Interim Advice Note 81 / 06

VOLUME 11 **ENVIRONMENTAL ASSESSMENT**

SECTION 2: **PRINCIPLES OF ENVIRONMENTAL ASSESSMENT**

PART 5

ASSESSMENT AND MANAGEMENT OF ENVIRONMENTAL EFFECTS

Contents

1 IDENTIFYING AND ASSESSING ENVIRONMENTAL EFFECTS

1.1 The task of identifying and assessing environmental effects commences at the early inception of the project. Increasingly the potential for significant effects will have been recognised in strategic studies or plans. Where a Strategic Environmental Assessment has supported strategic studies or plans this may also inform the scope of project environmental assessment activities. This scope may also have been informed by consultation with key stakeholders.

1.2 This chapter sets out the approach to identifying and assessing environmental effects including the following:

I. Defining the project.
II. Defining the study area.
III. Existing, baseline and future conditions.
IV. Information assembly.
V. Establishing project objectives.
VI. Environmental assessment and design.
VII. Exploring alternatives.
VIII. Identifying the most appropriate design.
IX. Identifying potential impacts.
X. Direct and indirect effects.
XI. Cumulative effects.
XII. Mitigation, enhancement and monitoring.
XIII. Environmental performance specification.
XIV. Uncertainty and validity of environmental data.

I. DEFINING THE PROJECT

1.3 Correctly defining the project is essential. The Highways Agency should ensure that the environmental assessment matches the project that is the subject of the decision-making and legal procedures, and that this relationship is made clear in reporting. Where Environmental Impact Assessment (EIA) is completed, and an Environmental Statement published, the decision on the Statement is an integral part of the statutory decision-making process leading to consent.

1.4 Division of a construction or improvement works into small projects to avoid mandatory EIA is unacceptable. Furthermore, the separation of works into smaller projects for management and administrative reasons needs to ensure that the defined project is autonomous, neither dependant on other projects nor necessitating new separate projects in order to function.

1.5 In some cases the environmental assessment may need to cover the combined and cumulative effects of several projects, notably from traffic changes. Consideration of longer routes or of a number of related projects together can give a clearer sense of the impacts of the proposal seen as a whole and may allow a better choice of options. The phasing of the projects may also provide opportunities for advance mitigation or combined provision of mitigation measures.

1.6 Critically however, a project cannot rely on the benefits of a future project for the delivery of its own mitigation, but neither should the effects of the second project be attributed to the first.

II. DEFINING THE STUDY AREA

1.7 The study area for the assessment should be defined on a case-by-case basis reflecting the project and the surrounding environment over which significant effects can reasonably be thought to have the potential to occur. The Designer and Highways Agency should establish the study boundaries for each individual topic. It is a good practice for geographic boundaries to be identified at an early stage.

1.8 Where practical establishing a common area across the assessment topics is desirable. For most projects the study area will be in the immediate environs around the project, however, for others it is possible that sensitive receptors and resources may be located beyond the immediate environs of the project, and pathways exist through which the receptors and resources may experience effects associated with the project. Consultation with key stakeholders and identification of potential receptors should inform the definition of the study area.

III. EXISTING, BASELINE AND FUTURE CONDITIONS

1.8 The environmental impact is represented as the difference between the environmental characteristics with and without the project. An appreciation of the existing, baseline and future conditions is important to put the consequences of the project into context. The existing conditions can be a useful datum that an interested party can judge the environmental impact or make other tangible comparisons. Only for a simple project, with rapid delivery, could the existing condition be used to represent the baseline/opening year.

1.9 The baseline is the environment as it appears (or would appear) prior to the implementation of the project together with any known or foreseeable future changes that will take place before completion of the project. The relevant baseline condition will be dependent on the nature of the impact. Some impacts occur as a direct result of the construction of the road. Other impacts occur as a result of the use of the road. For example, the baseline condition data for effect on land take would be the situation that exists just prior to the start of construction. This may be different from the existing conditions. It will, therefore, be necessary to forecast the change in the present conditions between the year in which the assessment is carried out and the forecast year for construction. For impacts that occur once the road is open to traffic the baseline conditions would be the conditions that exist just prior to opening to traffic. For example the baseline conditions for traffic noise would be the noise levels that would exist just prior to opening assuming that the road has not been built but taking into account the forecast traffic levels in the absence of the new or improved road scheme. Further advice on the relevant baseline condition for each impact is given in the assessment topics in SECTION 3.

1.10 The objective is to gain an appreciation of the existing and future natural, human and physical environment in the absence and presence of the proposed project. These scenarios in transport are frequently referred to as the Do-Minimum and Do-Something conditions. The environment and traffic needs to be defined for the Do-Minimum and Do-Something conditions in the opening year and a future year or at potentially a series of other future years depending on the topic. Whilst the future year is typically year 15 (15 years after opening), for some topics the worst year in the first 15 years needs to be assessed. For others particular target years may be assigned.

Assessment Scenarios	Existing year	Baseline/ opening year	Year 15 (or worst in first fifteen years)
Existing condition	✓	×/✓	×
Do-Minimum	×	✓	✓
Do-Something	×	✓	✓

Table 1.1 Assessment Scenarios and Assessment Years

The base year (typically the project opening year) should make an assessment without and with the project. Similarly, the future year assessments should also be made without and with the project.

1.11 To inform the likely base year and future year condition, each potentially affected resource and receptor should be considered in terms of their geographic extent, existing condition and historical context revealing previous stresses. Where known, historic or current actions contributing to the state of the resource could be reviewed, indicating whether the effects are increasing or decreasing over time. Relevant legislation and regulation, standards and policies should be known where appropriate since these can inform the choice of assessment year(s). Similarly, changes in legislation, land use, transport and community activities are key to defining the Do-Minimum conditions to be examined in an attempt to determine the various changes that are likely to occur regardless of the road project.

1.12 The local community and non-statutory consultees are initially frequently more knowledgeable about local conditions than those responsible for the assessment. Consequently, dialogue with such groups, bearing in mind the individual groups' interests, has the potential to minimise the risk of unforeseen impacts and to better focus the assessment upon those topics of interest. This dialogue should be directed towards establishing:

i. Whether existing environmental problems occur in the locality that may be ameliorated or potentially made worse by the proposed project;
ii. Whether opportunities exist to improve environmental conditions which may coincide with delivery of the project;
iii. Whether any trends or intermittent events occur that would be of relevance to the assessment, such as seasonal flooding or an activity occurring under some circumstances such as a large public events, diverted traffic, exceptional loads; and
iv. Forthcoming events, activities, developments and land use changes that may have a bearing upon the future state of the environment.

1.13 The assessment should reflect upon the extent to which land use and management change, and indeed how climate change, may alter future conditions. As a result of this a new problem or opportunity may arise that does not exist under the current conditions. If dealt with as part of the considerations of effects, cost effective solutions may be identified early when the problem is anticipated rather that left to become evident over time.

1.14 In some planning situations, typically urban situations, the environment may be subject to rapid change such that it is difficult to forecast the future situation. Consequently, some of the data, assumptions and predictions may become invalid. The environmental assessment should provide a commentary upon the likely period over which the data is envisaged to be valid and the degree of uncertainty attached to such data, more detail can be found in paragraph 1.39: Cumulative Effects.

IV. INFORMATION ASSEMBLY

1.15 There is a great deal of environmental information readily available to Designers from government organisations and agencies, academic and charitable organisations as well as the Highways Agency. Data, survey and assessment needs should, therefore, be the subject of the scoping process as well as the overall project management process. It is important that the gathering of site environmental information does not lead to unnecessary anxiety amongst local people and the possible blighting of properties. However, increasingly projects will have been identified in publicly available transport plans. Before the Designer undertakes a site visit, consideration should be given to the sensitivity of resources and receptors and the confidentiality of particular interests. Approval should also be sought from the Highways Agency prior to approaching landowners and undertaking site visits.

1.16 Some environmental surveys should be undertaken at specific times of the year to ensure that appropriate data are obtained (see topic specific advice in SECTION 3). In order not to encounter delay, the Designer and Highways Agency should determine the need for time sensitive surveys as early as possible in the planning and assessment process and then incorporate these into the project planning schedule unless impractical or unnecessary e.g. where the risk is small. Where justifiable constraints limit the scope of surveys being potentially undertaken, then these should be discussed with the relevant statutory environmental bodies to determine an appropriate approach.

V. ESTABLISHING PROJECT OBJECTIVES

1.17 The project objectives are the measures against which the success of the project can be judged. The project objectives will contribute to the reporting of the extent to which national, regional, and local objectives are achieved and the extent to which problems have been resolved. It may be appropriate in some circumstances to adopt different objectives for different parts of the study area.

1.18 It is important to establish and understand if there is a hierarchy of objectives from national, even international, policy objectives through to the specific objectives for local areas and individual communities. An awareness of conflicting objectives is needed and approaches followed to minimise the adverse risk of conflict.

1.19 There is likely to be a need to provide a clear link between any previous commitments made by policies, plans or programmes, any described through SEA and the project objectives. Understanding existing and future environmental problems and opportunities, means these can be translated into project specific objectives for the entire project design team.

VI. ENVIRONMENTAL ASSESSMENT AND DESIGN

1.21 One key purpose of environmental assessment is to ensure that there is a regular flow of information between the project designers, the environmental assessment and topic area specialists. This is to ensure that the emerging findings of the assessment are conveyed and the feasibility of ‘designing-out’ potential significant adverse environmental impacts is adequately considered and then carried out.

1.22 Avoiding, reducing and, if possible, remedy significant adverse environmental effects by design of mitigation measures is an integral part of the iterative design and planning of a scheme. Some mitigation is inherent in designing the project, for example, the selection of vertical and horizontal alignment or the location of junctions. The incorporation of other additional mitigation measures such as noise barriers or earth bunds can be separately identified to complement the chosen alignment to produce an efficient and cost-effective design.

1.23 In designing and assessing the effects of the project, due regard has to be had for impacts that arise not just when the project is constructed or opened, but also in the longer term.

1.24 In determining the most appropriate form of design solutions there should be no ambiguity. Only those measures which the Highways Agency has power to control or implement should be presented in the environmental assessment; any measures dependent upon agreement with third parties should be presented as such and not be construed as part of committed measures. Such mitigation by agreement should not feature in the assignment of impact significance unless it has been agreed to an extent that it is reasonably certain it can be secured.

1.25 It is possible that Environmental Reports prepared for plans and programmes under the SEA Regulations will impose requirements upon the design of projects. Indeed, it is possible that strategic mitigation measures may need to be delivered via individual projects. Consequently, the Designer needs to be aware of any such obligations placed on their project. The effectiveness of the project design in meeting the strategic measures defined in SEA Environmental Reports and implemented through projects may also be the subject of monitoring and auditing as part of the review reporting process defined by the SEA Regulations.

VII. EXPLORING ALTERNATIVES

1.26 The formulation of alternatives needs to be driven by a regard to all the project objectives rather than focussed on the narrow pursuit of one or two primary objectives. The aim of exploring alternatives is to ensure consideration of possible solutions that offer the best outcomes across the full range of objectives set by Government. The number and magnitude of adverse effects should therefore be minimised.

1.27 Transport projects are increasingly identified as a result of plans or studies in which an assessment of alternatives has been undertaken in the establishment of the project brief. Where a project has been the subject of, for example, a Multi-Modal Study, a wider range of alternatives will have been examined and reported in the public domain. Where a higher-level assessment has considered alternatives, there is no requirement to duplicate the assessment.

1.28 Nevertheless, the Highways Agency may be faced with consideration of the following types of alternatives including the “Do-Minimum” option:

i. Demand alternatives: Meet the need through demand management techniques;
ii. Activity alternatives: Such as provision of traffic calming instead of new road;
iii. Location alternatives: Selection of different corridors or access routes;
iv. and as a sub set of these main alternatives:

v. Delivery alternatives: Alternatives that reflect different means of delivering the desired end point in production terms, for example, a clear span bridge or one with piers and abutments in the river;
vi. Scheduling alternatives: Programming the activities to avoid periods when environmental sensitivity is enhanced. Alternative temporary land take during construction should be considered as there may be issues associated with the phasing or scheduling;
vii. Input alternatives: Use of different materials, lighting strategies or different designs; and
viii. Mitigation alternatives: A variety of solutions may be available to mitigate the adverse consequences of a proposal.

1.29 Not all alternatives need to be explored to an equal level of detail. Some alternatives will be examined in less detail than others as a short study may reveal that they can be eliminated early in the process. Others may survive to a later stage in the project delivery process. The amount of investigation should be proportionate to the feasibility and benefits that an alternative may generate. An audit trail of such alternatives that where examined, and the reason for not pursuing them, should be put in place.

1.30 To meet EIA regulations, a summary of the main alternatives studied by the Highways Agency, and an indication of the main reasons for the project taking consideration of environmental effects, will have to be provided in the Environmental Statement. The main alternatives typically relate to Demand, Activity or Location alternatives e.g., those considered and presented at public consultation for a major project. It should be noted that consideration of alternatives for other assessment processes (e.g., Appropriate Assessment) might be different from the above.

VIII. IDENTIFYING THE MOST APPROPRIATE DESIGN

1.31 In determining the most appropriate design, the following considerations should be made:

i. The long-term effectiveness of the proposed measure to secure the project objectives;
ii. The impact the measure may have on other environmental resources or receptors;
iii. The deliverability and practicality of the proposed measure; and
iv. The full cost of successful implementation including the practicalities of establishment and future management and maintenance costs.

1.32 The mitigation of environmental impacts should be dealt with during the planning and design stage. Failure to do so may result in: failure to deliver the project; major impacts that cannot be rectified, particularly where land is not secured to allow delivery or future maintenance; or prohibitively expensive solutions if the measures are implemented post construction. The following principles can be identified:

i. Measures perform to an acceptable standard in safety, environmental and economic terms;
ii. The measures can be fully implemented and all mitigation measures are agreed with the Highways Agency. The implications for management and maintenance should be recognised by the Designer and Highways Agency (e.g., the provision of planting to form a visual screen entails a commitment

to establishment maintenance in the early years and a long-term management requirement); and

iii. The Highways Agency should ensure that the design and mitigation measures do not unnecessarily restrict the flexibility during implementation to achieve the same or improved level of environmental performance by alternative means.

1.33 The costs for environmentally sound project design and mitigation should be considered at all stages when the overall costs for funding of the project are calculated and planned. Indeed, early consideration of environmental impacts can deliver more cost effective and environmentally acceptable solutions than mitigation that is added at a later stage, or after the project is completed.

IX IDENTIFYING POTENTIAL IMPACTS

1.34 While the majority of impacts associated with road projects are well known, local circumstances may have the potential to generate unique or controversial situations. Through the process of establishing an appreciation of the problems and opportunities within the study area, an awareness of the likely impacts will emerge. These likely impacts should be identified and considered at the scoping stage.

1.35 All impacts, whether real or perceived by the community, are worthy of consideration during the environmental assessment. However, the time and resource devoted to purely *perceived* impacts should be commensurate with that needed to change attitudes.

X. DIRECT AND INDIRECT EFFECTS

1.36 The assessments should not just concentrate on the direct effects that are generally very obvious, e.g., the noise benefits of reduced traffic. Assessments should also consider indirect effects which occur in two basic forms;

i. Those that alter the character, behaviour or functioning of the affected environment because of the encroachment of the project impacts over a wider area; and
ii. Effects related to pressure for project-induced change.

One of the key indirect effects arising from new road infrastructure is its potential for project-induced, consequential, development pressure. Such development falls within the ambit of land use planning legislation and the responsibilities of the local planning authorities. Nevertheless, the existence of new infrastructure, particularly junctions, can alter the *pressures* for development and it is this that should be reported.

1.37 Indirect effects potentially of concern during the decision-making process should be considered in the economic and environmental assessments. Discovering indirect effects early in the project delivery process helps determine whether to proceed or to modify the proposed action so that the long-term indirect consequences are consistent with the long-term needs and goals of the affected area as set out in adopted plans and programmes. Indirect effects should be judged by applying the Certainty of the Outcome and Development Status (Table 1.2) eliminating the Hypothetical and identifying those worthy of analysis.

1.38 SECTION 3 provides further guidance on the analysis of direct and indirect effects associated with each environmental topic.

XI. CUMULATIVE EFFECTS

1.39 Theoretically, cumulative effects are:

i. Caused by the sum of past, present and reasonably foreseeable future actions;
ii. The total effect, including direct and indirect effects, upon a given environmental resource, ecosystem or human system of all actions taken regardless of the organisation responsible for the action;
iii. May arise from the accumulation of similar effects or the synergistic interaction of different effects; or
iv. May arise over a longer timescale than individual project impacts.

1.40 Cumulative effects can result from incremental changes caused by the interactions between effects within a project and/or the interaction with the effects from other developments. In relation to road projects, cumulative effects should be considered in the following ways:

i. *Multiple effects* from the project, and from different projects of the same or similar type, upon the same resource; such as the effect on a single community of noise from several transport sources.
ii. *Different multiple effects* from the project, and from other projects, upon the same resource; such as land take and damage due to hydrological change, affecting several sites of the same habitat.
iii. *Incremental effects* arising from a number of small actions, including on-going maintenance operations, having developed or developing over time.

1.41 EIA legislation seeks that the project should be considered having regard to the cumulating effects with other projects. Specific advice is provided in SECTION 3 for those topics where these effects may be important. It should be noted that other assessment processes might have different requirements for the consideration of cumulative affects e.g. Appropriate Assessment.

1.42 Interactions may be under-estimated if the environmental assessment is carried out without actively linking the impacts, beneficial and adverse, that arise from each environmental topic. Addressing interactions requires integrated working practices with effective co-ordination between topic specialists throughout the assessment process.

1.43 Significant interactions may come from previous or proposed development. Where a combination of road projects occurs along a route, then cumulative effects may be relevant and should be assessed. The scope of any assessment should then be agreed with the Highways Agency. Since the Highways Agency's projects are initiated and progressed with different timescales, such an approach may not always be possible. However, as a minimum, the traffic impacts and land take consequences of preceding projects along a route should be considered by each subsequent project.

1.44 A number of variables need to be considered to inform a cumulative effects assessment. The Certainty of the Outcome and consequential change occurring and the probability of cumulative effects should be considered. This informs the status

the future action would have in the environmental assessment of the Highways Agency's project. Where possibilities are Hypothetical they should not feature in the assessments. The Designer should ensure the assumptions made within the economic impact assessment and the environmental assessment does not differ. This is particularly true for developments (Table 1.2) and traffic growth and assignment and, to a lesser extent, accident forecasts.

Certainty of the Outcome	Development Status
Near certain: The outcome will happen or there is a high probability or it occurring.	▪ Intent announced by proponent to regulatory agencies. ▪ Approved development proposals. ▪ Projects under construction.
More than likely: The outcome is likely to happen but some uncertainty.	▪ Development application within the consent process and in accordance with development plan. ▪ Development conditional upon the transport strategy/project proceeding.
Reasonably foreseeable: The outcome may happen, but significant uncertainty	▪ Identified within a development plan and, although not directly associated with the transport project, may occur if the project is implemented.
Hypothetical: There is considerable uncertainty whether the outcome would ever happen.	▪ Conjecture based upon currently available information. ▪ Discussed on a conceptual basis. ▪ One of a number of possible inputs in an initial consultation process.

Table 1.2: Certainty of the Outcome and Development Status

1.45 Environmental assessment should identify when each potential environmental effect is likely to occur. For road projects this identification would separate the environmental effects of the construction phase and those associated with operation of the project. The assessment of cumulative effects should take account of the location and timing of these impacts (Table 1.3). When addressing the temporal nature of changes, consideration should, therefore, be given to whether cumulative effects would themselves be temporary or permanent, and if temporary, their likely duration.

Affected Resource/Receptor	Effects Occurring at Different Time	Effects Occurring at Same Time
Affect Same Resource/Receptor at Same Location	Moderate probability	High probability
Affect Same Resource/Receptor at Different Locations	Moderate probability	Moderate probability
Affect Related Resources/Receptor	Low probability	Moderate probability

Table 1.3: Probability of Cumulative Effects

1.46 All predictions of cumulative effects should be presented in a manner that clearly indicates the components of the forecast. Where effects are likely to be significant, reasonable efforts should be made to assemble the data to ensure compliance with the EIA regulations and incorporate the findings into the design and assessment processes.

XII. MITIGATION, ENHANCEMENT AND MONITORING

1.47 Legislation provides the Highways Agency with powers for the mitigation of any adverse effects on the surroundings of a road and allows certain development of land belonging to them for the purpose of improving the surroundings of the road in a manner that is desirable. Within these limitations, the Designer should actively explore the feasibility and costs of delivering schemes that deliver across the project's objectives and make rounded contributions towards sustainable development.

1.48 Some measures may mitigate more than one effect. For example, planting can reduce visual effects for people and also benefit wildlife; balancing ponds may be designed with pollution control measures and deliver the required hydrological regime. Occasionally, mitigation measures can produce adverse as well as beneficial effects, e.g., an environmental barrier might severely increase visual impact or the excavation of balancing ponds may affect buried archaeological sites. In exceptional circumstances it may be necessary to monitor and manage mitigation measures provided to ensure that the anticipated benefits and commitments are achieved.

1.49 At each stage in the project planning process, the design and the mitigation measures should be agreed with the Highways Agency. The mitigation and management commitments and requirements should also be reported appropriately in an environmental management plan. The Highways Agency should ensure that appropriate skills are available to design and deliver the mitigation measures agreed during project assessment. Of crucial importance are those measures affecting and reducing the environmental significance of adverse effects. The Highways Agency should ensure that appropriate powers are used to ensure that essential mitigation can be delivered. The cost associated with the construction and establishment of mitigation measures should be included in the overall project cost, throughout the project planning and construction process.

1.50 Mitigation, enhancement and monitoring measures identified during previous SEA or earlier stages of the project should not be overlooked. Where they are no longer needed to deliver the environmental objective, then an audit trail should record this situation. Where a decision has been taken that the project can proceed given the reported level of environmental performance, then changes that undermine that decision may threaten the future integrity of the project. It is, therefore, important that the Highways Agency monitors their commitments to mitigate adverse impacts and enhance the environment. Follow-up management processes should be in place to ensure the delivery of essential features or controls takes place.

XIII. ENVIRONMENTAL PERFORMANCE SPECIFICATIONS

1.51 In defining the design and mitigation solutions, rather than being overly prescriptive, the objectives and level of environmental performance that the solution is to achieve should be specified. This allows for novel or innovative construction measures. However, some situations may require strict adherence to mitigation measures that are known to be successful. Due consideration of risk and failsafe measures to achieve the objective of the mitigation should be made when novel or innovative approaches are being considered. Particular care should be taken to ensure that the setting of a single performance objective does not then result in a secondary unforeseen adverse effect.

1.52 The Designer should explore alternative means of minimising mitigation costs and maintaining flexibility, whilst retaining the required level of environmental performance. Where alternatives arise, these should be explored with the Highways Agency to ensure there is no trade-off between maintaining flexibility and environmental performance. The level of environmental performance required may be appropriately documented as a commitment in an environmental management system. Ensuring that the proposed design and mitigation measures achieve their purpose is fundamental to minimise the adverse impact of any project and to meet any legal requirements.

XIV. UNCERTAINTY AND VALIDITY OF THE ENVIRONMENTAL DATA

1.53 The environmental assessment process should recognise that there may be some uncertainty attached to the prediction of environmental effects. The sources of uncertainty and their implications should be clearly identified and documented, usually in qualitative terms, as the environmental assessment progresses. Where it is meaningful to do so, the uncertainty should be expressed quantitatively, e.g., reflecting the error range associated with a particular prediction. The passage of time and environmental knowledge or change may alter uncertainty. There is, therefore, a link between uncertainty and validity in time.

1.54 One source of uncertainty is the time period or window between the various stages in project development or environmental assessment reporting. This influences the validity of the assessment since the data on which predictions are based may become out of date (e.g. through changes in the baseline environment). Similarly, where the environmental assessment places reliance upon data drawn from strategic studies, or data gathered during a previous stage in the project delivery process, then the validity of this information should be confirmed. This may require the gathering of updated information through site visits and consultations.

1.55 Apart from considering the validity of the baseline data, the likely period over which the project and individual topic assessments would remain valid should also be considered. Retaining previously gathered data would improve the efficiency of subsequent assessments. In certain circumstances, and if agreed with the Highways Agency, it may be cost effective to continue data collection during periods of inactivity reviewing the data once the project is to be taken forward.

1.56 Designers and the Highways Agency need to be aware of the changes that may occur that question the validity of environmental data. They should consider the following variables:

i. The baseline environment changes, e.g., community expansion or species movement;
ii. The problem changes and the project varies with consequentially different impacts;
iii. Environmental values change e.g. new designations; and
iv. Societal values change e.g. change of policy or legislation; new environmental design and mitigation possibilities emerge.

1.57 Projects emerging from studies and strategies may have been assessed at different levels of detail using data of potentially variable quality. Appropriate validation of the assessment from the study or strategy should be undertaken at the commencement of the project development process since several years may elapse prior to the project development process commencing.

2 SIGNIFICANCE CRITERIA

2.1 The purpose of trunk road environmental assessment is not to assess or characterise the environment for its own sake, but rather to influence design and determine the significance of the effects upon the environment, which any trunk road project may have. The criterion for arriving at the significance can be considered in a formulaic manner.

2.2 Updated SECTION 3 topics each outline the value or sensitivity of environmental resources and receptors, together with a scale of magnitude of impacts. Applying the formula that the significance of the effect is a function of the receptor or resource environmental value (or sensitivity) and the magnitude of project impact (change).

2.3 Typical SECTION 3 descriptors or criteria for the environmental value of an environmental resource are listed in Table 2.1 below. Not all the SECTION 3 topics will use all the following value categories.

Value (sensitivity)	Typical descriptors
Very High	▪ High importance and rarity, international scale and limited potential for substitution.
High	▪ High importance and rarity, national scale, and limited potential for substitution.
Medium	▪ High or medium importance and rarity, regional scale, limited potential for substitution.
Low (or Lower)	▪ Low or medium importance and rarity, local scale.
Negligible	▪ Very low importance and rarity, local scale.

Table 2.1: Environmental Value (or Sensitivity) and typical descriptors

2.4 Typical SECTION 3 descriptors or criteria for the impact of a project, that will be developed, are listed in Table 2.2 below. The greater the change the more major the impact.

Magnitude of impact	Typical criteria descriptors
Major	▪ Loss of resource and/or quality and integrity; severe damage to key characteristics, features or elements (Adverse). ▪ Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial)
Moderate	▪ Significant impact on the resource, but not adversely affecting the integrity; Partial loss of/damage to key characteristics, features or elements (Adverse). ▪ Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial)
Minor	▪ Some measurable change in attributes quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse) ▪ Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial)
Negligible	▪ Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse) ▪ Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial)
No change	▪ No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table 2.2: Magnitude of Impact and typical descriptors

2.5 The approach in developing the SECTION 3 topic criteria and to assigning significance relies on reasoned argument, professional judgement and taking on board the advice and views of appropriate organisations. Assigning each effect to one of the five significance categories enables different topic issues to be placed upon the same scale, i.e., the importance to the decision-making process at whatever stage the project is at within that process. These five significance categories or project descriptors are set out in the Table 2.3.

Significance category	Typical descriptors of effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a serious change in a site or feature of district importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local issues. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 2.3: Descriptors of significance of effects

2.5 It is important to note that significance categories are required for positive as well as negative effects. The five significance categories give rise to nine potential outcomes. Applying the formula, the greater the environmental value the more significant the effect. The consequences of a highly valued environmental resource suffering a major detrimental impact would be a very significant adverse effect. Also, the typical significance categories presented in Table 2.4 below and within SECTION 3 topics have been prepared specifically for decision-making on trunk road projects and they may not necessarily be appropriate to other projects.

Change can be either beneficial or adverse, and effects can also therefore be either beneficial or adverse. In some cases above the significance is shown as being one of two alternatives. In these cases a single description should be decided upon with reasoned judgement for that level of significance chosen.

ENVIRONMENTAL VALUE (SENSITIVITY)						
	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight
		No change	Negligible	Minor	Moderate	Major
		MAGNITUDE OF IMPACT (DEGREE OF CHANGE)				

Table 2.4: Arriving at the Significance

2.6 The significance should be assigned after consideration of the effectiveness of the design and committed mitigation measures in line with Highways Agency's requirements. That is, significance is assigned with mitigation in place allowing for the positive contribution of all mitigation that is deliverable and committed. The assignment of significance before the consideration of the effectiveness of the design and committed mitigation measures should only be undertaken if required by the Highways Agency.

2.7 At the early stages of project design, the details of mitigation are likely to be poorly defined. The significance assigned to effects by the Designer should be based upon the assumption that only standard mitigation practices should be put in place. Where other mitigation measures may be feasible or desirable to address the impacts, then these should be noted but these should not influence the significance score that is assigned at this early stage. The uncertainty regarding their adoption needs to be made clear and subsequently resolved by the Highways Agency at the later stages of the project assessment and design.

2.8 The SECTION 3 topics seek to ensure that the following questions, where relevant, should be considered in evaluating the significance of potential effects:

i. Which receptors/resources would be affected and in what way?
ii. Is the resource/resource of a local, regional, national or global importance?
iii. Does the effect occur over the long or short term; is it continuous or temporary and increase or decrease with time?
iv. Is the change reversible or irreversible?
v. Are environmental and health standards (e.g., local air quality standards) being threatened?
vi. Are feasible mitigating measures available?

2.9 Revised SECTION 3 guidance will offer advice on the significance criteria for individual topics. If necessary the description of the criteria may be adjusted to reflect the specific impacts that a project may generate but the overall criteria levels should not be adjusted. If changes are made, it is advisable to agree these with the Highways Agency and in turn the statutory environmental bodies in advance of forecasting the actual magnitude of the impacts.

2.10 Significance in cumulative effects is best left descriptive, not to a formulaic criterion, and should be determined by their forecast magnitude and the extent to which the impacts can be accommodated by the resource/receptor. This may be difficult to achieve, but a view of past losses/changes, if available, may give an indication whether further losses/changes may affect the future viability/integrity of the resource.

2.11 The description of significance for cumulative effects should be defensible and identified as being specific for the cumulative effects assessment. In arriving at significance, the Designer should consider the questions presented in Table 2.5.

Is there an incremental contribution of effects from the project under assessment?	Where the effects of an action are quite small relative to the effects of other development, then the cumulative effects of that action are likely to be negligible, however, a small change may cause a threshold to be exceeded.
Is there an increase in effects due to the combined influence of the project with the effects of other development?	Does the combined effect change the individual significance of each effect in terms of the overall relevance to decision-makers?
Is the resulting effect unacceptable?	Does the combined effect exceed a threshold or make the resource non-sustainable?
Are critical thresholds or assimilative capacities exceeded?	If the effect exceeds a threshold then the effect is usually considered significant.
Is there a balancing of effects?	Where there is a genuine compensatory effect, adverse impacts on some resources may be balanced by beneficial impacts on others. These should be genuine substitutions; such balancing should err on the side of caution.

Table 2.5: Questions to aid the Description of Significance to Cumulative Effects

3 ENVIRONMENTAL MANAGEMENT

Introduction

3.1 Advice on good design, mitigation measures associated with specific environmental topics and environmental management is given in DMRB Volume 10 and in SECTION 3. This chapter advises on the environmental management response to likely environmental impacts, identified by environmental assessment, with measures to reduce adverse project consequences and react positively to protect the environment.

The Environmental Management Process

3.2 The interface between the project design and assessment process and the environmental management process (DMRB Volume 10) presents many opportunities to enhance a project's long-term environmental performance. A structured and formalised approach to environmental management enables environmental planning, implementation, review and reporting to occur.

3.3 The environmental management process may typically be divided into four main stages:

i. Planning and Design: covering activities related to
   - feasibility
   - outline design
   - detailed design

ii. Construction: covering activities
   - prior to construction (e.g. site preparation)
   - during construction (e.g. works)
   - during establishment (e.g. site reinstatement).

iii. Handover: covering:
   - the transfer of scheme-specific environmental information from new-build to network management agent

iv. Maintenance and Operation: covering environmental management in the course of network
   - maintenance
   - operation

3.4 The environmental management process addresses the how, when, who, where and what of integrating environmental mitigation measures and management throughout an existing or proposed operation or activity. It would encompass all the elements that are sometimes addressed separately in consultation, design, mitigation, monitoring and action plans. The function of the environmental management process is, therefore, to:

i. Assist in the identification of environmental effects;
ii. Assist in the co-ordination in the design and implementation of measures;
iii. Ensure awareness of the commitments to design, mitigation, enhancement and monitoring measures made in project design and reporting;
iv. Provide a checklist of measures; and

v. Provide the basis for monitoring and auditing the delivery of environmental measures.

3.5 The environmental management process would be complementary to the activities undertaken during the environmental assessment, representing a collation of information that should exist within the project Designer's teams. To support the delivery of the project mitigation, a suitable environmental management process should accompany all environmental assessments.