

Post Opening Project Evaluation

Meta-Analysis: Environmental Impacts

March 2009

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1. Introduction

Overview

1.1 The Highways Agency (HA) is responsible for improving the strategic highway network of England by delivering schemes within the Programme of Major Schemes.

1.2 These schemes are subject to a detailed appraisal that considers the following five over-arching objectives:

- Environment;
- Economy;
- Safety;
- Accessibility; and
- Integration.

1.3 The HA evaluates all schemes after opening to see if the impacts predicted before scheme construction have occurred. This process is known as **POPE (Post Opening Project Evaluation)** and has been undertaken since 2001. For each scheme, an individual report is prepared which details all of the impacts and assesses how the scheme has performed against these.

Pilot Projects

1.4 As one of the enhancements to the initial POPE process, in 2004 three pilot environmental evaluations were undertaken. The New Approach to Appraisal (NATA) Environment sub-objectives as detailed in the Appraisal Summary Table (AST) formed the basis of the evaluation.

1.5 Three schemes were identified by HA POPE sponsors to reflect the variety of road projects undertaken by the HA:

- A5 Nesscliffe Bypass One Year After – rural - opened 2003;
- A1033 Hedon Road Improvements One Year After – urban – opened 2003; and
- A34 Newbury Bypass Five Year After – high profile – opened 1998.

1.6 Four further schemes were subsequently added to the pilot:

- A650 Bingley Relief Road One Year After – viaduct across Site of Special Scientific Interest (SSSI) and constrained urban location – opened 2003;
- A46 Norton Lenchwick Bypass Ten Year After – rural – opened 1995;
- A21 Lamberhurst Bypass One Year After - rural / Area of Outstanding Natural Beauty (AONB) / adjacent to National Trust property – opened 2005; and
- A63 Selby Bypass One Year After – rural – opened 2004.

1.7 Following the successful completion of the pilots, from September 2006 environmental evaluation was extended to all schemes.

1.8 The environmental analysis is based on:

- The Environmental Statement (ES), AST and other relevant environmental documents (for current evaluations a standard list of background information is requested (see Appendix A);
- A site visit; and

- Consultation with environmental bodies and relevant local authorities.

The POPE Meta Report

- 1.9 As well as the reporting of all impacts in individual reports, the POPE process is designed to provide an information base to help improve the appraisal methods currently used in England, and this is undertaken by considering the combined impacts from all of the individual evaluations in the form of a **'Meta' Report**. A 'Meta' evaluation is therefore one which seeks to learn lessons from a number of evaluations so that general themes and trends can be determined.
- 1.10 For the 2008 'Meta' analysis, the main report has been developed from a number of theme **'daughter documents'**, namely a detailed assessment of five key areas so that key findings, lessons learnt and recommendations can be made in the areas of most concern to the HA. The five key areas are:
- Traffic Impacts;
 - Economy;
 - Safety;
 - Environment; and
 - Accessibility/Integration and Consultation.
- 1.11 In summary, the Meta Report has brought together all POPE schemes to identify common themes in the data. It has examined the relationship between scheme predicted and outturn benefits and impacts, across all the appraisal objectives.
- 1.12 The main objectives of the Meta Report are threefold:-
- To identify differences between targeted (predicted) and outturn benefits and impacts;
 - To interpret these differences using evidence-based methods; and
 - To provide feedback on lessons to be learnt.
- 1.13 The Highways Agency will use the outcomes from the Meta Report to inform their decision-making and 'appraisal' methods.

Environmental Impacts

- 1.14 This report is the 'daughter document' on the Environmental impacts and presents the assessment of the environmental impact of the schemes for the 10 environmental sub-objectives:
- Noise;
 - Local Air Quality;
 - Greenhouse Gases;
 - Landscape;
 - Townscape;
 - Biodiversity;
 - Heritage of Historic Resources;
 - Water Environment;
 - Physical Fitness; and
 - Journey Ambience.
- 1.15 This report specifically looks to address these issues and derive a series of lessons learnt and recommendations for the HA and Department for Transport (DfT) to consider as part of any revisions to the appraisal process.

- 1.16 The format of this document reflects the qualitative nature of the findings and it was agreed should focus on the following areas:
- ***How accurate is the predicted impacts of schemes on the environment?***
 - ***Key Findings from four of the environmental sub-objectives:-***
 - ***Heritage;***
 - ***Biodiversity;***
 - ***Water Quality; and***
 - ***Landscape***
 - ***What responses do we get from the consultation undertaken for POPE?***
 - ***The current status of the recommendations from the 2006 Meta?***
- 1.17 In addition to the topics here, work has been undertaken to evaluate the carbon emissions of schemes. This was published on the HA website in January 2009. It is included as a table in Appendix B to this document for reference; however, differing publication timescales did not allow for more detailed incorporation to the meta-analysis.

The Schemes

- 1.18 For this report, data has been used from **14** schemes where evaluation included detailed consideration of the environment. This did not include schemes where evaluation has been undertaken, but is currently in draft format.
- 1.19 POPE evaluations are undertaken One Year After (OYA) and Five Years After (5YA) the scheme has opened. However as the POPE process only started in 2001, and evaluated schemes that opened in mid 2002, there are very few schemes in the 5YA stage where the evaluations and approval have been completed, hence, the majority of the conclusions drawn have been for the OYA stage.
- 1.20 **Table 1.1** outlines the sample of schemes that have been used within this daughter document, identified by evaluation period and by scheme type. Seven of these schemes were included in the original Pilot project, which have been shaded in the table. Six of these schemes were also considered in the previous 2006 Meta report (which did not include A63 Selby Bypass). These have been shaded in the table.
- 1.21 This Table shows that we have included one 5YA Evaluation and one 10 Year After Evaluation. These schemes are the A34 Newbury Bypass and A46 Norton Lenchwick schemes respectively, and have been included as although they were not part of the TPI programme, were part of the original Pilot project and have valuable environmental data to include in this report.

Table 1.1 – POPE Schemes

Scheme Name	Actual Opening	Type	Report Stage
A1(M) Ferrybridge to Hookmoor Improvements	2004	Bypass	OYA
A10 Wadesmill, High Cross and Colliers End Bypass	2004	Bypass	OYA
A21 Lamberhurst Bypass	2005	Bypass	OYA
A34 Newbury Bypass	1998	Bypass	5YA
A46 Norton Lenchwick Bypass	1995	Bypass	10YA
A5 Nesscliffe Bypass	2003	Bypass	OYA
A5 Weeford Fazeley Bypass	2005	Bypass	OYA
A63 Selby Bypass	2004	Bypass	OYA
A650 Bingley Relief Road	2003	Bypass	OYA
A14 Rookery Crossroads Improvements	2006	Junction	OYA
A64 Colton Lane Grade Separated Junction	2005	Junction	OYA
A1033 Hedon Road Improvements	2003	Online	OYA
M25 Jct 12-15 Widening	2005	Online	OYA
M4 Jct 18 Eastbound Diverge	2005	Online	OYA

Data Sources

- 1.22 The evaluations are based on the information that is made available to the POPE process; but as a baseline they use the scheme's ES and AST.
- 1.23 In addition, scheme specific background data is requested from the HA Project Sponsor. This is based on a standard list of information which has evolved over time and includes information such as 'As Built' scheme drawings for the environmental design and information relating to ongoing maintenance and monitoring, which, when available, greatly improves the quality of the evaluation process.
- 1.24 A full list of standard information requested has been included as Appendix A. Data availability has been variable between schemes for many reasons, for example, information archived and difficult to retrieve, staff changes since construction, post-construction monitoring reports unavailable at time of request.
- 1.25 Consultation with external parties has also been a key part of the evaluation process and their responses are discussed in Chapter 7.
- 1.26 The primary focus of the One Year After evaluation is to confirm to what extent the mitigation measures detailed in the ES have been implemented. In the Five Year After evaluation, the focus is to review the ongoing effectiveness of the mitigation measures and to follow up any issues that were not fully evaluated at the One Year After stage. As this stage it would be expected that the academic Archaeology report would have been published and the Handover Environmental Management Plan or Landscape Management Plan and ecological monitoring information would be available. These documents would be logged as part of the HA Project Control Framework (PCF) process if available prior to project close out.

2. Accuracy of Predicted Environmental Impacts

Overview

- 2.1 This section has looked at how accurate the original Appraisal Summary Table (AST) scores compared to the Evaluation Summary Table (EST) scores for each environmental sub-objective. The analysis made a **comparison between predicted and outturn impacts** and identified whether each of the sub objective scored 'better than expected', 'as expected' or 'worse than expected'.
- 2.2 **Table 2.1** shows how many schemes have been considered for each of the 10 environmental sub-objectives.
- 2.3 For some sub objectives there was no predicted impact reported in the AST. This generally reflected the fact that journey ambience and physical fitness were only introduced in the AST in early 2002. However, for these impacts an evaluation was made based on information in the scheme ES.
- 2.4 In a number of cases the scheme objectives were not evaluated, for example, greenhouse gases where AST entries were not included and townscape where schemes would not be impacting on local townscape.

Table 2.1 – Number of Schemes included for each Environmental Sub Objectives

Environmental Sub-Objective	Number of schemes Evaluated
Noise	13
Local Air Quality	14
Greenhouse Gases	7
Landscape	14
Biodiversity	13
Heritage	13
Water Environment	14
Physical Fitness	10
Journey Ambience	10
Townscape	3

Comparison between predicted and outturn impacts

- 2.5 A comparison of the predicted and outturn environmental impacts has been undertaken, and results summarised below in **Table 2.2** below.

Table 2.2 – Comparison of Predicted and Outturn Impacts

Sub-Objective	Predicted Vs Outturn			
	Better than Expected	As Expected	Worse than Expected	Not Evaluated
Noise	2	9	2	1 (insufficient info do at 5YA)
Local Air Quality	1	10	3	0
Landscape	0	13	1	0
Biodiversity	0	12	1	1 (no clear evidence)
Heritage	1	11	1	1 (insufficient info do at 5YA)
Water Environment	0	12	2	0
Physical Fitness	0	10	0	4
Journey Ambience	0	10	0	4
Townscape	0	3	0	0
Total	4	90	10	11

2.6 The key points to note are:

- Of those evaluated, a significant number (86%) of outturn impacts were as predicted.
- 4% of sub-objectives were 'better' than predicted, 10% were 'worse' than predicted;
- Landscape and biodiversity had a high level of schemes as predicted (92%);
- For journey ambience and physical fitness 4 schemes had AST entries and were evaluated as expected. Six further schemes were either included in the EST or evaluated in the report and were considered to be as expected. Four schemes were not evaluated; these were all from the pilot, none had AST entries and physical fitness and journey ambience were not carried forward into the evaluation if there was no AST entry.
- For noise, biodiversity and heritage, in one case each, there was insufficient information available and it was suggested that these sub-objective should be evaluated at the Five Year After stage.

2.7 Main differences between this and the last Meta (2006) is:

- A higher percentage of schemes (83%) outturn impacts were as predicted. This was in comparison to 70% reported in the 2006 Meta.
- There was an improvement in predicting impacts for all of the environmental sub-objectives.

2.8 The townscape objective considers the impacts of a scheme on the built and un-built urban environment. The approach for townscape does not specify a minimum settlement size to which it should be applied and will depend on the nature of the proposal in question. For example, a junction improvement in a village may well result in townscape impacts. For the 14 schemes evaluated, 13 did not include a townscape entry on the AST (A34 Newbury Bypass was the only scheme with a specific entry under Townscape). In addition to Newbury two other schemes (Lamberhurst and Wadesmill) included EST townscape entries and all three were positive, as expected. Evaluations have covered townscape under the landscape sub-objective where appropriate to comment on the benefits to bypassed villages e.g. with removal of through traffic or

environmental improvement measures. One scheme (Bingley) noted improvements to townscape as a scheme objective and it would seem appropriate for this to have been included on the AST.

- 2.9 As part of the POPE process, resident surveys have been conducted for five schemes. Each of these schemes included an evaluation of environmental impacts. In these surveys there was a general view that the local environment improved in villages and town centres that have been bypassed. With the removal of through traffic, local air quality improved and noise pollution had lessened. However, this was not universal for all areas; the main beneficiaries were those living on or near the old roads. For some residents the bypasses brought traffic noise and pollution closer to them, however, most of those affected in this way recognised the wider benefits to the village/town.

Conclusions

- 2.10 In 86% of cases the outturn environmental impacts were as expected against what was originally predicted. There is indication that there has been an improvement in predicting impacts since the last Meta (2006).
- 2.11 Landscape and biodiversity in particular had high proportions of schemes which were as predicted in the AST.
- 2.12 Of the 14 schemes only four included the newer objectives of physical fitness and journey ambience on the AST. However, a further six schemes were also evaluated for both sub – objectives based on information within the ES and all were as expected.
- 2.13 Where impacts on townscape have been evaluated, including those schemes where it has been covered within the landscape objective, the impacts were beneficial as expected.
- 2.14 Results from resident surveys indicate a general view that the local environment in bypassed towns and villages has improved, whilst recognising that the traffic is often relocated to previously quieter countryside.

Recommendations

- 2.15 Where physical fitness and journey ambience have not been included in the AST, the outturn impacts should be evaluated where information is available from the ES as both sub-objectives are important elements of schemes when considering scheme design; and
- 2.16 Environmental questions should continue to be included on the resident surveys to provide an opportunity for those directly effected by schemes to be able to comment on environmental impacts.

3. Heritage

- 3.1 Currently, One Year After reports concentrate on built heritage but POPE also consults with regard to archaeology and further evaluation of archaeology is suggested for the Five Years After reports.
- 3.2 The evaluation takes the information contained in the Environmental Statement as the baseline. Consultation is undertaken with English Heritage (EH) and with local authority archaeology staff. Sometimes either EH or the local authority suggest that other interested parties involved in the archaeological aspects of the scheme should also be contacted and this has usually been taken forward.
- 3.3 Where popular archaeological reports have been produced and where an academic report has been published copies are requested. For the schemes being considered for this Meta, the A1 Ferrybridge report was available.
- 3.4 This chapter looks at the key findings from heritage information taken from the scheme evaluation reports being considered for this Meta-Report (schemes listed in Table 1.1). It aims to identify what the Highways Agency did well and could be shared with others as best practice and conversely suggestions for areas of improvement.
- 3.5 The following key findings have been identified from the scheme data:-
- Evaluation and mitigation measures were generally considered satisfactory;
 - English Heritage generally only comments where designated sites are affected;
 - Observations raised regarding the approach to evaluation and therefore the mitigation measures;
 - Comments received regarding publication of reports and deposition of archives; and
 - Differences of opinion between archaeological experts for example regarding mitigation methodology.
- 3.6 These findings have been outlined in more detail below.

Key Findings

- 3.7 English Heritage generally only comments where designated sites are affected. It often suggests that POPE should consult with the local authority that has specialist local knowledge of heritage issues. For A1(M) Ferrybridge where an unexpected find of national importance was discovered, the chariot burial at Ferry Fryston, EH commended the archaeological work to excavate and record the finds;
- 3.8 The outturn impacts for heritage were as expected for 11 out of the 14 schemes (85%). This compares to 86% in the last Meta Report (2006). One scheme was better than predicted, one worse than predicted and one was not evaluated due to insufficient information being available.
- 3.9 Most feedback confirmed that sufficient evaluation and adequate mitigation was considered to have been undertaken, for example, English Heritage considered that overall the archaeological works for A1(M) Ferrybridge were undertaken to a high standard. For three schemes, observations were raised regarding the approach to archaeological evaluation (A21 Lamberhurst by English Heritage and A1(M) Ferrybridge by local authority consultant) and linking pre-contract archaeological works to those that formed part of the contract (A10 Wadesmill Bypass by the local authority);
- 3.10 The last Meta report identified concerns associated with reporting and publishing of results and impacts on areas of unknown archaeology. Concerns have continued regarding deposition of the archive of which three of the schemes are from this 2008 meta.

- 3.11 For four schemes consultees commented on the effects of the scheme on the local historic landscape context;
- A21 Lamberhurst Bypass: EH commented that the land bridge successfully conserved the historic approach to Scotney Castle. This was an addition to the original ES scheme design and agreed in discussion with the National Trust and EH;
 - A34 Newbury Bypass: the local authority commented that it considered that a greater understanding of the design of bridges, fencing and other structures along the route could have allowed the scheme to sit more comfortably within its historic and landscape context. It did however consider the suitability of materials and finishes to structures better than expected;
 - A64 Colton Lane: the local authority commented that although the impacts were as expected, the scheme had fragmented the historic landscape further making it difficult for future generation to follow the line of the Roman road or read the history of the landscape;
 - A14 Rookery Crossroads: the local authority had commented at scheme design stage that loss of part of meadow with earthworks features and old oak trees was unfortunate in landscape and historic environment terms and considers that the historic landscape has deteriorated;
- 3.12 Most feedback indicates that archaeological impact is generally as expected however, one scheme noted work starting on site before the archaeological watching brief was in place (A14 Rookery Crossroads) and the local authority commented that its recommended changes to the evaluation methodology were not adopted (A63 Selby Bypass);
- 3.13 A benefit of bypassing local settlements is the removal of through traffic close to listed buildings and conservation areas. For A21 Lamberhurst and A5 Weeford Fazeley consultees particularly mentioned these benefits;
- 3.14 For Newbury Bypass EH was pleased that the results of the evaluation and mitigation had been written up and published. In five instances (A64 Colton Lane, A63 Selby Bypass; A650 Bingley Relief Road, A1(M) Ferrybridge and A14 Rookery Crossroads) consultees had not received confirmation of the deposition of the archive including any finds with the local museum (or other agreed location) at the time of consultation. One consultee noted the disappointing standard of the final report.

Conclusions

- 3.15 Based on the schemes being considered for this Meta report it would appear that the impacts on built heritage and archaeology are generally as expected. The removal of through traffic from settlements has benefited conservation areas and listed buildings as expected.
- 3.16 English Heritage generally only comments on designated sites, for example, the scheme design change to include a land bridge as approach road to the National Trust Scotney Castle was well received by EH as was the archaeological work to record the chariot burial at Ferry Fryston.
- 3.17 English Heritage considered for A21 Lamberhurst that a major lesson learnt was with regard to the identification of archaeology. It considered that for future improvements to other sections of the A21, where off-line, there will be a high potential of significant archaeological impacts, English Heritage would want to pay particular attention to this issue.
- 3.18 Some concerns were raised regarding the impact of schemes on the local historic landscape, for example, fragmentation making it more difficult to understand the history of the landscape.
- 3.19 Confirmation of the deposition of the archive and finds had not been provided in five instances at the time of the evaluation

Recommendations

- 3.20 A timetable for archaeological academic and popular reporting should be agreed with all parties. Timely archaeological reporting would allow lessons learnt to be incorporated into evaluation methodologies for future schemes; and

- 3.21 Inclusion of heritage interpretation information for sensitive sites or where areas of historic landscape have been impacted would help with an understanding of the historic context of the route corridor. This could include interpretation boards in lay-bys or near footpaths/bridleways for example.

4. Biodiversity

Overview

- 4.1 Currently One Year After reports concentrate on whether the mitigation measures are in place as described in the environmental statement. At the Five Years After stage the effectiveness of these measures is evaluated. This is based on monitoring undertaken on behalf of the HA as a scheme requirement e.g. for protected species and habitat creation areas. Post construction monitoring and ongoing management information is requested to help inform the environmental evaluation of the biodiversity sub-objective. No new survey work is carried out for POPE.
- 4.2 Evaluation takes the information contained in the Environmental Statement as the baseline. Consultation is undertaken with Natural England (NE) (previously English Nature) and with local authority ecologists or countryside teams and as part of this consultation, sometimes either NE or the local authority suggested that other parties interested in the biodiversity aspects of a scheme should also be contacted.
- 4.3 This Section looks at the key findings from biodiversity information taken from the scheme evaluation reports being considered for this Meta-Report (schemes listed in Table 1.1). It aims to identify what the Highways Agency does well and could be shared with others as best practice and conversely suggestions for areas of improvement.
- 4.4 The following key findings have been identified from the scheme data:-
- Mitigation measures were implemented in line with expectations;
 - Limited circulation of lessons learnt and best practice within HA and with other stakeholders;
 - Some consultees would welcome more liaison with HA; and
 - The availability of monitoring information for species and habitats was variable.
- 4.5 These findings are outlined in more detail below.

Key Findings

How well are mitigation measures implemented?

- 4.6 Biodiversity mitigation measures were generally implemented in line with expectations and in some instances consultees considered them to be better than expected (for example A5 Weeford Fazeley, although no habitat or protected species surveys had been carried out by the consultees). For one scheme (A650 Bingley) although the overall outcome was considered by NE to be as expected, the short term impacts on the SSSI were worse than expected.
- 4.7 The outturn impacts for biodiversity were 'as predicted' for 12 out of 14 schemes (92%). This compares to 71% in the last Meta Report (2006). The outturn impact for one scheme was worse than predicted and for another there was no clear evidence to enable an evaluation.
- 4.8 In two instances major design changes were incorporated into schemes which also benefited biodiversity and this was recognised by Consultees:
- The green bridge at A21 Lamberhurst provided a habitat link across the bypass; and
 - The provision of a viaduct rather than road on embankment at A650 Bingley Relief Road enabled a reduced construction footprint across an SSSI.
- 4.9 Sometimes existing habitats / species change after the ES has been written and opportunities identified for biodiversity measures are not taken forward; this might be particularly relevant where scheme development took place over a long period of time. Examples included:-

- At A1033 Hedon Road the ES identified the potential to safeguard locally important habitats from development, this was not taken forward as the pre-works site survey did not identify the need for any remedial action;
- Translocation of locally rare plants at A1(M) Ferrybridge was not required as plants were no longer in evidence; and
- The habitat improvements suggested at the River Aire Bingley were not required as no protected species were present; although desirable this was not essential mitigation. However both the Environment Agency and English Nature said they would have welcomed habitat improvement measures being implemented at the site.

4.10 The evaluations identified that some mitigation measures were more successful than others and Consultees have commented on particular aspects of certain schemes. Specific suggestions from the evaluations included;

Re-use of soils

- Woodland soil from site re-used at A1(M) Ferrybridge but its use could have been more extensive;
- A34 Newbury bypass invasion by Gorse – local authority suggested that better management of topsoil requirements could have avoided this maintenance problem;
- A14 Rookery Crossroads re-used species rich soils but species diversity surveys would be required to evaluate success; and
- A63 Selby translocation of turfs from Site of Interest for Nature Conservation (SINC) was undertaken but local authority suggested that monitoring would be required to evaluate the success of the technique.

Establishment of species rich grassland

- Different techniques trialled on A1 Ferrybridge included sowing onto rock scree, subsoil and quarry waste and the use of locally collected seed. Findings should be used to inform other projects;
- A34 Newbury – the local authority stated that detailed surveys of new grasslands are required to confirm the species diversity of the habitats; and
- A63 Selby – the local authority wanted to be informed of any species surveys carried out by HA as this would inform on habitat treatments for future schemes locally and be useful as a 'lessons learnt' initiative.

Translocation

- The local authority commented that at A650 Bingley translocation of bottle sedge was very successful, other species possibly less so, a species survey was suggested to inform on any changes in the plant communities post construction;
- A63 Selby waterside plants from the canal were relocated to the new balancing ponds and this was considered a success by consultees; and
- The translocation of hedges on A1 Ferrybridge had mixed results, and suggestions made for future schemes were toolbox talks, a programme of preparation, propagation by cuttings or seed collection and re-location to adjacent land or a holding area.

Availability of Monitoring Information

4.11 There appeared to be some inconsistencies in the availability of monitoring information, however, overall the availability was poor. Of the 14 schemes being considered, only one (M4 Junction 18) provided copies of ongoing monitoring information to be considered as part of the evaluation process and one other included some information for one specific element of a scheme.

- 4.12 For three of the schemes consultees specifically commented on the apparent lack of monitoring with regard to biodiversity (A34 Newbury Bypass, A650 Bingley Relief Road and A10 Wadesmill Bypass).
- 4.13 In one instance English Nature responded that in their opinion monitoring had not been carried forward to address the key question of whether the operation of the road had damaging impacts. For the same scheme the local authority considered that the lack of monitoring information was a weakness of road design as without post-construction monitoring of biodiversity how can lessons be learnt?

Communication

- 4.14 For two schemes consultees specifically mentioned that they would welcome more communication with the Highways Agency;
- For A63 Selby Bypass the Local Authority commented with regard to mitigation measures for local SINC (site of interest for nature conservation) that they would have welcomed opportunity to discuss post implementation species surveys and future management as a positive way to inform on potential habitat treatments for future roads schemes locally;
 - English Nature noted for A34 Newbury Bypass that although it had an input into a management plan it was not aware whether the prescriptions for management and maintenance were being followed and would welcome more communication with Highways Agency / Managing Agents.
- 4.15 It would appear that occasionally information on habitats and species was not cascaded to site, with the potential for loss of environmentally sensitive areas.

Conclusions

- 4.16 Based on the schemes being considered for this Meta report biodiversity mitigation measures were generally implemented in line with expectations and in one instance a Consultee considered them to be better than expected. There has been a clear improvement in predicting outturn biodiversity impacts since the last Meta Report in 2006.
- 4.17 In two instances major design changes were implemented which also benefited biodiversity and this has been recognised by Consultees – the A21 Lamberhurst green bridge provides a habitat link across the bypass and the provision of a viaduct rather than road on embankment enabled a reduced construction footprint across the Bingley South Bog SSSI. However, the overall impact of the scheme on the SSSI was considered worse than expected in the short term by NE;
- 4.18 Some opportunities identified in the Environmental Statement were not always taken forward, for example, the potential to safeguard locally important habitats from development as the pre-works site survey did not identify the need for any remedial action and river habitat improvements not being required as no protected species were present. This could have been due to changes in conditions on site since the time an ES was written or that opportunities were general desirable requirements rather than essential mitigation.
- 4.19 The evaluations identified that some mitigation measures were more successful than others and the results of the use of different techniques could be shared more widely to inform future designs e.g. the results of the different seeding methods used at A1 Ferrybridge.
- 4.20 There appears to be inconsistency in the availability of monitoring information. Of the 14 schemes considered, only one provided copies of ongoing monitoring information as part of the POPE process. This may be due to the higher number of evaluated schemes being One Year After schemes. This was an issue raised by consultees in the last Meta (2006).
- 4.21 For two schemes Consultees specifically mentioned that they would welcome more communication with the Highways Agency.

Recommendations

- 4.22 Ongoing monitoring of habitats and species should be undertaken and reported for all schemes post opening in order to provide evidence of the effectiveness of mitigation measures to inform future designs;
- 4.23 Scheme close out meetings could be used as a method of capturing best practice suggestions to feed back into HA research in order to review appraisal and mitigation methodologies; and
- 4.24 A greater degree of ongoing liaison with statutory Consultees and local authorities post-opening would maximise feedback on biodiversity issues and hence contribute to the understanding of best practice to inform future scheme design.

5. Water

Overview

- 5.1 Currently One Year After reports concentrate on whether mitigation measures are in place as described in the environmental statement. At the Five Years After stage the maintenance of facilities and a review of any secondary function as a biodiversity resource is considered.
- 5.2 Evaluation takes the information contained in the Environmental Statement as the baseline and consultation is undertaken with the Environment Agency (EA) and with local authorities. Although EA water quality monitoring data is available for local watercourses, for various reasons, for example location of existing sampling points, any changes in water quality may not be attributable to the impacts of a particular scheme.
- 5.3 Analysis in Table 2.2 showed that the outturn impacts for water quality were 'as predicted' for 11 out of the 14 evaluated schemes. The outturn impact for two schemes was worse than predicted and one scheme could not be evaluated due to insufficient outturn information.
- 5.4 This section looks at the key findings from the water environment information taken from the 14 scheme evaluation reports considered for this Meta-Report. It aims to identify what the Highways Agency does well and could be shared with others as best practice and conversely suggestions for areas of improvement.
- 5.5 The following key findings were identified from the scheme data:-
- Mitigation measures were implemented in line with expectations;
 - Consultees made suggestions for improved design of water mitigation measures;
 - There have been occasional concerns over the lack of communication with HA;
 - Post construction monitoring of water quality and habitat diversity was not available to POPE; and
 - Some comments regarding ongoing maintenance and management of balancing ponds.
- 5.6 These findings have been outlined in more detail below.

Key Findings

- 5.7 For six of the schemes being evaluated there were no concerns raised regarding water issues based on the information held by consultees and for all schemes it appeared that mitigation measures were incorporated as expected. The impacts were 'as predicted' for 12 out of the 14 schemes (86%). This compares to 71% in the last Meta Report (2006).
- 5.8 Pollution control measures were incorporated into new schemes as expected, although the effectiveness of the majority of pollution control measures can only be evaluated in the light of any pollution incidents actually occurring. POPE has only been made aware of one pollution incident as a result of a yoghurt spillage (A46 Norton Lenchwick) which the EA confirmed was dealt with satisfactorily.
- 5.9 The EA commented on pollution concerns relating to one scheme which were being addressed in agreement with adjacent property owners and the HA; the complexity of the existing drainage contributed to the situation (A1033 Hedon Road).
- 5.10 At one scheme (A650 Bingley Relief Road) the EA was impressed by the installation of the interceptor and balancing pond mid scheme, but disappointed that interceptors were not installed at scheme end roundabouts with highway drainage discharge direct to watercourses, potentially compromising spillage management. However it is understood that this was not an EA requirement at the time of scheme design and that the design was agreed with the EA

- 5.11 Generally balancing ponds were seen to be as effective as expected, for example, at Selby Bypass, balancing ponds were considered to be establishing satisfactorily and at A5 Weeford better than expected. Ongoing monitoring and management was commented on by EA for two schemes in terms of concerns over potential erosion and maintenance of balancing ponds to remove accumulated silts and contamination to ensure that the facilities maintain their drainage and storage capacity (A5 Weeford and A34 Newbury). Lack of monitoring of water quality was also raised as a concern by consultees in the last Meta Report (2006).
- 5.12 For two schemes communication between the Highways Agency and Environmental Agency was commented on, these were;
- A63 Selby Bypass at the design stage. In hindsight the EA considered that it should have undertaken the flood defence work in house; and
 - A34 Newbury bypass post-opening. Disappointed with the level of communication and involvement after opening, and the level of information provided about ongoing management and monitoring of mitigation features.
- 5.13 Scheme design takes flood risk into consideration in agreement with EA e.g. by incorporating culverts. Some observations however were received from EA, namely:
- New tree planting close to culverts might impede flood flows and prevent culverts working efficiently. Further study by the HA would indicate that in this instance it was not the case; (A63 Selby Bypass,);
 - Bridge openings should be sufficiently broad or high enough to allow free passage of wildlife without impacting adversely on movement and migration patterns (A34 Newbury Bypass);
 - Size of watercourses should be maintained as existing through new crossings (culvert or bridge) to avoid problems of shallow water restricting fish migration (A47 Norton Lenchwick); and
 - Consider safe passage for mammals under bridges and within culverts during times of severe flood (A46 Norton Lenchwick and A21 Lamberhurst).
- 5.14 For two schemes the EA provided suggestions as part of its feedback with regard to how aspects of water mitigation measures could, in its view, be improved for future schemes, for example;
- Concrete bed at culverts should be 300mm minimum below natural stream bed and backfilled with gravel to avoid over shallow water and weir effect restricting fish migration and movement of fauna upstream (A46 Norton Lenchwick);
 - At river re-creation areas concerns over use of gabion baskets; only biodegradable geotextiles should be used near watercourses and use of rocks at meanders does not allow natural erosion and sites for burrowing, or colonising by marginal plants (A46 Norton Lenchwick);
 - When rivers or streams need to be realigned as a result of road construction they should be allowed to find their own path, within the constraints of the scheme (A46 Norton Lenchwick);
 - For headwalls the use of more substantial structures, rather than sandbags should be considered, EA suggests they can be prone to slumping and require repairs on a more frequent basis (A21 Lamberhurst); and
 - The use of marginal planting and retaining remains of old watercourse was considered good design, although the simplified new channel was thought likely to have reduced diversity (A21 Lamberhurst).

Conclusions

- 5.15 Mitigation measures were incorporated into all schemes and impacts were as expected for 12 of the 14 schemes.
- 5.16 Pollution control measures have been incorporated into new schemes as expected, although the effectiveness of the majority of pollution control measures can only be evaluated in the light of any pollution incidents actually occurring.
- 5.17 Generally, balancing ponds were seen to be as effective as expected. However, for two schemes the EA commented that ongoing maintenance and management of balancing ponds was important to ensure functionality was maintained (A34 Newbury Bypass and A5 Weeford Fazeley). This concern was raised in the last Meta (2006).
- 5.18 Lack of communication on scheme design and after monitoring was raised by the EA on two schemes (A43 Newbury Bypass and A63 Selby Bypass).
- 5.19 Observations have been made with regard to the operation of facilities in times of flood, including new tree planting, bridge openings, maintaining existing size of watercourses and provision of safe routes for wildlife.
- 5.20 A number of suggestions were received with regard to how aspects of water mitigation measures could be improved for future schemes, which could be shared as good practice on new schemes.

Recommendations

- Detailed 'As Built' information on water mitigation measures including drawings and handover information e.g. from the Health and Safety File could be used to inform future evaluations;
- The Environment Agency's suggestion regarding water mitigation for future schemes should be considered by the relevant HA expert; and
- Meeting with stakeholders after construction should be carried out to enable best practice and 'lessons learnt' to be discussed, recorded and disseminated within the HA, with the potential for improved design for future schemes. This could form part of a scheme close out meeting.

6. Landscape

Overview

- 6.1 As for the other environmental sub-objectives, One Year After reports concentrate on whether mitigation measures are in place as described in the Environmental Statement (ES). At the Five Years After stage evaluation considers the effectiveness of these measures, for example, visual screening, establishment of the planting and integration of the scheme into the local landscape.
- 6.2 Evaluation takes the information contained in the Environmental Statement as the baseline. Consultation is undertaken with Natural England (NE) (formerly Countryside Agency) and with local authority landscape and countryside teams. A site visit is carried out to confirm that mitigation measures are in place, to review establishment of planting, evaluate visual impacts and consider public rights of way, etc.
- 6.3 The majority of schemes evaluated for this Meta have been One Year After schemes, and new planting is likely to be more advanced in the Five Year After schemes which have subsequently been or will be evaluated.
- 6.4 This section looks at the key findings from the landscape information taken from the scheme evaluation reports being considered for this Meta-Report. It also aims to identify what the Highways Agency does well and could be shared with others as best practice and conversely suggestions for areas of improvement.
- 6.5 The following key findings have been identified from the scheme data:-
- Implementation of landscape mitigation was in line with expectations;
 - The resident surveys have raised issues with some of the mitigation measures, either that they were not completed or not extensive enough. It is believed that this has more to do with the measures not yet being fully established. However, ongoing maintenance of landscape mitigation measures is essential for these measures to reach their full potential;
 - Appraisals required review where changes to signs, gantries and lighting were introduced; and
 - Road improvements in and adjacent to designated landscapes required sensitive design.
- 6.6 These findings have been outlined in more detail below.

Key Findings

- 6.7 Based on the schemes evaluated, landscape mitigation measures were implemented in line with expectations. The outturn impacts for landscape were 'as predicted' for 13 out of 14 schemes (93%). This compares to 86% in the last Meta Report (2006).
- 6.8 The following consultee responses on the effectiveness of mitigation measures in reducing visual impacts and integrating the scheme into the surrounding landscape were typical:
- 'as a driving experience the landscape design and mitigation of the road scheme has been successful, - as expected'
 - '...Too early to comment on effectiveness of landscape planting'.
- 6.9 Of the 14 schemes being considered there were only two (A1033 Hedon Road and A64 Colton Lane) where there were concerns over the initial establishment of planting. In both cases remedial measures were put in place to overcome any potential issues regarding the mitigation of impacts in the long term. Aftercare in the form of landscape maintenance of planting and seeding was included for all schemes.

- 6.10 Where the opportunities were taken to use local vernacular style, reflect historic connections or provide gateway features this contributed to the creation of a sense of place for schemes and local identity, for example;
- The road swing bridge at A63 Selby and footbridge at A5 Nesscliffe;
 - The A650 Bingley Relief Road with retaining walls faced with local stone reflects local townscape character;
 - The sculptures at A1 Ferrybridge reflects historic connections;
 - The land bridge forming the approach to Scotney Castle (A21 Lamberhurst); and
 - The feature roundabouts on the A1033 Hedon.
- 6.11 The visual impacts of the introduction of signs, gantries and lighting into schemes were occasionally underestimated. Examples included:
- M4 jct 18 – comment from the local authority that the gantry sign nearest the junction is more visible than expected;
 - A1 Ferrybridge – where signs (to current standards) are located in close proximity to adjacent housing, the impact was not considered at the time the ES was prepared; and
 - For two of the schemes where there were changes to the existing lighting this was commented on as being worse than expected (A21 Lamberhurst and M25 Jct 12-15);
- 6.12 Five of the schemes were located within or adjacent to designated landscapes, of these three received negative feedback (A34 Newbury, M4 Jct 18 and A10 Wadesmill) and two (A5 Weeford, A21 Lamberhurst) received positive feedback by consultees;
- Negative comments received included the adverse effect on the natural beauty and character of the an AONB; significant changes made to the landscape character of a historic landscape, and a sign gantry being more visible and a plant building not being detailed in the manner expected in the AONB; and
 - Positive comments received included the A21 Lamberhurst Bypass being considered to be very impressive, with appropriate landform and new planting in keeping with the surrounding woodland and also the land bridge was considered to be excellent; for A5 Weeford landscape planting, earthworks and ground modelling was better than expected; the efforts to integrate the new road into the landscape were as successful as could be expected given the nature of the topography, particularly through alignment and the landscaping measures.
- 6.13 The only concerns raised in the last Meta (2006) were the availability of Environmental Management Plans. This remains an issue with management plans available for three schemes from the total of 14 being considered (including one also included in 2006).

Conclusions

- 6.14 Based on the schemes evaluated, landscape mitigation measures were implemented in line with expectations. However, with One Year After schemes most consultees deemed it too early to comment on effectiveness of landscape planting. It would be appropriate to evaluate ongoing establishment as part of the Five Year After study.
- 6.15 Of the 14 schemes being considered there have only been two where there have been concerns over the initial establishment of planting. In both cases remedial measures were put in place to overcome any potential issues regarding the mitigation of impacts in the long term.
- 6.16 For all schemes, the ongoing maintenance and management of landscape mitigation measures was essential to ensure successful establishment of planting and seeding long term in order to

fulfil its potential for screening and landscape integration. All schemes have included aftercare within the contract requirements;

- 6.17 Where the opportunities were taken to use local vernacular style for walls or fencing, reflect historic connections or provide gateway features this contributed to schemes having a strong local identity and sense of place.
- 6.18 The visual impacts of the introduction of signs, gantries and lighting into schemes was underestimated in some cases, particularly if these elements were included after the ES, possibly to comply with changes to HA standards where schemes have taken many years from appraisal to construction. This can have impacts on local landscape character and visual impacts particularly where located adjacent to residential areas.
- 6.19 Where schemes were located within or adjacent to designated landscapes, three were considered worse than expected due to the adverse effect on the natural beauty and landscape character and two received positive feedback by Consultees due to the successful integration of the schemes into the local landscape.

Recommendations

- 6.20 Given the importance of landscape mitigation in road design, landscape should be retained as a high priority within the appraisal process, particularly as later changes may alter the subtleties of signs, gantries and lighting and effective mitigation may become more difficult to achieve;
- 6.21 Where possible, extend the number of schemes designed with gateway features and use of high quality local materials and vernacular style to create a sense of place and local identity; and
- 6.22 Visual impacts are assessed in the ES for the opening year and the design year (year 15) by which time it is assumed that planting will be sufficiently mature to provide visual screening and landscape integration. In order to evaluate how effective the planting measures are it is recommended that the POPE process is extended to include a study at 15 Years After opening.

7. Environmental Consultation

Overview

- 7.1 Consultation is a key part of the environment evaluation process and is undertaken to give stakeholders and interested parties the opportunity to provide feedback on schemes where they were involved in the initial design and appraisal process. Consultees are asked to consider how, in their opinion, the predicted impacts compare with the observed impacts of the scheme after opening.
- 7.2 The environmental evaluation included consultation with the following bodies:-
- Environment Agency – statutory consultee for water issues ;
 - English Heritage – statutory consultee on the historic environment;
 - Natural England (formerly the Countryside Agency and English Nature prior to 2006) statutory consultee for the natural environment including landscape and biodiversity issues; and
 - Local authorities and the National Park Authority (where applicable).
- 7.3 The consultation process can involve other interested parties such as the local Parish Council, RSPB, the National Trust, the British Horse Society and Local Wildlife Trusts depending on the nature of the forecast environmental impacts.
- 7.4 Consultation is carried out using a variety of methods including:
- Questionnaires;
 - Telephone discussion;
 - Meetings; and
 - Email correspondence.
- 7.5 Consultation questions are tailored to the remit of each agency, with the detail of the questions targeted on specific impacts/ predictions identified in the ES.
- 7.6 Where local community questionnaires form part of the main POPE report there is the opportunity to include environment questions, for example, regarding changes to non-motorised user (NMU) facilities and views on benefits to the local street scene once a bypass is opened. These were piloted in 2007 and have now been undertaken on five schemes.

Consistency of Consultation Responses

- 7.7 14 schemes were evaluated, and this section of the report seeks to look at the consistency of responses from Consultees once the scheme has been built.
- 7.8 Table 7.1 identifies the statutory Consultees that were invited to provide feedback on the schemes after opening and summarises the reasons why feedback was or was not provided. No response means the stakeholder did not reply. It should be noted that prior to 2006 and the formation of Natural England, consultation was carried out separately with the Countryside Agency for landscape and English Nature for biodiversity.

Natural England is currently contacted once but asked to respond to both topic areas which is reflected in Table 7.1 below.

Table 7.1 – Statutory Consultee Summary of Reasons for Feedback Responses

Statutory Consultee	Responded	Reasons
Natural England Landscape	12 No	No records of original response/no data stored/no current information (5) No response including one with part AONB (4) Unable to comment as prioritises consultation based upon impact upon national designations / scheme does not meet criteria for comment (3)
	2 Yes	Provided observations for one scheme near SSSI and another in AONB.
Natural England Biodiversity	11 No	No monitoring info available(2) Unable to comment as no nationally designated sites affected by the scheme (3) Staff moved on (2) No comments / no response(4)
	3 Yes	Two schemes involved SSSIs and for the third staff had detailed knowledge of the scheme
English Heritage	8 No	Unable to comment as no nationally designated sites affected by the scheme (2) No information available (3) Lack of resources(1) No comments / no response(2)
	6 Yes	Three were high profile and detailed comments were provided
Environment Agency	3 No	No response (2) No information available / national flooding took priority (1)
	11 Yes	Circulated within EA teams, different levels of response depending upon data available and knowledge of scheme by staff

- 7.9 The Local Authority and other parties were also consulted on a number of schemes. The responses are listed below in Table 7.2.

Table 7.2 – Summary of Local Authority and Other Organisations Responses

Consultees	Responded
County Council (consulted for 11 schemes)	2 No 9 Yes
District Council (consulted for 7 schemes)	1 No 6 Yes
National Trust (consulted for 1 scheme)	No
British Waterways (consulted for 1 scheme)	Yes
Archaeological Consultant (consulted for 2 scheme)	Yes

Key Findings

- 7.10 The main question was to identify the consistency of responses from statutory Consultees once the scheme had been built and to identify reasons why feedback was or was not given.
- 7.11 In general, the Statutory Consultees were supportive of the Highways Agency undertaking post opening evaluation of the environment sub-objectives, even if they have not been in a position to provide any feedback. Natural England and English Heritage often suggested contacting the appropriate local county authority contact;
- 7.12 Natural England (and previously the Countryside Agency and English Nature) provided responses where designated sites were affected including SSSIs and AONB or where individual staff had detailed knowledge of a particular scheme. The five responses where feedback was provided were all for the 2006 Meta. Biodiversity mitigation measures were generally implemented in line with expectations and in one instance a Consultee considered them to be better than expected;
- 7.13 English Heritage provided feedback for schemes where archaeological impacts were of national importance usually where designated sites were effected which indicated that impacts on the built environment and archaeology generally are as expected. Most feedback confirmed that sufficient evaluation was undertaken. Of the six responses three were for 2006 and three for 2008;
- 7.14 The Environment Agency generally provided feedback which confirmed that mitigation measures were implemented as expected. A response was received for all 2006 schemes but only 4 of the 2008 schemes. This might be due to the changes made by EA, whereby requests for information are initially dealt with by its central customer liaison service. Where the HA are able to provide a named contact a direct approach is made which may result in a more focussed response. Some issues were raised and these are identified within the Water section of this report;
- 7.15 The main reasons when given, for not providing a response, include;
- Lack of data, including original response and monitoring information (11 responses);
 - There were no nationally designated sites affected by the scheme (8 responses);
 - Lack of resources or staff moved on (3 responses);
 - No reason given (12 occasions);
- 7.16 County Councils were consulted for 11 schemes, of which responses were given for 9 schemes and no response for 2 schemes;
- 7.17 District Councils were consulted on 7 schemes, of which responses were given for 6 schemes and no response for one scheme;

- 7.18 The local authorities provided responses on a variety of sub-objectives and often used their local knowledge to comment in depth, for example regarding the effectiveness of non motorised user (NMU) measures including footpath diversions. Where new crossing of roads were provided these were generally well received. Landscape measures were generally seen 'as expected' with it being too soon to comment on success of planting establishment at the One Year After stage. A general comment for biodiversity measures was that local authorities do not undertake independent monitoring or survey work which would be required to demonstrate effectiveness.

Conclusions

- 7.19 In general, the Statutory Consultees were supportive of the Highways Agency undertaking post opening evaluation of the environment sub-objectives. The response rate from EH remained the same for 2006 and 2008, however for NE and EA responses have reduced since 2006, and this is something the HA could address through a revised agreement with the EA. However, there are a number of factors behind this reduction in response rate as illustrated in Table 7.1;
- 7.20 Based on the responses received, the statutory Consultees will usually only comment on national issues e.g. designated sites. Many HA schemes do not impact on designated sites and where this is the case, regional and local bodies are better placed to provide comments;
- 7.21 English Heritage usually suggests contacting the local authority archaeologist; either in addition to its own feedback response or when it was unable to comment directly about particular schemes;
- 7.22 The extension of the consultation process to include the Local Authorities at county and district level has resulted in a greater level of feedback being provided – for example, staff have greater local knowledge, are able to comment on a wider range of topics and may personally have been involved in the scheme;
- 7.23 Although not routinely contacted, other 'interested parties' are often suggested by the other Consultees. Where contact has been made they normally have a level of interest in their own area of expertise to be able to provide detailed and informative feedback. Where environmental questions have been included on the local Resident Surveys people have taken the opportunity to provide feedback, both positive and negative.

Recommendations

- 7.24 A post construction meeting is now held by the Highways Agency to identify lessons learnt from that scheme. It is recommended that all documentation from this meeting is circulated to the POPE team, so that these specific lessons are woven into the key conclusions from the evaluation;
- 7.25 This meeting could be widened to involve statutory Consultees and relevant local authority stakeholders to provide an opportunity to discuss concerns and provide positive feedback and to promote the POPE process and their involvement in it;
- 7.26 Following arrangements recently set up with English Heritage, a similar initiative to share POPE findings with Natural England and Environment Agency should be considered. POPE should be discussed at meetings with these organisations to increase awareness and encourage greater engagement; and
- 7.27 A formal methodology should be agreed within the HA for circulating the combined findings of the HA 'lessons learnt' meeting and the POPE evaluations to ensure that best practice is adopted for future schemes.

8. POPE Recommendations Meta 2006

8.1 The 2006 Meta reviewed seven pilot schemes for the environmental section of the report, as follows;

- A5 Nesscliffe Bypass, A34 Newbury Bypass, A1033 Hedon Road Improvements, A46 Norton Lenchwick Bypass, A650 Bingley Relief Road and A21 Lamberhurst Bypass which were all TPI schemes;
- It also included the M6Toll for which although not a TPI scheme an environmental evaluation had been requested and completed.

8.2 The 2006 meta-analysis of environmental impacts included a series of recommendations for future POPE schemes and these are outlined in Table 5.4 below in the left hand column. The middle column indicates whether this recommendation has been adopted (and hence any row colour coded as green is that the recommendation has been adopted) and the right hand column provides an update of the current status of each recommendation.

Table 8.1 – Status Review of Meta 2006 POPE-E Recommendations

Meta 2006 process recommendation		2009 Status of recommendation
The POPE process needs to be refined. Future 1 year after studies could concentrate on evaluation of the commitments made and whether mitigation is in place: with 5 years after studies reporting on the comparison of impacts compared to the predictions	✓	This has been adopted into the POPE methodology
Environmental monitoring costs should be built into scheme costs. This would ensure that environmental monitoring objectives are included and reviewed as part of POPE	Ongoing	It is understood that monitoring is a requirement for all schemes and funding is provided. However, monitoring information has only been made available to POPE for a small number of schemes
Long term landscape and ecology management proposals should be prepared to ensure that the objectives of the environmental mitigation measures can be achieved	Ongoing	Handover Environmental Management Plan (HEMP) should fulfil this but although requested for POPE, they are not always available at the One Year After stage but should be available by Five Years After.
The Evaluation Summary Table (EST) should focus on whether the impact is better than expected, as expected or worse than expected with supporting evidence from site inspections or consultations, rather than being scored	✓	This has been adopted into the POPE methodology
It becomes a project requirement that a full set of appraisal documents (e.g. ES, AST and worksheets, PI Inspectors Report etc) to be set aside by the HA for evaluation purposes	Ongoing	This is a requirement and could now be linked to the Project Control Framework (PCF) for schemes, however, the retrieval of environmental information for POPE remains time consuming with the availability of information variable from scheme to scheme. A standard list of information has now been adopted (see Appendix)
In addition to the inclusion of local authorities and certain environmental organisations, consultation should be extended to include local stakeholders (e.g. parish councils, residents groups) in order to confirm/challenge the professional view.	✓	Consultation can be extended to include other interested parties and local stakeholders subject to agreement with individual HA Project Managers.
Where sub-objectives are highlighted as key issues at appraisal consideration should be given to each environmental sub objective being reviewed by a specialist for that topic for all POPE reports	✓	The current POPE method is to cover all the NATA objectives at a basic level and to undertake more detailed evaluation on key topics. The structure of each evaluation is agreed with the scheme Project Sponsor using a Scheme Evaluation Plan.
Continuing the evaluation of environmental sub-objectives would inform on mitigation provisions for future schemes and allow ongoing improvement in design and implementation of the environmental aspects of road schemes	✓	Evaluation continued. Methodology for capturing lessons learnt and best practice to inform HA research and feed into ongoing improvements appraisal process is still required

POPE Process Issues

- 8.3 The POPE methodology is in the process of being reviewed and updated to take account of process lessons learnt so far. It has been rolled out to all schemes in the Major Projects programme and the next Meta report will have the benefit of being able to use a much larger

sample of results for robust reporting which would include more schemes at the Five Years After stage. Recommendations for the POPE process are:

- Environmental monitoring costs are already built into scheme costs and environmental monitoring objectives are included and reviewed as part of the POPE process. However, monitoring information was only made available for a small number of schemes, possibly due to the large number of One Year After evaluations. A point of accountability should be established within the HA to track delivery and collation of results of environmental monitoring;
- Data availability remains variable between schemes for many reasons, for example, information archived and difficult to retrieve, staff changes since construction, post-construction monitoring reports unavailable at time of request;
- Environment Management Plans are requested for POPE but are not always available; HEMP should be made a requirement of the PCF process; and
- It is a project requirement that a full set of appraisal documents are set aside by the Highways Agency for evaluation purposes, however, the retrieval of background information for POPE remains time consuming with the availability of information variable from scheme to scheme. The provision of appraisal documents should also be a requirement of the PCF process.

Appendix A

Standard Environmental Information that is Requested

The information in the box below is the standard list which has been developed to provide background information for evaluations. This list forms part of the current methodology and the exact information requested for previous schemes varies.

Standard list of information required to evaluate the environmental sub-objective

- Environmental Statement (ES)
- Appraisal Summary Table (AST)
- Any amendments, updates or addendums to the ES or any relevant further studies or reports. Any significant changes to the scheme since the ES.
- 'As Built' drawings for landscape, ecological mitigation measures, drainage, fencing, earthworks etc. Preferably electronic versions
- Landscape and Ecology Management Plans
- Construction Environment Management Plan
- Relevant contact names, of people with knowledge of the scheme, at:
 - the Statutory Consultees (Environment Agency, English Heritage and Natural England);
 - the local authorities;
 - the designer or environmental coordinators for the scheme and for the MAC; and,
 - any other relevant specialist consultees that were contacted.
- Archaeological reports (popular and academic)
- List of properties eligible for noise insulation
- List of Part 1 Claims regarding noise, air quality or lighting (from HA National Part 1 Team)
- Results of any post opening survey or monitoring work e.g. ecology surveys, water quality surveys pre- and post- construction
- Animal mortality data, pre and post scheme construction (from MAC)
- Any scheme newsletters or publicity material for the scheme
- Copy of the Non-motorised User (NMU) post opening survey
- Information may be available regarding environmental enhancements to streetscape/townscape for bypassed settlements

Appendix B

Scheme Evaluation Table

Scheme Evaluation Table

The Scheme Evaluation Table summarises the appraisal and evaluation figures for our major schemes. The appraisal figures show the predicted impact of the scheme, calculated during the design stage. The evaluation figures recalculate these predictions using outturn data – i.e. what was found to be happening after the scheme opened.

The table lists all schemes that have opened since 1997, but only those which have opened since 2002 are part of the Post Opening Project Evaluation (POPE) programme. Please note that because the schemes all opened on different dates, figures in the table relate to different years.

The table records information on traffic, accident savings and carbon emissions, because they are the topics we are most frequently asked about.

What information does the table give?

1. Scheme details:

The table gives the scheme's name and the date it opened. The date the scheme appraisal was produced is also given. We have used the most recent published appraisal. The 'data source' notes what this appraisal document is: an Appraisal Summary Table (AST) or an Environmental Statement (ES). We have used whichever document had the most detailed information about traffic and emissions. An "RR AST", refers to an AST created in 1998 as part of a 'roads review'.

2. Traffic:

The table gives the traffic predicted for the opening year and the traffic measured in that year.

Notes:

- Traffic is given as the annual average daily traffic (AADT). This is number of vehicles that will use new or improved road on an average day. Figures are rounded to the nearest 500 vehicles.
- Opening year counts are undertaken after the scheme has been open for about a year. Therefore, if the scheme opened in 2006, the traffic count would have been undertaken in 2007.
- For some schemes that have recently opened, the One Year After study was not available at the time the table was compiled and so the 'observed AADT' cell is currently blank.
- Some schemes affect more than one road. The figure given is for the main route only. If the scheme is a bypass the figures given are for the new route.

3. Accidents:

The table gives the number of injury accidents predicted to be saved in the opening year and the observed injury accident savings.

Notes:

- The observed accident savings are calculated by taking an average over the first 5 years of opening. This figure is only given for schemes where the Five Years After study has been completed. This is in line with Department for Transport guidance which states that accident monitoring should be undertaken over at least a 3 year period.
- As the figures are averages, they are given with decimal places. For example: a saving of 0.5 personal injury accidents means a saving of 1 accident in 2 years.

4. Carbon emissions:

The table has columns that give the predicted change in carbon emissions as stated in the scheme's Appraisal Summary Table (AST) or Environmental Statement; the change in carbon emissions that would

have been predicted if the AST had been able to use the current method; and the change in carbon emissions that occurred, calculated using observed traffic.

Notes:

- Carbon dioxide is a greenhouse gas, and contributes to climate change. Vehicles emit carbon dioxide as they burn fuel.
- Carbon emissions are therefore calculated using information about traffic flows, speeds and types of vehicle.
- The outturn carbon emissions in the table are calculated using the observed traffic flows.
- This table uses the DMRB screening method for regional impact assessment to calculate carbon emissions. This is a standard method using a spreadsheet produced by the Highways Agency. Version 1.03c has been used. Where the cell is blank this is because we did not have enough traffic data to undertake the calculation.
- Figures are given in 'tonnes of carbon'. This is standard practice, but the figures can be easily changed to tonnes of carbon dioxide using a conversion factor of 44/12. A positive number represents an increase in carbon; a negative number represents a decrease. Figures are rounded to the nearest 10 tonnes of carbon.
- You will see that for the schemes which have opened most recently (top section of the table), we have made detailed carbon emission predictions. For schemes which opened before 2002 (the bottom section of the table), we did not predict what the carbon emission impact would be. These schemes also pre-date POPE, and so there is almost no evaluation data. There was a period in between where carbon emissions were estimated in ranges. These schemes are given in the middle section of the table.

Evaluation of HA Major Schemes opened since 1997: Carbon

Scheme Name	Actual opening year	Data Source for Prediction (ES=Environment Statement) (AST=Appraisal Summary Table) (RR=Roads Review) (SAR=Scheme Appraisal Report)	Date of Data Source	Estimated Carbon emissions (tonnes net difference in opening year)			
				Prediction			Evaluation estimate using observed traffic data
				Original data (as stated on data source) CO ₂	Original data converted to Carbon	Recalculation with current (DMRB) method	Using current DMRB method

Schemes with detailed carbon emission predictions							
A1(M) Ferrybridge - Hook Moor	2006	ES	Feb-95	-3000	-818	5800	2520
A11 Attleborough Bypass	2007	ES	Jun-04	2439	665	- ^b	- ^c
A14 Rookery Crossroads GSJ	2006	AST	Mar-02	460	125	80	190
A2 Bean - Cobham Phase 1 Bean - Tollgate	2004	AST	2001	73	20	410	980
A249 Iwade - Queenborough Improvement (DBFO)	2006	ES addendum	1999	263	72	400	100
A30 Bodmin Indian Queens	2007	AST	Mar-05	6704	1828	- ^b	- ^c
A30/A382 Merrymeet Junction	2006	AST	2005	416	113	- ^b	- ^e
A34 Chieveley/M4 J13 Improvement	2004	AST	2000	-16	-4	- ^b	- ^e
A419 Commonhead Junction	2007	AST	Jan-05	768	209	- ^c	- ^c
A421 Great Barford Bypass	2006	AST	Aug-04	3220	905	610	-190
A428 Caston Common to Hardwick Improvement	2007	AST	Feb-03	8950	2441	- ^c	- ^c
A47 Thorney Bypass	2005	AST	Aug-02	1184	323	160	-350
A5 Weeford - Fazeley Improvement	2005	ES	Mar-02	3223	879	- ^b	590
A500 City Road & Stoke Junction Improvement	2006	ES	Mar-02	-1638	-447	- ^b	- ^b
A63 Melton Grade Separated Junction	2006	AST	Aug-00	4121	1124	680	1850
A64 Colton Lane GSJ	2005	SAR	2000	205	56	80	100
A66 Carkin Moor to Scotch Corner Improvement	2007	AST	Oct-02	800	218	260	- ^c
A66 Greta Bridge to Stephen Bank Improvement	2007	AST	Oct-02	600	164	140	- ^c
A66 Temple Sowerby & Imp at Winderwath	2007	ES	Jun-02	1153.4	315	220	110
M4 J18 Eastbound diverge	2004	AST	Dec-04	625	170	130	130
M40/A404 Handycross	2007	AST	Apr-04	170	46	- ^c	- ^c
M5 J18a - J17 Northbound (Hallen Hill)	2005	AST	Dec-04	1763	481	30	520
M5 J19 - J20 Northbound Climbing Lane (Tickenham Hill)	2006	AST	Apr-05	898	245	30	-90
M5 J19 - J20 Southbound Climbing Lane (Naish Hill)	2006	AST	Mar-05	409	112	20	-220

Schemes where carbon emissions were predicted in ranges							
A1 Stanington Junction	2004	AST	2002	Neutral	- ^b	350	280
A1 Willowburn - Denwick Improvement	2003	RR AST	1998	N/A	- ^b	- ^b	- ^b
A1(M) Wetherby - Walshford	2005	RR AST	1998	N/A	- ^b	-1310	-2180
A10 Wadesmill Colliers End	2004	RR AST	1998	0 - 2000	0 - 546	- ^b	- ^b
A1033 Hedon Road Improvement	2003	RR AST	1998	0 - 2000	0 - 546	60	500
A11 Roudham Heath - Attleborough Improvement	2003	RR AST	1998	N/A	- ^b	- ^b	- ^b
A120 Stansted - Braintree Improvement	2004	AST	1998	2000 - 5000	546 - 1364	- ^f	- ^f
A21 Lamberhurst Bypass	2005	RR AST	1998	0 - 2000	0 - 546	90	360
A27 Polegate Bypass	2002	RR AST	1998	0 - 2000	0 - 546	230	2270
A41 Aston Clinton Bypass	2003	RR AST	1998	0 - 2000	0 - 546	390	720
A43 M40 - B4031 Dualling	2002	RR AST	1998	0 - 2000	0 - 546	- ^b	- ^b
A43 Silverstone Bypass (A43 M40 - B4031 Dualling)	2002	RR AST	1998	0 - 2000	0 - 546	1540	4430
A43 Whitfield Turn - Brackley Hatch Improvement	2002	RR AST	1998	0 - 2000	0 - 546	-2520	1170
A46 Newark - Lincoln Improvement	2003	RR AST	1998	0 - 2000	0 - 546	1390	6090
A5 Nesscliffe Bypass	2003	RR AST	1998	N/A	- ^b	300	960
A500 Basford, Hough, Shavington Bypass	2003	RR AST	1998	0 - 2000	0 - 546	- ^b	- ^b
A6 Alveston	2003	RR AST	1998	0 - 2000	0 - 546	- ^g	- ^g
A6 Clapham Bypass	2002	RR AST	1998	0 - 2000	0 - 546	1200	860
A6 Great Glen Bypass	2003	RR AST	1998	0 - 2000	0 - 546	-20	-20
A6 Rothwell - Desborough Bypass	2003	RR AST	1998	0 - 2000	0 - 546	380	320
A6 Rushden & Higham Ferrers Bypass	2003	RR AST	1998	0 - 2000	0 - 546	- ^b	- ^b
A63 Selby Bypass	2004	RR AST	1998	0 - 2000	0 - 546	- ^b	- ^b
A650 Bingley Relief Road	2003	RR AST	1998	0 - 2000	0 - 546	- ^b	- ^b
A66 Stainburn & Great Clifton Bypass	2002	RR AST	1998	N/A	- ^b	-80	-130
M25 J12 - J15 (Widening) : J12-13							
M25 J12 - J15 (Widening) : J13-14							
M25 J12 - J15 (Widening) : J14-15	2005	RR AST	1998	5000+	1364+	- ^j	- ^j
M60 J5 - J8 (Widening)	2006	AST	1998	2000 - 5000	546 - 1364	- ^b	300 ^k

Schemes which pre-date the TPI programme hence are not covered by POPE ^L							
A1 Tempsford Junction Improvements	2001			N/A	-	-	-
A1(M) Alconbury - Peterborough (DBFO)	1998			N/A	-	-	-
A1(M) Walshford - Dishforth	1997			N/A	-	-	-
A12 Hackney Wick - M11 Contract I	1999			N/A	-	-	-
A12 Hackney Wick - M11 Contract II	1998			N/A	-	-	-
A12 Hackney Wick - M11 Contract III	1999			N/A	-	-	-
A12 Hackney Wick - M11 Contract IV	1999			N/A	-	-	-
A13 Thames Avenue - Wennington	1997			N/A	-	-	-
A13 Wennington - Mar Dyke	1998			N/A	-	-	-
A13 West of Heathway - Thames Avenue	1999			N/A	-	-	-
A16 Market Deeping/Deeping St James Bypass	1998			N/A	-	-	-
A19A168 Dishforth - Tyne Tunnel (DBFO)	1998			N/A	-	-	-
A30/A35 Hornton - Easing (DBFO)	2000			N/A	-	-	-
A30/A35 Puddleton Bypass (DBFO)	1999			N/A	-	-	-
A34 Newbury Bypass	1998			N/A	-	-	-
A417/A419 Lutton Bypass (DBFO)	1997			N/A	-	-	-
A417/A419 Nettleton Improvement (DBFO)	1998			N/A	-	-	-
A417/A419 Stratton Bypass (DBFO)	1997			N/A	-	-	-
A50 Blythe Bridge - Queensway Phase I	1997			N/A	-	-	-
A50 Blythe Bridge - Queensway Phase II	1997			N/A	-	-	-
A50/A564 Stoke - Derby Link (DBFO)	1998			N/A	-	-	-
A564 Derby Southern Bypass and Derby Spur	1997			N/A	-	-	-
A564 Derby Southern Bypass Contract B	1999			N/A	-	-	-
A69 Newcastle-Carlisle Haltwhistle Bypass (DBFO)	1997			N/A	-	-	-
M1/M62 Link Roads	1997			N/A	-	-	-
M1-A1 Lofthouse - Bramham Link Road (DBFO)	1999			N/A	-	-	-
M25 J8-10 Widening	1997	ES	Sep-93	-500	-136	-	-
M40 Denham - Warwick (DBFO)	1998			N/A	-	-	-
M5 J18-19 Widening	1998			N/A	-	-	-
M65 Blackburn Southern Bypass Contract I	1997			N/A	-	-	-
M65 Blackburn Southern Bypass Contract II	1997			N/A	-	-	-
M66 Denton - Middleton Contract I	2000			N/A	-	-	-
M66 Denton - Middleton Contract II	1997			N/A	-	-	-
M66 Denton - Middleton Contract III	2000			N/A	-	-	-

Footnotes:
a - these figures will be filled in when the POPE Five Year After study is available. This is to ensure that results are based on at least 3 years of accident data.
b - scheme data missing
c - One Year After POPE study not yet published
d - no forecast obtained by POPE
e - junction scheme. DMRB carbon method not suitable for this type of scheme
f - this estimate only applies to junction element of scheme
g - scheme not modelled with COBA (TUBA or URECA used)
h - no carbon dioxide prediction to convert
i - scheme not evaluated by POPE
j - characteristics of a 5/6 lane motorway were uncertain. Therefore no accident saving prediction was made. carbon evaluation could not be undertaken as no suitable forecast speed data.
k - carbon evaluation relates to only J5-6
L - these schemes were appraised before the requirement to consider carbon emissions. As they are not covered by the POPE commission, they will not be filled in future. In subsequent updates of this table these rows will not be presented.
m - flows on this scheme are higher than forecast - the increase in accidents is believed to be due to strategic re-routing of long-distance traffic between the M1/M40(M25 west) - and may be off-set by accident savings elsewhere.
General note on carbon - the figures above relate to change in emissions from a road as a result of the scheme. Apparently significant changes may be less important when considered in relation to total carbon emissions from the road.

Notes on how traffic factors are handled in carbon emission calculations		
	Recalculation with current (DMRB) method	Evaluation estimate using observed traffic data
Network	Road links where the scheme was thought to have a significant impact. (Not full network used in Environmental Statement).	Do-minimum: estimated using before traffic count data factored to one year after opening to take account of traffic growth.
Traffic flows	Do-minimum and Do-something flows on selected link in the network from scheme modelling.	Do-something: from traffic counts one-year after Do-minimum: assumed to be observed before speeds. Do-something: observed speeds one year after opening. Speeds obtained from either journey time runs or HA's Journey Time Database. For schemes with a large difference between peak and interpeak speeds, the time periods were treated separately.
Speeds	Do-minimum and Do-something speeds taken from scheme modelling.	
Composition	Do-minimum and Do-something vehicle types taken from scheme modelling.	Do-minimum composition taken from surveys before construction. Do-something composition taken from surveys one year after opening.