurs contiguously with the subtidal reefs (yet to be fully defined).

Table 19 Favourable Condition Table for the Migratory fish assemblage feature of the Severn Estuary Ramsar Site

Ramsar interest feature	Sub-feature	Attribute	Measure	Target	Comments
Ramsar Interest feature 2 : Migratory fish assemblage		Migratory access (Barriers to migration) (migratory passage not impeded - sections 4.6.i and 4.7.i of the conservation objectives)	Water quality measured regularly throughout the reporting cycle in the Bristol Channel, Severn Estuary, River Wye SAC, River Usk SAC and River Severn. (see also lines A17- A20 of Table 8 relating to general water quality requirements for the estuary feature (and dependant sub features)	Water quality is sufficient to support migratory passage. Levels (for temperature, salinity, turbidity and pH, and dissolved oxygen) should comply with targets established under the EA Review of Consents and the Water Framework Directive. Baseline is water quality sampling data collected by the Environment Agency	Significant variation in these physio-chemical parameters may act as barriers to migration. For example, the timing, duration and consistency of their upstream migration are believed to be closely related to temperature changes as well as pheromone triggers from the juveniles during periods of high water flow. Peak migration usually coincides with river temperatures that remain above 10°C and continues until temperatures reach 18°C. Dissolved oxygen can also be significantly reduced in stretches receiving significant BOD inputs, or through the re-suspension of organic rich sediments. Toxic contaminants may act as a barrier to migration.
			Water flows measured regularly throughout the reporting cycle (frequency to be determined) in the River Wye SAC, River Usk SAC and River Severn (see also line A3 of Table 8 relating to general tidal and water flow requirements for the estuary feature (and dependant sub features)	Flows from the rivers into the estuary must be sufficient to allow migration Baseline is water flow sampling data collected by the Environment Agency provides a baseline. Severe low flow conditions that affect these species yet to be defined	
			Physical barriers Mapping and quantification of potential obstructions in relation to height, type and water depth below obstruction once during the reporting cycle.	No artificial barriers significantly impairing, adults from reaching existing and historical spawning grounds, or juveniles from moving downstream. Baseline is the Environment Agency data on structures and flood defences	Dams, navigation and other weirs may prevent fish from reaching their spawning grounds. In particular, sea lamprey is known to be poor at ascending obstacles.

Ramsar interest feature	Sub-feature	Attribute	Measure	Target	Comments
		Population sizes (returning adults) <i>(size of populations - sections 4.6.ii and 4.7.ii of the conservation objectives)</i>	Number of returning adults measured using fish counters on the feeding rivers (Wye, Usk and Severn) during the migratory period.	No decline in number of returning adults from established baseline. <i>Baseline is yet to be established - fish counter data may be able to provide a baseline in future years.</i>	(Note that this attribute will not be able to be measured until the technological solutions for monitoring some species (notably lampreys and shad) are developed.)
		River populations <i>(size of populations - sections 4.6.ii and 4.7.ii of the conservation objectives)</i>	Survey through various methods (Electrofishing, seine netting, line fishing records, licencing returns) at a series of locations in the Rivers Wye, Usk and Severn	No decline in populations of the Rivers Wye and Usk <i>Baseline is yet to be established - fish counter data may be able to provide a baseline in future years.</i>	Details of methods for river and sea lamprey are outlined in section 4.1.9, Table 13 and for Twaite shad in Table 14 - the individual FCT for these species within the SAC section of this document
		Prey species <i>(abundance of prey species - sections 4.6.iii and 4.7.iii of the conservation objectives)</i>	The abundance of key prey species measured by EA in their routine monitoring of the rivers and estuary	No significant reduction in abundance of key prey species against an established baseline <i>Baseline is yet to be established through fish surveys in estuary and rivers</i>	<p>River and sea lamprey require a variety of other fish species to act as hosts throughout their lifecycle. Their principal host species are part of the estuarine fish assemblage which has measures and targets included within Table 8.</p> <p>Twaite shad require a variety of invertebrates including crustacean, mysids and copepods, small fish and fish eggs particularly in that section of the estuary where saline and freshwaters meet.</p> <p>While at sea, salmon feed on a variety of fish (e.g. herring, sprat, sand eel, mackerel, and various gadoids) and crustaceans (e.g. euphausiid shrimps, prawns, gammarid amphipods and various crabs). (Bird, 2008)</p> <p>The diet of sea trout at sea is believed to include a range of fish species including sprat, young herring and sand eels as well as crustaceans such as amphipods (e.g. Corophium), gammarids, decapods such as Crangon and mysid shrimps.</p> <p>Eels feed on a range of benthic organisms that include crustaceans and small fish. (Bird, 2008)</p>

Table 20 Favourable Condition Table for the supporting habitats of the bird interest features (Ramsar interest features 3 to 9) in the Severn Estuary Ramsar Site (Numbers of bird species using these habitats are given in Table 6)

Ramsar interest features	Supporting Habitat	Attribute	Measure	Target	Comments
<p><i>Ramsar Interest features 3-8 : Internationally important populations of waterfowl</i></p> <p>and</p> <p><i>Ramsar Interest feature 9 : Internationally important assemblage of waterfowl</i></p>	Saltmarsh	Habitat extent	Area (ha) measured once per reporting cycle.	No decrease in extent from 1,400 ha. At The Dumbles, no decrease in extent from 76 ha.	Saltmarsh and their communities are important habitats as they provide both roosting and feeding areas.
		Food availability	Presence and abundance of suitable saltmarsh food plants measured periodically (frequency to be determined).	Presence and abundance of suitable saltmarsh food plants should not deviate significantly from an established baseline ¹ .	European white-fronted geese graze on a range of saltmarsh grasses and herbs. Wigeon feed on well-grazed saltmarsh with <i>Puccinella maritiae</i> , <i>Salicornia</i> and <i>Agrostis</i> . Teal and pintail feed on seeds from <i>Salicornia</i> and <i>Atriplex</i> .
		Vegetation characteristics	Abundance of suitable soft leaved herbs and grasses - % cover (frequency to be determined)	Greater than 25% cover during the winter season.	Bewick's swans graze on soft wet meadow grasses such as <i>Agrostis stolonifera</i> , <i>Glyceria fluitans</i> and <i>Alopecurus geniculatus</i> which are found in the transition of saltmarsh to grassland.
		Vegetation characteristics	Range of vegetation heights measured periodically (frequency to be determined).	Sward height and density throughout areas used for roosting should not deviate significantly from an established baseline ¹ .	Vegetation of <10 cm is required throughout areas used by roosting waders. This is managed by grazing.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines. Areas of vegetation with an effective field size of >6ha at the Dumbles (Bewicks swan)	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

Table 20 continued

Ramsar interest features	Supporting Habitat	Attribute	Measure	Target	Comments
Ramsar Interest features 3-8 : Internationally important populations of waterfowl and Ramsar Interest feature 9 : Internationally important assemblage of waterfowl	Intertidal mudflats and sandflats	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 15,000 ha. At Frampton Sands, Waveridge Sands and The Noose no decrease in extent from 980 ha.	Intertidal mudflats and sandflats and their communities are important habitats as they provide both roosting and feeding areas. The intertidal mudflats and sandflats at The Noose, Frampton Sand and Waveridge Sand are used as disturbance refuge for Bewick's swan. The extent and distribution of this sub-feature are important to maintain the population in favourable condition.
		Food availability	Presence and abundance of suitable prey species measured periodically (frequency to be determined).	Presence and abundance of suitable prey species should not deviate significantly from an established baseline ¹ .	Most of the waders and waterfowl within the assemblage including the internationally important population of waterfowl feed on invertebrates within and on the sediments. Diet includes <i>Arenicola</i> , <i>Crangon</i> , <i>Hydrobia</i> , <i>Hediste</i> , <i>Corophium</i> , <i>Macoma</i> , <i>Gammarus</i> , small molluscs and strandline plankton and seeds.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.
	Shingle and rocky shores	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 1,500 ha.	This habitat is used for feeding and roosting, particularly by waders.
		Food availability	Presence and abundance of suitable intertidal invertebrates, measured periodically (frequency to be determined).	Presence and abundance of suitable food species should not deviate significantly from an established baseline ¹ .	Waders feed on worms, crustaceans and molluscs.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

¹ Baselines to be established

Table 21 Favourable Condition Table for the qualifying bird features in the Severn Estuary Ramsar Site

Ramsar interest features	Supporting Habitat	Attribute	Measure	Target	Comments
<i>Ramsar Interest features 3-8 :</i> Internationally important populations of waterfowl and <i>Ramsar Interest feature 9 :</i> Internationally important assemblage of waterfowl		Population size	5 year peak mean number of individuals	No less than 68,026 individuals in the assemblage [ie the 5 year peak mean between 1988/9 - 1992/3] For individual species - no less than the 5 year peak mean between 1988/9 - 1992/3 detailed in Table 6	Figures derived from WeBS counts. The 5 year peak means for this period for each of the internationally important populations and species with nationally important populations which make up the internationally important assemblage are detailed in Table 6
		Distribution	Number and location of sectors occupied at low tide	No decrease in use of the number of sectors and their distribution established as baseline ¹ .	WeBS low tide counts display distribution information by sector (not annual counts) Birds use certain sectors to a greater or lesser degree from year to year
		Disturbance in feeding and roosting areas.	Reduction or displacement of wintering birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline ¹ .	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure. Five year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.

¹ Baselines to be established

4.1 Conservation Objective for Feature 1: Greater Horseshoe Bat *Rhinolophus ferrumequinum* (EU Species Code: 1304)

Vision for feature 1

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The site will support a sustainable population of greater horseshoe bats in the Wye Valley area.
- The population will viable in the long term, acknowledging the population fluctuations of the species.
- Buildings, structures and habitats on the site will be in optimal condition to support the populations.
- Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, and mortality from predation or vehicle collision, changes in habitat management that would reduce the available food source are not at levels which could cause any decline in population size or range
- Management of the surrounding habitats is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size or range, nor any decline in the extent or quality of breeding, foraging or hibernating habitat.
- There will be no loss or decline in quality of linear features (such as hedgerows and tree lines) which the bats use as flight lines - there will be no loss of foraging habitat use by the bats or decline in its quality, such as due to over-intensive woodland management
- All factors affecting the achievement of the foregoing conditions are under control.

Performance indicators for Feature 1

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

The performance indicators for maintenance of **favourable condition** of the greater horseshoe bats (*Rhinolophus ferrumequinum*) on the Welsh side of the Wye Valley and Forest of Dean Bat Sites SAC.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Population of Greater Horseshoe Bats	<p>Justification for limits in document 'Draft Performance Indicators for Greater', K. Wilkinson, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p> <p>An adult bat is defined as any greater horseshoe bat recorded leaving the roost between 7th – 21st July.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> During at least one surveillance visit between 7th – 21st July of every year, there will be 80 or more adult bats present.</p>

A2. Recruitment to bat population/productivity	<p>Justification for limits in document ‘Draft Performance Indicators for Greater’s’, K. Wilkinson, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> During at least one surveillance visit between 7th –28th July of every year, the productivity should be 0.3 or more (i.e. number of births is 30% or more of the total number of adult bats).</p>
Performance indicators for factors affecting the feature		
Factor	Factor rationale and other comments	Operational Limits
F1. Site security	<p>Justification for limits in document ‘Draft Performance Indicators for Greater’s’, K. Wilkinson, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> Access to the site under the control of the owner/occupier or site secured against unauthorised access.</p>
F2. External condition of the building	<p>Justification for limits in document ‘Draft Performance Indicators for Greater’s’, K. Wilkinson, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> Fabric of building sufficient to maintain roost conditions internally with:</p> <ul style="list-style-type: none"> • Weatherproof roof. • No holes allowing excessive heat loss or high light levels in the roost area. • Walls sound, rainwater goods in adequate condition. • Solar heating sufficient to maintain adequate roost temperature, with no significant shading of the roost. • The building is structurally stable.

F3. Roost access	<p>Justification for limits in document ‘Draft Performance Indicators for Greater’s’, K. Wilkinson, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> The roost access is in a suitable condition to allow emergence by bats with:</p> <ul style="list-style-type: none"> • A greater horseshoe bat entrance a minimum of 400mm x 300mm. • An entrance that is unobstructed and allows the bats to fly through unimpeded. • No artificial lights shining on access or associated flight paths.
F4. Disturbance	<p>Justification for limits in document ‘Draft Performance Indicators for Greater’s’, K. Wilkinson, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	<p><i>Upper limits:</i> None required</p> <p><i>Lower limits:</i> Disturbance levels acceptable to bats with:</p> <ul style="list-style-type: none"> • No increase since previous visit. • Human access to roost controlled and limited.
F5. Internal condition of building	<p>Justification for limits in document ‘Draft Performance Indicators for Greater’s’, K. Wilkinson, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> The internal fabric of the building is sufficient to maintain the roost location with:</p> <ul style="list-style-type: none"> • No significant water penetration. • Low light levels with no through draught. • No toxic substances present which would adversely affect the health of the bats.
F6. Temperature of roost area	Site specific requirements based on site monitoring	To be determined

<p>F7. Flight Lines</p>	<p>Justification for limits in document 'Draft Performance Indicators for Greater', K. Wilkinson, 2005/ 'Monitoring Greater Horseshoe Bats in the Wye Valley through radio tracking and field survey to assess habitat use and condition', G. Billington, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p> <p>Broadleaf woodland edge is defined as an area where 90% of the trees are broadleaf.</p> <p>A woodland ride is defined as woodland track >10m wide and greater than 100m in length.</p> <p>Tree lined is defined as a line of trees with <20% gaps over the length and with no individual gaps that are greater than 10m.</p> <p>Type 2A hedgerow is defined as partially managed/unmanaged hedgerow >2m wide and >2m high, not gappy.</p> <p>Type 2B hedgerow is defined as 2A but with gaps.</p> <p>Type 3A hedgerow is defined as hedgerow with trees (overall >30% trees) or tree lined, non gappy.</p> <p>Gappy/gaps is defined as a hedge where there is 20% gaps over the length of the hedge or with single gaps greater than 10m.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> Refer to Figure 2 (Collins <i>et al</i>, 2005) for locations of these Areas.</p> <p>70% of Area A (Hayes coppice up to horizontal line) is maintained as woodland AND Within Area A there are a minimum of two woodland rides AND Area B is maintained as a broadleaf woodland edge AND Within 500m of the roost:</p> <ul style="list-style-type: none"> • Mally Brook is maintained as a tree-lined stream. • There are at least 400m of hedgerow that are described as type 2 or better, of which no more than 50% will be type 2B. • Type 2 or better hedgerows will be present (at least 50m) both north and south of Mally Brook. <p>AND District staff should comment on felling licences applications within 2km of the roost.</p> <p>Note: Refer to Collins <i>et al</i>, 2005 for development of these habitat definitions and figures.</p>
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<p>F8. Feeding habitats</p>	<p>Justification for limits in document ‘Draft Performance Indicators for Greater’, K. Wilkinson, 2005/ ‘Monitoring Greater Horseshoe Bats in the Wye Valley through radio tracking and field survey to assess habitat use and condition’, G. Billington, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site specific requirements.</p> <p>Type 2A hedgerow is defined as partially managed/unmanaged hedgerow >2m wide and >2m high, not gappy.</p> <p>Type 2B hedgerow is defined as 2A but with gaps.</p> <p>The River Wye has also been shown to be an important flight line/feeding habitat for greater horseshoe bats.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i></p> <ul style="list-style-type: none"> • Within Area G (see Figure 3, Collins <i>et al</i>, 2005) 40% of the length of field boundaries will be type 2 or better. • Within Area I (see Figure 4) 50% of the length of field boundaries will be of type 2 hedge or better. • An ideal level of cattle grazing for the area has yet to be determined. <p><i>Other conditions:</i></p> <ul style="list-style-type: none"> • District staff should comment on any Tir Gofal applications within the 7km survey boundary. Management should look to increase the amount of cattle grazing, conversion of improved pasture to semi-improved and improve the structure of hedgerows (to make them taller and bushier). • The requirements of these bats should be considered when considering riparian management along the stretch of the River Wye that lies within the 7km survey boundary.
<p>F9. Roosts</p>	<p>Justification for limits in document ‘Draft Performance Indicators for Greater’, K. Wilkinson, 2005 / ‘Monitoring Greater Horseshoe Bats in the Wye Valley through radio tracking and field survey to assess habitat use and condition’, G. Billington, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site specific requirements.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i></p> <ul style="list-style-type: none"> • The roost at Osbaston will be maintained according to the criteria outlined in the Common Standards Monitoring for Mammals version: August 2004.

<p>F10. Condition of the habitat within the SSSI boundary</p>	<p>Justification for limits in documents ‘Draft Performance Indicators for Greater’s, K. Wilkinson, 2005 / ‘Monitoring Greater Horseshoe Bats in the Wye Valley through radio tracking and field survey to assess habitat use and condition’ G. Billington, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site specific requirements.</p> <p>Woodland is defined as an area dominated by broadleaf or conifer trees with no clear felled areas >0.1ha</p> <p>Livox Wood and Harper’s Grove Lord’s Grove are within close proximity to Newton Court and it is likely that they are used at certain times of the year (one radio-tagged bat was recorded sheltering in Harper’s Grove during the 2004 study).</p>	<p><i>Upper limit:</i> The roof of the roost will not be shaded by trees.</p> <p><i>Lower limit:</i></p> <ul style="list-style-type: none"> • The wall (refer to Figure 1 in report ‘Draft Performance Indicators for Greater’s K. Wilkinson, 2005) is structurally intact <p>AND</p> <ul style="list-style-type: none"> • 70% of the SSSI is referable to broadleaf woodland <p>AND</p> <ul style="list-style-type: none"> • Livox Wood and Harper’s Grove Lord’s Grove form part of the Wye Valley Woods SAC and therefore CCW has some degree of management control of them. The requirements of these bats should be considered when developing management plans for both these sites.
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The feeding habitat and flight line limits represent more of a long-term aim and in some respects represent the ideal landscape. However here we have attempted, using information from radio-tracking and general knowledge of greater horseshoe bat ecology, to identify key areas that will aid the maintenance of FCS of this colony of greater horseshoe bats. This is not a complete list and it is likely that as more information becomes available other areas of habitat will be identified as being of importance.

4.2 Conservation Objective for Feature 2: Lesser Horseshoe Bat *Rhinolophus hipposideros* (EU Species Code: 1303)

Vision for feature 2

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The site will support a sustainable population of lesser horseshoe bats in the Wye Valley area.
- The population will viable in the long term, acknowledging the population fluctuations of the species.
- Buildings, structures and habitats on the site will be in optimal condition to support the populations.
- Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, and mortality from predation or vehicle collision, changes in habitat management that would reduce the available food source are not at levels which could cause any decline in population size or range.

- Management of the surrounding habitats is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size or range, nor any decline in the extent or quality of breeding, foraging or hibernating habitat.
- There will be no loss or decline in quality of linear features (such as hedgerows and tree lines) which the bats use as flight lines – there will be no loss of foraging habitat use by the bats or decline in its quality, such as due to over-intensive woodland management.
- All factors affecting the achievement of the foregoing conditions are under control.

Performance indicators for Feature 2

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

The performance indicators for maintenance of **favourable condition** of the lesser horseshoe bats (*Rhinolophus hipposideros*) on the Welsh side of the Wye Valley and Forest of Dean Bat Sites SAC.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Distribution and population of Lesser Horseshoe Bats	<p>Justification for limits in document ‘Draft Performance Indicators for Lessers’, K. Wilkinson, 2005 / ‘Monitoring the Welsh Colonies of Lesser Horseshoe Bats in the Wye Valley’, P. Morgan 2006.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p> <p>Mwyngloddfa Mynydd-Bach limits based on Common Standards Monitoring for hibernating populations of lesser or greater horseshoe bats.</p> <p>The performance indicators only relate to adult bats; lesser horseshoe bats are sensitive to disturbance and access to the roost to count juvenile bats is considered too disturbing.</p>	<p><i>Upper limits:</i> None required</p> <p><i>Lower limits:</i> For the Welsh side of this SAC to be favourable each of the individual roosts must meet the criteria outlined below. During at least one surveillance visit between 29th May and 17th June of <u>every year</u>, there will be a minimum of adults:</p> <p>Penallt Old Church</p> <ul style="list-style-type: none"> • 250 LHS bats <p>Itton Court Stud</p> <ul style="list-style-type: none"> • 120 LHS bats <p>The Priory</p> <ul style="list-style-type: none"> • 325 LHS bats <p>Tregeiriog and Llangovan Church</p> <ul style="list-style-type: none"> • A combined minimum of 180 LHS bats, with a minimum of 40 LHS bats at each roost <p><u>And</u> during at least one surveillance visit during January of <u>every year</u>, there will be a minimum of:</p> <p>Mwyngloddfa Mynydd-Bach 60 LHS bats</p>
<i>Performance indicators for factors affecting the feature</i>		
<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>

F1. Condition of structures and buildings	<p>Justification for limits in document ‘Draft Performance Indicators for Lessers’, K. Wilkinson, 2005</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> Fabric of each building sufficient to maintain roost conditions internally with:</p> <ul style="list-style-type: none"> • Weatherproof roof. • No holes allowing excessive heat loss or high light levels in the roost area. • Walls sound, rainwater goods in adequate condition. • Solar heating sufficient to maintain adequate roost temperature, with no significant shading of the roost. • The building is structurally stable.
F2. Roost access	<p>Justification for limits in document ‘Draft Performance Indicators for Lessers’, K. Wilkinson, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p> <p>Horseshoe bats prefer to fly through an entrance.</p>	<p>Where:</p> <p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> Each roost access is in a suitable condition to allow emergence by bats with:</p> <ul style="list-style-type: none"> • A lesser horseshoe bat entrance a minimum of 300mm x 200mm. • An entrance that is unobstructed and allows the bats to fly through unimpeded. • No artificial lights shining on access or associated flight paths.

F3. Hibernaculum access	<p>Justification for limits in document ‘Draft Performance Indicators for Lessers’, K. Wilkinson, 2005</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p> <p>These limits cover only the Mwyngloddfa Mynydd-Bach SSSI.</p> <p>Horseshoe bats prefer to fly through an entrance.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> The site entrance is in suitable condition to allow continued use by bats with:</p> <ul style="list-style-type: none"> • Existing access unobstructed. • No unplanned new access causing a change to the ventilation. • No change in the size sufficient to affect the airflow and internal temperature. • The access used by the bats is stable. • No recent falls or signs of geological instability. • Vegetation present close to the access but not obstructing it. • No artificial lights shining on access or associated flight paths.
F4. Disturbance	<p>Justification for limits in document ‘Draft Performance Indicators for Lessers’, K. Wilkinson, 2005</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> Disturbance levels acceptable to bats with:</p> <ul style="list-style-type: none"> • No increase since previous visit. • Human access to roost controlled and limited.
F5. Temperature of roost area	Site specific requirements based on site monitoring	To be determined
F6. Internal Condition of building	<p>Justification for limits in document ‘Draft Performance Indicators for Lessers’, K. Wilkinson, 2005</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> The internal fabric of each building is sufficient to maintain the roost location with:</p> <ul style="list-style-type: none"> • No significant water penetration. • Low light levels with no through draught. • No toxic substances present which would adversely affect the health of the bats.

F7. Site Security	<p>Justification for limits in document 'Draft Performance Indicators for Lessers', K. Wilkinson, 2005.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p>	Access to each site is under the control of the owner/occupier and the site is secured against unauthorised access.
F8. Condition of the habitat within the SAC boundary	<p>Justification for limits in document 'Draft Performance Indicators for Lessers', K. Wilkinson, 2005 / 'Monitoring the Welsh Colonies of Lesser Horseshoe Bats in the Wye Valley', P. Morgan 2006.</p> <p>Based on Common Standards Monitoring for this feature. Modified according to site-specific requirements.</p> <p>Mwyngloddfa Mynydd-Bach limits based on Common Standards Monitoring for hibernating populations of lesser or greater horseshoe bats.</p> <p>The performance indicators only relate to adult bats, Lesser horseshoe bats are sensitive to disturbance and access to the roost to count juvenile bats is considered too disturbing.</p>	<p><i>Upper limits:</i> None required.</p> <p><i>Lower limits:</i> Penallt Old Church The line of trees leading from the church porch to the entrance should be maintained AND Mwyngloddfa Mynydd-Bach The extent of the woodland/scrub is as mapped in 2006.</p>

Other factors considered include –

Owner/occupier objectives - the owners/occupiers of the land typically have an interest from the land. This factor will be controlled through management agreements and the SSSI legislation. An operational limit is not required.

Weather conditions - Weather conditions have an effect on the breeding success of the lesser horseshoe bats. In particular, poor weather conditions during the adult breeding season will reduce opportunities for foraging and therefore affect adult condition and reproductive outputs. This factor is outside the influence of the site manager and an operational limit is not required.

5. ASSESSMENT OF CONSERVATION STATUS AND MANAGEMENT REQUIREMENTS

This part of the document provides:

- A summary of the assessment of the conservation status of each feature.
- A summary of the management issues that need to be addressed to maintain or restore each feature.

5.1 Conservation Status and Management Requirements of Feature 1: Greater Horseshoe Bat *Rhinolophus ferrumequinum* (EU Species Code: 1304)

Conservation Status of Feature 1

The greater horseshoe bat numbers of Newton Court Stable Block SSSI are monitored annually in June. The assessment found the SSSI to be in **Favourable condition**. But FCS is **Unfavourable declining**

Newton Court Stable Block SSSI *Current assessments are:*
MU1 Unfavourable declining

Management Requirements of Feature 1

The current status of the feature overall is unfavourable. The following outlines which attributes are considered favourable/unfavourable at each site. The site-specific monitoring report provides more detail on the condition of the site.

Building condition

The external condition of Newton Court is currently in a poor state. While the roof is largely intact and provides a waterproof environment for the roost, holes in the fabric of the roof allow heat loss and too much light into the roost. The current roof is tin causing large fluctuations in diurnal temperature making the roost too hot during the day and too cool at night. However, this appears to have no effect on the bat population. The building is currently structurally stable due to recent remedial work, but this is unlikely to be enough to maintain it in the long term.

Habitat management

The habitat surrounding Newton Court is of paramount importance to maintaining the population. The loss of flight lines in the form of walls, hedges or woodland rides within 1km around the roost should be prevented, as this is where juvenile bats learn to forage and navigate. There should be a similar aim to maintain or improve the quality of woodland and grazed pasture around and between areas identified as being used by the bats. Management of river habitats in the area is also critical due to the diversity of insect life that sustains the bats.

The overall aim for the landscape surrounding Newton Court is to improve the feeding opportunities for the greater horseshoe bats and the flight links between these feeding areas and the roosts (nursery, hibernation and transitory). Increases in the amount of land that is cattle grazed, development of 'less managed' bushier hedgerows and conversion of improved grassland to semi-improved grassland, particularly close to the notified nursery roost, would improve the extent and quality of available greater horseshoe bat feeding habitat.

5.2 Conservation Status and Management Requirements of Feature 2: Lesser Horseshoe Bat *Rhinolophus hipposideros* (EU Species Code: 1303)

Conservation Status of Feature 2

The lesser horseshoe bat numbers for all component SSSIs are annually monitored. The assessment of all 3 component SSSIs showed lesser horseshoe bats to be favourable in two of the three areas. As all of the three SSSIs units have to be in good condition for the LHB overall to be favourable the feature is in **unfavourable condition**, and in this case we can give condition information at the unit level.

Llangovan Church SSSI *Current assessments are:*

MU1 Favourable maintained

Mwyngloddfa Mynydd Bach SSSI *Current assessments are:*

MU1 Favourable maintained

Wye Valley Lesser Horseshoe Bats SSSI *Current assessments are:*

MU1 Favourable maintained

MU2 Unfavourable declining

MU3 Unfavourable maintained

MU4 Unfavourable declining

Management Requirements of Feature 2

The current status of the feature overall is unfavourable. The following section outlines which attributes are considered favourable/unfavourable at each site. The site-specific monitoring report provides more detail on the condition of the site.

Structure Condition

At **Mwyngloddfa Mynydd-Bach** structural integrity of the rock forming the adit may require management to prevent further collapse. Rockfall deep within the adit should not affect the viability of the mine as a habitat, but rockfall closer to the entrance may block access and could result in the complete loss of this site as a hibernaculum roost. Given the current unsupported state of the rock, collapse should be considered imminent.

Habitat management

The habitat surrounding these sites is of paramount importance to maintaining the population. The loss of flight lines in the form of walls, hedges or woodland rides within 1km around the roost should be prevented, as this is where juvenile bats learn to forage and navigate. There should be a similar aim to maintain or improve the quality of woodland and grazed pasture around and between areas identified as being used by the bats. Management of river habitats in the area is also critical due to the diversity of insect life that sustains the bats.

The overall aim for the landscape surrounding the management units is to improve the feeding opportunities for the lesser horseshoe bats and the flight links between these feeding areas and the roosts (nursery, hibernation and transitory). Increases in the amount of land that is cattle grazed, development of 'less managed' bushier hedgerows and conversion of improved grassland to semi-improved grassland, particularly close to the notified nursery roost, would improve the extent and quality of available lesser horseshoe bat feeding habitat.

Llangovan Church – no issues except surrounding habitat.

Mwyngloddfa Mynydd Bach – no issues except surrounding habitat.

Wye Valley Lesser Horseshoe Bats SSSI

MU1 – no issues, but important to continue liaison with owner/occupiers and monitor the progress of planned extension.

MU2 – issue with declining numbers needs to be investigated, possibly another unknown roost in the area.

MU3 – no issues, but important to continue liaison with owner/occupiers.

MU4 – issue with declining numbers, requires investigation into possible reasons including building condition.

Surrounding habitat management important for all units.

4.1 Conservation Objective for Feature 1: *Asperulo-Fagetum* beech forest (EU Habitat Code 9130)

Vision for feature 1

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The existing *Asperulo-fagetum* beech forest will be maintained.
- At least 95% of canopy forming trees will be locally native species such as beech, ash and oak, with some areas dominated by beech.
- The tree canopy will not be completely closed; approximately 10% of the canopy will include a dynamic shifting pattern of gaps encouraging natural regeneration of tree species of all ages.
- Dead wood, standing and fallen, will be maintained where possible to provide habitat for invertebrates, fungi and other woodland species.
- There are pockets of ground flora across the site, comprising species typical of lime-rich beech wood, including indicators of ancient woodland such as wood anemone, ramsons and sanicle.
- There is little evidence of browsing or squirrel damage to trees.
- Recreational use of the site will continue to be managed so it does not damage the wildlife interest of the site.
- All factors affecting the achievement of these conditions are under control.

Performance indicators for feature 1

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent	For a habitat feature to be considered to be at favourable conservation status, the area of the habitat must be stable in the long-term or increasing. Upper limit – restricted by the limits set in the conservation objective for the <i>Tilio-acerion</i> feature. Lower limit - based on current extent.	<i>Upper limit:</i> None set <i>Lower limit:</i> As mapped (Garth Wood and Fforestganol a Chwm Nofydd in 1997 and Castell Coch Woodlands and Road Section in 1990)
A2. Quality	For a habitat feature to be considered to be at favourable conservation status, its quality (including in terms of ecological structure and function) must be maintained. <u>Good condition <i>Asperulo-fagetum</i> woodland of Garth Wood definition:</u> Within a 25m radius of a sample point* all of the following criteria must be met:	<i>Upper limit:</i> Not required <i>Lower limit:</i> The following are met: In Unit 1 of Garth Wood, 70% of the woodland habitat is referable to ‘good condition <i>Asperulo-fagetum</i> woodland of Garth Wood’ and there are at least 4 patches of advanced beech regeneration.

	<ul style="list-style-type: none"> ○ At least 95% of the canopy forming trees are native to the site with at least 50% of the canopy forming trees being <i>Fagus sylvatica</i> <p>AND</p> <ul style="list-style-type: none"> ○ There are at least 5 mature trees present <p>AND</p> <ul style="list-style-type: none"> ○ There are at least 5 sapling present <p>AND</p> <ul style="list-style-type: none"> ○ There are at least 3 relevant ground flora species present and there is no evidence of grazing <p>AND</p> <ul style="list-style-type: none"> ○ Dead wood is present in at least 2 forms <p><u>Good condition <i>Asperulo-fagetum</i> woodland of Castell Coch definition:</u> As above except the definition requires the criteria to be met in a 12.5m radius of a sample point* (NOT 25m radius) and only requires 3 mature trees to be present</p> <p><u><i>Asperulo-fagetum</i> forest definition:</u> The canopy is generally dominated by <i>Fagus sylvestris</i> however in some areas <i>Fraxinus excelsior</i> shares dominance. The shrub layer is sparse with scattered <i>Corylus avellana</i> and <i>Fagus</i> saplings and occasional <i>Ilex aquifolium</i>. The field layer is also characterised by its sparseness, largely due to the presence of deep leaf litter, low light levels and thin soils. Patches of bare ground are frequent. However in some areas <i>Rubus fruticosus</i> or <i>Hedera helix</i> can form dense patches. Other associated ground flora species include <i>Mercurialis perennis</i>, <i>Hyacinthoides non-scripta</i> and <i>Luzula sylvatica</i> and <i>Dryopteris filis-mas</i></p>	<p>In Units 3 and 4 of Castell Coch Woodlands, 60% of the woodland habitat is referable to ‘good condition <i>Asperulo-fagetum</i> woodland of Castell Coch’ and there are at least 4 patches of advanced beech regeneration.</p> <p>In Unit 1 of Fforestganol a Chwm Nofydd, <i>Fagus sylvatica</i> is present within a 25m radius of a sample point*.</p> <p>In Units 2 and 3 of Fforestganol a Chwm Nofydd, habitat present within a 25m radius of a sample point* meets the definition of ‘<i>Asperulo-fagetum</i> forest’.</p>
A3. Canopy cover	Woodland structure to include a shifting dynamic of canopy gaps to encourage natural regeneration	<p><i>Upper limit:</i> No more than 85% canopy cover</p> <p><i>Lower limit:</i> As existing</p>
A4. Viable saplings	Native species sapling of > 1.5m	<p><i>Upper limit:</i> Not required</p> <p><i>Lower limit:</i> 5 no. of successive cohorts in 25m x 25m sample plot* of understorey</p>
A5. Advanced regeneration	Areas of regeneration >10m x 10m with 50+ beech saplings/seedlings. Each area	<p><i>Upper limit:</i> Not required</p>

	of advance regeneration needs to be separated by a minimum of 10m	<i>Lower limit:</i> 4 areas of regeneration in each of Garth Wood, Castell Coch Woodlands and Fforestganol a Chwm Nofydd noted every 6 years
A6. Species composition	Any species native to the area, including <i>Acer pseudoplatanus</i>	<i>Upper limit:</i> At least 95% of the canopy forming trees are native to the site with at least 50% of the canopy forming trees being <i>Fagus sylvatica</i> <i>Lower limit:</i> As existing
A7. Age structure	All age classes represented including mature and veteran trees. Mature tree: canopy forming tree with a girth of >150cm at chest height	<i>Upper limit:</i> None set <i>Lower limit:</i> At least 5 mature trees present within a 25m radius of a sample point*
A8. Ground flora species	Three of the following: <i>Mercurialis perennis</i> , <i>Hyacinthoides non-scripta</i> , <i>Hedera helix</i> , <i>Allium ursinum</i> , <i>Anemone nemorosa</i> , <i>Circaea lutetiana</i> , <i>Arum maculatum</i> , <i>Sanicula europaea</i> , <i>Geum urbanum</i> or <i>Melica uniflora</i>	<i>Upper limit:</i> Not required <i>Lower limit:</i> At least 3 ground flora species present within a 25m radius of a sample point* and no evidence of browsing
A9. Dead wood	Fallen trees, fallen branches, dead branches on living trees or standing dead trees (all > 20cm in diameter) All dead wood (standing or fallen) left in situ	<i>Upper limit:</i> None set <i>Lower limit:</i> Dead wood present in at least 2 forms within a 25m radius of a sample point*
A10. Evidence of browsing	Signs of browsing particularly on saplings (where tops have been taken off) or ferns (where fronds/pinnae have been removed)	No limits set
A11. Evidence of bark stripping by squirrels	Signs of bark stripping by squirrels	No limits set
* Sampling points as defined in Wilkinson, K. (17 March 2004) Cardiff Beech Woods cSAC, Annex 1 Habitat (9130) <i>Asperulo-Fagetum</i> beech forests SAC Monitoring Report (draft)		
<i>Performance indicators for factors affecting the feature</i>		
<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>
F1. Recreational Use	The woodlands, especially Castell Coch and Fforestganol a Chwm Nofydd, experience heavy recreational pressure and certain areas are managed for this purpose. Health and safety considerations (discussed below) are relevant here.	No limits set. Pending a fuller understanding of current situation and impact on habitat. Access issues need to be kept under review.
F2. Health & safety	In addition to general health and safety issues arising from woodland	No limits set.

	management for conservation purposes, site-specific safety issues need to be addressed by management. Such issues may arise from the presence of old quarry workings, and ‘unsafe’ trees in vicinity of public footpaths, access routes and car parks etc.	
F3. Atmospheric pollution	The location of the woodland in industrialised South Wales, together with the presence of nearby quarrying and associated activities, means that there is the potential for localised atmospheric pollution.	No limits set. There is no evidence to date that this has had an adverse impact on the features but this may need to be addressed in more detail in the future.
F4. Development	Its location in the populated South Wales area means that there is considerable development pressure in the vicinity including associated infrastructure on land adjacent to the site. There is the potential for a range of impacts arising from increasing urbanisation.	No limits set. May need to be considered in the future.
F5. Commercial forestry	Commercial forestry in the vicinity of Castell Coch may have implications for surface water supply and quality, and this needs to be kept under review.	No limits set. Pending a fuller understanding of current situation and impact on habitat.
F6. Mineral extraction	There are a number of active and disused limestone quarries in the area. Garth Wood surrounds Taff’s Well Quarry but there are other, smaller quarries in and around all component SSSIs. Quarrying can lead to direct loss of the feature together with indirect impacts from issues such as access. There are also a number of impacts arising from restoration at the end of a quarry’s working life. (For aerial impacts see atmospheric pollution above.)	No limits set. Pending a fuller understanding of current situation and impact on habitat. Quarry restoration may need to be considered in the future.
F7. Cultural heritage	There is considerable cultural heritage interest in the area, including Castell Coch and industrial workings. The associated health and safety issues are addressed above. The management of these sites needs to be balanced with the requirements of the conservation objectives.	No limits set.

4.2 Conservation Objective for Feature 2:

Tilio-Acerion forest of slopes, screes and ravines (EU Habitat Code 9180)

Vision for feature 2

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The existing *Tilio-acerion* forest will be maintained.
- At least 95% of canopy forming trees will be locally native species (sycamore included).
- The tree canopy will not be completely closed; approximately 10% of the canopy will include a dynamic shifting pattern of gaps encouraging natural regeneration of tree species of all ages.
- Dead wood, standing and fallen, will be maintained where possible to provide habitat for invertebrates, fungi and other woodland species.
- There are pockets of ground flora across the site, comprising species typical of lime-rich beech wood, including indicators of ancient woodland such as wood anemone, ramsons and sanicle.
- There is little evidence of browsing or squirrel damage to trees.
- Recreational use of the site will continue to be managed so it does not damage the wildlife interest of the site.
- All factors affecting the achievement of these conditions are under control.

Performance indicators for feature 2

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent	<p>For a habitat feature to be considered to be at favourable conservation status, the area of the habitat must be stable in the long-term or increasing.</p> <p>Upper Limit – restricted by the limits set in the conservation objective for the <i>Asperulo-fagetum</i> feature.</p> <p>Lower limit - based on current extent.</p> <p><u><i>Tilio-acerion</i> forest definition:</u> Woodland on steep, rocky limestone slopes or sloping, ‘undulating’ ground. <i>Fraxinus excelsior</i> is at least present in the canopy and is generally associated with a wide variety of other canopy forming species e.g. <i>Fagus sylvatica</i> and <i>Acer pseudoplatanus</i>. <i>Phyllitis scolopendrium</i> is at least present in the ground flora within a 10m radius of a sample point*. In addition <i>Dryopteris</i> species are often present.</p>	<p><i>Upper limit:</i> None set</p> <p><i>Lower limit:</i> <i>Tilio-acerion</i> is present in at least four locations in Unit 1 of Garth Wood, two locations in Unit 1 of Fforestganol a Chym Nofydd, and as mapped in Units 3 and 4 of Fforestganol a Chym Nofydd (see Map 1 below)</p>

A2. Quality	<p>For a habitat feature to be considered to be at favourable conservation status, its quality (including in terms of ecological structure and function) must be maintained.</p> <p><u>‘Good condition’ semi-natural broadleaf woodland definition:</u> Woodland where within a 25m radius of a sample point* all of the following are met:</p> <ul style="list-style-type: none"> ○ At least 95% of the canopy forming trees are native to the site AND ○ At least 5 mature trees are present AND ○ There are 5 viable saplings present AND ○ There are at least 3 relevant ground flora species present and there is no evidence of browsing AND ○ Dead wood is present in at least two forms AND ○ There are no tracks present other than those highlighted on Map 2 below 	<p><i>Upper limit:</i> Not required</p> <p><i>Lower limit:</i> The following are met:</p> <p>In Units 3 and 4 of Fforestganol a Chym Nofydd (Area Z of Map 1 below) the <i>Tilio-acerion</i> is referable to ‘good condition’ semi-natural broadleaf woodland.</p>
A3. Canopy Cover	Woodland structure to include a shifting dynamic of canopy gaps to encourage natural regeneration	<p><i>Upper limit:</i> No more than 85% canopy cover</p> <p><i>Lower limit:</i> As existing</p>
A4. Viable saplings	Native species sapling of > 1.5m	<p><i>Upper limit:</i> Not required</p> <p><i>Lower limit:</i> 5 no. of successive cohorts in 25m x 25m sample plot* of understorey</p>
A5. Species composition	Any species native to the area, including <i>Acer pseudoplatanus</i>	<p><i>Upper limit:</i> At least 95% of the canopy forming trees are native to the site</p> <p><i>Lower limit:</i> As existing</p>
A6. Age structure	<p>All age classes represented including mature and veteran trees.</p> <p>Mature tree: canopy forming tree with a girth of >150cm at chest height</p>	<p><i>Upper limit:</i> None set</p> <p><i>Lower limit:</i> At least 5 mature trees present within a 25m radius of a sample point*</p>
A7. Ground flora species	Three of the following: <i>Mercurialis perennis</i> , <i>Hyacinthoides non-scripta</i> , <i>Hedera helix</i> , <i>Allium ursinum</i> , <i>Anemone nemorosa</i> , <i>Circaea lutetiana</i> , <i>Arum maculatum</i> , <i>Sanicula europaea</i> , <i>Geum</i>	<p><i>Upper limit:</i> Not required</p> <p><i>Lower limit:</i> At least 3 ground flora species present within a 25 m radius of a sample point* and no evidence</p>

	<i>urbanum</i> or <i>Melica uniflora</i>	of browsing
A8. Dead wood	Fallen trees, fallen branches, dead branches on living trees or standing dead trees (all > 20cm in diameter) All dead wood (standing or fallen) left in situ	<i>Upper limit:</i> None set <i>Lower limit:</i> Dead wood present in at least 2 forms within a 25m radius of a sample point*
A9. Evidence of browsing	Signs of browsing particularly on saplings (where tops have been taken off) or ferns (where fronds/pinnae have been removed)	No limits set
A10. Evidence of bark stripping by squirrels	Signs of bark stripping by squirrels	No limits set
* Sampling points as defined in Wilkinson, K. (17 February 2004) Cardiff Beech Woods cSAC, Annex 1 Habitat (9180) <i>Tilio-Acerion</i> forests of slopes, screes and ravines, SAC Monitoring Report (draft)		
Performance indicators for factors affecting the feature		
Factor	Factor rationale and other comments	Operational Limits
F1. Recreational Use	The woodlands, especially Castell Coch and Fforestganol a Chwm Nofydd, experience heavy recreational pressure and certain areas are managed for this purpose. Health and safety considerations (discussed below) are relevant here.	No limits set. Pending a fuller understanding of current situation and impact on habitat. Access issues need to be kept under review.
F2. Health & safety	In addition to general health and safety issues arising from woodland management for conservation purposes, site-specific safety issues need to be addressed by management. Such issues may arise from the presence of old quarry workings, and 'unsafe' trees in vicinity of public footpaths, access routes and car parks etc.	No limits set.
F3. Atmospheric pollution	The location of the woodland in industrialised South Wales, together with the presence of nearby quarrying and associated activities, means that there is the potential for localised atmospheric pollution.	No limits set. There is no evidence to date that this has had an adverse impact on the features but this may need to be addressed in more detail in the future.
F4. Development	Its location in the populated South Wales area means that there is considerable development pressure in the vicinity including associated infrastructure on land adjacent to the site. There is the potential for a range of impacts arising from increasing urbanisation.	No limits set. May need to be considered in the future.
F5. Commercial forestry	Commercial forestry in the vicinity of Castell Coch may have implications for	No limits set. Pending a fuller understanding of current situation

	surface water supply and quality, and this needs to be kept under review.	and impact on habitat.
F6. Mineral extraction	There are a number of active and disused limestone quarries in the area. Garth Wood surrounds Taff's Well Quarry but there are other, smaller quarries in and around all the component SSSIs. Quarrying can lead to direct loss of the feature together with indirect impacts from issues such as access. There are also a number of impacts arising from restoration at the end of a quarry's working life. (For aerial impacts see atmospheric pollution above.)	No limits set. Pending a fuller understanding of current situation and impact on habitat. Quarry restoration may need to be considered in the future.
F7. Cultural heritage	There is considerable cultural heritage interest in the area, including Castell Coch and industrial workings. The associated health and safety issues are addressed above. The management of these sites needs to be balanced with the requirements of the conservation objectives.	No limits set.

4.1 Conservation Objective for Feature 1: *Tilio–Acerion* forests of slopes, screes and ravines (EU Habitat Code: 9180)

Vision for feature 1

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- *Tilio–Acerion* woodland is found in all eight of the Welsh SSSIs that contribute to the Wye Valley Woodlands SAC.
- The woodland area covers the entire site.
- The woodland is maintained as far as possible by natural processes.
- The location of open glades varies over time.
- Trees and shrubs are mainly locally native broadleaved species.
- The abundance and density of individual native species varies across the site.
- Trees and shrubs of a wide range of ages and sizes are present.
- Tree seedlings are plentiful throughout the site.
- Tree seedlings develop into saplings in the open glades.
- There are abundant dead and dying trees with holes and hollows, rot columns, torn off limbs and rotten branches.
- Some dead and dying trees will be partially or completely hollow.
- Fallen dead wood is dense enough to obstruct progress by foot across the entire site, except on established maintained paths.
- Dead wood dependent species of moss, liverwort, fungi and specialised invertebrates are present, in spatially and temporally variable abundance, throughout the site.
- Field and ground layers are well developed with a patchwork of vegetation communities characteristic of local soil and humidity conditions.
- All factors affecting the achievement of these conditions are under control.

Performance indicators for Feature 1

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent of <i>Tilio–Acerion</i> woodland	<p>Monitoring is likely to be a map-based exercise. The area of <i>Tilio–Acerion</i> woodland will be mapped as a baseline extent and the total area measured. Repeat monitoring will either re-map the site or review the baseline map in the field.</p> <p><i>Tilio–Acerion</i> woodland is defined as Woodland occurring on steep, rocky or sloping ground with rocky outcrops. In which <i>Fraxinus excelsior</i> and/or <i>Tilia cordata</i> are dominant/co-dominant in the canopy. Other species that may occur in the canopy include <i>Ulmus glabra</i>, <i>Quercus</i> spp., <i>Fagus sylvatica</i>, <i>Salix</i> spp.,</p>	<p><i>Lower Limit:</i> No loss of extent of feature (mapped as NVC community W8d-g). Refer to Ecotech survey 1996 <u>and</u> The extent of the feature under high forest management, coppice with standards and minimum intervention is as outlined on Map X.</p> <p>Loss = 0.5 ha or 0.5% of the stand area, whichever is the smaller (i.e. loss of extent through felling).</p>

	<i>Prunus avium</i> and in some instances <i>Acer pseudoplatanus</i> . <i>Corylus avellana</i> is constant in the shrub layer along with occasional <i>Acer campestre</i> and <i>Taxus baccata</i> . <i>Phyllitis scolopendrium</i> is at least present in the field layer within 10m of any point.	
A2. Condition of the <i>Tilio-Acerion</i> woodland	Based on the Standard CSM attribute for this feature. Modified according to site-specific requirements.	<p><i>Tilio-Acerion</i> woodland continues to be present within all eight of the woodlands that contribute to the Welsh side of this SAC</p> <p>Blackcliff Wyndcliff –29,30,31 Cleddon Shoots Woodland -32 Fiddler’s Elbow –35,36 Graig Wood – 37,38 Harper’s Grove-Lord’s Grove 39,40 Livox Wood -43 Lower Hael -44 Pierce, Alcove and Piercefield –45,46</p> <p><i>Upper limit:</i> Not required <i>Lower limit:</i> 100% of the <i>Tilio-Acerion</i> woodland meets the following conditions within a given 25 m radius sample point</p> <ul style="list-style-type: none"> • ≥ 20 ash (<i>Fraxinus excelsior</i>) saplings • ≥ 5 native canopy forming trees with girth >1.5 m • $\leq 5\%$ of the canopy forming trees are non-native species • ≥ 2 dead trees, standing or fallen, of >20 cm diameter. • $<20\%$ of the canopy forming trees are sycamore (<i>Acer pseudoplatanus</i>)
Performance indicators for factors affecting the feature		
Factor	Factor rationale and other comments	Operational Limits
F1. Livestock grazing		<p><i>Upper limit:</i> Light browsing <i>Lower limit:</i> Not applicable Deer browsing definitions: Heavy: Absence of shrub layer, topiary effect on shrubs and young trees, browse line on mature trees, ground vegetation <10cm mostly grasses and mosses. Abundant dung, paths. Moderate: Patchy understorey with some evidence of browse line. Ground vegetation >30cm with mixture of</p>

		<p>species, locally some close cropped area. Tree saplings projecting above ground vegetation but may show some evidence of browsing</p> <p>Light: Well-developed understorey with no obvious browse line, lush ground vegetation with sensitive species such as bramble, honeysuckle and ivy. Tree seedlings and saplings common.</p>
F2. Adjacent land use	One of the component SSSIs lies close to opencast quarry. This may have indirect effects on the extent and quality of the woodland	No limits set. May need to be considered in the future.

4.2 Conservation Objective for Feature 2: *Asperulo–Fagetum* beech forests (EU Habitat Code:9130)

Vision for feature 2

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- *Asperulo–Fagetum* woodland continues to be present in Fiddler’s Elbow, Harper’s Grove-Lord’s Grove, Lower Hael, Cleddon Shoots and Blackcliff Wyndcliff, woods that contribute to the Wye Valley Woodlands SAC.
- The woodland area covers the entire site.
- The woodland is maintained as far as possible by natural processes.
- One quarter of the woodland canopy is open at any time.
- The location of open glades varies over time.
- Trees and shrubs are mainly locally native broadleaved species.
- The abundance and density of individual native species varies across the site.
- Trees and shrubs of a wide range of ages and sizes are present.
- Tree seedlings are plentiful throughout the site.
- Tree seedlings develop into saplings in the open glades.
- There are abundant dead and dying trees with holes and hollows, rot columns, torn off limbs and rotten branches.
- Some dead and dying trees will be partially or completely hollow.
- Fallen dead wood is dense enough to obstruct progress by foot across the entire site, except on established maintained paths.
- Field and ground layers are a patchwork of vegetation communities characteristic of local soil and humidity conditions.
- The woodland supports populations of birds (including pied flycatchers, redstarts, wood warblers) and mammals (including several bat species, otters and badgers).
- All factors affecting the achievement of these conditions are under control.

Performance indicators for Feature 2

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent of <i>Asperulo–Fagetum</i> beech forests	Monitoring is likely to be a map-based exercise. The area of <i>Asperulo–Fagetum</i> beech forests will be mapped as a baseline extent and the total area measured. Repeat monitoring will either re-map the site or review the baseline map in the field. <i>Asperulo–Fagetum</i> woodland is defined as having a canopy generally dominated (>50%) by <i>Fagus sylvestris</i> , however in some areas <i>Tilia cordata</i> , <i>Ulmus</i> spp., <i>Quercus</i> spp. or <i>Fraxinus excelsior</i> share dominance. The shrub layer is sparse with	<i>Lower Limit:</i> No loss of extent of feature (mapped as NVC community W12). Refer to Ecotech survey 1996. <u>and</u> The extent of the feature under high forest management, coppice with standards management and minimum intervention management is as outlined on Map X. Loss = 0.5 ha or 0.5% of the stand area, whichever is the smaller

	scattered <i>Corylus avellana</i> and <i>Fagus</i> saplings and occasional <i>Ilex aquifolium</i> . The field layer is also characterised by its sparse-ness, largely due to the presence of deep leaf litter, low light levels and thin soils. Patches of bare ground are frequent. However in some areas <i>Rubus fruticosus</i> or <i>Hedera helix</i> can form dense patches. Other associated ground flora species include <i>Mercurialis perennis</i> , <i>Hyacinthoides non-scripta</i> and <i>Luzula sylvatica</i> and <i>Dryopteris filis-mas</i>	
A2. Condition of the <i>Asperulo–Fagetum</i> beech forests	Based on the Standard CSM attribute for this feature. Modified according to site - specific requirements.	<p><i>Asperulo–Fagetum</i> woodland continues to be present within the following woodlands, in the units specified:</p> <p>Blackcliff-Wyndcliff – 29,30,31 Cleddon Shoots – 32,33,34 Fiddler’s Elbow SSSI (both Garth Wood and Lady Grove) –35,36 Harper’s Grove-Lord’s Grove – 39,40 Lower Hael -44</p> <p><i>Upper limit:</i> Not required <i>Lower limit:</i> 100% of the <i>Asperulo–Fagetum</i> woodland is in good condition, characterised by: Within a 25 m radius sample point</p> <ul style="list-style-type: none"> • ≤50% of the canopy forming trees are beech • ≥ 3 beech (<i>Fagus sylvatica</i>) saplings • ≥ 5 native canopy forming trees with girth >1.5 m • ≥ 2 dead trees, standing or fallen, of >20 cm diameter. • No more than 5% or less? of the canopy forming trees are non-native species • <20% of the canopy forming trees are sycamore (<i>Acer pseudoplatanus</i>) • <5% of the shrub layer is non-native
Performance indicators for factors affecting the feature		
Factor	Factor rationale and other comments	Operational Limits
F1. Livestock grazing	Refer to Feature 1	Refer to Feature 1
F2. Adjacent land use	Refer to Feature 1	Refer to Feature 1

4.3 Conservation Objective for Feature 3: *Taxus Baccata* woods of the British Isles (EU Habitat Code:91JO)

Vision for feature 3

- *Taxus Baccata* woodland continues to be present in Blackcliff Wyndcliff Woods that contribute to the Wye Valley Woodlands SAC.
- The woodland area covers the entire site.
- The woodland is maintained as far as possible by natural processes.
- The location of open glades varies over time.
- Trees and shrubs are mainly locally native broadleaved species.
- The abundance and density of individual native species varies across the site.
- Trees and shrubs of a wide range of ages and sizes are present.
- Tree seedlings are plentiful throughout the site.
- Tree seedlings develop into saplings in the open glades.
- There are abundant dead and dying trees with holes and hollows, rot columns, torn off limbs and rotten branches.
- Some dead and dying trees will be partially or completely hollow.
- Fallen dead wood is dense enough to obstruct progress by foot across the entire site, except on established maintained paths.
- Dead wood dependent species of moss, liverwort, fungi and specialised invertebrates are present, in spatially and temporally variable abundance, throughout the site.
- Field and ground layers are a patchwork of vegetation communities characteristic of local soil and humidity conditions.
- The woodland supports populations of birds (including pied flycatchers, redstarts, wood warblers) and mammals (including several bat species, otters and badgers).
- All factors affecting the achievement of these conditions are under control.

Performance indicators for Feature 3

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

Performance indicators for feature condition		
Attribute	Attribute rationale and other comments	Specified limits
A1. Extent of <i>Taxus baccata</i> woodland	Monitoring is likely to be a map-based exercise. The area of <i>Taxus baccata</i> woodland will be mapped as a baseline extent and the total area measured. Repeat monitoring will either re-map the site or review the baseline map in the field. <i>Taxus baccata</i> woodland is defined as where <i>Taxus baccata</i> (yew) achieves dominance or co-dominance in the canopy	Blackcliff Wyndcliff <i>Upper limit:</i> As limited by other habitat types <i>Lower limit:</i> As mapped in 1996 by Ecotech
A2. Condition of the <i>Taxus baccata</i> woodland	Based on the Standard CSM attribute for this feature. Modified according to site-specific requirements.	Where <i>Taxus baccata</i> woodland is the Key Habitat in the Management Units, Blackcliff –Wyndcliff - 30 <i>Upper limit:</i> Not required

		<p><i>Lower limit:</i></p> <p>The woodland canopy in managed sections of the wood is comprised of:</p> <p>>40% of trees are <i>Taxus baccata</i></p> <p>Tree - Any woody plant >2m tall</p>
<i>Performance indicators for factors affecting the feature</i>		
<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>
F1. Livestock grazing	Refer to Feature 1	Refer to Feature 1

4.4 Conservation Objective for Feature 4: Lesser horseshoe bat *Rhinolophus hipposideros* (EU Species Code: 1303)

Vision for feature 4

- The woodlands continue to support populations of lesser horseshoe bat.
- Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, mortality from predation or vehicle collision, and changes in habitat management that would reduce the available food source are not at levels, which could cause any decline in population size.
- Management of the woodland SAC is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size or range, nor any decline in the extent or quality of breeding, foraging or hibernating habitat, for example due to over-intensive woodland management.
- There will be no loss or decline in quality of linear features (such as hedgerows and tree lines), which the bats use as flight lines.
- Disturbance to roost sites both within the site and in the surrounding area, especially from human physical presence, noise and lighting, is minimized.
- All factors affecting the achievement of these conditions are under control.

Performance indicators for Feature 4

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Population of Lesser Horse shoe bat	<p>Lesser horseshoe bat is a qualifying feature but is not a primary reason for the selection of this SAC site.</p> <p>A number of lesser horseshoe bat maternity and hibernation roosts are located within the English side of the Wye Valley Woods SAC. Natural England will consider the condition of these and provide the assessment of this feature. However lesser horseshoe bats do use caves within the Welsh side of this SAC as hibernation roosts. Also, a number of large maternity roosts are located close to this SAC and the woodland are highly likely to be important feeding areas for this species of bat. A number of these roosts are included in the Wye Valley and Forest of Dean Bat Sites SAC.</p> <p>The lesser horseshoe bat is a feature of this SAC. However, the roosts lie on the English side of the SAC. Assessment of</p>	

	this feature shall be based on data collected by Natural England.	
<i>Performance indicators for factors affecting the feature</i>		
<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>
F1. Condition of the <i>Tilio–Acerion</i> , <i>Asperulo–Fagetum</i> , <i>Taxus Baccata</i> and non SAC semi natural broadleaved woodland	The conditions stipulated in the conservation objective/performance indicators for Feature 1,2, 3, 5 will ensure that the necessary requirements for flightlines and foraging for lesser horse shoe bat are met	Refer to Feature 1,2,3,5 - Attributes 1 & 2.

4.5 Conservation Objective for Feature 5: Non SAC semi natural broadleaved woodland (EU habitat Code: 9160)

Vision for feature 5

As Feature 1,2 and 3

Performance indicators for Feature 5

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent of non-SAC semi natural broadleaved woodland	Monitoring is likely to be a map-based exercise. The areas of non- SAC semi natural broadleaved woodland will be reviewed in the field against The Ecotech survey 1996 Definition of non-SAC semi natural broadleaved woodland: semi-natural woodland types not selected as SAC habitat features at this site including Sun-Atlantic and medio European oak and/or old sessile oak woods, alder woodland, conifer plantations and non-wooded areas.	No loss of extent in any of the eight woodlands
A2. Condition of the <i>non-SAC</i> semi natural broadleaved woodland	Based on the Standard CSM attribute for this feature. Modified according to site-specific requirements. See individual SSSI management plans for full details on site specific performance indicators.	It has been possible to deduce the SSSI feature condition from the SAC monitoring except in Fiddler's Elbow and Harper's Grove – Lord's Grove where additional monitoring work to assess the condition of the SSSI feature was undertaken
<i>Performance indicators for factors affecting the feature</i>		
<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>
As feature 1		

Aberbargoed Grasslands SAC

4.1 Conservation Objective for Feature 1: Marsh fritillary Butterfly *Euphydryas* (*Eurodryas*, *Hypodryas*) *aurinia* (EU Species Code: 1065)

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The site will support a sustainable metapopulation of the marsh fritillary in the Aberbargoed area. This will require at least 50ha of suitable habitat, although not all of this will be within the SAC
- The population will be viable in the long term, acknowledging the extreme population fluctuations of the species.
- Habitats on the site will be in optimal condition to support the metapopulation.
- At least 25ha of the total site area will be marshy grassland suitable for supporting marsh fritillary, with *Succisa pratensis* present and only a low cover of scrub.
- At least 6.25ha will be good marsh fritillary breeding habitat, dominated by purple moor-grass *Molinia caerulea*, with *S. pratensis* present throughout and a vegetation height of 10-20cm over the winter period.
- All factors affecting the achievement of the foregoing conditions are under control.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Density of larval webs Marsh fritillary butterfly <i>Euphydryas</i> (<i>Eurodryas</i> , <i>Hypodryas</i>) <i>aurinia</i>	We have limited web count surveillance information therefore we are unable to set site-specific targets therefore the targets set are based on those outlined in the generic guidance (Fowles, 2004)	<i>Upper limit:</i> Not required <i>Lower limit:</i> In one year in six the number of larval webs is estimated to be: 200 per hectare of good condition habitat.
A2. Extent of Marsh fritillary butterfly (<i>Eurodryas</i> , <i>Hypodryas</i>) <i>aurinia</i> Habitat	<p>There is limited habitat available in the landscape surrounding Aberbargoed Grasslands, therefore it is vital that management of the SAC needs to ensure that as much habitat as possible within the SAC is available to Marsh Fritillaries, to ensure their long term survival.</p> <p>Approximately 50ha of habitat is required to maintain the population in the long term, with at least 10ha in good condition. Not all is expected to be within the SAC. The specified limits reflect the minimum contribution of the Aberbargoed Grasslands SAC towards the favourable conservation status of the species in the Caerphilly area.</p> <p>Good condition habitat is defined as:</p> <p>Grassland, with <i>Molinia</i> abundant</p>	<i>Upper limit:</i> Not required <i>Lower limit:</i> 25ha of available habitat including 6.25ha of good condition habitat.

	<p>where, for at least 80% of sampling points, the vegetation height is within the range of 10 to 20 cm and <i>Succisa pratensis</i> is present within a 1 m radius. Scrub (>0.5 metres tall) covers no more than 10% of area.</p> <p>Suitable condition habitat is defined as:</p> <p>Stands of grassland where <i>Succisa pratensis</i> is present at lower frequencies but still widely distributed (>5% of sampling points) throughout the habitat patch and in which scrub (>0.5 metre tall) covers no more than 25% of area. Alternatively, <i>Succisa</i> may be present at high density in close-cropped swards. [note: Available habitat is the total of Good Condition and Suitable habitat]</p> <p>An assessment of Rhos Pasture habitat in Caerphilly CBC, in respect of its suitability and condition for the priority butterfly species, marsh fritillary <i>Euphydryas aurinia</i> was carried out in February 2005 by Richard Smith. This highlights areas around Aberbargoed Grassland that could support metapopulations of marsh fritillary.</p>	
A3. Condition of Marsh fritillary butterfly (<i>Eurodryas</i> , <i>Hypodryas</i>) <i>aurinia</i> Habitat	Refer to feature 2.	<p><i>Upper limit:</i> Not required</p> <p><i>Lower limit:</i> See feature 2.</p>
Performance indicators for factors affecting the feature		
Factor	Factor rationale and other comments	Operational Limits
F1. Livestock grazing	The <i>eu-Molinion</i> marshy grassland needs to be maintained through traditional farming practices. Without an appropriate grazing regime, the grassland will continue to become rank and eventually turn to scrub and woodland. Light grazing by cattle and ponies between April and November each year is essential in maintaining the marshy grassland communities.	<p><i>Upper limit:</i> to be agreed</p> <p><i>Lower limit:</i> See feature 2</p>
F2. Anti-social behaviours	In previous years anti-social behaviour such as off-roading and burning have occurred at Aberbargoed grasslands.	<p>See feature 2</p> <p><i>Upper limit:</i> None</p>

	This issues need to be addressed to prevent the <i>eu-Molinion habitat</i> from being damaged.	<i>Lower Limit:</i> None tolerated
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4.2 Conservation Objective for Feature 2: *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caerulea*) (EU Habitat Code: 6410)

Vision for feature 1

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- *eu-Molinia* marshy grassland will occupy at least 70% of the total site area.
- The remainder of the site will be other semi-natural habitat or areas of permanent pasture.
- The following plants will be common in the *eu-Molinia* marshy grassland: purple moor-grass *Molinia caerulea*; meadow thistle *Cirsium dissectum*; devil's bit scabious *Succisa pratensis*; carnation sedge *Carex panicea*; saw wort *Serratula tinctoria*; and lousewort *Pedicularis sylvestris*.
- Cross-leaved heath *Erica tetralix* and common heather *Calluna vulgaris* will also be common in some areas.
- Rushes and species indicative of agricultural modification, such as perennial rye grass *Lolium perenne* and white clover *Trifolium repens* will be largely absent from the *eu-Molinia* marshy grassland.
- Scrub species such as willow *Salix* and birch *Betula* will also be largely absent from the *eu-Molinia* marshy grassland.
- All factors affecting the achievement of these conditions are under control.

Performance indicators for Feature 1

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

Performance indicators for feature condition		
Attribute	Attribute rationale and other comments	Specified limits
A1. Extent of <i>Eu Molinia</i> grassland	Lower limit is based on current extent. The draft mapping guidance developed by Adrian Fowles was used to map the habitat at Aberbargoed and is in itself a condition mapping exercise that has provided information on the quality of the habitat.	<i>Upper limit:</i> As limited by other habitats. <i>Lower limit:</i> Current extent (As shown in SAC monitoring report by Karen Wilkinson 2002)
A2. Condition of <i>Eu Molinia</i> grassland	Habitat quality required within each of the four areas reflects that detailed in the generic guidance. In addition however sampling in good condition habitat at Aberbargoed indicated that <i>Succisa</i> is present at a density of 5% or more. This has therefore been incorporated into the sites based performance indicators.	<i>Upper limit:</i> Not required <i>Lower limit:</i> Within fields H,L,M and W (on phase II map) 50% of the vegetation meets the following criteria: Within a 50cm radius: <i>Molinia</i> is present AND The cover of <i>Succisa</i> is 5% or greater AND The vegetation height is between 10-20cm when measured using a

		Boorman's disc. AND Scrub (including seedlings of any tree species and bramble) is absent.
Performance indicators for factors affecting the feature		
Factor	Factor rationale and other comments	Operational Limits
F1. Livestock grazing	The <i>eu-Molinion</i> marshy grassland needs to be maintained through traditional farming practices. Without an appropriate grazing regime, the grassland will continue to become rank and eventually turn to scrub and woodland. Light grazing by cattle and ponies between April and November each year is essential in maintaining the marshy grassland communities.	<i>Upper limit:</i> to be agreed <i>Lower limit:</i> as grazing is has only been happening for two years it will need constant review to make sure we get it right. The <i>eu Molinion</i> grasslands have been grazed hard for the first couple of year to get through the litter build up. Now light grazing by cattle is required.
F2. Burning/off-road vehicles	In previous years anti-social behaviour such as off-roading and burning have occurred at Aberbargoed grasslands. This issues need to be addressed to prevent the <i>eu-Molinion habitat</i> from being damaged.	<i>Upper limit:</i> None <i>Lower Limit:</i> No burning No off-road vehicles

4.3 Conservation Objective for Feature 3 & 4:

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Non SAC features-Marshy Grassland, Dry Neutral Grassland	See features 1 & 2	<i>Upper limit:</i> See features 1 &2 <i>Lower limit:</i>
<i>Performance indicators for factors affecting the feature</i>		
<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>
F1. Livestock grazing	See features 1 &2	<i>Upper limit:</i> See features 1 &2 <i>Lower limit:</i>
F2. Anti-social behaviours	See features 1 &2	<i>Upper limit:</i> See features 1 &2 <i>Lower Limit:</i>

Feature 3 and 4 to be completed

European Site Conservation Objectives for Avon Gorge Woodlands Special Area of Conservation Site code: UK0012734

With regard to the natural habitats and/or species for which the site has been designated („the Qualifying Features” listed below);

Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.

Subject to natural change, to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species;
- The distribution of qualifying species within the site.

Qualifying Features:

H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*); Dry grasslands and scrublands on chalk or limestone

H9180. *Tilio-Acerion* forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes*

* denotes a priority natural habitat or species (supporting explanatory text on following page)

*** Priority natural habitats or species**

Some of the natural habitats and species listed in the Habitats Directive and for which SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Directive and the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Directive. The term „priority“ is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Directive or the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

European Site Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations”) and Article 6(3) of the Habitats Directive 1992. They are for use when either the appropriate nature conservation body or competent authority is required to make an Appropriate Assessment under the relevant parts of the respective legislation.

These conservation objectives are set for each habitat or species of a [Special Area of Conservation \(SAC\)](#). Where the objectives are met, the site can be said to demonstrate a high degree of integrity and the site itself makes a full contribution to achieving favourable conservation status for those features.

This document is also intended for those who are preparing information to be used for an appropriate assessment by either the appropriate nature conservation body or a competent authority. As such this document cannot be definitive in how the impacts of a project can be determined. Links to selected sources of information, data and guidance which may be helpful can be found on Natural England’s website. This list is far from exhaustive.

European Site Conservation Objectives for North Somerset and Mendip Bats Special Area of Conservation Site code: UK0030052

With regard to the natural habitats and/or species for which the site has been designated („the Qualifying Features” listed below);

Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.

Subject to natural change, to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species;
- The distribution of qualifying species within the site.

Qualifying Features:

H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*); Dry grasslands and scrublands on chalk or limestone

H8310. Caves not open to the public

H9180. *Tilio-Acerion* forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes*

S1303. *Rhinolophus hipposideros*; Lesser horseshoe bat

S1304. *Rhinolophus ferrumequinum*; Greater horseshoe bat

* denotes a priority natural habitat or species (supporting explanatory text on following page)

*** Priority natural habitats or species**

Some of the natural habitats and species listed in the Habitats Directive and for which SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Directive and the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Directive. The term „priority“ is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Directive or the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

European Site Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations”) and Article 6(3) of the Habitats Directive 1992. They are for use when either the appropriate nature conservation body or competent authority is required to make an Appropriate Assessment under the relevant parts of the respective legislation.

These conservation objectives are set for each habitat or species of a [Special Area of Conservation \(SAC\)](#). Where the objectives are met, the site can be said to demonstrate a high degree of integrity and the site itself makes a full contribution to achieving favourable conservation status for those features.

This document is also intended for those who are preparing information to be used for an appropriate assessment by either the appropriate nature conservation body or a competent authority. As such this document cannot be definitive in how the impacts of a project can be determined. Links to selected sources of information, data and guidance which may be helpful can be found on Natural England’s website. This list is far from exhaustive.

4.1 Conservation Objective for Feature 1:

Lesser Horseshoe Bat *Rhinolophus hipposideros* (EU species code:1304)

Vision for Feature 1

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The site will support a sustainable population of lesser horseshoe bats in the River Usk area.
- The population will viable in the long term, acknowledging the population fluctuations of the species.
- Buildings, structures and habitats on the site will be in optimal condition to support the populations.
- Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, and mortality from predation or vehicle collision, changes in habitat management that would reduce the available food source are not at levels which could cause any decline in population size or range
- Management of the surrounding habitats is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size or range, nor any decline in the extent or quality of breeding, foraging or hibernating habitat.
- There will be no loss or decline in quality of linear features (such as hedgerows and tree lines) which the bats use as flight lines - there will be no loss of foraging habitat use by the bats or decline in its quality, such as due to over-intensive woodland management
- All factors affecting the achievement of the above conditions are under control.

Performance indicators for Feature 1

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A.1 Pre-parturition population in the maternity roost	The is the target for the number of adult bats required each year during early summer, when females gather to give birth and numbers are likely to be at their highest. The figure of 320 bats is based on the lowest number of bats at Buckland between 2000 and 2006.	On at least one occasion between 29 th May and 17 th June of every year, there will be: <ul style="list-style-type: none"> • 320 or more bats at Buckland Coach House and 600 bats to be recorded at Buckland Coach House in at least one year during the six year monitoring cycle
A.2 Population in hibernation roost	There are a large number of hibernation sites within the SAC, and also a number outside the SAC, which all contribute towards maintaining the SAC population of lesser horseshoe bats. For the performance indicators for the SAC, counts will therefore be undertaken at five key sites. Buckland Ice House, closely associated with the maternity roost, is the easiest	During at least one surveillance visit between 1 st January and 28 th February of every year, there will be: <ul style="list-style-type: none"> • 270 or more lesser horseshoe bats at Agen Allwedd cave, and 500 (this figure may need revising as 500 is close to the maximum recorded, although current trends show an increasing

	<p>site to count. The numbers in the performance indicators are based on maximum counts between 2000 and 2006, and have been devised using the same rationale as for the maternity site. However, there are some difficulties in timing of counts at Buckland Ice House. The site is used by large numbers of bats during relatively mild winters. In cold weather the ice house becomes unsuitable, and the bats relocate to another site not within the SAC, (Ogof Cynnes). For this reason counts for this hibernaculum will be accepted between 1st November and 28th February.</p> <p>Counts at cave sites are technically very difficult. Bats are often difficult to see and also frequently move hibernation site, within the cave and between caves. They may use parts of the cave inaccessible to humans.</p> <p>There are also specific problems at the Usk Bat Sites hibernation sites. Agen Allwedd is a large cave system with a number of passages. One section particularly favoured by bats is known as Angel's Roost. However, it is occasionally impossible to survey this section, because bats are hibernating in the passage to it, and it cannot be reached without disturbing these bats. The Clydach Gorge sites consist of more than 10 caves, not all of which are continually used, but which collectively support a significant part of the wintering bat population. Foxwood is a drift cave with holes in the cave roof. This allows warm air in the cave to escape during the winter. As a result, bats frequently leave this site when it becomes too cold. The internal temperature when the site is surveyed is therefore critical to gaining an accurate picture of the importance of this site for lesser horseshoe bats.</p> <p>The numbers of bats expected at each site have been calculated using the same rationale as that used for the maternity site. An alternative lower number is provided for situations in which the Angel's Roost section of Agen Allwedd cannot be accessed. This count should</p>	<p>population) or more present at least once during the six year monitoring cycle OR 220 or more lesser horseshoe bats at Agen Allwedd Cave excluding the Angel's roost section (see rationale below), AND</p> <ul style="list-style-type: none"> • A total of 18 or more lesser horseshoe bats at the Clydach Gorge cave sites, and 47 to be recorded at least once during the six year monitoring cycle, AND <p>During at least one surveillance visit between 1st November and 28th February of each year,</p> <ul style="list-style-type: none"> • 280 or more lesser horseshoe bats at Buckland Ice House and 470 to be recorded at least once during the six year monitoring cycle AND <p>During at least one surveillance visit between 1st November and 28th February of each year, when the internal temperature of the cave is 6°C or above there will be:</p> <ul style="list-style-type: none"> • 60 lesser horseshoe bats at Foxwood cave AND <p>There is continued use by lesser horseshoe bats at Siambre Ddu (data collected from this site requires further examination in order to devise population limits).</p>
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	<p>not be used in years when Angel's Roost is accessible.</p> <p>Siambre Ddu is another large roost. Data recently collected from this site requires further examination in order to devise population limits. It is expected that the lower limit would be in the region of several 10s of bats. The performance indicator for this site at present requires only that bats be present. Droppings will not be used to make assumptions about bats using the site.</p> <p>Once more data is collected, it is possible that a moving (6yearly) average could be calculated, such that a fall in numbers of say 10% could flag up a potential decline in health of the population.</p>	
Performance indicators for factors affecting the feature		
Buckland House Maternity Roost (may also apply to other non-SAC maternity roosts)		
Factor	Factor rationale and other comments	Operational Limits
F.1 Site security	Derived from Common standards Monitoring advice.	Access to the site under the control of the owner/occupier or site secured against unauthorised access. Doors, gates or security fences in sound condition and able to resist unauthorised access attempts
F.2 External condition of building	As above.	<p>Fabric of building sufficient to maintain roost conditions internally with:</p> <ul style="list-style-type: none"> • Weatherproof roof. The roof covering materials (slates, tiles etc.) in weatherproof condition with no significant gaps, slippage or damage. • No holes large enough to allow soaking of roof timbers, excessive heat loss or high light levels in the roost area • Walls sound, rainwater goods in adequate condition. <p>The building is structurally stable. No significant deterioration in overall condition of the building</p>
F.3 Roost entrance – buildings and underground	As above.	<ul style="list-style-type: none"> • Unobstructed roost entrance large enough for bats to fly through unimpeded. Normal minima: 300 x 200 mm

sites		No artificial lights shining on access or associated flight paths
F.4 External Disturbance	As above.	Disturbance levels acceptable to bats with: <ul style="list-style-type: none"> No increase since previous visit Human access to roost controlled and limited
F.5 Internal condition of building/ underground site in roost area	As above.	<ul style="list-style-type: none"> Low light levels with no through draught. No toxic substances present, which would adversely affect the health of the bats (e.g. chemical timber treatment within inappropriate substances).
F.6 Temperature of roost area	As above.	<ul style="list-style-type: none"> Range of temperatures available to bats with mean temperature in July greater than 20°C
F.7 Internal disturbance	As above.	<ul style="list-style-type: none"> Human access to roost area controlled and limited Disturbance is kept to a minimum
<i>Hibernation Sites</i>		
F.8 Site entrance	As above.	<ul style="list-style-type: none"> Existing entrances unobstructed. No human-influenced new entrances causing a change to ventilation. No change in size sufficient to affect airflow and internal temperature.
F.9 External conditions of site	As above.	<ul style="list-style-type: none"> Vegetation present close to entrance (s) but not obstructing it (them). No artificial lights shining on entrance(s).
F.10 Internal conditions	As above.	<ul style="list-style-type: none"> The temperature should remain constantly cool (8-12°C) and dark, once beyond the entrance zone No significant man-induced changes to ventilation or temperature regime. No toxic substances present (dumping of oil or other substances).
F.11 Internal disturbance	As above.	<ul style="list-style-type: none"> Human access to roost area controlled and limited (at Agen Allwedd the number of visitors is already controlled) Disturbance is kept to a minimum.

<i>Foraging areas and links to roosts</i>		
F.12 Habitat Quality	The bats mainly feed along the edges of woodland, large hedges and tree-lined rivers within and around the SAC areas and land situated between the SSSIs in the Usk valley area between Llangorse and Abergavenny.	There should be no nett loss of suitable woodland, scrub and hedgerows within the SAC or adjoining areas used by the bats.
F.13 Connectivity	<p>The bats appear to prefer not to like crossing large areas of open ground and therefore retaining or providing new cover would be beneficial. Links between foraging areas, maternity roosts and hibernacula, are provided by hedgerows, woodland, scrub and lines of trees.</p> <p>There are quite a few maternity roosts in buildings in the Usk valley area that are not within in the SAC, so connectivity is important here too.</p>	Major gaps in the continuity of these habitats should not be created. See also F12 above.
The extent of these habitats shown on aerial photographs taken in 2006 forms a baseline to measure habitat cover.		

4.2 Conservation Objective for Feature 2: Blanket bog

Vision for Feature 2

- The extent, quality and species richness of the blanket bog vegetation is maintained and, where possible, degraded bog is restored to good condition so that this habitat occupies its full potential range within the site.
- The bog vegetation is largely a mixture of dwarf shrubs, hare's-tail cottongrass and mosses, including bog-mosses.
- Extensive areas of purple moor-grass or hare's-tail cottongrass show signs of recovery towards a more mixed dwarf shrub sward.
- The natural hydrological regime is maintained and there is continued peat formation and thus carbon storage.
- Areas of bare peat are not extensive and most areas show signs of recovery.
- Peat profiles containing important pollen records are maintained.
- All factors affecting the achievement of the above conditions are under control.

Performance indicators for Feature 2

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>

A1. Extent	There have been past losses and degradation, so it is essential to maintain the current (2003) extent of the habitat and to restore degraded areas where possible.	<i>Upper limit:</i> 280 ha, constrained by site topography and hydrology. <i>Lower limits:</i> 150 ha (c 90% of extent as measured in 2003).
A2. Quality of the Blanket bog	<p>The key attributes are presence and frequency of positive (listed below) and negative indicator species and the lack of significant grazing damage to the dwarf shrubs (where present).</p> <p>These conditions should be met in 90% of the blanket bog.</p>	<p><i>Upper Limits:</i> No more than 75% cover of purple moor-grass, hare's-tail cottongrass, deergrass or common haircap moss (<i>Polytrichum commune</i>). AND: Less than 1/3 of shoots of all dwarf shrub species collectively showing signs of browsing. AND: <i>Lower limits:</i> 6 positive indicator species present. AND: 50% of vegetation cover comprising 3 or more of the positive indicators. AND: flat-topped bog-moss (<i>Sphagnum fallax</i>) should not be the only bog-moss present. Ideally <i>S. capillifolium</i> and other true 'bog' species would be present. (further work required to elucidate the species present or likely to be present at this locality).</p>
Performance indicators for factors affecting the feature		
Factor	Factor rationale and other comments	Operational Limits
F1. Peat Erosion	<p>There is a natural cycle of peat erosion and deposition but the balance can be upset by burning, heavy grazing, pollution and vehicle damage.</p> <p>The process is best measured across the whole plan area using aerial photography, backed by ground checks, where necessary.</p>	<p><i>Upper limit:</i> The total extent of active erosion over a 5-year period should not exceed the total extent of areas showing signs of peat accumulation and re-vegetation. <i>Lower limit:</i> There are always some areas of bare peat present as a result of natural erosive processes.</p>
F2. Burning	Blanket bog is adversely affected by burning, which leads to surface drying and the replacement of bog-mosses by purple moor-grass and common haircap.	<p><i>Upper limit:</i> No evidence of significant burning (patches larger than 1ha) in any areas of blanket bog. <i>Lower limit:</i> N/A.</p>
F3. Drainage	Significant new drains within the bog areas could cause surface drying and peat erosion. Most old drains are now blocked with peat.	<p><i>Upper Limit:</i> No evidence of new drains or major clearance of old drains or deepening of bog outlet streams. <i>Lower limit:</i> N/A.</p>

F4. Air Quality	<p>High levels of air pollution are believed to be damaging and there may be combined effects. Increased cover of hare's-tail cottongrass and flat-topped bog-moss may be symptoms, as could increased levels of peat erosion. The Environment Agency has set critical levels for these pollutants in relation to various types of vegetation (Refer to the APIS database at www.airquality.co.uk).</p> <p>Monitoring stations located at grid location: 319097.79 214637.88</p>	<p><i>Upper limits:</i> No exceedence of critical loads for Sulphur dioxide – 20µg/m³ Nitrous Oxides – 30µg/m³ Ozone – 3000 ppb ammonia – 1µg/m³ N – 5-10 kg/ha/yr acid – 0.35keq/ha/yr</p> <p><i>Lower limits:</i> None.</p>
<p>Positive indicators for blanket bog quality: Bog rosemary (<i>Andromeda polifolia</i>); heather (<i>Calluna vulgaris</i>); round-leaved sundew (<i>Drosera rotundifolia</i>); cross-leaved heath (<i>Erica tetralix</i>); crowberry (<i>Empetrum nigrum</i>); common cottongrass (<i>Eriophorum angustifolium</i>); hare's-tail cottongrass (<i>E. vaginatum</i>); bog asphodel (<i>Narthecium ossifragrum</i>); non-crust-forming lichens (count together); other mosses (count together as one); bog-mosses (<i>Sphagnum spp.</i> – count each species*); deergrass (<i>Trichophorum cespitosum</i>); bilberry (<i>Vaccinium myrtillus</i>); cowberry (<i>V. vitus-idaea</i>).</p> <p>* flat-topped bog-moss only counts if at least other species (further survey required) of bog-moss is present.</p>		
<p>Definition of blanket bog vegetation: Generally occurs where the peat is deeper than half a metre and conforms with National Vegetation Classification types M17, M19 & M20b.</p>		

4.3 Conservation Objective for Feature 3: Tilio-Acerion forests of slopes, screes and ravines

Vision for Feature 3

The vision for this feature is for it to be in favourable conservation status within the site, as a functioning and regenerating ash woodland, where all of the following conditions are satisfied:

- There are extensive patches of semi-natural woodland on the cliffs of the Llangatwg escarpment and hillsides in the Clydach gorge.
- The woodland canopy is dominated by locally native species, including lime ash *Fraxinus excelsior*, Tilia spp., pedunculate oak *Quercus robur*, hazel *Corylus avellana*, birch *Betula* spp., whitebeams *Sorbus* spp. and, in the Clydach gorge, beech *Fagus sylvatica*. Rare whitebeams are a significant component of the canopy.
- Saplings of locally native species dominate the tree regeneration and there is evidence of sufficient regeneration to maintain the canopy in the long term.
- There is an accumulation of standing and fallen deadwood as the woodland develops.
- The woodland ground flora is composed of a range of typical native plants including enchanters-nightshade *Circaea lutetiana*, dog's-mercury *Mercurialis perennis*, wood-sorrel *Oxalis acetosella*, hart's-tongue *Phyllitis scolopendrium* and wood sage *Teucrium scorodonia*.
- The populations of rare whitebeams are stable or increasing.

- Young sycamore *Acer pseudoplatanus* trees are rare, as are beech *Fagus sylvatica* in areas away from the Clydach gorge.
- Plants indicating disturbance and nutrient enrichment, such as nettles, cleavers and weeds, are not dominant in the ground flora of the woodland.
- All factors affecting the achievement of the above conditions are under control.

Performance indicators for Feature 3

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent of and distribution	<p>To be assessed using aerial photography and ground checking. The total area of broadleaved semi-natural woodland, screes and ravines has been mapped as a baseline but extent of ash dominated types has been estimated as they can be intermixed with other types.</p> <p>Tilio-Acerion forests of slopes, screes and ravines is defined as: any area where there is a more-or-less continuous cover of shrubs over 3 metres tall, with or without woodland canopy trees such as ash. In the long-term, when a better woodland community has developed, then these objectives will need to be revisited.</p>	<p><i>Lower limit:</i> 13.5 ha, of which units 1 & 2 support at least 10 ha and unit 5 supports at least 3.5 ha. Small areas are also present in units 12 & 13.</p> <p><i>Upper limit:</i> N/A</p>
A2. Canopy cover	<p>The woodland is scattered over the lower slopes of Craig y Cilau and extends onto the cliff areas. The latter is secure from the effects of grazing and is probably more or less self-sustaining. The remaining woodland on the grazed slopes has been developing for sometime, and at present it is assumed that this development will continue, provided that the grazing is at a level to permit gradual regeneration. In the long-term (at least 50 years hence), when a better woodland community has developed, then these objectives will need to be revisited.</p>	<p><i>Upper limits:</i> 90% canopy cover OR: 60% on the south-west facing slopes of unit 1 <i>Lower limits:</i> 75% canopy cover OR: 30% on the south-west facing slopes of unit 1</p>
Attributes A3 –A7 below apply to the main woodland stands in units 1, 2 & 5 (see maps in Annex 1).		
A3. Regeneration	In the Clydach gorge on the southern slopes of Mynydd Llangatwg there are	<p><i>Upper limit:</i> N/A <i>Lower limit:</i> Canopy forming</p>

	<p>stands of ungrazed woodland, which are unlikely to ever be grazed. Therefore the same performance indicators can be applied to all areas.</p> <p>Regeneration to be met in at least 50% of significant gaps in canopy. Such gaps should be recorded at each monitoring visit.</p>	<p>shrubs, trees or coppice re-growth at least 1.5m high present (should be evident in at least one location within each woodland block).</p>
A4. Woodland structure	<p>A functioning woodland system will have trees of all ages present.</p> <p>Veteran trees provide particularly important habitat for birds and invertebrates.</p> <p>75% of the woodland should meet the criteria for an understorey.</p>	<p><i>Upper limit:</i> N/A</p> <p><i>Lower limits:</i> An understorey at a height of 2–5m over at least 20% of the stand, composed of locally native species, such as yew, wych elm, whitebeams, hawthorn, limes, rowan, hazel and ash.</p> <p>AND:</p> <p>In grazed areas there should be evidence of an understorey developing.</p>
A5. Canopy composition	<p>In some areas non-native trees, such as sycamore, will be tolerated, as long as they are not freely re-generating to form large saplings in the understorey, which would likely change the canopy composition over time. Consequently, only 70% of the woodland need comply with the limits set.</p>	<p><i>Upper limit:</i> None</p> <p><i>Lower limit:</i> 95% of tree cover is composed of locally native species, such as ash, whitebeams, wych elm, rowan, field maple, hazel, or beech.</p>
A6. Ground flora	<p>The ground flora is naturally quite sparse in the rocky areas of units 1 and 2, but a few typical ash woodland plants should be evident in all areas.</p> <p>Brambles and ivy can be locally abundant in ungrazed ash woodland but other indicators of disturbance and nutrient enrichment should not be.</p> <p>Limits should be met for 80% of the woodland.</p>	<p><i>Upper limit:</i></p> <p>The cover of nettles should not exceed 10%.</p> <p><i>Lower limit:</i> Typical ground flora species (see list below) should be evident throughout the woodland.</p>
A7. Deadwood	<p>Deadwood will be retained.</p> <p>The limits given here should be met in at least 50% of existing woodland.</p>	<p><i>Upper limit:</i> None</p> <p><i>Lower limit:</i> Presence of standing and/or fallen deadwood.</p>
<p>Typical ash woodland plants: Dog's-mercury; Bramble; Violets; Lesser celandine; Barren strawberry; Ivy; Herb-Robert; Hart's-tongue fern; Chalk comb-moss <i>Ctenidium molluscum</i>; Wild garlic; Wood false-brome; Wood sage; Wood Melick; Shield ferns; Enchanter's-nightshade; Wood avens; Lords-and-ladies and Male fern.</p>		
<i>Performance indicators for factors affecting the feature</i>		

<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>
F1. Grazing	<p>The present structure and species composition of the northern escarpment woodland, excluding the cliff ledges, is a result of natural regeneration. The cliff ledges are inaccessible to stock, have developed naturally and are not actively managed.</p> <p>The greatest influence on the woodland, and its continued regeneration, is grazing. In units 1 & 2, the woodland has developed on common land and parts are subject to high grazing levels by sheep. The woodland in units 5, 12 & 13 is now largely un-grazed and the ground flora is noticeably more luxuriant in these areas.</p>	<p><i>Upper limit:</i> Sufficient to allow regeneration in the long term, as defined by the regeneration attribute above.</p> <p><i>Lower limit:</i> None required.</p>
F2. Non-native species	<p>Beech is at the edge of its range in this part of Wales. In units 5, 12 and 13 the beech wood appears to be natural, but the spread of beech over much of Units 1 & 2 may not be desirable, as it would replace the ash woodland.</p> <p>Limits should be met in 70% of the woodland.</p>	<p><i>Upper limits:</i> 5% cover of non-native trees in the canopy.</p> <p>AND:</p> <p>No cotoneaster (or other invasive non-native shrubs) in the understorey or shrub layer.</p> <p><i>Lower limit:</i> None.</p>
F.3 Woodland Management	<p>Natural ecological processes should be allowed to operate as far as possible. In many areas, these are gradually creating greater structural diversity.</p> <p>Most of the woodland on the site is not actively managed (indeed much occurs on cliffs and will never have been managed).</p>	<p>There should be no evidence of tree felling or coppicing within the past five years. (Tree surgery for safety reasons excluded).</p>

4.4 Conservation Objective for Feature 4: Calcareous rocky slopes with chasmophytic vegetation

Vision for Feature 4

- Sufficient vegetation within crevices remains free from disturbance to support typical plants, including mosses, ferns and rare hawkweeds (*Hieracium* spp.) and allow them to sustain their populations into the future.
- Areas accessible to grazing animals should free from being smothered by ivy or heavily shaded by trees.
- All factors affecting the achievement of the above conditions are under control.

Performance indicators for Feature 4

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent and Distribution	<p>The distribution of calcareous rocks (including old quarries) as been mapped as a baseline. However, it has not been possible to accurately map or measure the extent of the chasmophytic vegetation itself.</p> <p>Calcareous rocky slopes with chasmophytic vegetation is defined as: plant species capable of colonising cracks and fissures of rock faces, and the type of plant community depends on the base-status of the rock face.</p>	<p><i>Lower limit:</i> 11ha of suitably open cliffs and scree and old quarry faces, mainly located in units 1 & 2, with outliers in unit 13.</p>
A2. Condition	<p>Many of the cliff areas are inaccessible to grazing stock, and therefore it is reasonably certain that the communities are self-sustaining, assuming that they are not at risk from ivy growing up from below.</p> <p>The species composition is beyond the influence of management, so all that is required is to assume the habitat is not threatened by land use of changes in management.</p> <p>Condition attributes should apply to the key areas of open rocky ground in units 1 & 2, as shown on the maps in Annex 1 of this plan.</p>	<p><i>Upper limits:</i> Alien species should be absent, especially cotoneasters.</p> <p>AND: Brambles, nettles, bracken, ivy and shrubs should remain scattered and subdued by grazing, where accessible to livestock.</p> <p><i>Lower limits:</i> Chasmophytic and ledge vegetation should be diverse and abundant in available crevices and ledges.</p> <p>AND: Crevices support a mixture of mosses and higher plants.</p>

<i>Performance indicators for factors affecting the feature</i>		
<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>
F1. Grazing	Low grazing levels are important in controlling the growth of ground-smothering species such as ivy, which have the potential to smother boulders and cliff faces that are important for their lower plant communities. Tree growth at the base of the cliffs may shade out important calcareous chasmophytic habitat, so should be controlled within limits outside the areas of agreed woodland. Surveillance of grazing levels and type should be maintained so that changes that may influence the features on the site are identified and recorded.	<i>Upper limit:</i> To be set in relation to the requirements of the limestone grassland. <i>Lower limits:</i> Sufficient to prevent the development of scrub or spread of ivy and tall vegetation. NB. Limits apply to the key areas in units 1 & 2.
F2. Quarrying	Any quarrying in the key areas would lead to habitat loss.	No quarrying in the key areas as shown on the maps in Annex 1.
F3. Rock Climbing	Intensive use can dislodge plants and disturb breeding birds. These impacts may be avoided if climbing is subject to specific agreements, which include a code of conduct.	No rock climbing in the key areas of units 1 & 2 without agreement.

4.5 Conservation Objective for Feature 5: Caves not open to the public

Vision for Feature 5

- The cave system provides a winter hibernation site for large numbers of lesser horseshoe bats and other bat species, including Brandt's, whiskered, Daubenton's, Natterer's, brown long-eared and, occasionally, greater horseshoe bats.
- Numbers of roosting bats are stable or increasing in the system as a whole.
- All factors affecting the achievement of the above conditions are under control.

Also see the vision for lesser horseshoe bats.

As outlined in the JNCC description of this feature, the cavernicolous fauna is considered to be impoverished throughout the UK and this feature is not a primary reason for selection of any SAC in the UK (www.jncc.gov.uk).

There is however significant bat interest associated with many of the caves within this SAC, particularly Lesser Horseshoe Bat. Great Horseshoe Bat has also been recorded in very small numbers. Several other bat species are recorded, particularly from the genus *Myotis*, but their habit of hibernating deep within crevices in the caves (rather than hanging freely from the cave roof, like horseshoe species) makes them extremely difficult to record.

Performance indicators for Feature 5

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent and Distribution of the habitat	Within Mynydd Llangatwg SSSI, many of the same cave passages used by lesser horseshoe bats are also used by other hibernating bat species.	No loss of suitable bat hibernating areas in units 1, 2, 5, 12, 13 and 19.
A2. Species of bat using the caves	Records of other bats using the caves in total at least seven species. These have included Lesser Horseshoe, Greater Horseshoe, Brandt's, Whiskered, Natterer's, Daubentons and Brown Long-eared.	<i>Upper Limit:</i> N/A <i>Lower limit:</i> At least 6 of the species listed are recorded as using the caves as hibernation site in Unit 1. AND: At least 3 of the species listed are recorded as using the caves as hibernation site in Unit 2.

<i>Performance indicators for factors affecting the feature</i>		
F1. Condition of the habitat	It is assumed that the condition of the hibernating areas should be much the same for all bat species, although most of the myotid species require less open space as the hibernate in small crevices.	See factors F1-F13 for lesser horseshoe bats in 4.1 above.

4.6 Conservation Objective for Feature 6:

Degraded raised bogs still capable of natural regeneration

Vision for Feature 6

- The extent, quality and diversity of raised bog vegetation is maintained and, where possible, restored to good condition, with active moss and peat growth across the raised bog surface.
- The vegetation consists of a mixture of dwarf shrubs, hare's-tail cottongrass, deergrass and bog mosses, grading at the edges into acid and alkaline flushes influenced by acidic water draining from the bog and springs rising in the limestone catchment.
- All factors affecting the achievement of the above conditions are under control.

Performance indicators for Feature 6

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent	Monitoring is likely to be a map-based exercise. The area of degraded raised bog will be mapped as a baseline extent and the total area measured. Repeat monitoring will either re-map the site or review the baseline map in the field.	<i>Upper Limit:</i> None, constrained by governed by site topography. <i>Lower limit:</i> 3.4 ha
A2. Condition	<p>The important attributes for degraded raised bog on this site are considered to be:</p> <ul style="list-style-type: none"> • Ericaceous shrub cover • Species compliment • Height of vegetation • Cover of bog-mosses, grass cover and bare ground • Indicators of grazing pressure <p>The invasion of trees and scrub is not an issue on the site. Consequently, no performance indicator is required for this element. If this becomes a problem in the future then this can be addressed by adding additional performance indicators.</p> <p>At least 80% of the feature must fall within the limits.</p>	<p><i>Upper Limit:</i> The total cover of grasses is less than 50% AND: Dwarf shrub cover is less than 70% AND: Cover of bare peat is less than 10%</p> <p><i>Lower limits:</i> Cover of hummock forming bog-mosses is at least 10% AND: Vegetation must support at least 5 of the following plants: Heather, sundews, cross-leaved heath, common cotton-grass, hare's-tail cottongrass, bog asphodel, non-crustose lichens, bog-mosses, deer-grass and bilberry. AND: Vegetation is at least 10cm high.</p>

<i>Performance indicators for factors affecting the feature</i>		
<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>
F1. Grazing	This area of bog has been damaged by heavy grazing in the past and current (2008) grazing levels are still to high to enable the re-generation of the bog habitats. Most of the bog is on commonland and therefore it is difficult to control grazing without agreement and fencing.	<i>Upper limits:</i> Overall grazing pressure of 0.05 livestock units/ha/year on the bog area. AND: Minimal winter grazing. AND: no stock feeding <i>Lower limit:</i> Sufficient to prevent the establishment of trees and shrubs in the long term
F2. Burning	Burning will damage the feature and could encourage dominance by purple-moor grass if grazing is significantly reduced and result in a decline in the cover of bog mosses. At present there is generally insufficient vegetation to be burnt here.	There should be no evidence of recent burning.
F3. Drainage	See blanket bog 4.2 above.	See 4.2 above.

F4. Air Quality	See 4.2 above.	See 4.2 above.
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4.7 Conservation Objective for Feature 7: European dry heaths

Vision for Feature 7

- The extent, quality and diversity of heath vegetation within the constituent sites is maintained and, where possible, degraded heath is restored to good condition.
- The main heathland areas have a varied age structure with a mosaic of young heath, mature heath and degenerate heath.
- All factors affecting the achievement of these conditions are under control.

Performance indicators for Feature 7

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent and Distribution	The area of European dry heaths has been mapped as a baseline extent and the total area measured (based on the latest habitat survey information from 2003). Repeat monitoring will either re-map the site or review the baseline map in the field. There should be no discernable decline in extent from those areas defined above.	<i>Upper limit:</i> N/A, constrained by site topography and hydrology. <i>Lower limits:</i> 385 ha, largely confined to the drier areas of unit 2 and the top of the escarpment in unit 1.
A2. Quality of the habitat	Based on the presence and cover of typical heathland plants and 'negative indicator' species. At least 90% of the dry heath within unit 2 should fall within the specified limits. Unit 1 should be managed primarily to suit its other habitats. Recently burnt areas should be avoided when sampling but see also F1 below. The invasion of trees and scrub is not an issue on the site. Consequently, no performance indicator is required for this element. If this becomes a problem in the future then this can be addressed.	<i>Upper Limits:</i> Cover of Western gorse <i>Ulex gallii</i> no more than 50 %. AND: Cover of non-native plants and/or agricultural weeds is less than 1%. AND: cover of Bracken is less than 10%. AND: Less than 1/3 of shoots of all mature dwarf shrub plants collectively showing signs of browsing. OR: Less than 2/3 of young pioneer plants collectively showing signs of browsing. <i>Lower limits:</i> At least 50% of vegetation cover made up of at least 2 dwarf shrub species and the height of the shrub canopy is at least 15cm. AND:

		1 species of moss, liverwort or non-crustose lichen present (excluding hair-cap mosses and <i>Campylopus</i> mosses - associated with burning).
Performance indicators for factors affecting the feature		
Factor	Factor rationale and other comments	Operational Limits
F1. Burning	Areas burnt may be measured by aerial photography.	<i>Upper limits:</i> In areas subject to any burning plan, only a maximum of up to 15% of the total heathland area should be burnt in any one year. <i>Lower limit:</i> N/A.
F2. Erosion/Bare Ground	Is generally caused by uncontrolled fires (see above) or heavy trampling. Assessments should not be made in areas that have been recently been subject to planned burning.	<i>Upper Limit:</i> 10% bare ground <i>Lower limit:</i> N/A.
F3. Air Quality	Increased cover of grasses and degenerate heather may be symptomatic of air pollution, as there is evidence that pollution makes heather plants more susceptible to damage by frost and heather beetles. The Environment Agency has set critical levels for these pollutants in relation to various types of vegetation. Monitoring station located at grid location: 319097.79 214637.88	<i>Upper limits:</i> No critical loads are exceeded. Sulphur dioxide – 20µg/m ³ Nitrous Oxides – 30µg/m ³ Ozone – 3000 ppb ammonia – 1µg/m ³ N – 10-20 kg/ha/yr acid – 0.35keq/ha/yr <i>Lower limits:</i> None required.
Dwarf shrub species are: Heather (<i>Calluna vulgaris</i>); crowberry (<i>Empetrum nigrum</i>); bilberry (<i>Vaccinium myrtillus</i>); cowberry (<i>V. vitis-idaea</i>);		
Definition of dry heath vegetation: Generally occurs over thin peat on hilltops or mineral soils and conforms with National Vegetation Classification types H8, H10, H12& H18. Can occur intermixed with dense bracken stands, rock and scree but these areas should be avoided when sampling for vegetation condition.		

4.1 Conservation Objective for Feature 1:

Asperulo – Fagetum beech forests (EU Habitat code 9130)

Vision for feature 1

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- At least 50% of the canopy-forming trees are beech.
- The canopy cover is at least 80% (excluding areas of crag) and composed of locally native trees.
- The woodland has trees of all age classes with a scattering of standing and fallen dead wood.
- Regeneration of trees is sufficient to maintain the woodland cover in the long term.
- The shrub layer and ground flora can be quite sparse, but where present consist of locally native plants such as yew, hawthorn, wych elm, ash, hazel, field maple and elder, bramble, dog's mercury, enchanter's-nightshade, lords-and-ladies, woodruff, male fern, sanicle, wood melick, ivy, false brome, violets, herb robert, wood avens, and tufted hair-grass.
- Scarcer plants, such as soft-leaved sedge and bird's-nest orchid are locally frequent and, more rarely, yellow bird's-nest orchid can be found.
- All factors affecting the achievement of the above conditions are under control.

Performance indicators for Feature 1

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>		
<i>Attribute</i>	<i>Attribute rationale and other comments</i>	<i>Specified limits</i>
A1. Extent and distribution	Extent is based on ground surveys and 2006 aerial photographs. Upper limit set to maintain areas of non-wooded habitat.	<i>Upper limit:</i> 25 ha <i>Lower limit:</i> 21 ha Located in units 1 & 5.
A2. Canopy cover	75% of the woodland should meet the criteria for canopy cover.	<i>Upper limit:</i> 90% <i>Lower limit:</i> 80%
Attributes A3–A6 below are based on the Standard Common Standards Monitoring guidance, modified according to site-specific requirements. They apply to the main calcareous beech woodland stands in units 1 & 5 (see maps in Annex 1).		
A3. Canopy composition	In some areas non-native trees, such as sycamore, will be tolerated, so long as they are not freely re-generating in the understorey. 75% of the woodland needs to comply with the limits set.	<i>Upper limit:</i> N/A <i>Lower limit:</i> 50% of the canopy forming trees are beech (except in those areas where whitebeam dominates) AND: 95% of tree cover is composed of locally native trees (see definition below).

A4. Regeneration	<p>To be met in at least 50% of significant gaps in canopy. Such gaps should be recorded at each monitoring visit.</p> <p>A gap is defined as an open area with a diameter of at least one average tree height.</p> <p>Beech will also regenerate under the canopy and some recording should also occur here.</p>	<p><i>Upper limit:</i> N/A <i>Lower limit:</i> Canopy forming trees, shrubs or coppice re-growth at least 1.5m high present (there should be enough present to maintain the canopy in the long term).</p>
A5. Ground flora	<p>The ground flora can be naturally quite sparse under the beech canopy, but a few typical calcareous beech woodland plants should be evident in all areas.</p> <p>Brambles and ivy can be locally quite abundant but other indicators of disturbance and nutrient enrichment should not be.</p> <p>Limits should be met for 75% of the woodland.</p>	<p><i>Upper limit:</i> The cover of nettles should not exceed 10%. <i>Lower limit:</i> Typical ground flora species (see list below) should be evident throughout the woodland.</p>
A6. Dead Wood	<p>It is difficult to set meaningful limits for dead wood but, in the short term. Much of the woodland is on steep ground and so removal of deadwood is unlikely. However, any fallen timber will tend to accumulate at the foot of the slopes.</p> <p>The limits given here should be met in at least 75% of existing woodland.</p>	<p><i>Upper limit:</i> None <i>Lower limit:</i> Presence of standing and/or fallen deadwood greater than 20 cm diameter.</p>
<p>Locally native Trees and shrubs: Beech; Ash; Oak; Birch; Rowan; Field maple; Yew; Hawthorn; Hazel; Elder and Holly.</p>		
<p>Typical plants of calcareous beech woodland: Dog's mercury; Bramble; Enchanter's-nightshade; Lords-and-Ladies; Woodruff; Male fern; Sanicle; Wood melick; Ivy; False brome; Violets; Rough-stalked feather moss <i>Brachythecium rutabulum</i>; Common feather-moss <i>Eurhynchium praelongum</i> and Herb Robert. List likely to be refined following further survey and monitoring.</p>		
<i>Performance indicators for factors affecting the feature</i>		
<i>Factor</i>	<i>Factor rationale and other comments</i>	<i>Operational Limits</i>
F1. Livestock grazing	<p>There is a long-history of the woodland being open to casual grazing by sheep. This has probably skewed the species make up of the wood towards beech because sheep preferentially graze other species.</p> <p>This is not thought to be a major issue,</p>	<p><i>Upper limit:</i> Sufficiently low to allow regeneration in the long term, as defined by the regeneration attribute above. <i>Lower limit:</i> None required.</p>

	but needs to be kept under review.	
F2. Non-native and invasive species	Along the river corridor there is Japanese knotweed, which may pose a threat to the woodland habitat.	<i>Upper limit:</i> No spread of Japanese knotweed into woodland. <i>Lower limit:</i> None required.

4.2 Conservation Objective for Feature 2:

Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion* (EU Habitat code 9120))

Vision for feature 2

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

At least 75% of the woodland vegetation meets the criteria for intact acid beech wood, where:

- At least 10% of the canopy forming trees are beech.
- The canopy cover is at least 80% and composed of locally native species.
- The woodland has trees of all age classes with a scattering of standing and fallen dead wood.
- Regeneration of trees is sufficient to maintain the woodland cover in the long term.
- The shrub layer and ground flora can be quite sparse, but where present consist of locally native plants.
- All factors affecting the achievement of the above conditions are under control.

Performance indicators for Feature 2

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

Performance indicators for feature condition		
Attribute	Attribute rationale and other comments	Specified limits
A1. Extent and distribution	Extent is based on ground surveys and 2006 aerial photographs. Upper limit set to maintain areas of non-wooded habitat.	<i>Upper limit:</i> 3.5 ha <i>Lower limit:</i> 4.3 ha Located mainly on the upper slopes at the western end of unit 1.
A2. Canopy cover	75% of the woodland should meet the criteria for canopy cover.	<i>Upper limit:</i> 90% <i>Lower limit:</i> 80%
Attributes A3–A6 below are based on the Standard Common Standards Monitoring guidance, modified according to site-specific requirements. They apply to the main acid beech woodland stands in unit 1 (see maps in Annex 1).		
A3. Canopy composition	In some areas non-native trees, such as sycamore, will be tolerated, so long as they are not freely re-generating in the understorey. 75% of the woodland needs to comply with the limits set.	<i>Upper limit:</i> N/A <i>Lower limit:</i> 10% of the canopy forming trees are beech AND: 95% of tree cover is composed of locally native trees (see definition below).

A4. Regeneration	To be met in at least 50% of significant gaps in canopy. Such gaps should be recorded at each monitoring visit. A gap is defined as an open area with a diameter of at least one average tree height.	<i>Upper limit:</i> N/A <i>Lower limit:</i> Canopy forming trees, shrubs or coppice re-growth at least 1.5m high present (should be enough present to maintain the canopy in the long term).
A5. Ground flora	The ground flora can be naturally quite sparse under the beech canopy, but a few typical acid beech woodland plants should be evident. Bracken can be locally quite abundant but should not dominate large areas of the woodland floor. Limits should be met for 75% of the woodland.	<i>Upper limit:</i> N/A <i>Lower limit:</i> Typical ground flora species (see list below) should be evident throughout the woodland.
A6. Dead Wood	It is difficult to set meaningful limits for dead wood but, in the short term. Much of the woodland is on steep ground and so removal of deadwood is unlikely. However, any fallen timber will tend to accumulate at the foot of the slopes. The limits given here should be met in at least 75% of existing woodland.	<i>Upper limit:</i> None <i>Lower limit:</i> Presence of standing and/or fallen deadwood greater than 20 cm diameter.
Locally native Trees and shrubs: Beech; Ash; Oak; Birch; Rowan; Yew; Hawthorn; Hazel and Holly.		
Typical plants of acid beech woodland: Bilberry; Heather; Wavy hair-grass; Common bent; Wood sorrel and moss carpets, of species such as swan's-neck thyme-moss <i>Mnium hornum</i> , bank hair-cap <i>Polytricum formosum</i> , large white-moss <i>Leucobryum glaucum</i> and common tamarisk-moss <i>Thuidium tamariscinum</i> .		
Performance indicators for factors affecting the feature		
Factor	Factor rationale and other comments	Operational Limits
F1. Livestock grazing	There is a long-history of the woodland being open to casual grazing by sheep. This has probably skewed the species make up of the wood towards beech because sheep preferentially graze other species. This is not thought to be a major issue, but needs to be kept under review.	<i>Upper limit:</i> Sufficiently low to allow regeneration in the long term, as defined by the regeneration attribute above. <i>Lower limit:</i> None required.
F2. Non-native and invasive species	There are localised problems with bracken on the upper slopes in the western part of the site, but this is mainly confined to more open areas at	<i>Upper limit:</i> No increase in the area of woodland floor that is dominated by invasive species. <i>Lower limit:</i> None required.

	the edges of the woodland. Once a canopy has established, shading usually limits the growth of bracken.	
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5. ASSESSMENT OF CONSERVATION STATUS AND MANAGEMENT REQUIREMENTS

This part of the document provides:

- A summary of the assessment of the conservation status of each feature.
- A summary of the management issues that need to be addressed to maintain or restore each feature.

5.1 Conservation Status and Management Requirements of Feature 1: Asperulo – Fagetum beech forest (EU Habitat code 9130)

Conservation Status of Feature 1

The conservation status of this feature within the site is considered to be **Favourable** (2006).

Assessment carried out in August 2002 indicated that feature condition was: **Favourable, maintained**. All the factors affecting the features appear to be under control.

Management Requirements of Feature 1

Woodland management

Most of the woodland at the site is mature and appears to require little active management. Many of the beech trees, however, are old and of a rather even age and in recent years a significant number of these have fallen. In some areas there is good regeneration of beech, and in time, these should grow and fill gaps. Most management, apart from the removal of a small area of larch, would likely be aimed at aiding the spread and growth of beech, possibly by actively moving saplings into gaps where there is little or no natural regeneration and also by selectively thinning species such as ash or sycamore, which might become dominant and displace beech. Dead and fallen trees should in general be left in situ to provide habitat for species such as birds, insects and fungi.

Scrub management

Some areas with the woodland should be retained as permanent open glades to benefit butterflies and other invertebrates and scrub encroachment should be controlled in these areas. Tree branches overhanging parts of the railway track with important grassland habitat will need cutting back from time-to-time to enable more light to reach the ground.

Grazing

Past grazing has influenced the structure of the woodland, such as the dominance of beech in the canopy. It is therefore likely that occasional light grazing would be beneficial for the woodland habitat, although any increase in grazing pressure could prevent all tree and shrub regeneration and suppress the woodland ground flora. Some land within the site, mainly in the Llanelly quarry and Llam-march dingle areas, is common land. Small numbers of sheep graze the area and also graze adjoining open land along the old railway trackbed and adjacent vegetated spoil heaps.

Dumping

European Site Conservation Objectives for Mendip Limestone Grasslands Special Area of Conservation Site code: UK0030203

With regard to the natural habitats and/or species for which the site has been designated („the Qualifying Features” listed below);

Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.

Subject to natural change, to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species;
- The distribution of qualifying species within the site.

Qualifying Features:

H4030. European dry heaths

H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*); Dry grasslands and scrublands on chalk or limestone

H8310. Caves not open to the public

H9180. *Tilio-Acerion* forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes*

S1304. *Rhinolophus ferrumequinum*; Greater horseshoe bat

* denotes a priority natural habitat or species (supporting explanatory text on following page)

*** Priority natural habitats or species**

Some of the natural habitats and species listed in the Habitats Directive and for which SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Directive and the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Directive. The term „priority“ is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Directive or the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

European Site Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations”) and Article 6(3) of the Habitats Directive 1992. They are for use when either the appropriate nature conservation body or competent authority is required to make an Appropriate Assessment under the relevant parts of the respective legislation.

These conservation objectives are set for each habitat or species of a [Special Area of Conservation \(SAC\)](#). Where the objectives are met, the site can be said to demonstrate a high degree of integrity and the site itself makes a full contribution to achieving favourable conservation status for those features.

This document is also intended for those who are preparing information to be used for an appropriate assessment by either the appropriate nature conservation body or a competent authority. As such this document cannot be definitive in how the impacts of a project can be determined. Links to selected sources of information, data and guidance which may be helpful can be found on Natural England’s website. This list is far from exhaustive.

The ecological status of the watercourse is a major determinant of FCS for all features. The required conservation objective for the watercourse is defined below.

4.1 Conservation Objective for the watercourse

- 4.1.1 The capacity of the habitats in the SAC to support each feature at near-natural population levels, as determined by predominantly unmodified ecological and hydromorphological processes and characteristics, should be maintained as far as possible, or restored where necessary.
- 4.1.2 The ecological status of the water environment should be sufficient to maintain a stable or increasing population of each feature. This will include elements of water quantity and quality, physical habitat and community composition and structure. It is anticipated that these limits will concur with the relevant standards used by the Review of Consents process given in Annexes 1-3.
- 4.1.3 Flow regime, water quality and physical habitat should be maintained in, or restored as far as possible to, a near-natural state, in order to support the coherence of ecosystem structure and function across the whole area of the SAC.
- 4.1.4 All known breeding, spawning and nursery sites of species features should be maintained as suitable habitat as far as possible, except where natural processes cause them to change.
- 4.1.5 Flows, water quality, substrate quality and quantity at fish spawning sites and nursery areas will not be depleted by abstraction, discharges, engineering or gravel extraction activities or other impacts to the extent that these sites are damaged or destroyed.
- 4.1.6 The river planform and profile should be predominantly unmodified. Physical modifications having an adverse effect on the integrity of the SAC, including, but not limited to, revetments on active alluvial river banks using stone, concrete or waste materials, unsustainable extraction of gravel, addition or release of excessive quantities of fine sediment, will be avoided.
- 4.1.7 River habitat SSSI features should be in favourable condition. Where the SAC habitat is not underpinned by a river habitat SSSI feature, the target is to maintain the characteristic physical features of the river channel, banks and riparian zone.
- 4.1.8 Artificial factors impacting on the capability of each species feature to occupy the full extent of its natural range should be modified where necessary to allow passage, eg. weirs, bridge sills, acoustic barriers.
- 4.1.9 Natural factors such as waterfalls, which may limit, wholly or partially, the natural range of a species feature or dispersal between naturally isolated populations, should not be modified.
- 4.1.10 Flows during the normal migration periods of each migratory fish species feature will not be depleted by abstraction to the extent that passage upstream to spawning sites is hindered.
- 4.1.11 Flow objectives for assessment points in the Wye Catchment Abstraction Management Strategy will be agreed between EA and CCW as necessary. It is anticipated that these limits will concur with the standards used by the Review of Consents process given in Annex 1 of this document.
- 4.1.12 Levels of nutrients, in particular phosphate, will be agreed between EA and CCW for each Water Framework Directive water body in the Wye SAC, and measures taken to maintain nutrients below these levels. It is anticipated that these limits will concur with the standards used by the Review of Consents process given in Annex 2 of this document.
- 4.1.13 Levels of water quality parameters that are known to affect the distribution and abundance of SAC features will be agreed between EA and CCW for each Water Framework Directive water body in the Wye SAC, and measures taken to maintain pollution below these levels. It is anticipated that these limits will concur with the

standards used by the Review of Consents process given in Annex 3 of this document.

- 4.1.14 Potential sources of pollution not addressed in the Review of Consents, such as contaminated land, will be considered in assessing plans and projects.
- 4.1.15 Levels of suspended solids will be agreed between EA and CCW for each Water Framework Directive water body in the Wye SAC. Measures including, but not limited to, the control of suspended sediment generated by agriculture, forestry and engineering works, will be taken to maintain suspended solids below these levels.

4.2 Conservation Objective for Features 1-5:

- Sea lamprey *Petromyzon marinus* (EU Species Code: 1095) ;
 - Brook lamprey *Lampetra planeri* (EU Species Code : 1096) ;
 - River lamprey *Lampetra fluviatilis* (EU Species Code : 1099) ;
 - Twaite shad *Alosa fallax* (EU Species Code : 1103) ;
 - Allis shad *Alosa alosa* (EU Species Code : 1102) ;
 - Atlantic salmon *Salmo salar* (EU Species Code : 1106) ;
 - Bullhead *Cottus gobio* (EU Species Code : 1163)
-

Vision for features 1-5

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

<i>FCS component</i>	<i>Supporting information / current knowledge</i>
4.2.1 <i>The conservation objective for the water course as defined in 4.1 above must be met</i>	
4.2.2 <i>The population of the feature in the SAC is stable or increasing over the long term.</i>	<p><i>Refer to sections 5.1 to 5.5 for current assessments of feature populations</i></p> <p><i>Entrainment in water abstractions directly impacts on population dynamics through reduced recruitment and survival rates.</i></p> <p><i>Fish stocking can adversely affect population dynamics through competition, predation, introduction of disease and alteration of population genetics.</i></p>
4.2.3 <i>The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches where predominantly suitable habitat for each life stage exists over the long term. Suitable habitat is defined in terms of near-natural hydrological and geomorphological processes and forms eg. suitable flows to allow upstream migration, depth of water and substrate type at spawning sites, and ecosystem structure and functions eg. food supply (as described in sections 2.2 and 5).</i>	<p><i>Some reaches of the Wye SAC are more suitable for some features than others eg. the Edw has important populations of salmon but is not used by shad due to its small size. These differences influence the management priorities for individual reaches and are used to define the site units described in section 3.2. Further details of feature habitat suitability are given in section 5. In general, management for one feature is likely to be sympathetic for the other features present in the river, provided that the components of favourable conservation status for the watercourse given in section 4.1 are secured.</i></p> <p><i>The characteristic channel morphology provides the diversity of water depths, current velocities and substrate types necessary to fulfil the habitat</i></p>

Suitable habitat need not be present throughout the SAC but where present must be secured for the foreseeable future. Natural factors such as waterfalls may limit the natural range of individual species. Existing artificial influences on natural range that cause an adverse effect on site integrity, such as physical barriers to migration, will be assessed in view of 4.2.4

requirements of the features. The close proximity of different habitats facilitates movement of fish to new preferred habitats with age.

Hydrological processes in the Wye are affected by abstraction and regulation releases from the Elan Valley reservoirs. While these effects cannot practicably be removed any adverse effects on the integrity of the SAC should be minimised as far as possible.

Extensive coniferous forestry plantations in the upper catchment, including the Irfon catchment, adversely affect the run-off and sediment characteristics and water quality of the river. Measures should be taken to restore the hydrological characteristics of headwater areas including wetland functions.

Shad and salmon migration can be affected by acoustic barriers and by high sediment loads, which can originate from a number of sources including construction works.

4.2.4 *There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.*

Performance indicators for features 1-5

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

Sea lamprey *Petromyzon marinus* :

Performance indicators for feature condition

<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>	<i>Relevant unit(s)</i>
a) Distribution within catchment	Suitable habitat adjacent to or downstream of known spawning sites should contain <i>Petromyzon ammocoetes</i> .	This attribute provides evidence of successful spawning and distribution trends. Spawning sites known to have been used within the previous 10 years and historical sites considered still to have suitable habitat are shown in Annex 4. Spawning locations may move within and between sites due to natural processes and new sites may be discovered over time. Silt beds downstream of all sites identified in Annex 4 will be sampled for presence or absence of ammocoetes. Where apparently suitable habitat at any site is unoccupied feature condition will be considered unfavourable.	1A-D, 2A, 2B, 6, 7

b) Ammocoete density	Ammocoetes should be present in at least four sampling sites each not less than 5km apart.	This standard CSM attribute establishes a minimum occupied spawning range, within any sampling period, of 15km.	1A-D, 2A, 2B, 6, 7
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Brook lamprey *Lampetra planeri* and River lamprey *Lampetra fluviatilis* :

Performance indicators for feature condition

<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>	<i>Relevant unit(s)</i>
a) Age/size structure of ammocoete population	Samples < 50 ammocoetes ~ 2 size classes Samples > 50 ammocoetes ~ at least 3 size classes	This gives an indication of recruitment to the population over the several years preceding the survey. Failure of one or more years recruitment may be due to either short or long term impacts or natural factors such as natural flow variability, therefore would trigger further investigation of the cause rather than leading automatically to an unfavourable condition assessment.	All
b) Distribution of ammocoetes within catchment	Present at not less than 2/3 of sites surveyed within natural range No reduction in distribution of ammocoetes	The combined natural range of these two species in terms of ammocoete distribution includes all units above the tidal limit. Presence at less than 2/3 of sample sites will lead to an unfavourable condition assessment. Reduction in distribution will be defined as absence of ammocoetes from all samples within a single unit or sub-unit/tributary, and will lead to an unfavourable condition assessment.	All
c) Ammocoete density	Optimal habitat: >10m ⁻² Overall catchment mean: >5m ⁻²	Optimal habitat comprises beds of stable fine sediment or sand ≥15cm deep, low water velocity and the presence of organic detritus, as well as, in the Wye, shallower sediment, often patchy and interspersed among coarser substrate.	All

Twaite shad *Alosa fallax* and Allis shad *Alosa alosa* :

Performance indicators for feature condition

<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>	<i>Relevant unit(s)</i>
a) Spawning distribution	No decline in spawning distribution	Spawning distribution is assessed by kick sampling for eggs and/or observations of spawning adults. A representative sample of sites within units 1C and 2A will be monitored at 3 yearly intervals. Absence from any site in 2 consecutive surveys will result in an unfavourable condition assessment.	1A-D, 2A

Performance indicators for factors affecting the feature

a) Flow	Targets are set	Targets equate to those levels agreed and used in	1A-D,
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	in relation to river/reach type(s)	the Review of Consents (see Annex 1). Shad are particularly sensitive to flow. The ideal regime is one of relatively high flows in March-May, to stimulate migration and allow maximum penetration of adults upstream, followed by rather low flows in June-September, which ensures that the juveniles are not washed prematurely into saline waters and grow rapidly under warmer conditions. The release of freshets to encourage salmonid migration should therefore be discouraged on shad rivers during this period.	2A
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Atlantic salmon *Salmo salar* :

Performance indicators for feature condition

Attribute	Specified limits	Comments	Relevant unit(s)
a) Adult run size	Conservation Limit complied with at least four years in five (see 5.4)	CSM guidance states: Total run size at least matching an agreed reference level, including a seasonal pattern of migration characteristic of the river and maintenance of the multi-sea-winter component. As fish counter data in the Wye is considered unreliable (EA pers. comm.), adult run size is calculated using rod catch data. Further details can be found in the EA Wye Salmon Action Plan.	All
b) Juvenile densities	Expected densities for each sample site using HABSCORE	CSM guidance states: These should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality. Assessed using electrofishing data.	All except 1A-D, 2A

Performance indicators for factors affecting the feature

Water quality

a) Biological quality	Biological GQA class A	This is the class required in the CSM guidance for Atlantic salmon, the most sensitive feature.	All
b) Chemical quality	RE1	It has been agreed through the Review of Consents process that RE1 will be used throughout the SAC (see Annex 3)	All

Hydromorphology

a) Flow	Targets are set in relation to river/reach type(s)	Targets equate to those levels agreed and used in the Review of Consents (see Annex 1)	All
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Bullhead *Cottus gobio* :

Performance indicators for feature condition

Attribute	Specified limits	Comments	Relevant unit(s)
a) Population densities	No less than 0.2 m ⁻² in	CSM guidance states that densities should be no less than 0.2 m ⁻² in upland rivers (source altitude	All except

	sampled reaches	>100m) and 0.5 m ⁻² in lowland rivers (source altitude ≤100m). A significant reduction in densities may also lead to an unfavourable condition assessment.	1A, 1B
b) Distribution	Bullheads should be present in all suitable reaches. As a minimum, no decline in distribution from current	Suitable reaches will be mapped using fluvial audit information validated using the results of population monitoring. Absence of bullheads from any of these reaches, or from any previously occupied reach, revealed by on-going monitoring will result in an unfavourable condition assessment.	All except 1A, 1B
c) Reproduction / age structure	Young-of-year fish should occur at densities at least equal to adults	This gives an indication of successful recruitment and a healthy population structure. Failure of this attribute on its own would not lead to an unfavourable condition assessment.	All except 1A, 1B

4.3 Conservation Objective for Feature 6:

- European otter *Lutra lutra* (EU Species Code: 1355)

Vision for feature 6

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

<i>FCS component</i>	<i>Supporting information / current knowledge</i>
4.3.1 <i>The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour.</i>	<i>Refer to section 5.9 for current assessment of feature population</i>
4.3.2 <i>The natural range of otters in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches that are potentially suitable to form part of a breeding territory and/or provide routes between breeding territories. The whole area of the Wye SAC is considered to form potentially suitable breeding habitat for otters. The size of breeding territories may vary depending on prey abundance. The population size should not be limited by the availability of suitable undisturbed breeding sites. Where these are insufficient they should be created through habitat enhancement and where necessary the</i>	<i>Survey information shows that otters are widely distributed in the Wye catchment. However, an assessment of otter breeding habitat has indicated that there may be a shortage of suitable habitat around the middle reaches of the river, which may affect the long-term viability of the population. This should be addressed by habitat enhancement including stock exclusion from suitable woodlands near to the river but outside the floodplain. The decline in eel populations may be having an adverse effect on the population of otters in the Wye.</i>

provision of artificial holts. No otter breeding site should be subject to a level of disturbance that could have an adverse effect on breeding success. Where necessary, potentially harmful levels of disturbance must be managed.

4.3.3	<i>The safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable riparian habitat, and underpasses, ledges, fencing etc at road bridges and other artificial barriers.</i>	<i>Road and bridge improvement schemes within the catchment should take appropriate measures towards achievement of this objective.</i>
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Performance indicators for feature 6

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

Performance indicators for feature condition			
Attribute	Specified limits	Comments	Relevant unit(s)
a) Distribution	Otter signs present at 82-90% of Otter Survey of Wales sites in sub-catchments	Ref: CCW Environmental Monitoring Report No 30 (2006) ⁵	All
b) Breeding activity	Reports of cub/family sightings (no specified limit)	Ref: CCW Environmental Monitoring Report No 30 (2006) ⁵	All
c) Actual and potential breeding sites	No decline in number and quality of mapped breeding sites in sub-catchments. Increase from 5 to 9 sites in Middle Wye sub-catchment (see Ref)	Ref: CCW Environmental Monitoring Report No 30 (2006) ⁵ In the Wye catchment within Wales, 32 actual or potential breeding sites have been identified (19 within the Wye SAC), distributed throughout the catchment on the main river and tributaries. It is recommended that this should increase to at least 40 (23 within Wye SAC) ⁵ . Note: breeding territories typically contain more than one breeding site.	All

4.4 Conservation Objective for Feature 7:

- Water courses of plain to montane levels with the *Ranunculon fluitantis* and *Callitricho-Batrachion* vegetation (EU Habitat Code: 3260)

Vision for feature 7

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

<i>FCS component</i>	<i>Supporting information / current knowledge</i>
4.4.1 <i>The conservation objective for the water course as defined in 4.1 above must be met</i>	
4.4.2 <i>The natural range of the plant communities represented within this feature should be stable or increasing in the SAC. The natural range is taken to mean those reaches where predominantly suitable habitat exists over the long term. Suitable habitat and associated plant communities may vary from reach to reach. Suitable habitat is defined in terms of near-natural hydrological and geomorphological processes and forms eg. depth and stability of flow, stability of bed substrate, and ecosystem structure and functions eg. nutrient levels, shade (as described in section 2.2). Suitable habitat for the feature need not be present throughout the SAC but where present must be secured for the foreseeable future, except where natural processes cause it to decline in extent.</i>	<i>Stands of this feature are known to be widespread in the Wye SAC including many of the tributaries. However, further information on its natural range, distribution and variation is desirable. Sympathetic management will be promoted wherever the feature is present.</i> <i>Species indicative of unfavourable condition for this feature eg. filamentous algae associated with eutrophication, invasive non-native species, should be maintained or restored below an acceptable threshold level, indicative of high ecological status within the SAC.</i>
4.4.3 <i>The area covered by the feature within its natural range in the SAC should be stable or increasing.</i>	<i>Adverse factors may include elevated nutrient levels, shading or altered flow and/or sediment regimes.</i> <i>It is possible that reaches with slightly elevated nutrient levels and/or regulated flows may have a higher cover of the feature than under natural conditions, though species composition may also be affected (see 4.4.4)</i>
4.4.4 <i>The conservation status of the feature's typical species should be favourable. The typical species are defined with reference to the species composition of the appropriate JNCC river vegetation type for the particular river reach, unless differing from this type due to natural variability when other typical species may be defined as appropriate.</i>	<i>More information on the typical species expected within each management unit in the SAC is required.</i> <i>The effects of artificial factors such as flow regulation on species composition should be examined eg. river jelly lichen may prefer greater flow variability.</i>

Performance indicators for feature 7

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

<i>Performance indicators for feature condition</i>			
<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>	<i>Relevant unit(s)</i>
a) Distribution within catchment	Distribution within site units	<i>Ranunculus</i> spp. will be present with a cover of at least 10% in any three representative sample 100m stretches of suitable habitat in: [reaches to be confirmed]	All
b) Typical species	Species list for reference vegetation type	Should conform to appropriate JNCC type or other list for site unit as appropriate. Details to be confirmed	All
<i>Performance indicators for factors affecting the feature</i>			
Negative indicators			
a) Native species	Cover of indicators of eutrophication maintained below threshold over the medium to long term	CSM guidance states: Care should be taken with the setting of these targets as thresholds may vary considerably by site and conservation goals. For the Wye SAC: Algae indicative of eutrophication (<i>Enteromorpha</i> spp., <i>Cladophora</i> spp. and <i>Vaucheria</i> spp.) should not have a cover value of greater than 10% in 3 consecutive years in: [reaches to be confirmed]	All
b) Alien / introduced species	No impact on native biota from alien or introduced species	In the CSM guidance, the SERCON scoring system for naturalness of aquatic and marginal macrophytes and naturalness of banks and riparian zone, are used to assess this attribute. SERCON protocols have not been applied in the Wye SAC, therefore assessment of this attribute relies on locally defined thresholds and expert judgement. Details to be confirmed	All

4.2 Conservation Objective for Feature 8:

- White-clawed crayfish *Austropotamobius pallipes* (EU Species Code: 1092)

Vision for feature 8

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

<i>FCS component</i>	<i>Supporting information / current knowledge</i>
4.2.5 <i>The conservation objective for the water course as defined in 4.1 above must be met</i>	

4.2.6 <i>The population of the feature in the SAC is stable or increasing over the long term.</i>	<p><i>Refer to section 5.8 for current assessment of feature population</i></p> <p><i>Presence of non-native crayfish adversely affects population dynamics through competition, predation and introduction of disease (crayfish plague). This is thought to invariably lead to local extinction of white-clawed crayfish. American signal crayfish are present in the Bachawy and Lugg and Arrow sub-catchments (outside the SAC) and have been reported in the Edw.</i></p> <p><i>The release of highly toxic sheep dips into streams has caused mass mortality and local extinction in the SAC from which populations may be very slow to recover.</i></p>
4.2.7 <i>The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches where predominantly suitable habitat for each life stage exists over the long term. Suitable habitat is defined in terms of near-natural hydrological and geomorphological processes and forms eg. substrate type, water hardness and temperature, and ecosystem structure and functions eg. food supply, absence of invasive non-native competitors (as described in sections 2.2 and 5). Suitable habitat need not be present throughout the SAC but where present must be secured for the foreseeable future. Natural factors such as waterfalls may limit the natural range of individual species. Existing artificial influences on natural range that cause an adverse effect on site integrity will be assessed in view of 4.2.4</i>	<p><i>Some reaches of the Wye SAC are more suitable for some features than others eg. the natural range of white-clawed crayfish may be limited by water hardness and temperature (which may possibly also mediate competition with non-native crayfish to some extent). These differences influence the management priorities for individual reaches and are used to define the site units described in section 3.2. Further details of feature habitat suitability are given in section 5.</i></p> <p><i>Eradication of American signal crayfish, or control of its spread in the Wye catchment is considered essential to the long-term suitability of the SAC for white-clawed crayfish. At present there are no known effective methods for eradication or long-term control of signal crayfish.</i></p> <p><i>Prevention of release of toxic sheep dips and other harmful diffuse pollution into water courses is essential.</i></p>
4.2.8 <i>There is, and will probably continue to be, a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.</i>	<p><i>Invasion of American signal crayfish is likely to make existing habitat in the Wye SAC unsuitable for white-clawed crayfish in the long term. There may be a need to translocate white-clawed crayfish to suitable habitat outside its present (and historic) range.</i></p>

Performance indicators for feature 6

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

White-clawed crayfish *Austropotamobius pallipes* :
Performance indicators for feature condition

Attribute	Specified limits	Comments	Relevant unit(s)
a) Adult/juvenile densities	Abundance in habitat patches above threshold	Average number of crayfish in each habitat patch surveyed by stone turning and trapping combined should be greater than 1 ⁹ .	3, 4, 5, 6
b) Distribution	Distribution in suitable reaches (monitoring units)	Suitable reaches within the relevant management units will be mapped using fluvial audit information validated with historic data and the results of population monitoring. Absence of white-clawed crayfish from any of these reaches revealed by on-going monitoring will result in an unfavourable condition assessment.	3, 4, 5, 6
Performance indicators for factors affecting the feature			
Negative indicators			
a) Invasive non-native crayfish	Absence of non-native crayfish from the SAC	Collation of <i>ad hoc</i> records of non-native crayfish in the Wye catchment and adjacent areas and monitoring in conjunction with control programmes using trapping.	All
b) Porcelain disease in white-clawed crayfish	Incidence <10%	Incidence to be recorded during population monitoring.	3, 4, 5, 6

4.4 Conservation Objective for Feature 9:

- Quaking bogs and transition mires (EU Habitat Code: 7410)

Vision for feature 9

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

FCS component	Supporting information / current knowledge
4.4.5 <i>The conservation objective for the water course as defined in 4.1 above must be met</i>	
4.4.6 <i>The natural range of the plant communities represented within this feature should be stable or increasing in the SAC. The natural range is taken to mean those reaches where near-natural hydrological and geomorphological processes and landforms favour the development of this habitat. The feature need not be present in all suitable locations in the SAC but where present must be secured for the foreseeable future.</i>	<i>This feature is represented within the SAC at Colwyn Brook Marshes SSSI. Other locations with similar habitat within and adjacent to the SAC are not considered to qualify as examples of this feature e.g. Waen Rhyd SSSI, but may have similar management requirements.</i> <i>Species indicative of unfavourable condition for this feature eg. invasive native trees and shrubs and non-native species, should be maintained or restored below an acceptable threshold level, indicative of high ecological status within the SAC.</i>
4.4.7 <i>The area covered by the feature within its natural range in the SAC should be stable or increasing.</i>	<i>Adverse factors may include elevated nutrient levels or altered hydrological processes through drainage or groundwater abstraction.</i>
4.4.8 <i>The conservation status of the feature's typical species should be</i>	<i>More information on the typical species expected within each management unit is required. Details</i>

favourable. The typical species are defined with reference to the species composition of the appropriate NVC type(s), unless differing from this type due to natural variability/local distinctiveness when other typical/indicator species may be defined as appropriate.

to be confirmed

Performance indicators for feature 9

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

Performance indicators for feature condition			
Attribute	Specified limits	Comments	Relevant unit(s)
a) Habitat extent	No reduction in total extent	This would be indicative of drying out due to a change in hydrological processes/wetland structure & function.	9
b) Habitat composition	No significant increase in woodland/scrub	This would be indicative of drying out due to a change in hydrological processes/wetland structure function and/or vegetation succession due to a change in grazing pressure.	9
c) Habitat structure	Cover of exposed substrate/litter	May indicate either over- or under-grazing.	9
d) Vegetation composition	Indicator species presence/frequency for reference vegetation type(s). No significant reduction in key type(s)	Should conform to appropriate NVC type(s) and/or locally defined vegetation composition criteria as appropriate. Shifts in vegetation composition may indicate change in hydrology, nutrient status and/or grazing pressure. Details to be confirmed	9
Performance indicators for factors affecting the feature			
Negative indicators			
a) Native species	Cover of indicators of under-grazing, drainage, eutrophication or disturbance maintained below threshold	May include graminoids such as <i>Phragmites australis</i> , <i>Phalaris arundinacea</i> , <i>Glyceria maxima</i> , <i>Typha latifolia</i> , <i>Juncus</i> spp., <i>Molinia caerulea</i> ; tall herbs such as <i>Epilobium hirsutum</i> , <i>Urtica dioica</i> , <i>Pteridium aquilinum</i> , <i>Rubus fruticosus</i> ; bryophytes such as <i>Brachythecium rutabulum</i> , <i>Eurhynchium praelongum</i> , <i>Sphagnum recurvum</i> ; tree and shrub spp. (CSM Lowland fens guidance)	9
b) Invasive non-native species	No impact on native biota from invasive non-native or introduced species	Possible invasive non-natives include New Zealand swamp-stonecrop <i>Crassula helmsii</i> : although not recorded at the site, any records should be verified and followed up with control measures.	9

**European Site Conservation Objectives for
Chew Valley Lake Special Protection Area
Site Code: UK9010041**

With regard to the individual species and/or assemblage of species for which the site has been classified („the Qualifying Features“ listed below);

Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive.

Subject to natural change, to maintain or restore:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of the qualifying features;
- The distribution of the qualifying features within the site.

Qualifying Features:

A056 *Anas clypeata*; Northern shoveler (Non-breeding)

Explanatory Notes: European Site Conservation Objectives

European Site Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations”) and Article 6(3) of the Habitats Directive 1992. They are for use when either the appropriate nature conservation body or competent authority is required to make an Appropriate Assessment under the relevant parts of the respective legislation.

These conservation objectives are set for each bird feature for a [Special Protection Area \(SPA\)](#). Where the objectives are met, the site can be said to demonstrate a high degree of integrity and the site itself makes a full contribution to achieving the aims of the Birds Directive for those features. On the first page of this document there may be a list of „Additional Qualifying Features identified by the 2001 UK SPA Review“. These are additional features identified by the UK SPA Review published in 2001 and, although not yet legally classified, are as a matter of Government policy treated in the same way as classified features.

This document is also intended for those who are preparing information to be used for an appropriate assessment by either the appropriate nature conservation body or a competent authority. As such this document cannot be definitive in how the impacts of a project can be determined. Links to selected sources of information, data and guidance which may be helpful can be found on Natural England’s website. This list is far from exhaustive.

Appendix B DMRB Screening Tables

Table B.1 River Usk SAC

Project name	M4 CaN Project	
Natura 2000 site under consideration	River Usk/ Afon Wysg SAC	
Date	Author	Verified
April 2012	Nicole Price	Keith Jones
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with any other plans or projects) on the European Site by virtue of:		
Size and scale (<i>road type and probable traffic volume</i>)	-A new section of 3-lane motorway between Junctions 23 and 29 of the M4 south of Newport (between Magor and Castleton), with complementary measures including: -Reclassification of the existing section of the M4 as a trunk road; -A M48-B4245 link: involving a connection between the M4, M48 and B4245 which would provide relief to Junction 23A and to the local road network. It would also provide improved access to proposed park and ride facilities at Severn Tunnel Junction; -Provision of cycle friendly infrastructure: promoting the use of cycling as an alternative to the car for journeys of up to three miles by providing new infrastructure or improving existing infrastructure; and -Provision of walking friendly infrastructure: promoting the use of walking as an alternative to the car journeys of up to three miles by providing new infrastructure or improving existing infrastructure. -Predicted traffic volumes are currently unknown (data awaited). -The area covered by the Project design has yet to be determined.	
Land-take within SAC	The M4 CaN will involve a small amount of land take (salt marsh) within the SAC for the East Pylon required for the new bridge across the River Usk. No loss within the river. No measurements as yet.	
Distance from the European Site or key interests of the site (<i>from edge of the project assessment corridor</i>)	The M4 CaN will run across the SAC via a new River Usk crossing. There will be no installation of bridge structures within the River Usk itself.	

Project name	M4 CAN Project
Natura 2000 site under consideration	River Usk/ Afon Wysg SAC
Resource requirements (<i>from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts</i>)	Potential resource requirements are provided in Section 2.
Emissions (<i>e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution</i>)	<p>The proposed M4 CaN has potential to cause pollution of the SAC via water run-off during construction and operation. On-going maintenance of the bridge (e.g. painting etc.) also has potential to lead to water quality changes.</p> <p>The proposed M4 CaN has potential to result in air quality impacts during operation, however, this is thought to lead to improvements in air quality upstream of the new River Usk crossing and any effects will be localised.</p>
Excavation requirements (<i>e.g. impacts of local hydrogeology</i>)	There would be some excavation within the SAC adjacent to the river for the East Pylon. No significant hydrogeology impacts are anticipated within the river as the new single span bridge would require no support structures within the river.
Transportation requirements	Not known
Duration of construction, operation etc.	Construction period Spring 2018-2021
Other	None
Description of avoidance and / or mitigation measures	
Nature of proposals	<p>The main measure is that the new bridge across the River Usk would involve no installation of support structures within the river. Construction would follow CIRIA best practice EA guidance for pollution prevention.</p> <p>A CEMP will be developed to prevent/minimise impacts.</p> <p>Underpasses and fencing for otters</p> <p>Other measures as outlined in section 6 and Section 7, see screened in tables.</p>
Location	Across the site and to be determined following further surveys.
Evidence for effectiveness	Full details not yet available.
Mechanism for delivery	Full details not yet available.
Characteristics of European Site	
Name of European Site and its EU code	River Usk SAC UK0013007

Project name	M4 CAN Project
Natura 2000 site under consideration	River Usk/ Afon Wysg SAC
Location and distance of the European Site from the proposed works	The M4 CaN would pass through the lower River Usk SAC via a new River Usk bridge.
European Site size	1007.71 ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	<p>Annex I habitats that are present as qualifying feature, but not a primary reason for selection of the site:</p> <ul style="list-style-type: none"> -Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion vegetation</i> <p>Annex II species that are primary reason for designation of this site:</p> <ul style="list-style-type: none"> -Sea lamprey (<i>Petromyzon marinus</i>) -Brook lamprey (<i>Lampetra planeri</i>) -River lamprey (<i>Lampetra fluviatilis</i>) -Twaite shad (<i>Alosa fallax</i>) -Atlantic salmon (<i>Salmo salar</i>) Bullhead (<i>Cottus gobio</i>) -Otter (<i>Lutra lutra</i>) <p>Annex II species present as a qualifying feature, but not a primary reason for site selection:</p> <ul style="list-style-type: none"> -Allis shad (<i>Alosa alosa</i>)

Project name	M4 CAN Project
Natura 2000 site under consideration	River Usk/ Afon Wysg SAC
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	<p>The status of the features is provided in Section 4, Table 4.1. The following text is a summary of the effects that could affect the status of species.</p> <p>Fish: Barriers to migration and flow depletion; Impacts of acoustic noise/vibration and sediment/chemical barriers; Entrainment in water abstractions; Maintaining suitable quality spawning areas and nursery areas (e.g. elevated levels of fines can affect spawning success and water quality changes from. diffuse pollution and siltation, toxic pollutants) Development pressure in lower catchment can cause temporary physical, acoustic, chemical and sediment barrier effects.</p> <p>Otter: Maintaining undisturbed breeding habitat to support otters; maintaining food availability; provision of safe movement of otters around the catchment with the provision of ledges, tunnels and fencing on new road bridge schemes. The River Usk SAC provides a key movement corridor for otters passing between the relatively high densities in mid Wales and the south-east Wales coastal strip (Seven Estuary and Gwent Levels). The function of this aspect of the site should be protected through the maintenance of suitable resting sites (in terms of size, quality and levels of disturbance) through the major urban centre of Newport. There should be no increase in pollutants potentially toxic to otters.</p> <p>Water course habitat: Flow, substrate quality and water quality- unfavourable conditions promote algae and other species indicative of eutrophication; increase in invasive non-native species.</p>
European Site conservation objectives	See Appendix A.
Assessment Criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site	

Project name	M4 CAN Project
Natura 2000 site under consideration	River Usk/ Afon Wysg SAC
<ul style="list-style-type: none"> -Habitat loss/fragmentation of otter habitat (e.g. resting areas) during construction. -Physical presence-barrier to movement of otters during construction and operation. -Release of pollutants –water quality changes leading to physiological/behavioural/barrier effects in migratory fish and otters. -Change in traffic flows/speeds/ use of the area-disturbance/collision risk to otters. -Noise and vibration-disturbance/behavioural/barrier effects in migratory fish (construction) and otters (construction and operation). -Visual and lighting-disturbance/barrier effects to migratory fish and otters during construction and operation. 	
Initial Assessment The key characteristics of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	There will be some small amount of land-take within the SAC adjacent to the river, there may be some loss of adjacent areas outside of the SAC.
Disturbance to key species	<p>Construction:</p> <ul style="list-style-type: none"> -Habitat loss/fragmentation potential loss of otter habitat (resting sites). -Physical presence/increase use of the area leading to potential restriction in the movement of otters, outside of the SAC. -Disturbance of otters due to physical presence, noise and vibration, as well as visual and lighting. -Physiological changes in otters from changes in water quality. -Physiological/behavioural/barrier effects to fish from water quality, noise and vibration.. -Behavioural/barrier effects to fish from lighting. <p>Operation:</p> <ul style="list-style-type: none"> -Potential for disturbance to otters from loss of otter habitat (resting sites). -Potential restriction in the movement/collision of otters from the physical presence/increase use of the area. -Disturbance to otters and barriers to movement from noise and vibration, as well as visual and lighting. -Physiological/behavioural and barrier effects in fish from changes in water quality.
Habitat or species fragmentation	Small amount of land take adjacent to the River Usk.
Reduction in species density	Impacts on fish and otters could potentially reduce numbers.

Project name	M4 CAN Project
Natura 2000 site under consideration	River Usk/ Afon Wysg SAC
Changes in key indicators of conservation value (water quality etc)	Potential for localised air emissions and subsequent deposition on habitats is considered unlikely to lead to likely significant effects. Water quality changes could adversely affect fish and otters. It is likely that measures can be implemented including installation of highways drainage system to treat surface run-off prior to discharge. However, measures need to be developed and assessed as part of water quality assessment. Therefore precautionary approach taken.
Climate change	Sea level rise will affect intertidal habitat.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	The ecological structure and functions of the site are dependent on hydrological and geomorphological processes (often referred to as hydromorphological processes), as well as the quality of riparian habitats and connectivity of habitats. Animals that move around and sometimes leave the site, such as migratory fish and otters, may also be affected by factors operating outside the site. The M4 CaN will not affect hydromorphological and geomorphological processes. There may be some disturbance to otters in their resting habitat and their movement (e.g. along the river and across the Gwent Levels) due to the physical presence, increase use of the area, noise and vibration and lighting. There may also be some physiological/ behavioural/barrier effects to fish from water quality changes/noise and vibration as well as lighting effects
Interference with the key relationships that define the function of the site	
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Some loss within the SAC of saltmarsh habitat (not a feature) adjacent to the River Usk, not considered to result in a LSE.
Disturbance to key species	Disturbance to species as outlined previously and these have potential for LSEs (also see Section 6). These include temporary short-term effects on fish from disturbance from noise and vibration. Longer term effects from light and water quality changes during the operation of the M4 CaN. A future water quality and noise assessments as well as development of lighting strategy are required to inform the significance of effects. Habitat loss/fragmentation of otter resting habitat and temporary restriction in movement during construction, therefore short-term effects. Longer term operational effects from physical presence and increase use leading to collision/barrier effects across the Gwent levels. Also water quality, noise/vibration, visual/lighting disturbance in the longer term. Otter surveys and further studies are required to inform the significance of effects more accurately.
Habitat or species fragmentation	As outlined previously and see Section 6.
Loss	No likelihood of effects beyond those identified above
Fragmentation	No additional effects beyond those identified above

Project name	M4 CAN Project
Natura 2000 site under consideration	River Usk/ Afon Wysg SAC
Disruption	As outlined previously and in Section 6-potentially significant disruption to otters and fish, leading to restriction in movement and reduction in numbers.
Disturbance	For otters and fish as outlined above
Change to key elements of the site (e.g. water quality, hydrological regime etc)	As outlined previously some potential for significant water quality changes within the River Usk SAC, no alteration of the hydrological regime.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant, or where the scale or magnitude of impacts is not known.	
	<p>Potential for LSE associated with the M4 CaN are:</p> <ul style="list-style-type: none"> -Habitat loss/fragmentation of otter habitat and restriction in movement (e.g. resting areas); -Physiological changes in otters due to changes in water quality; -Potential for collision risk and subsequent injury/mortality in otters due to the presence of the M4 CaN and increase in use of the area; -Disturbance to otters from noise and vibration, as well as visual and lighting and therefore normal movement; -Physiological/behavioural/barrier effects in fish from changes in water quality; and -Disturbance/physiological/behavioural/barrier effects in fish from noise and vibration as well as lighting.
Outcome of screening stage	Significant effects are likely or cannot be excluded
Are the appropriate statutory environmental bodies in agreement with this conclusion?	YES/NO

Table B.2 Severn Estuary SAC

Project name	M4 CAN Project	
Natura 2000 site under consideration	Severn Estuary SAC/ Môr Hafren	
Date	Author	Verified
April 2015	Nicole Price	Keith Jones
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with any other plans or projects) on the European Site by virtue of:		
Size and scale (<i>road type and probable traffic volume</i>)	-A new section of 3-lane motorway between Junctions 23 and 29 of the M4 south of Newport (between Magor and Castleton), with complementary measures including: -Reclassification of the existing section of the M4 as a trunk road; -A M48-B4245 link: This will involve a connection between the M4, M48 and B4245 which would provide relief to Junction 23A and to the local road network. It would also provide improved access to proposed park and ride facilities at the Severn Tunnel Junction; -Provision of cycle friendly infrastructure: promoting the use of cycling as an alternative to the car for journeys of up to three miles by providing new infrastructure or improving existing infrastructure; and -Provision of walking friendly infrastructure: promoting the use of walking as an alternative to the car journeys of up to three miles by providing new infrastructure or improving existing infrastructure. -Predicted traffic volumes not currently known (data awaited). -The area covered by the Project design has yet to be determined.	
Land-take within SAC	The M4 CaN involves no land-take within this SAC.	
Distance from the European Site or key interests of the site (<i>from edge of the project assessment corridor</i>)	The M4 CaN is located 0.4 km from the Severn Estuary SAC.	
Resource requirements (<i>from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts</i>)	Potential resource requirements are provided in Section 2.	

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary SAC/ Môr Hafren
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	There could potentially be a change in water and air quality effects further upstream of this SAC. However, no significant effects are anticipated on this SAC.
Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavation within or adjacent to the SAC. No impacts are envisaged on the hydrogeology of the SAC.
Transportation requirements	Not known
Duration of construction, operation etc.	Construction period Spring 2018-2021
Other	None
Description of avoidance and / or mitigation measures	
Nature of proposals	The main measure is that the new bridge across the River Usk will involve no installation of support structures within the river, therefore reducing the potential for barrier effects in fish. Construction will follow CIRIA best practice EA guidance for pollution prevention. A CEMP will be developed to prevent/minimise impacts. Other measures as outlined in section 6 and potential future measures in Section 7, see screened in tables.
Location	Measures will be implemented across the site, but those of particular relevance to this site will be those required with regard to the crossing of the River Usk
Evidence for effectiveness	Full details not yet available
Mechanism for delivery	Full details not yet available
Characteristics of European Site	
Name of European Site and its EU code	Severn Estuary SAC/ Môr Hafren UK0013030
Location and distance of the European Site from the proposed works	The M4 CaN is some 0.4km from the SAC at its closest point.
European Site size	73715.4ha

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary SAC/ Môr Hafren
Key features of the European Site including the primary reasons for selection and any other qualifying interests	<p>Annex I habitats that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> -Estuaries. -Mudflats and sandflats not covered by seawater at low tide. -Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>). <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> -Sandbanks which are slightly covered by sea water all the time. -Reefs. <p>Annex II species that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> -Sea lamprey. -River lamprey. -Twaite shad.
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The conservation of the site is dependent on the tidal regime and contains high sediment loads. The estuary is therefore vulnerable to large-scale interference, mainly as a result of human actions. These include land-claim, aggregate extraction, physical developments such as barrage construction and other commercial construction activities, flood defences, industrial pollution, oil spillage and tourism-based activities and disturbance.
European Site conservation objectives	See Appendix A.
Assessment Criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site	
<p>No direct impacts anticipated within the Severn Estuary SAC.</p> <p>During construction and operation, potential changes in water quality and lighting may lead to physiological/behavioural/ barrier effects in migratory fish, but only as they pass through the River Usk SAC during upstream and downstream migration.</p> <p>During construction of the East Pylon on land, adjacent to the River Usk and potentially the new bridge in the River Ebbw, sufficient noise and vibration may be generated to cause behavioural/barrier effects as the migratory fish pass through the River Usk (this will be dependent on construction methodology and outcome of noise assessments).</p>	
Initial Assessment The key characteristics of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	There will be no land-take within the SAC,

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary SAC/ Môr Hafren
Disturbance to key species	No direct impacts anticipated within the Severn Estuary SAC. Disturbance to migratory fish, but only as they pass through the River Usk SAC during construction and operation from potential changes in water quality and lighting. Disturbance to fish as they pass through the Usk from noise and vibration during construction of the East Pylon on land, adjacent to the River Usk and potentially the new bridge in the River Ebbw (depending on construction methodology and outcome of noise assessments).
Habitat or species fragmentation	No species or habitat fragmentation within the SAC, potential for barrier effects for migratory fish in the River Usk.
Reduction in species density	Impacts on migratory fish, outwith the SAC could potentially reduce numbers.
Changes in key indicators of conservation value (water quality etc)	Potential for air emissions but not within the SAC, emissions thought to be taken away from this SAC and localised to areas outside of the SAC. Water quality changes could affect migratory fish, outside of the SAC and as they migrate through the River Usk.
Climate change	Sea level rise will affect intertidal habitat.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	The only potential impact may be on the migratory fish species as the move out of the Severn Estuary SAC into the River Usk SAC, whereby they may be affected by water quality/noise and vibration (construction only) /lighting leading to physiological/behavioural/barrier effects. There would be no direct impacts within the Severn Estuary SAC that would interfere with the overall structure and function of the SAC.
Interference with the key relationships that define the function of the site	
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	No permanent loss within the SAC.

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary SAC/ Môr Hafren
Disturbance to key species	<p>No direct impacts anticipated within the Severn Estuary SAC.</p> <p>Disturbance to migratory fish, but only as they pass through the River Usk during construction and operation from potential changes in water quality and lighting (long-term, without appropriate mitigation measures).</p> <p>Temporary disturbance to fish as they pass through the River Usk from noise and vibration during construction of the East Pylon on land, adjacent to the River Usk and potentially the new bridge in the River Ebbw (depending on construction methodology and outcome of noise assessments).</p> <p>Further studies are required to assess the magnitude of impacts and full development of measures</p>
Habitat or species fragmentation	No habitat fragmentation. For species potential barrier effects in fish outwith the SAC, within the River Usk SAC.
Loss	No likelihood of effects beyond those identified above
Fragmentation	No additional effects beyond those identified above
Disruption	Potentially significant disruption to migratory fish, outwith the SAC, leading to a reduction in numbers.
Disturbance	For fish as outlined above.
Change to key elements of the site (e.g. water quality, hydrological regime etc)	No potential for significant water quality changes within the Severn Estuary SAC.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant, or where the scale or magnitude of impacts is not known.	
	<p>Potential for LSE include:</p> <ul style="list-style-type: none"> -Physiological/behavioural/barrier effects in fish from changes in water quality during construction and operation; and -Behavioural/barrier effects in fish from noise and vibration as well as lighting during construction and operation.
Outcome of screening stage	Significant effects are likely or cannot be excluded.
Are the appropriate statutory environmental bodies in agreement with this conclusion?	YES/NO

Table B.4 Severn Estuary SPA

Project name	M4 CAN Project	
Natura 2000 site under consideration	Severn Estuary SPA	
Date	Author	Verified
April 2015	Nicole Price	Keith Jones
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with any other plans or projects) on the European Site by virtue of:		
Size and scale (<i>road type and probable traffic volume</i>)	-A new section of 3-lane motorway between Junctions 23 and 29 of the M4 south of Newport (between Magor and Castleton), with complementary measures including: -Reclassification of the existing section of the M4 as a trunk road; -A M48-B4245 link: This will involve a connection between the M4, M48 and B4245 which would provide relief to Junction 23A and to the local road network. It would also provide improved access to proposed park and ride facilities at the Severn Tunnel Junction; -Provision of cycle friendly infrastructure: promoting the use of cycling as an alternative to the car for journeys of up to three miles by providing new infrastructure or improving existing infrastructure; and -Provision of walking friendly infrastructure: promoting the use of walking as an alternative to the car journeys of up to three miles by providing new infrastructure or improving existing infrastructure. -Predicted traffic volumes not currently known (data awaited). -The area covered by the Project design has yet to be determined.	
Land-take within SPA	The M4 CaN involves no land-take within this SPA.	
Distance from the European Site or key interests of the site (<i>from edge of the project assessment corridor</i>)	The M4 CaN is located 0.4 km from the SPA. However, the interest features may be nearer to the footprint of the M4 CaN (future surveys will verify this).	
Resource requirements (<i>from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts</i>)	Potential resource requirements are provided in Section 2.	

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary SPA
Emissions (e.g. <i>polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution</i>)	There could potentially be a change in water and air quality, outside and upstream of this SPA.
Excavation requirements (e.g. <i>impacts of local hydrogeology</i>)	There will be no excavation within or adjacent to the SPA. No impacts are envisaged on the local hydrogeology.
Transportation requirements	Not known
Duration of construction, operation etc.	Construction period Spring 2018-2021
Other	None
Description of avoidance and / or mitigation measures	
Nature of proposals	The main measure relevant to this site include: Construction will follow CIRIA best practice EA guidance for pollution prevention. A CEMP will be developed to prevent/minimise impacts. Other measures as outlined in section 6 and potential future measures in Section 7, see screened in tables.
Location	Measures will be implemented across the site.
Evidence for effectiveness	Full details not yet available
Mechanism for delivery	Full details not yet available
Characteristics of European Site	
Name of European Site and its EU code	Severn Estuary SPA UK9015022
Location and distance of the European Site from the proposed works	The M4 CaN is located 0.4 km from the European site.
European Site size	24700.91 ha

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary SPA
Key features of the European Site including the primary reasons for selection and any other qualifying interests	<p>During passage: Ringed plover (passage) (<i>Charadrius hiaticula</i>)</p> <p>Over wintering: Bewick's swan (wintering) (<i>Cygnus columbianus bewickii</i>) Dunlin (<i>Calidris alpina alpina</i>) Redshank (<i>Tringa totanus</i>) Shelduck (<i>Tadorna tadorna</i>) Curlew (<i>Numenius arquata</i>) Pintail (<i>Anas acuta</i>)</p> <p>Assemblage of nationally important populations of wintering waterfowl</p>
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	The conservation of the site features is dependent on the tidal regime. The range is the second highest in the world and the scouring of the seabed and strong tidal streams result in natural erosion of the habitats. The estuary is therefore vulnerable to large scale interference, including human actions. These include land-claim, aggregate extraction/dredging, physical developments such as barrage construction flood defences, pollution (industrial, oil spillage), eutrophication and tourism based activities and disturbance.
European Site conservation objectives	See Appendix A.
Assessment Criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site	

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary SPA
<p>There will be no direct impacts within the Severn Estuary SPA.</p> <p>-Habitat loss/fragmentation- no loss within the SPA, but potential for loss of roosting or foraging areas if located in the vicinity of the route and outside of the SPA during construction and operation.</p> <p>-Physical presence of the M4 CaN- may lead to displacement of the features if, located in the vicinity of the route. Also potential interruption of flight lines/collision risk depending on bridge design during construction and operation.</p> <p>-Change in traffic flows/use of the area may lead to disturbance/displacement/collision/interruption of flight lines during construction and operation.</p> <p>-Noise and vibration has the potential to lead to disturbance/displacement if roosting sites within close proximity during construction and operation.</p> <p>-Visual and lighting leading to disturbance/behavioural/interruption of flight paths and subsequent effects on night behaviour patterns during construction and highway lighting.</p> <p>-</p>	
Initial Assessment <p>The key characteristics of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:</p>	
Reduction of habitat area	There will be no land-take within the SPA. There may be some loss of foraging area and roosting areas (to be determined during surveys)
Disturbance to key species	Disturbance to bird species, outside of the SPA as detailed above.
Habitat or species fragmentation	No species or habitat fragmentation within the SPA, but potential for outside of the SPA as described previously.
Reduction in species density	Potential for impacts to result in a reduction in species numbers (without appropriate mitigation measures).
Changes in key indicators of conservation value (water quality etc)	Potential for air emissions but not anticipated to affect the SPA, emissions thought to be taken away from this SPA and localised to areas outside of the SPA. Water quality changes not anticipated to affect these features.
Climate change	Sea level rise will affect intertidal habitat.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	Potential impacts on the features are those as described previously outside of the SPA. However, it is not anticipated that there would be significant interference with key relationships that define the structure and function of the SPA as a whole.
Interference with the key relationships that define the function of the site	
Indicate the significance as a result of the identification of impacts set out above in terms of:	

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary SPA
Reduction of habitat area	No permanent loss within the SPA, as described previously potential for loss of foraging and roosting areas during construction and operation leading to LSE.
Disturbance to key species	As described previously
Habitat or species fragmentation	As described previously
Loss	No likelihood of effects beyond those identified above
Fragmentation	No additional effects beyond those identified above
Disruption	As described previously
Disturbance	As described previously
Change to key elements of the site (e.g. water quality, hydrological regime etc)	Some potential for significant water quality changes (precautionary until measures are fully developed) within the River Usk SAC which could potentially affect SPA birds, but no local hydrological changes anticipated.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant, or where the scale or magnitude of impacts is not known.	
	<p>Potential for LSE include:</p> <ul style="list-style-type: none"> -Habitat loss/fragmentation- no loss within the SPA, but potential for loss of roosting or foraging areas if located in the vicinity of the route and outside of the SPA during construction and operation. -Physical presence of the M4 CaN- may lead to displacement of the features if, located in the vicinity of the route. Also potential interruption of flight lines/collision risk depending on bridge design during construction and operation. -Change in traffic flows/use of the area may lead to disturbance/displacement/collision/interruption of flight lines during construction and operation. -Noise and vibration has the potential to lead to disturbance/displacement if roosting sites within close proximity during construction and operation. -Visual and lighting leading to disturbance/behavioural/interruption of flight paths and subsequent effects on night behaviour patterns during construction and highway lighting.
Outcome of screening stage	Significant effects are likely or cannot be excluded.
Are the appropriate statutory environmental bodies in agreement with this conclusion?	YES/NO

Table B.5 Severn Estuary Ramsar Site

Project name	M4 CAN Project	
Natura 2000 site under consideration	Severn Estuary Ramsar Site	
Date	Author	Verified
April 2015	Nicole Price	Keith Jones
Description of Project Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with any other plans or projects) on the European Site by virtue of:		
Size and scale (<i>road type and probable traffic volume</i>)	-A new section of 3-lane motorway between Junctions 23 and 29 of the M4 south of Newport (between Magor and Castleton), with complementary measures including: -Reclassification of the existing section of the M4 as a trunk road; -A M48-B4245 link: This will involve a connection between the M4, M48 and B4245 which would provide relief to Junction 23A and to the local road network. It would also provide improved access to proposed park and ride facilities at the Severn Tunnel Junction; -Provision of cycle friendly infrastructure: promoting the use of cycling as an alternative to the car for journeys of up to three miles by providing new infrastructure or improving existing infrastructure; and -Provision of walking friendly infrastructure: promoting the use of walking as an alternative to the car journeys of up to three miles by providing new infrastructure or improving existing infrastructure. -Predicted traffic volumes not currently known (data awaited). -The area covered by the Project design is still to be determined.	
Land-take within the Ramsar site	The M4 CaN involves no land-take within this Ramsar site.	
Distance from the European Site or key interests of the site (<i>from edge of the project assessment corridor</i>)	The M4 CaN is located 0.4 km from the Ramsar site. However, the interest features may be foraging or roosting on adjacent land to the Ramsar site and present nearer to the footprint of the M4 CaN (future surveys will verify this).	
Resource requirements (<i>from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts</i>)	Potential resource requirements are provided in Section 2.	

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary Ramsar Site
Emissions (e.g. <i>polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution</i>)	There could potentially be a change in water and air quality outside and upstream of this Ramsar site. Only the water quality changes within the River Usk, has the potentially to affect the migratory fish species listed as part of this site.
Excavation requirements (e.g. <i>impacts of local hydrogeology</i>)	There will be no excavation within the Ramsar site. There may be some adjacent to the site. No impacts are envisaged on the local hydrogeology.
Transportation requirements	Unknown
Duration of construction, operation etc.	Construction period Spring 2018-2021
Other	None
Description of avoidance and / or mitigation measures	
Nature of proposals	The main measure relevant to this site include: Construction will follow CIRIA best practice EA guidance for pollution prevention. A CEMP will be developed to prevent/minimise impacts. Other measures as outlined in section 6 and potential future measures in Section 7, see screened in tables.
Location	Measures will be implemented across the site, as appropriate.
Evidence for effectiveness	Full details not yet available
Mechanism for delivery	Full details not yet available
Characteristics of European Site	
Name of European Site and its EU code	Severn Estuary Ramsar Site UK11081
Location and distance of the European Site from the proposed works	The Ramsar site is located 0.4 km from the M4 CaN.
European Site size	24662.98 ha

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary Ramsar Site
Key features of the European Site including the primary reasons for selection and any other qualifying interests	<p>Habitats:</p> <p>Sandbanks which are slightly covered by sea water all the time</p> <p>Estuaries</p> <p>Mudflats and sandflats not covered by seawater at low tide</p> <p>Atlantic salt meadows</p> <p>Migratory fish:</p> <p>Salmon</p> <p>Sea trout</p> <p>Sea lamprey</p> <p>River lamprey</p> <p>Allis shad</p> <p>Twaite shad</p> <p>European eel</p> <p>Bird assemblages of international importance</p> <p>Species with peak counts in winter:</p> <p>Bewick's swan</p> <p>European white-fronted goose</p> <p>Shelduck</p> <p>Gadwall</p> <p>Dunlin</p> <p>Redshank</p> <p>Species regularly supported during the breeding season:</p> <p>Lesser black-backed gull</p> <p>Species with peak counts in spring/autumn:</p> <p>Ringed plover</p> <p>Species with peak counts in winter:</p> <p>Eurasian teal</p> <p>Pintail</p>
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Factors (past, present or potential) adversely affecting the site's ecological character as identified from the Ramsar data sheet include dredging, erosion, recreational/tourism disturbance.
European Site conservation objectives	See Appendix A.

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary Ramsar Site
Assessment Criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site	
<p>There will be no direct impacts within the Severn Estuary Ramsar site. (Also see Section 6)</p> <p>Birds</p> <ul style="list-style-type: none"> -Habitat loss/fragmentation- no loss within the Ramsar site, but potential for loss of roosting or foraging areas, outside of the Ramsar site, if birds are located in the vicinity of the during construction and operation. -Physical presence of the M4 CaN- may lead to disturbance/displacement of the features if they are located in the vicinity of the route. Also potential interruption of flight lines/collision risk depending on bridge design during construction and operation. -Change in traffic flows/use of the area may lead to disturbance/displacement/collision/interruption of flight lines during construction and operation. <p>Noise and vibration has the potential to lead to disturbance/displacement if roosting and foraging sites within close proximity during construction and operation.</p> <ul style="list-style-type: none"> -Visual and lighting leading to disturbance/behavioural/interruption of flight paths and subsequent effects on night behaviour patterns during construction and highway lighting. <p>Migratory Fish</p> <ul style="list-style-type: none"> -No habitat loss/fragmentation of key habitats within this site, however, potential for loss/fragmentation of eel habitat across the Gwent Levels during construction and operation. -The physical presence of the new motorway may pose a barrier to the movement of eels across the Gwent Levels during construction and operation. -No change in water quality within this site, although, there is potential for water quality effects (e.g. physiological/behavioural and barrier) on fish as they migrate through the River Usk and for eels across the Gwent Levels (construction and operation). -Noise and vibration will not directly affect the features within this site. However, there is potential for disturbance/behavioural/ barrier effects as the features migrate through the River Usk during construction. -Lighting leading to behavioural and barrier effects as the features migrate through the River Usk during construction and operation. <p>Habitats</p> <ul style="list-style-type: none"> -No impacts anticipated on habitat features. 	

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary Ramsar Site
Initial Assessment The key characteristics of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	There will be no land-take within the Ramsar Site. There may be some loss of foraging area and roosting areas outside of the site (to be determined during surveys). Potential loss/fragmentation of eel habitat across the Gwent Levels.
Disturbance to key species	Disturbance to birds and migratory fish, outside of the Ramsar as detailed above.
Habitat or species fragmentation	No species or habitat fragmentation within the Ramsar, but potential for outside of the SPA as described previously.
Reduction in species density	Potential for impacts to result in a reduction in species numbers (without appropriate mitigation measures).
Changes in key indicators of conservation value (water quality etc)	Potential for air emissions but not anticipated to affect the Ramsar site, emissions thought to be taken away from this site and potential effects localised. Water quality changes not anticipated to affect the features within the Ramsar site. Potential to affect migratory species as the pass through the River Usk and for eels across the Gwent Levels.
Climate change	Sea level rise will affect intertidal habitat.
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	Potential impacts on the features are those as described previously outside of the Ramsar site. However, it is not anticipated that there would be significant interference with key relationships that define the structure and function of the SPA as a whole. .
Interference with the key relationships that define the function of the site	
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	No permanent loss within the Ramsar, as described previously potential for loss of foraging and roosting areas outside of the Ramsar during construction and operation leading to LSE.
Disturbance to key species	As described previously
Habitat or species fragmentation	As described previously
Loss	No likelihood of effects beyond those identified above
Fragmentation	No additional effects beyond those identified above
Disruption	As described previously
Disturbance	As described previously

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary Ramsar Site
Change to key elements of the site (e.g. water quality, hydrological regime etc)	Some potential for significant water quality changes (precautionary until measures are fully developed) within the River Usk SAC, but not within Ramsar site and no local hydrological changes anticipated.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant, or where the scale or magnitude of impacts is not known.	
	<p>Potential for LSE include:</p> <p>Birds</p> <ul style="list-style-type: none"> -Habitat loss/fragmentation- no loss within the Ramsar site, but potential for loss of roosting or foraging areas, outside of the Ramsar site, if birds are located in the vicinity of the during construction and operation. -Physical presence of the M4 CaN- may lead to disturbance/displacement of the features if they are located in the vicinity of the route. Also potential interruption of flight lines/collision risk depending on bridge design during construction and operation. -Change in traffic flows/use of the area may lead to disturbance/displacement/collision/interruption of flight lines during construction and operation. -Noise and vibration has the potential to lead to disturbance/displacement if roosting and foraging sites within close proximity during construction and operation. -Visual and lighting leading to disturbance/behavioural/interruption of flight paths and subsequent effects on night behaviour patterns during construction and highway lighting. <p>Migratory Fish</p> <ul style="list-style-type: none"> -No habitat loss/fragmentation of key habitats within this site, however, potential for loss/fragmentation of eel habitat across the Gwent Levels during construction and operation. -The physical presence of the new motorway may pose a barrier to the movement of eels across the Gwent Levels during construction and operation. -No change in water quality within this site, although, there is potential for water quality effects (e.g. physiological/behavioural and barrier) on fish as they migrate through the River Usk and for eels across the Gwent Levels (construction and operation). -Noise and vibration will not directly affect the features within this site. However, there is potential for disturbance/behavioural/ barrier effects as the features migrate through the River Usk during construction. -Lighting leading to behavioural and barrier effects as the features migrate through the River Usk during construction and operation.

Project name	M4 CAN Project
Natura 2000 site under consideration	Severn Estuary Ramsar Site
Outcome of screening stage	Significant effects are likely or cannot be excluded.
Are the appropriate statutory environmental bodies in agreement with this conclusion?	YES/NO

Draft

Table B.6: Wye Valley and Forest of Dean Bat Sites SAC

Project name		
M4 CAN Project		
Natura 2000 site under consideration		
Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumo Dyffryn Gwy a Fforest y Ddena SAC		
Date	Author	Verified
April 2015	Nicole Price	Keith Jones
Description of Project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with any other plans or projects) on the European Site by virtue of:		
Size and scale (<i>road type and probable traffic volume</i>)	<p>-A new section of 3-lane motorway between Junctions 23 and 29 of the M4 south of Newport (between Magor and Castleton), with complementary measures including:</p> <p>-Reclassification of the existing section of the M4 as a trunk road;</p> <p>-A M48-B4245 link: This will involve a connection between the M4, M48 and B4245 which would provide relief to Junction 23A and to the local road network. It would also provide improved access to proposed park and ride facilities at the Severn Tunnel Junction;</p> <p>Provision of cycle friendly infrastructure: promoting the use of cycling as an alternative to the car for journeys of up to three miles by providing new infrastructure or improving existing infrastructure; and</p> <p>-Provision of walking friendly infrastructure: promoting the use of walking as an alternative to the car journeys of up to three miles by providing new infrastructure or improving existing infrastructure.</p> <p>-Predicted traffic volumes not currently known (data awaited).</p> <p>-The area covered by the Project design is still to be determined.</p>	
Land-take within the SAC site	The M4 CaN involves no land-take within this SAC.	
Distance from the European Site or key interests of the site (<i>from edge of the project assessment corridor</i>)	The M4 CaN is located 7.1 km from the SAC. However, lesser horseshoe bats have been recorded on the eastern edge of the M4 CAN (further bat surveys are to be undertaken to confirm).	
Resource requirements (<i>from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts</i>)	Potential resource requirements are provided in Section 2.	

Project name	M4 CAN Project
Natura 2000 site under consideration	Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumo Dyffryn Gwy a Fforest y Ddena SAC
Emissions (e.g. <i>polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution</i>)	There will be no water and air quality changes to this SAC.
Excavation requirements (e.g. <i>impacts of local hydrogeology</i>)	There will be no excavation within this SAC. Construction at the eastern edge of the M4 CaN could affect potential flight lines (commuting/foraging routes) and bat roosts, if present. No impacts are envisaged on the local hydrogeology.
Transportation requirements	Unknown
Duration of construction, operation etc.	Construction period Spring 2018-2021
Other	None
Description of avoidance and / or mitigation measures	
Nature of proposals	The main measure relevant to this site include: Construction will follow CIRIA best practice EA guidance for pollution prevention. A CEMP will be developed to prevent/minimise impacts. Other measures as outlined in section 6 and potential future measures in Section 7, see screened in tables.
Location	Measures will be implemented across the site, as appropriate.
Evidence for effectiveness	Full details not yet available
Mechanism for delivery	Full details not yet available
Characteristics of European Site	
Name of European Site and its EU code	Wye Valley and Forest of Dean Bat Sites SAC UK0014794
Location and distance of the European Site from the proposed works	The SAC is located 7.1 km from the M4 CaN.
European Site size	142.7ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	Annex II species that are a primary reason for selection of this site: Lesser horseshoe bat Greater horseshoe bat

Project name	M4 CAN Project
Natura 2000 site under consideration	Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumo Dyffryn Gwy a Fforest y Ddena SAC
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Qualifying bat species forage for food outside the SAC and their foraging/commuting areas could be affected by new road construction.
European Site conservation objectives	See Appendix A.
Assessment Criteria Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site	
Lesser horseshoe bat - Land take outside the SAC leading to habitat loss/fragmentation of roosts/foraging routes/severance of flight lines, if present in the area during construction or operation (to be confirmed by surveys). - Physical presence leading to restriction in movement through the severing of flight lines/collision risk. - Visual and lighting leading to restriction of bat movements during construction and operation. Greater horseshoe bat - No impacts anticipated (Also see Section 6)	
Initial Assessment The key characteristics of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	There will be no land-take within the SAC. There may be some habitat loss/fragmentation of roosts/foraging routes outside the SAC.
Disturbance to key species	As described above
Habitat or species fragmentation	As described previously.
Reduction in species density	Potential for impacts to result in a reduction in species numbers (without appropriate mitigation measures and further surveys to confirm).

Project name	M4 CAN Project
Natura 2000 site under consideration	Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumo Dyffryn Gwy a Fforest y Ddena SAC
Changes in key indicators of conservation value (water quality etc)	Potential for some localise effects from air emissions but not anticipated to affect the SAC, due to the large distance between the M4 CaN and SAC. Water quality changes will not affect the features within the SAC.
Climate change	Changes in habitat quality and prey availability
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	Potential impacts on the features are those as described previously outside of the SAC. However, it is not anticipated that there would be significant interference with key relationships that define the structure and function of the SAC as a whole.
Interference with the key relationships that define the function of the site	
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	As described previously (precise areas to be confirmed)
Disturbance to key species	As described previously
Habitat or species fragmentation	As described previously (precise areas to be confirmed)
Loss	No likelihood of effects beyond those identified above
Fragmentation	No additional effects beyond those identified above
Disruption	As described previously
Disturbance	As described previously
Change to key elements of the site (e.g. water quality, hydrological regime etc)	No changes to water quality or alteration of the hydrological regime within this SAC, due to distance from M4 CaN.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant, or where the scale or magnitude of impacts is not known.	
	Potential for LSE include: -Land take leading to habitat loss/fragmentation of roosts/foraging routes/severance of flight lines outside the SAC, if present in the area during construction (to be confirmed by surveys). -Physical presence leading to restriction in movement through the severing of flight lines/collision risk -Visual and lighting leading to restriction of bat movements during construction and operation.

Project name	M4 CAN Project
Natura 2000 site under consideration	Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumo Dyffryn Gwy a Fforest y Ddena SAC
Outcome of screening stage	Significant effects are likely or cannot be discounted.
Are the appropriate statutory environmental bodies in agreement with this conclusion?	YES/NO

Draft

Appendix C Development plans considered for possible in combination effects

Draft

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
Transport Plans		
Wales Transport Strategy		
<p>The WTS provides the detailed blueprint for the development of a transport system in Wales which supports WG objectives. The goal of "One Wales: Connecting the nation" is to promote sustainable transport networks that safeguard the environment while strengthening our country's economic and social life. The WTS identifies a series of high-level outcomes and sets out the steps to their delivery.</p> <p>The strategic priorities of the WTS are:</p> <ul style="list-style-type: none"> • Reducing greenhouse gas emissions and other environmental impacts from transport; • Integrating local transport; • Improving access between key settlements and sites; • Enhancing international connectivity; and • Increasing safety and security. 	<p>Improving the efficient, reliable and sustainable movement of people and freight as well as reducing the contribution of transport to greenhouse gas emissions will help to mitigate or offset any increase in diffuse air pollution as a result of this Strategy.</p>	<p>Reduction in greenhouse gas emissions.</p>
National Transport Plan and the Prioritised National Transport Plan		
<p>This sets out the strategic priorities for Wales for the period up to 2015 and beyond. This Plan details the approach to putting transport onto a carbon reduction pathway, whilst at the same time ensuring that it can continue to support sustainable economic development and social inclusion. The</p>	<p>The Plan considers the commitments and objectives of the NTP and responds directly to the priority to improve the M4 between Magor and Castleton. The Plan will provide a package of highway infrastructure improvements alongside complementary measures including encourage alternative</p>	<p>Reduction in air pollution emissions.</p>

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<p>objectives of the plan are to improve sustainable transport options in Wales through encouraging alternative modes of transport such as cycling and public travel. The plan aims to invest in transport in Wales to tackle poverty and assist economic growth.</p>	<p>modes of transport such as providing cycle friendly infrastructure and walking friendly infrastructure.</p> <p>To reduce the contribution of transport to air pollution and other harmful pollutant emissions: It is expected that the provisions outlined in the NTP will support the improvement in air quality across aspects of the transport network throughout Wales, although there is no certainty that improvements will be universal. Measures outlined in the NTP support the reduction in the use of cars in favour of public transport, which would improve the general level of air quality across some locations throughout Wales, should a significant number of people switch to using public transport rather than using cars. However, particular parts of the road network could suffer from deteriorating air quality should the expected increase in population across Wales precipitate an increase in car use in the near future.</p> <p>Additional measures in the NTP which could be of benefit to improving local air quality across Wales include the promotion of walking and cycling schemes to encourage people to leave their cars when undertaking short journeys. This would assist with reducing emissions of nitrogen dioxide and particulate matter from the transport network,</p>	

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
	<p>and subsequently the formation of low lying ozone, which is damaging to the health of both flora and fauna.</p> <p>To reduce the negative impacts of transport on biodiversity and to increase its positive impacts: It should be noted that there is a significant risk that the cumulative impact of individual transport projects could have a significantly adverse effect on biodiversity, by reducing the extent of habitats and incrementally increasing the emission or release of harmful pollutants.</p> <p>Generally however, it is expected that the provisions in the NTP will indirectly benefit the protection of biodiversity across Wales. Reducing the use of private vehicles in favour of home working, public transport or cycling and walking, would assist with reducing air quality emissions, and noise impacts, which would be to the benefit of biodiversity across Wales.</p> <p>To avoid transport related damage to designated wildlife sites and protected species: The NTP recognises that there could be effects from habitat loss and fragmentation, loss of breeding sites, damage to flightlines, changes to habitat structure and potential wildlife vehicle collisions. The NTP identifies</p>	

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
	<p>potential mitigation measures that would address such issues if they were to arise. To limit transport related pollution of water resources:</p> <p>The future impact of the transport network on water pollution is likely to be small overall, especially in comparison to air and noise pollution. The number of recorded water pollution events where transport is the primary cause is not expected to significantly change given the proposals outlined in the NTP, which are supportive of improving road drainage and incorporating water quality treatment measures across the transport network. Thus there is likely to be some pollution of water resources due to the movement of particles arising from tyre or brake wear or spilt oil being washed into waterways during a surface runoff event.</p>	
Wales Spatial Plan Update (WSPU)		
<p>The WSPU sets out cross-cutting national spatial priorities. It encompasses the elements required to deliver sustainable development: services, land use and investment and provides a framework for developing national and regional perspectives, reflecting the distinctive needs of the various communities of Wales. The WSPU comprises a series of national frameworks based on the core themes of:</p> <ul style="list-style-type: none"> • Building Sustainable Communities; • Promoting a Sustainable Economy; 	<p>The provision of transport infrastructure includes the effects of port and marine developments as well as road and rail that potentially may give rise to adverse effects due to direct disturbance or indirect effects such as hydrological impacts. The provision of water supplies and sewage treatment may also have a bearing upon the conservation objectives of European sites based on river systems and groundwater flows. Provision of both low carbon conventional and renewable energy sources may give rise to effects primarily due to direct land take, but also as a</p>	<p>Insufficient information on actual activities or locations to allow identification of impacts.</p>

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<ul style="list-style-type: none"> Valuing our Environment; Achieving Sustainable Accessibility; and Respecting Distinctiveness. <p>The WSPU is a strategic document which provides a framework for other spatial planning activities in Wales and as such contains limited detail relating to the scale and location of new development.</p>	<p>result of the provision of water, thermal effluent and transmission lines.</p> <p>Flood risk management may alter the hydrological regime potentially affecting European sites. This applies to both coastal as well as fluvial systems since in the case of the former, coastal defences may alter the movement of marine sediment and erosive forces.</p> <p>There are 94 Special Areas of Conservation (SAC), including 5 European Marine Sites, 20 Special Protection Areas (SPA) and 10 Ramsar sites in Wales.</p> <p>The Appropriate Assessment has identified that 84 European and Ramsar sites could potentially be affected by the delivery of the WSPU either directly or in combination with other plans and projects both in Wales and in England.</p> <p>Particular attention should be paid to the following areas:</p> <ul style="list-style-type: none"> River Wye; and Severn Estuary. <p>The key actions associated with the WSPU and in combination with other plans that may affect European sites are:</p> <ul style="list-style-type: none"> Urban and economic development activities; Water abstraction and water pollution; Recreation and tourist pressures; and Provision of energy and transport 	

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
	infrastructure.	
South East Wales Regional Transport Plan and Habitats Regulations Assessment		
<p>The vision for the RTP is to provide a modern, integrated and sustainable transport system for South East Wales that increases opportunity, promotes prosperity and protects the environment; where public transport, walking, cycling and sustainable freight provide travel alternatives.</p> <p>The priorities of the SE Wales RTP are:</p> <ul style="list-style-type: none"> • To improve access to services, facilities and employment, particularly by public transport, walking and cycling; • To provide a transport system that increases the use of sustainable modes of travel; • To reduce the demand for travel; • To develop an efficient and reliable transport system with reduced levels of congestion and improved transport links within the Sewta region and to the rest of Wales, the UK and Europe; • To provide a transport system that encourages healthy and active lifestyles, is safer and supports local communities; • To reduce significantly the emission of greenhouse gases and air pollution from transport; • To ensure that land use 	<p>To reduce the contribution of transport to air pollution and other harmful pollutant emissions:</p> <p>It is expected that the provisions outlined in the SE Wales RTP will support the improvement in air quality across aspects of the transport network in SE Wales, although there is no certainty that improvements will be universal. Measures outlined in the SE Wales RTP support the reduction in the use of cars in favour of public transport, which would improve the general level of air quality across some locations in SE Wales, should a significant number of people switch to using public transport rather than using cars. However, particular parts of the road network could suffer from deteriorating air quality should the expected increase in population across SE Wales precipitate an increase in car use in the near future.</p> <p>Additional measures in the SE Wales RTP which could be of benefit to improving local air quality across SE Wales include the promotion of walking and cycling schemes to encourage people to leave their cars when undertaking short journeys. This would assist with reducing emissions of nitrogen dioxide and particulate matter from the transport network, and subsequently the formation of low lying ozone, which is damaging to the health of both flora and fauna.</p>	Reduction in air pollution emissions.

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<p>development in SE Wales is supported by sustainable transport measures;</p> <ul style="list-style-type: none"> To make better use of the existing transport system; and To play a full role in regenerating SE Wales. 	<p>To reduce the negative impacts of transport on biodiversity and to increase its positive impacts:</p> <p>It should be noted that there is a significant risk that the cumulative impact of individual transport projects could have a significantly adverse effect on biodiversity, by reducing the extent of habitats and incrementally increasing the emission or release of harmful pollutants.</p> <p>Generally however, it is expected that the provisions in the SE Wales RTP will indirectly benefit the protection of biodiversity across SE Wales. Reducing the use of private vehicles in favour of home working, public transport or cycling and walking, would assist with reducing air quality emissions, and noise impacts, which would be to the benefit of biodiversity across SE Wales.</p> <p>To avoid transport related damage to designated wildlife sites and protected species:</p>	
Cardiff Local Development Plan		
<p>The LDP objectives are to:</p> <ul style="list-style-type: none"> Support the development of Cardiff as the heart of a sustainable, competitive and integrated city region; Support the regeneration of deprived communities; 	<p>The most likely mechanism for the draft Plan to have a significant effect is through airborne pollution.</p> <p>Opportunities for housing, employment and the enhanced status of Cardiff as a regional hub for industry, commerce and recreation as identified in the preferred Strategy have the</p>	<p>Increases in airborne pollution and deposition</p>

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<ul style="list-style-type: none"> Promote the regeneration of district and local centres as providers of accessible local services, facilities and employment; Maintain and enhance the vitality, attractiveness and viability of the city centre as the principal and most accessible commercial, administrative and visitor focus of the city region; Progress the regeneration of Cardiff Bay to provide new and accessible housing, employment and leisure opportunities and visitor attractions; Provide for a range and mix of new housing to address demand and need in the county; Ensure a range and choice of employment land is provided to maintain and improve the economic competitiveness of the city; Support the development of an integrated transport system that enables sustainable and active travel options, ensures the safe and efficient movement of people and goods throughout the city, addresses social inclusion and facilitates commuting, national and international business travel by a choice of means of transport; Maintain and enhance a network of 	<p>potential to affect levels of airborne pollution, and hence deposition of pollutants at these sites. Critical loads for the deposition of Nitrogen, Acid and Ozone are already exceeded at Blackmill Woodlands SAC. Acid deposition at Aberbargoed Grasslands SAC already exceeds the critical load by a factor of 22.</p> <p>There are two International Sites within Cardiff – the Cardiff Beech Woods SAC and the Severn Estuary SPA/SAC/Ramsar Site. Within a 10km radius of Cardiff there is the River Usk SAC. Within 15km there are the Aberbargoed Grassland SAC and Blackmill Woodlands SAC.</p>	

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<p>green spaces and corridors throughout the urban area, including the river corridors, which link to the surrounding countryside and coastline, provide opportunities for healthy recreation and travel, and support wildlife; and</p> <ul style="list-style-type: none"> Promote high quality, locally distinctive and sustainable design that addresses social inclusion and the need for efficient use of natural resources. <p>Provision will be made for between 22,750 and 24,750 new dwellings in Cardiff over the plan period (2006-21).</p> <p>The HRA Screening for Cardiff's Preferred Strategy has identified potential effects on five European sites: Cardiff Beechwoods SAC, Severn Estuary SAC/SPA/Ramsar, Aberbargoed Grasslands SAC, River Usk SAC and Blackmill Woodlands SAC.</p> <p>The main pathways through which likely significant effects are anticipated are via increased air emissions and recreational pressures.</p> <p>Recommendations include changes to the LDP wording and potentially further appropriate assessment work.</p>		

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
Vale of Glamorgan Local Development Plan Draft Preferred Strategy		
<p>The Draft Preferred Strategy for the LDP sets out the spatial direction of the Plan between 2011 and 2026 and seeks to "Concentrate development opportunities in Barry and the South East Zone. The St Athan area to be a key development opportunity. Other sustainable settlements to accommodate further housing and associated developments."</p>	<p>The following five European Sites within and adjacent to the borders of the county were identified to be of relevance for the LDP:</p> <ul style="list-style-type: none"> • Dunraven Bay SAC (water quality and quantity, soil loss, habitat fragmentation, air pollution, increased recreational pressure); • Severn Estuary / Mor Hafren SPA, SAC, and Ramsar Site (possible impacts include land-take, disturbance through noise and vibration, pollution through ground and surface water run-off, and interruption of flight-lines by wind turbines); • Kenfig / Cynffig SAC (water quality and quantity, soil loss, habitat fragmentation, air pollution, increased recreational pressure); • Blackmill Woodlands SAC (the site is already subject to high levels of air pollution, and any further development should seek to have positive impact on the site); and • Cardiff Beech Woods SAC (the site is already subject to high levels of air pollution, and any further development should seek to have positive impact on the site). <p>Overall detrimental impacts of the LDP alone on SACs are considered unlikely; however in-</p>	<p>Airborne pollution impacts, potential land-take and disturbance impacts. Noise, vibration and impacts on hydrology.</p>

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
	combination effects cannot be disregarded. Therefore a precautionary approach needs to be undertaken in respect of all five sites and further investigations will be needed.	
Blaenau Gwent Local Development Plan		
<p>The Blaenau Gwent Draft Preferred Strategy vision is to create a network of sustainable vibrant communities where people have the opportunity through the improvement of skills and opportunities to achieve a better quality of life. The communities are to be safe, healthy and thriving, with access to a range of good quality affordable homes and thriving town centres. Its unique environment, cultural and historic identity will be protected and enhanced to create a place where people want to live, work and visit. The Strategy is for growth and regeneration based around developing Ebbw Vale as the main hub and creating a network of secondary hubs to serve the other three areas of Tredegar, Ebbw Fach Upper and Ebbw Fach Lower. The aim is to ensure that the regeneration benefits to be delivered at the Ebbw Vale Steelworks site are spread across the Borough. The strategy is anticipated to accommodate between 2,250- 3,000 dwellings and up to 50-80ha of employment land.</p>	<p>There are no European sites within the Local Planning Authority of Blaenau Gwent. Taking into account the potential for transboundary impacts the screening has identified 9 European Sites that lie within a 15km search area around BGCBC's Planning Authority boundary. The potential impacts arising as a result of the screened in policies are:</p> <ul style="list-style-type: none"> • Airborne pollution as a result of increased traffic, new housing development and employment; • Increased water extraction; • Increased dumping of domestic and commercial waste; and • Recreational pressure. <p>Screening Conclusion Based on the information gathered for the screening process and considering the Habitats Regulations requirements for a precautionary approach, it is determined that further Appropriate Assessment work is required for:</p> <ul style="list-style-type: none"> • Cwm Clydach Woodlands; and • It is considered that increased development in Blaenau Gwent may lead to dumping. Therefore a 	<p>Pollution impacts and recreational disturbance.</p>

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
	<p>precautionary approach is proposed and further assessment is undertaken.</p> <p>Usk Bat Site CCW Management Plans identify that lesser horseshoe bats are very sensitive to disturbance, such as light and noise pollution and even the presence of a single person in close proximity can cause problems. A potential increase in recreation levels at the site could therefore have significant adverse effects.</p>	Impacts on flight lines and foraging areas.
Caerphilly County Borough LDP		
<p>The vision statement includes: The Development Strategy for the Local Development Plan will capitalise on the strategic location of Caerphilly County Borough at the centre of the Capital Network Region. It will ensure that the needs of all the County Borough's residents and visitors are met and that the regeneration of our towns, villages and employment centres and the surrounding countryside is delivered in a well-balanced and sustainable manner that reflects the specific role and function of individual settlements." The LDP has a number of aims, in summary these include:</p> <ul style="list-style-type: none"> To protect the environment as a whole whilst balancing the need for development with the need to conserve valuable resources. To ensure that new development minimises emissions of greenhouse 	<p>The potential effects arising from these policies are:</p> <ul style="list-style-type: none"> Urbanisation Impacts & Recreational – resulting from an expanding population within and around Bargoed/Aberbargoed, issues include fly tipping, dog fouling, cat predation, potential vandalism, trampling, introduction of invasive/ non-native species, pollution (water, air, noise, light); Land take – from proximal and adjacent development to European sites, including impacts on surrounding "buffer" habitats/ green space areas not designated for European interest but part of wider habitats connectivity supporting site integrity (important for the designated species at Aberbargoed Grasslands SAC); 	<p>There is no potential for land take from the M4 CaN within Caerphilly Borough. This M4 CaN screening assessment has considered that there will be no likely significant in-combination effect on the features of the Aberbargoed Grasslands SAC. This is because the site is located 16.7km away and thus there is sufficient spatial distance to prevent any likely significant in-combination effects between the M4 CaN and this plan. No other likely significant in-combination effects are anticipated on the other European/Internationally designated sites.</p>

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<p>gases as far as is practically possible in order to mitigate the effects of climate change.</p> <ul style="list-style-type: none"> To underpin all development with the principle of good design, that meets a diversity of needs; which uses resources efficiently; and which makes adequate provision for recycling and waste management. To make Caerphilly County Borough a clean, green, safe and pleasant place to live and work with decent public services. To enhance the vibrancy and diversity of local communities. To ensure equal opportunities. To provide a modern, integrated and sustainable transport system; To increase the economic prosperity of the people and communities of the County Borough To contribute to improving public health, by promoting land use developments that contribute to healthy lifestyles. To use resources efficiently making the best use of our assets. To improve education facilities to 'up skill' the population. To promote Caerphilly County Borough as an area in its own right. 	<ul style="list-style-type: none"> Water Resources and Water Quality – resulting from increased demand for water consumption and discharge requirements arising from new/ expanded housing and commercial developments and the potential for increased point source pollution, changes to surface water/ run-off which may have implications for water dependant sites; and Atmospheric Pollution - arising from a growth in traffic and transport and general development (emissions from construction/ building stock) which has the potential to affect sites sensitive to changes in air quality. <p>There is one European site within the CCBC boundary, the Aberbargoed Grasslands SAC, and several adjacent sites:</p> <ul style="list-style-type: none"> Brecon Beacons SAC; Cardiff Beech Woods SAC; Cwm Cadlan SAC; Cwm Clydach Woodlands SAC; Llangorse Lake SAC; River Usk SAC; Severn Estuary SAC; Severn Estuary SPA; Severn Estuary Ramsar; and Usk Valley Bat Sites SAC. 	

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<p>The HRA identified a number of policies in the Plan that had the potential to lead to likely significant effects on the Aberbargoed SAC. However, a Stage 2 - Appropriate Assessment was carried out and it was found that the Plan alone and in-combination would not lead to adverse effects on the integrity of this European site.</p>		
Torfaen County Borough Council Local Development Plan Preferred Strategy 2006 – 2021		
<p>The Strategy of the LDP is one of achieving a Network of Integrated Communities in Torfaen.</p> <p>The principal elements of this spatially will be to ensure that the two key settlements of Cwmbran and Pontypool function as service hubs for surrounding settlements. This strategy will rely on realising regeneration benefits of key sites namely the British site in Talywain alongside Cwmbran Town Centre. The strategy is anticipated to accommodate mid to high housing provision of 6600-7000 dwellings.</p> <p>Taking a precautionary approach, the HRA of the LDP has identified the potential for effects on five European sites: Aberbargoed Grasslands SAC, Usk Valley Bat Sites SAC, Cwm Clydach Woodlands SAC, the River Usk SAC and the Severn Estuary SAC/SPA/Ramsar.</p> <p>The Council intends to appoint independent</p>	<p>There are no European sites within the County Borough Boundaries. Following sites have been identified in close proximity to the boundaries of the county:</p> <ul style="list-style-type: none"> • Aberbargoed Grasslands SAC - Caerphilly (potential for air pollution from new developments); • Coed Y Cerrig SAC – Monmouthshire (proximity to A465 – air pollution); • Cwm Clydach Woodlands SAC - Blaenau Gwent (proximity to A465 – air pollution); • River Usk SAC - Newport, Monmouthshire, Powys (potential for air pollution from new developments); • River Wye SAC – Monmouthshire; • Severn Estuary SAC and SPA - Newport, Monmouthshire, Powys (potential for air pollution from new developments); • Sugar Loaf Woodlands SAC – Monmouthshire; • Usk Bat Sites SAC - Monmouthshire, 	<p>Pollution impacts and recreational disturbance.</p>

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<p>consultants to carry out Stage 2 of the HRA to ensure that it satisfies the requirements of the Habitats Regulations. It will also allow for an independent appraisal to be carried out of the implications for European sites.</p>	<p>Powys;</p> <ul style="list-style-type: none"> Wye Valley Woodlands SAC – Monmouthshire; and Wye Valley and the Forest of Dean Bat Sites SAC – Monmouthshire. <p>Although the LDP will be unlikely to have significant effects on the sites named here alone, a precautionary approach will be adopted so that the potential impacts will be reassessed when the detail of the policies and allocations in the Deposit LDP emerge. The most likely mechanism for significant effects is considered to be “in-combination” with other developments.</p>	
Brecon Beacons National Park Authority Local Development Plan		
<p>The LDP Vision in summary includes:</p> <ul style="list-style-type: none"> The Brecon Beacons National Park will continue to be a living working landscape with many uses, where development will be sustainable. The LDP will guide development in a way which will: Continues to be recognised internationally for its value as a protected area; Continues to be widely acclaimed for its natural beauty, geodiversity, biodiversity, and cultural heritage; Continues to be a sought-after destination providing an outstanding variety of sustainable opportunities; 	<p>Four of the twelve European sites likely to be affected by the LDP were identified in the HRA screening process as potentially affected primarily by the housing and employment allocations proposed within the National Park:</p> <ul style="list-style-type: none"> Llangorse Lake, River Usk SAC, River Wye SAC, and Usk Bat Sites. 	<p>Insufficient information on actual activities or locations to allow identification of impacts. However, this M4 CaN AEIS screening report has identified potential impacts on the River Usk SAC for migratory fish and otters, albeit lower down and thus there is unlikely to be any spatial overlap with development in the Brecon Beacons National Park. However, it is possible that fish affected in the lower part of the river could be subsequently affected in the higher reaches by a large scale development. It is difficult to ascertain this unless project level HRA's are being undertaken for potential large scale developments.</p>

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<ul style="list-style-type: none"> • Promotes an approach to development which ensure that the National Park of the future is able to be resilient, open and responsive to change – particularly climate change – and can be proactive in mitigating and adapting to the effects of undesirable change. • Promotes an approach to development which enables our communities to be less dependent upon external supply chains; • Continues to be a living landscape where innovative approaches to sustainable development and renewable energy are encouraged; • Managed sustainably through active partnerships among the Park's stakeholders; and • Has appropriate monitoring systems in place 		
Powys Local Development Plan (Deposit Draft)		
<p>The Powys Local Development Plan (LDP) sets out the Council's policies for the development and use of land in Powys, and for reconciling uses, up to 2026. It is applicable to all of Powys except the Brecon Beacons National Park. When it is adopted it will replace the adopted Powys Unitary Development Plan (UDP), 2010, this is expected in 2015 and it will become the basis for making decisions on planning</p>	<p>The European Sites within or close to the borders of the county include: Special Areas of Conservation (SAC):</p> <ul style="list-style-type: none"> • Berwyn a Mynyddoedd De Clwyd/ Berwyn and South Clwyd Mountains; • Coedydd Llawr-y-glyn; • Coetiroedd Cwm Elan/ Elan Valley Woodlands; • Drostre Bank; • Elenydd; 	<p>No likely significant effects on European sites identified.</p>

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<p>applications.</p> <p>Based on evidence of future need identified, the LDP aims to provide sufficient land through its policies and proposals to enable the provision of up to 5,000 dwellings, including 900 affordable homes, to be constructed. It also provides 49 hectares of employment land and includes policies to meet the needs of the economy. The plan distributes this development according to a hierarchy of settlements, with sites allocated for dwellings and employment in towns and larger villages which act as service centres for their wider communities. Outside of these larger settlements, in the smaller settlements and the open countryside of Powys, policies enable smaller scales of development to meet local needs, particularly affordable housing and to support the rural economy.</p>	<ul style="list-style-type: none"> • Granllyn; • Montgomery Canal; • Mynydd Epynt; • Pen Llyn a'r Sarnau/ Lleyen Peninsula and the Sarnau; • Rhos Goch; • River Usk/ Afon Wysg; • River Wye/ Afon Gwy; and • Tanat and Vyrnwy Bat Sites/ Safleoedd Ystlumod Tanat ac Efyrrwy. <p>Special Protection Areas (SPA):</p> <ul style="list-style-type: none"> • Berwyn; and • Elenydd – Mallaen. <p>Ramsar site:</p> <ul style="list-style-type: none"> • Cors Fochno and Dyfi. <p>It is considered that the policies and proposals contained in the Powys UDP are not likely to give rise to any significant effects on any European site in Powys.</p>	
Monmouthshire Local Development Plan		
<p>The Preferred Strategy Proposals of the Local Development Plan (LDP) set out the strategy for guiding development in the County. This includes setting the level of growth the LDP must provide for over the plan period, and the spatial distribution of this growth around the County. The Plan identifies the following:</p>	<p>A number of European Sites have been identified within and close to the boundaries of the county. The LDP has the potential to adversely affect some of these sites:</p> <p>Inside the Monmouthshire LDP area:</p> <ul style="list-style-type: none"> • River Usk – SAC (part is also in Brecon Beacons National Park) (increased pressure on natural 	<p>No likely significant in-combination effects anticipated on the River Wye /Afon Gwy SAC, Wye Valley and Forest of Dean Bat Sites SAC, Coed y Cerrig, Cwm Clydach Woodlands SAC, Sugar Loaf Woodlands SAC and Usk Bat Sites SAC with the M4 CaN development as these designated sites have been screened out. There is potential for the plan to lead to a likely significant in-</p>

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<p>Policy SAH7_Formal Paper Mill Site, Sudbrook- A brownfield site, which is allocated for residential development of around 190 new dwellings. This is located adjacent to the Severn Estuary SAC and SPA, Any application for development at the site will be subject to a project level HRA so as not to adversely affect the integrity of these sites.</p> <p>Policy SAE1-Identified Industrial Business Sites. For SAE1g South Woodside Usk. This requires a project level HRA to demonstrate that appropriate mitigation measures (if required) can be taken to avoid adverse effects on the River Usk SAC. Any such proposal must also:</p> <ul style="list-style-type: none"> • Avoid/minimise the loss or fragmentation of supporting habitat (vegetation adjacent to river corridor). Any proposal should also seek to enhance riparian and linear habitat features. • Avoid construction methods, such as pile-driving, which have the potential to disturb protected species through either noise and/or vibration. This is particularly important during migration periods for Salmonids or Lamprey as construction works can create acoustic barriers. • Be accompanied by a lighting scheme – dark corridors should be 	<p>resources, particularly water, recreational resources, green space, and air quality);</p> <ul style="list-style-type: none"> • River Wye/ Afon Gwy – SAC (increased pressure on natural resources, particularly water, recreational resources, green space, and air quality); • Severn Estuary – SAC, Ramsar and SPA (potential for the developments to affect green space, water run-off and water quality/quantity); • Wye Valley and Forest of Dean Bat Sites – SAC(increased pressure on recreational resources, water and air; increased light and noise pollution; reuse of buildings can affect bat roosting places; connectivity of habitats may be affected); and • Wye Valley Woodlands – SAC (increased pressure on recreational resources, water and air). <p>Brecon Beacons National Park LDP area:</p> <ul style="list-style-type: none"> • Coed y Cerrig – SAC (potential for the developments to increase pressure on natural resources, particularly water and air; air pollution from increased traffic; biodiversity (forests)); • Cwm Clydach Woodlands – SAC (impacts from developments on water quality/water table and air quality, particularly from increased traffic); 	<p>combination effect on the River Usk SAC, Severn Estuary SAC, SPA and Ramsar sites.</p>

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<p>maintained and light spillage onto the river corridor minimised.</p> <ul style="list-style-type: none"> Be accompanied by a Surface Water Management Plan that considers both the construction and operation of proposed development. <p>Policy SAH3-Fairfield Mabey, Chepstow. 16.1 hectares are allocated for a mixed use residential and employment development. Planning permission requires a project level HRA to satisfactorily demonstrate that appropriate mitigation can be taken during construction and operation of the scheme to avoid adverse effects (either direct or indirect) on the integrity of the River Wye SAC. The proposal includes a buffer strip of undeveloped land between the River Wye SAC and any development. The exact size and position of the buffer strip in relation to the development and SAC should be determined through the detailed project level HRA and in consultation with CCW. This will help to protect the SAC both during construction and operational phases of any future development.</p> <p>The HRA Screening of the Plan identified the potential for significant effects on several European sites in Monmouthshire County including the River Usk SAC and River Wye SAC through water pollution and reduced flow due to water abstraction.</p>	<ul style="list-style-type: none"> Sugar Loaf Woodlands – SAC (increased pressure on recreational resources, water and air); and Usk Bat Sites – SAC (increased air, light and noise pollution; reuse of buildings can affect bat roosting places; connectivity of habitats may be affected). <p>Outside the County boundaries:</p> <ul style="list-style-type: none"> Llangorse Lake / Llyn Syfaddan- SAC; and Aberbargoed Grassland – SAC. 	

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Recommendations include changes to the LDP wording and potentially further appropriate assessment work.		
Newport Local Development Plan 2011 - 2026, Revised Deposit Plans May 2013		
<p>The purpose of the LDP is to guide the development of Newport over the next 15 years.</p> <p>There are nine objectives within the Plan. These are:</p> <ul style="list-style-type: none"> • Objective 1 - Sustainable Use of Land; • Objective 2 - Climate Change; • Objective 3 - Economic Growth; • Objective 4 – Housing; • Objective 5 - Conservation and the Environment; • Objective 6 - Conservation and the Environment; • Objective 7 - Community Facilities and Infrastructure; • Objective 8 - Culture and Accessibility;, • Objective 9 - Health and Wellbeing; and • Objective 10-Waste. <p>The HRA considered seven European Sites within the influence of the Newport City Council Revised Deposit LDP including:</p> <ul style="list-style-type: none"> • River Usk SAC; • Severn Estuary SAC/SPA/Ramsar site; 	<p>The findings of the assessment indicate that the Revised Newport City Council Deposit LDP in implementation will not have a likely significant effect on the European sites considered as part of the HRA screening alone or in combination and will not require full AA under the Habitats Regulations.</p> <p>The HRA considered seven European Sites within the influence of the Newport City Council Revised Deposit LDP including:</p> <ul style="list-style-type: none"> • River Usk SAC; • Severn Estuary SAC/SPA/Ramsar site; • River Wye SAC; • Cardiff Beechwoods SAC, • Wye Valley Woodland SAC, • Wye Valley and Forest of Dean Bat SAC; and, • Aberbargoed Grasslands SAC. 	No significant effects predicted from the plan.

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<ul style="list-style-type: none"> • River Wye SAC; • Cardiff Beechwoods SAC; • Wye Valley Woodland SAC; • Wye Valley and Forest of Dean Bat SAC; and, • Aberbargoed Grasslands SAC. 		
Flood Management Plans		
Wye and Usk Catchment Flood Management Plan (January 2010)		
<p>The Catchment Flood Management Plan (CFMP) sets out the scale and extent of the River Wye and River Usk flooding at present and in the future. The CFMP outlines policies for managing flood risk within the catchment.</p> <p>The Wye and Usk CFMP should be used to inform planning and decision making by key partners. CFMP aim to promote more sustainable approaches to managing flood risk.</p>	<p>There are four internationally designated environmental sites which lie fully or partially within the 1% Annual Exceedance Probability (AEP) flood outline. These include the River Wye SAC and the River Usk SAC and the Severn Estuary SAC, SPA and Ramsar site.</p> <p>The greatest risks to property and infrastructure for the 1% AEP flood event are located in the Lower Usk and Lower Wye catchments and include the urban areas of Newport, Cwmbran and Caerleon. Parts of Hay-on-Wye, Brecon, Caerleon and Usk are classed as the most socially vulnerable to flooding in the 1% AEP flood event therefore the consequences of a flood event in these areas will be greater than in the rest of the CFMP area.</p> <p>There are currently approximately 8,900 properties across the CFMP at risk from flooding. In the Wye and Usk catchments, climate change will have the greatest impact on flood risk, with urban growth and more</p>	<p>Insufficient information on actual activities or locations to allow identification of impacts</p>

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	<p>intensive farming practices also predicted to have some impact.</p> <p>Cwmbran and M4 Corridor - Approximately 450 properties are currently at risk from the 1% AEP flood event, rising to around 810 properties in the future. Important infrastructure is at flood risk. In the future increased tide levels will result in a significant rise in tidally influenced flooding. The likelihood of defences overtopping will increase.</p> <p>The Gwent Levels - Internationally and nationally important conservation sites are at risk from the 1% AEP flood event. These sites depend on active water level management and the land drainage networks. The Caldicot and Wentlooge Levels IDB plays an important role in this area. Any significant change in the water environment will impact on the valuable natural habitats and species.</p> <p>Lower Usk - Approximately 250 properties are currently at risk from the 1% AEP flood event, rising to around 570 properties in the future. People, properties and infrastructure in the towns and villages are at flood risk.</p> <p>Lower Wye - Approximately 780 properties are currently at risk from the 1% AEP flood</p>	

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	<p>event, rising to around 1,100 properties in the future. Overtopping of defences, now or in the future, by extreme flood events could have very serious consequences. This is an important agricultural area with a large proportion of good quality land at flood risk. The Lower Wye also has a large number of environmental designations.</p> <p>Newport - The area has a high population density and is a centre for employment and urban growth. Flood risk is associated with tidally influenced flooding from the River Usk and tributaries running through Newport. There is also risk of surface water and localised sewer flooding. Approximately 6,900 properties are currently at risk from the 1% AEP river and 0.5% tidal flood event, rising to around 13,100 properties in the future. Flood risk is dominated by the tidal influence. In the future, sea level rise and additional development will considerably increase the flood risks unless these are managed.</p>	
Eastern Valleys Catchment Flood Management Plan (January 2010)		
<p>The Catchment Flood Management Plan (CFMP) sets out the scale and extent of the Rhymney, Ebbw and Sirhowy rivers flooding at present and in the future. The CFMP outlines policies and actions for managing flood risk within the catchment. The Eastern Valleys CFMP should be used to inform planning and decision making by key partners.</p>	<p>The Rhymney flows into the Severn Estuary, the Ebbw flows into the Usk Estuary, and the Sirhowy is a major tributary of the Ebbw. The coastal and estuarine environments in the Eastern Valleys contain a number of important and diverse habitats and species, including three internationally designated conservation areas. The Severn Estuary is an important Ramsar site, Special Protection</p>	<p>Insufficient information on actual activities or locations to allow identification of impacts</p>

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<p>CFMP aim to promote more sustainable approaches to managing flood risk.</p>	<p>Area and Special Area of Conservation.</p> <p>The locations at greatest risk of flooding in the future are parts of Cardiff, Risca and Ystrad Mynach.</p> <p>Cardiff - Flood risk is primarily from river flooding with tidal risk affecting lower parts of the River Rhymney and Roath Brook. Localised surface and sewer flooding are also an issue. Approximately 310 properties are currently at risk from the 1% AEP river flood event and 0.5% tidal flood event. This rises to around 2,600 properties in the future. The majority of the increased flood risk comes from the lower reaches of Roath Brook.</p> <p>Wentlooge Levels - There are no main rivers in this area with flood risk coming from the reens and drains. There is also a tidally influenced flood risk from the River Ebbw. There are currently no properties at risk from the 1% AEP river flood event; however, there are approximately 10 properties at risk from the 0.5% AEP tidal flood event. This figure does not increase for the future 1% AEP river flood event, but rises to around 230 properties in the future for the 0.5% AEP tidal flood event.</p>	
Taff and Ely Catchment Flood Management Plan (January 2010)		
<p>The Catchment Flood Management Plan (CFMP) sets out the scale and extent of the Taff and Ely rivers flooding at present and in</p>	<p>A limited number of environmentally designated sites are directly impacted by flooding. There are no internationally</p>	<p>Insufficient information on actual activities or locations to allow identification of impacts</p>

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<p>the future. The CFMP outlines policies and actions for managing flood risk within the catchment. The Taff and Ely CFMP should be used to inform planning and decision making by key partners. CFMP aim to promote more sustainable approaches to managing flood risk.</p>	<p>designated sites at risk from the 1% AEP flood event. The highest numbers of properties at risk from the 1% AEP flood event are located in Pontyclun, Ynysddu, Treforest, Glyntaff, Pontypridd, Porth and Trehafod. Over 30 properties are also at risk in the 10% AEP flood event in Porth, Trehafod, Pontyclun and Ynysddu. The areas of Merthyr Tydfil, Aberdare, Gelli and Treorchy are the most socially vulnerable to flooding in the 1% AEP flood event. The most significant increase in risk is in Cardiff, although there are potentially significant local increases at Pontypridd, Porth and Trehafod, Gelli and Treforest.</p> <p>Flood risk to environmental, landscape and heritage features is expected to increase but is likely to be small scale in extent.</p> <p>Cardiff - Flood risk is mainly from river flooding in the lower parts of the Rivers Taff and Ely, both of which discharge into Cardiff Bay. Approximately 90 properties are currently at risk from the 1% AEP flood event, rising to around 2,800 properties in the future. Currently the main area of flood risk is local to Whitchurch. Flood risk is expected to increase significantly in the future unless it is managed.</p>	
Draft Shoreline Management Plan for the Severn Estuary (SMP2) (December 2010)		
<p>The Shoreline Management Plan for the Severn Estuary includes:</p>	<p>Population and human health - The SMP2 will result in significant benefit to populations, human health, material assets and critical infrastructure by ensuring a strategic</p>	<p>The SEA for the Severn SMP2 was unable to demonstrate no adverse effects on Severn SPA, SAC and Ramsar sites and the Somerset Levels and Moors SPA/Ramsar.</p>

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<ul style="list-style-type: none"> • An assessment of the way that the coast will change over time – identifying the natural forces shaping the shoreline and predicting, as far as possible, how the shoreline will change over time with erosion, sea level rise and climate change (in 20, 50 and 100 years); • Identifying the risks to people, property, the natural and historic environment as the coast changes; and • Policies for the different stretches of shoreline (Policy Units) to manage the risks in a sustainable way. <p>The SMP2 will help planners and regulators to plan for and manage the way that the shoreline will change over time. The SMP2 provides greater certainty for landowners, residents and businesses on how the shoreline will be managed by regulators during the next 100 years, so that they can plan ahead and make decisions about investments, homes, development and the management of their resources.</p> <p>The SMP2 supports and influences a whole range of regional, national and international policies, frameworks and strategies, not just those connected with managing the shoreline.</p>	<p>approach is taken to protect centres of population, businesses and critical infrastructure from increased flood and erosion risk, in the face of a changing climate.</p> <p>Biodiversity flora and fauna - The assessment of likely significant effects undertaken for the SMP2 concluded that the only European sites potentially affected by the implementation of the SMP2 are the Severn SPA, SAC and Ramsar sites and the Somerset Levels and Moors SPA/Ramsar Site, despite overlapping with the River Usk SAC. All of the SSSIs that comprise the Gwent Levels would be protected by a Hold the Line policy in this location. In many cases a Hold the Line policy will ensure sites continue to be protected from adverse effects of flooding and/or erosion. Overall the impact of the SMP2 on sites of national nature conservation importance has been assessed as a major beneficial impact.</p> <p>Historic environment - Overall all the SMP2 will have a major beneficial impact on the historic environment, largely protecting features and historic landscapes behind existing defences where a Hold the Line policy is being proposed.</p> <p>Water environment - The SMP2 will have a major positive effect on water resources and water quality, protecting key features such as sewage treatment works, existing abstractions</p>	<p>With regard to the Severn Estuary designations, the SEA process concluded that at the estuary wide scale the only major adverse impact likely to result from the implementation of the preferred SMP2 policy options is the loss of intertidal habitats from within the Severn Estuary European sites. As the M4 works will not lead to a loss of intertidal habitats within the Severn Estuary designations, there will be no likely significant in-combination effect.</p>

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
	<p>and source protection zones from future flood and erosion risk.</p> <p>Air and climate - Where a no active intervention policy or managed realignment is to be applied, the natural evolution of the coast will adapt to accommodate the impacts of climate change, delivering a minor beneficial impact. Landscape - Overall the SMP2 has been considered to have a neutral impact on the landscape of the Severn estuary. Uncertainty remains over specific impacts and mitigation measures that will need to be addressed either by the FRMS or at project level.</p>	
Welsh Water – Draft Water Resources Management Plan (WRMP)		
<p>To ensure that water is available to our customers when it is needed and in the quantity required. The WRMP forecasts over a 25 year period the supply and demand balance across our water supply area. This document included the results of a HRA completed of the WRMP. This concluded that it will be possible to provide a supply of water to the Welsh Water supply area (including Newport and most of Wales) for the lifetime of the WRMP (25 years) without having any significant adverse effects on any European sites alone or in combination (with certain mitigation measures in place).</p>	No likely significant effects identified.	No likely significant effects identified.
Habitats Regulation Assessment of Newport City Council's River Usk Strategy (2009)		

Aim of the Plan	Elements of the plan that could cause 'In-combination' effects	Summary of Possible Effect
<p>The HRA of this strategy identified key impacts from reduced flow, disturbance to fish and otters and pollution from numerous developments planned along the River Usk SAC. Numerous avoidance methods were recommended including the introduction of new byelaws by Newport Harbour Commissioners to assist the control and regulation of the river and good practice guidelines. When implemented these were deemed sufficient to avoid likely significant effects on any of the interest features, presuming NCC are able to enforce such methods, along with organisations such as the Environment Agency.</p>	<p>No likely significant effects identified.</p>	<p>No likely significant effects identified.</p>
<p>Countryside Council for Wales HRA of a Proposal for a continuous coastal path between Cardiff and Chepstow (May 2011)</p>		
<p>A HRA was carried out for the All Wales Coastal Path.</p> <p>The conclusion of the HRA was that the <i>“Project will not have an adverse effect on the integrity of the Natura 2000 sites (Severn Estuary Ramsar, SPA and SAC) and that effect can be reduced to de minimis, provided all proposed mitigation measure are fully implemented.”</i></p>	<p>No likely significant effects identified.</p>	<p>No likely significant effects identified.</p>

Draft

Draft