

# Project Appraisal Guidelines

## Unit 14.0 Non-Major Schemes

May 2012

## **Project Appraisal Guidelines**

---

*Unit 14.0*

*Non-Major Schemes*

---

Version	Date	Comments
1.0	May 2012	New Guidance

This document is available to download at [www.nra.ie/publications/projectappraisal](http://www.nra.ie/publications/projectappraisal)

**For queries relating to the application of this guidance to pavement and minor improvement projects please contact:**

Network Management  
National Roads Authority  
St Martin's House  
Waterloo Road  
Dublin 4

Tel: (01) 660-2511

Email: [info@nra.ie](mailto:info@nra.ie)

Web: [www.nra.ie](http://www.nra.ie)

---

## 1 Introduction

- 1.1 This PAG unit recommends methods of capital expenditure appraisal that are likely to be suitable for use in non-major schemes. Non-major schemes are those schemes which are less complex in nature, and hence where project appraisal is expected to be more straightforward. Whilst non-major schemes tend to cost less than €5m, this is not an absolute cutoff, and the definition of any scheme as a major or non-major project rests with the NRA Project Manager. More complex road schemes, typically costing above €5m should be assessed as Major Schemes or National Secondary Road projects. Schemes with an estimated cost below €0.5m can be based on a simple assessment of costs and benefits.
- 1.2 The distinction between capital expenditure and pavement maintenance should be noted. Capital expenditure describes the delivery of new or modified infrastructure. Pavement maintenance describes the ongoing expenditure that is required in order to maintain operation of the existing asset. Pavement maintenance is supported by the NRA Pavement Management System (PMS) which provides a basis for the allocation of such funds, and includes the appraisal of such expenditure at programme level based on life cycle analysis. Expenditure on pavement maintenance is therefore appraised at programme level, and need not be appraised as a non-major scheme using the guidance set out in this PAG Unit<sup>1</sup>.
- 1.3 Transport appraisal is a process to establish the merits of a proposed intervention in the transport system. Sound governance requires that the probable impacts of the proposed scheme need to be assessed, both relative to other options for addressing the same problem (“is this the best solution?”) and relative to other proposals – addressing different objectives - that are competing for government expenditure (“is this a priority for funding?”).
- 1.4 Appraisal should be carried out relative to a Do-Minimum case – the most-likely future scenario if the scheme does not go ahead. In the case of NM schemes, the Do-Minimum should assume that the road is maintained as proposed by the Pavement Management System, without any improvement in road width or alignment. It should also include any other committed or under-construction schemes that may impact on the traffic flows on the scheme in question (e.g. competing routes or corridors).
- 1.5 PAG Unit 1.0: Introduction refers to the need for a consistent and comprehensive framework, to facilitate comparisons of the value for money achieved by different proposed projects. In order to achieve this, a degree of standardisation is required in the calculations carried out and in the presentation of the results.
- 1.6 The guidance in this note should be read in conjunction with other units of the Project Appraisal Guidance (PAG). It is intended as a guide for those project-managing or

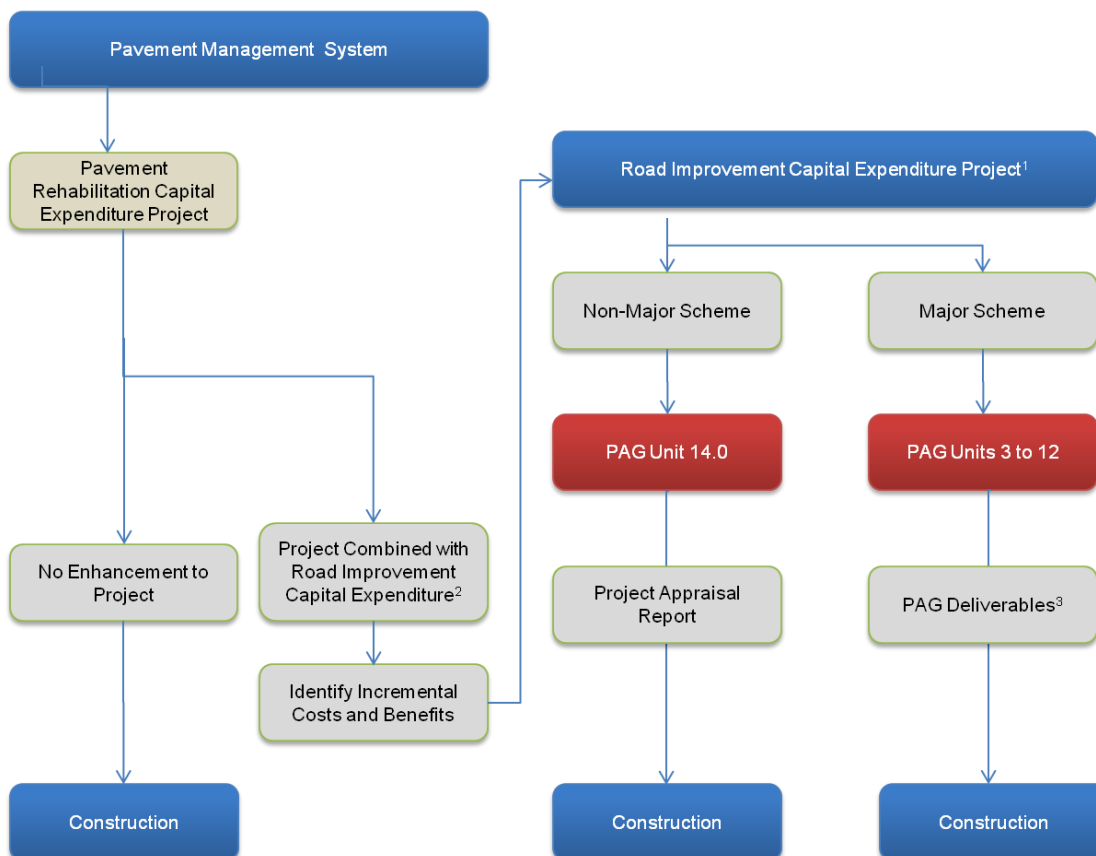
---

<sup>1</sup> Where pavement schemes include modifications to the road alignment or provision of non-pavement related expenditure that has not been included in the appraisal of pavement management programmes, such expenditure is deemed to be over and above that identified by the PMS. In such cases, the additional costs and benefits should be appraised as a Non-Major Scheme using the guidance set out in this PAG Unit.

progressing NM schemes as to the steps that need to be undertaken and the levels of detail that are appropriate.

## 2 Project Management

- 2.1 The NRA has a funding programme of Non-Major (NM) schemes. The schemes within this programme include junction improvements, bridge maintenance, pavement rehabilitation projects (overlays and edge strengthening) and minor improvements (pavement rehabilitation with minor improvements to the horizontal and/or vertical alignment as defined in Advice Note TA 85/11).
- 2.2 All appraisals should be proportional to the scale and likely impact of the project being proposed. For this purpose, the AF1 form has been defined as fulfilling the requirements of the Preliminary Business Case for Non Major Schemes. At Scheme Design), a less intensive form of Business Case document is defined (Project Appraisal Report).
- 2.3 *PAG Unit 2.0: Project Management* sets out standard NRA management procedures, and project roles for the appraisal of road schemes. For NM schemes, the same processes apply, but the need for formal appraisal and review can be reduced because of the lower expenditure involved. Figure 14.1 illustrates this process.



<sup>1</sup> Describes road realignments, junction improvements, new carriageway, ITS installations

<sup>2</sup> Where a pavement rehabilitation project is enhanced by additional road improvements (as in <sup>1</sup>), the *additional* costs and benefits are subject to appraisal

<sup>3</sup> Comprises Project Brief, Traffic Modelling Report, CBA Report, Project Appraisal Balance Sheet and Business Case

Figure 14.1 – Interaction of Pavement Management System and this PAG Unit

### 3 Project Appraisal Documentation

#### AF1 Form

- 3.1 At Scheme Identification stage, form AF1 should be completed with any relevant attachments. This form serves as a Preliminary Business Case, at a level of detail appropriate to the scale of some Non Major schemes.
- 3.2 The initial Scheme Identification should focus on the likely cost of the proposed scheme, and the degree of improvement in road standard that would result. At that point, only preliminary design and cost information are likely to be available. A single route option is sufficient to demonstrate the value for money likely to be achieved. The AF1 form is sufficient for this purpose. If approved, the scheme should then proceed to detailed design, which should be carried out in accordance with Advice Note TA 85/11 Minor Improvements to Existing National Roads.

#### Project Appraisal Report (PAR)

- 3.3 At the design stage, a more detailed appraisal is required, documenting the likely costs and benefits of the scheme as designed.
- 3.4 In the interests of ensuring that the costs of appraisal are reflective of the costs of a scheme, a shortened form of a full Business Case has been defined. The Project Appraisal Report follows the basic structure and content of a Business Case, but shall contain all detailed information necessary to support the project within a single document, without the need to provide separate supporting documentation (e.g. traffic modelling report, project brief etc). The Project Appraisal Report (PAR) is therefore intended to serve as a Detailed Business Case for the proposed scheme. This report should be structured as outlined in Table 14.1 below.

Table 14.1: Structure of Project Appraisal Report

Section	Title	Content
1	Introduction	A simple introduction to the project, outlining the origins of the scheme, and previous relevant studies and their findings.
2	Project Context	A review of policy to outline the basis and need for the project. Based on this review, a set of project objectives should be defined. The project objectives should be clearly defined and independent of each other, and specifically relevant to the current project. They should be classed as follows: <ul style="list-style-type: none"> <li>• Economy</li> <li>• Environment</li> <li>• Accessibility and Social Inclusion</li> <li>• Integration</li> <li>• Safety</li> </ul>
3	The Preferred Option	A presentation of the scheme design and costing, along with a discussion of any alternatives considered in arriving at the final design.
4	Analysis Tools	A description of the analysis tools used in support of

		the preparation of the business case. Such tools may include traffic models and economic models. The development and validation of models should be described.
5	Scheme Appraisal	An overview of the detailed appraisal of the preferred scheme, including the following: <ul style="list-style-type: none"> <li>• Cost Benefit Analysis or Cost Effectiveness Analysis; and</li> <li>• Project Appraisal Balance Sheet</li> </ul>
6	Risk Assessment	Presentation of the key risks associated with the project that require consideration in any decision making, and in subsequent stages of the project. Risks should include cost risks, programme risks, funding risks, affordability risks and acceptability risks.
7	Conclusion	A concluding chapter summarising the Business Case for the scheme in terms of the anticipated monetised and non-monetised benefits likely to be achieved

### *Post Project Review*

- 3.5 After approval of the PAR, the scheme can proceed to tendering. It is necessary to notify the NRA of the cost and proposed timescale of the selected tender. If there are financial implications – either the tendered price is above the cost estimate at Contract Documents stage, or the timing of expenditure is significantly different, then the NRA will need to assess whether the scheme still offers value for money before giving approval to proceed to construction.
- 3.6 Following project completion, the outturn cost should be submitted to the NRA, in order to provide feedback on construction costs. The NRA Network Operations Unit will at this stage decide whether a post-project review should be carried out on the scheme; in accordance with the Common Appraisal Framework this exercise is carried out on a sample of completed schemes to identify any “lessons learnt” that would enhance future decision-making.

## 4 Consideration of Alternatives

### *Approaches to Project Appraisal*

4.1 The consideration of alternatives is a key part of the planning of any project. It describes that process by which alternative design solutions are identified, shortlisted and a preferred option chosen in order to meet the project objectives. In defining the preferred solution for a Non Major Scheme, two approaches are possible:

- **Cost Effectiveness Analysis (CEA).** An assessment of the costs of alternative options which all achieve the same objective. The costs need not be restricted to purely financial ones.
- **Cost Benefit Analysis (CBA).** An assessment of all the costs and benefits of alternative options.

4.2 Where there are alternative options to achieve a specific objective, but where the objective itself cannot be valued, cost-effectiveness analysis can be used to assess the least-cost way of achieving the objective. Cost Effectiveness Analysis (CEA) is therefore an assessment of the costs of alternative options which all achieve the same objective.

4.3 The use of CEA is particularly relevant to schemes where the outcomes have been appraised at programme level, or to schemes where quantification of benefits is challenging. Such might include the provision or closure of accesses to national roads, implementation of variable message signing or improved lighting at a specified location, or the provision of an emergency lay-by.

4.4 Cost Benefit Analysis is undertaken where scheme costs and benefits can be quantified, and where the quantum of benefit from the scheme is dependant on the scheme design. Cost benefit analysis is outlined in detail through PAG Unit 6.0: Cost Benefit Analysis

4.5 Reporting should include a reasoned case for selecting the proposed design over alternative options such as:

- Different carriageway widths;
- Different alignments (e.g. north or south of the existing carriageway); or
- Different curvature.

### *Opportunities for Enhancement of Pavement Maintenance Works*

4.6 There may be opportunities for Non Major Schemes to be undertaken as part of pavement management works. In such cases, local authorities will submit proposals for upgrades of sections where maintenance works are proposed – such upgrades would go beyond repair of the existing pavement, and may include minor widening of the carriageway, junction improvements, and/or improvements in horizontal and/or vertical alignment. In such cases, the additional expenditure should be appraised as a Non Major Scheme in line with the requirements of this PAG Unit.

## 5 Traffic Modelling

### *Scope of the Traffic Model*

- 5.1 An overview of types of transport model and principles of modelling in general is contained in *PAG Unit 5.0: Transport Modelling*. NM schemes are generally sufficiently small that the use of static models may be deemed appropriate. The traffic modelling work required is therefore substantially reduced:

### *Survey Data Requirements*

- 5.2 Where there is existing recent traffic count data (less than 3 years old) that adequately represents current traffic patterns in the location proposed for improvement, then no new surveys are required.
- 5.3 Where such data does not exist, Automatic Traffic Counter (ATC) data should be collected for a two-week period at a single site on the route section that is proposed for improvement. In order to observe representative traffic conditions, traffic surveys should be undertaken in school term during “neutral months”, avoiding periods of the year when flows are untypically high or low (e.g. avoiding December, January, Easter and Bank Holiday weekends). Flows should be recorded for light and heavy vehicles separately. Guidance on data collection and estimation of AADT is outlined in *PAG Unit 16.0: Data Analysis Techniques*.

### *Traffic Growth Forecasting*

- 5.4 An initial estimate of future year traffic levels should be derived in accordance with *PAG Unit 5.4: Zone-Based Traffic Growth Forecasting*, or *PAG Unit 5.5: Link-Based Traffic Growth Forecasting*.
- 5.5 It may be the case that flows on the section of route proposed for improvement are likely to be affected by the completion or non-completion of other proposed schemes on the national or regional route network. In this case then it will be important to ensure that the assumptions on the completion or non-completion of such schemes that are reasonable and plausible in the light of current NRA and local authority plans and priorities.
- 5.6 If major development is proposed in the vicinity of the scheme, then the use of national growth rates may not be appropriate. In such cases, a more detailed approach to traffic forecasting may be warranted which accounts for local growth in demand. Nevertheless, the modification of growth should be done in accordance with *PAG Unit 5.3: Zone-Based Traffic Forecasting*, which permits rebalancing of growth forecasts between nearby zones.
- 5.7 If major development is proposed in the vicinity of the scheme, then the traffic generated or attracted by this development needs to be estimated separately (for example using Central Statistics Office data, such as POWCAR, to inform first-principles estimation of trip rates). This generated traffic should be added to the initial estimate of future year traffic, and the revised figure used as a sensitivity test.



## 6 Economic Appraisal

6.1 At Scheme Identification stage, an approximate estimate of the costs of the scheme is presented using the AF1 form.

6.2 At Design stage, the simplest way to assess the economic benefits of a proposed NM scheme where there are significant improvements to the alignment, lane widths, edge treatment and the like is to undertake a cost benefit analysis (CBA). For other types of NM schemes the costs estimated through the AF1 form should be reviewed and updated if there are significant changes compared to the Scheme Identification stage.

### *Estimation of Scheme Benefits*

6.3 The impact of the scheme in enhancing the national route is represented within the CBA by recording the geometric characteristics of the Do-Something link as being of higher quality than the characteristics of the Do-Minimum link. Guidance on a sample input file is to be found in *PAG Unit 6.4: Default COBA Input File*.

6.4 In general, the improved link may be:

- Shorter in length (due to straightening out of bends);
- Wider (in terms of carriageway width, shoulder width and verge width); and
- Less bendy (fewer degrees turned through per km).

### *Estimation of Scheme Costs*

6.5 *PAG Unit 6.7: Preparation of Scheme Costs* should be used to prepare Do-Something costs of the scheme in the format required for the CBA.

6.6 Do-Minimum costs should be entered as the costs of the maintenance-only alternative scheme. The CBA should assume no net cost of maintenance between the Do-Minimum and Do-Something cases.

### *Residual Value*

6.7 The latest version of COBA includes residual value calculation and for most NM schemes the appropriate residual life period will be ten years (i.e. appraisal of an additional 10 years of costs and benefits beyond the standard appraisal period of 30 years). For further guidance on Residual Value, refer to *PAG Unit 6.1: Guidance on Conducting CBA*.

### *Checking Cost Benefit Analysis Outputs*

6.8 Refer to *PAG Unit 6.13: CBA Checklist* for guidance on checking outputs from COBA or TUBA.

## 7 Multi-Criteria Appraisal

7.1 The Project Appraisal Balance Sheet (PABS – refer to PAG *Unit 7.0: Project Appraisal Balance Sheet* for further background information) provides a one-page summary of the merits of the preferred scheme option, based on a multi-criteria analysis. This section presents a simplified approach to multi-criteria analysis and compilation of a PABS appropriate to the scale of most NM schemes. It aims to present the totality of the impact of the scheme, including:

- A short qualitative statement describing each impact;
- Monetary values for those elements which are monetisable and included in the CBA; and
- Quantitative indicators of impact, where possible.

7.2 Each impact is scored on a scale of 1 (severe negative impact) to 7 (strong positive impact), with a score of 4 representing a neutral or minimal impact. For those impacts capable of quantification, the score should be derived from an appropriate quantitative indicator, and presented to one decimal place. For those impacts not capable of quantification, an integer score should be assigned according to whether the impact is:

- 7 - Major or highly positive;
- 6 - Moderately positive;
- 5 - Minor or slightly positive;
- 4 - not significant or Neutral;
- 3 - Minor or slightly negative;
- 2 - Moderately negative; or
- 1 - Major or highly negative.

7.3 A sample PABS table at Contract Documents stage is shown in Table 14.1. The header identifies clearly the option that is being appraised, notes the budget cost of the scheme (in current prices), and summarises the problems that the proposal is intended to address. The five appraisal criteria are divided into 18 sub-criteria; the proposed scheme option is assessed against each one of these, with a combination of qualitative statements, quantitative indicators and monetised values. Note that all monetised benefits (positive and negative) are at 2009 prices. Any negative benefits should be clearly indicated with a minus sign and shown in a different colour, to avoid confusion. All monetised benefits are summed up in the Present Value of Benefits (PVB), and compared with the Present Value of Costs (PVC) to give a Benefit to Cost Ratio (BCR).

Table 14.1: Sample Project Appraisal Balance Sheet

Project Appraisal Balance Sheet - Summary Table							
Scheme Option:		Description:	Problems Identified:			Budget Cost (million)	
N99 upgrade Bothár na dTrá		1.2 km upgrade to Type 3 standard, removing sharp bend	Narrow road with sharp bend, inconsistent with standard of adjacent sections, with resulting high incidence of accidents			€4.99	
Objective	Sub-objective	Qualitative impacts	Quantitative assessment		Monetised (€ million over 30 yrs)		Score
Environment	Air Quality	Greenhouse gas impacts from construction; slight increase in emissions from increased speeds	8700	tonnes additional CO <sub>2</sub> over 30 years	value of change in carbon emissions	-€0.33	3.2
	Noise and vibration	Realignment moves traffic away from dwellings at Kilchurch Cross		Change in noise	€ 0.09	4.2	
	Landscape & visual quality	Minimal impact, adequately mitigated by proposed planting					4
	Biodiversity	3% of Bothár na dTrá SAC lost to road realignment					3
	Cultural Heritage	No impact					4
	Land Use	Minimal land acquisition, fully reflected in scheme cost					4
	Water resources	Localised impact of runoff on small streams					4
Safety	Accident reduction	-	12	accidents saved over 30 years	Value of change in accident cost	€ 0.41	4.8
	Security	No impact	-	-	-	-	4
Economy	Transport Efficiency and Effectiveness	-	20	vehicle-hours per day in travel time savings	Non-business	€ 3.12	5.1
		-	-	-	Business	€ 2.12	
		-	4500	current traffic levels AADT	Active travel	€ 0.00	

					Residual value	€ 1.12	
	<b>Wider economic impact</b>	Increased output in imperfectly-competitive markets				€ 0.51	7.0
	<b>Funding</b>	Not assessed	-		<b>PVC</b>	€ 4.55	4
<b>Accessibility and Social Inclusion</b>	<b>Vulnerable groups</b>	Minimal impact	-		-		7
	<b>Deprived geographic areas</b>	-	3	CLAR zones gain improved access to Hub/Gateway	-		4.2
	<b>Integration</b>	<b>Transport integration</b>	Route supports a Bus Eireann service				
	<b>Land-use integration</b>	Scheme features in the County Dev. Plan					4.3
	<b>Geographical integration</b>	Improves access to the international airport					5.1
	<b>Integration with other government policies</b>	Route of regional significance					4.0
					<b>PVB</b>	€7.04	
					<b>BCR</b>	1.55	

### *Environmental Criteria*

- 7.4 The NRA has produced a series of Environmental Planning Guidelines to promote best practice in the area of environmental impact assessment. These guidelines cover the general environmental assessment process and also specific environmental topics including air, noise, ecology, cultural heritage, and geology. These guidelines should be referenced at project inception phase for the recommended approach to environmental appraisals at route selection and preliminary design stages. These guidelines are all available to download from [www.nra.ie](http://www.nra.ie).
- 7.5 Project managers should carry out an initial assessment to determine the requirement for Environmental Impact Assessment (EIA), in line with the DECLG guidance on thresholds<sup>2</sup>.
- 7.6 Where an EIA is deemed necessary, the NRA Guidelines on Environmental Impact Assessment should be followed (with particular reference to Section 3.0 on scope and information to be contained in an EIS) together with the best-practice approaches provided in each of the topic-specific guidance notes on air quality, noise, ecology, cultural heritage, and geology.
- 7.7 Where a road scheme does not trigger the need for mandatory or discretionary EIA, an appropriate level of environmental appraisal should nonetheless be undertaken to identify localised impacts and to suggest appropriate mitigation measures to address these.
- 7.8 The Environmental section of the PABS sheet is a highly-condensed summary of the work that needs to be undertaken in order to meet statutory and good-practice requirements for appraisal of the likely environmental impacts of a project.

### *Air Quality Score*

- 7.9 Air quality impacts from road schemes can arise during both the construction stage and the operational stage. Construction stage impacts predominately relate to the emissions of greenhouse gases (principally Carbon Dioxide CO<sub>2</sub>) from both energy use and embodied carbon in construction materials. Greenhouse gases from construction stages of a road scheme through the site materials employed (asphalt, aggregates, etc.), vehicles delivering this material and personnel to the construction site, and from energy use on the site.
- 7.10 The difference between the extent of construction activity for the Do-Something NM scheme and the corresponding activity for the Do-Minimum maintenance of the existing carriageway should be estimated, as a proportion relative to 1 lane-km of completely new construction.

---

<sup>2</sup> Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development, DEHLG, 2003.

- 7.11 A simplified emission factor for this assessment has been set at 400 tonnes of CO<sub>2</sub> per lane-km by the UK Environment Agency. A monetisation factor of €39/tonne should be applied, based on the Department of Finance circular of June 2009<sup>3</sup>.
- 7.12 The resulting value of construction emissions should usually be entered in the PABS as a one-off cost, with an appraisal score of 4 (i.e. minimal impact).
- 7.13 Operational stage impacts can be considered as negligible for these schemes, as the impact of higher speeds is likely to be offset by a reduction in braking and acceleration of vehicles.
- 7.14 Table 14.2 should be completed for all route options considered, to calculate the approximate greenhouse gas emissions from each option. Calculation of construction emissions for a Do-Nothing option (baseline) should be set at €0, however, if the Do-Minimum option includes some alignment or surface works this may give rise to a non-zero figure, which should be estimated in proportion.

Table 14.2: Template for Calculating Monetised Impacts During Construction

Route Option	Length (km)	No. of lanes	Emission factor (tonnes CO <sub>2</sub> per km)	Total Emissions (tonnes CO <sub>2</sub> )	Monetisation Factor (€ per tonne) <sup>1</sup>	Monetary Impact (€)
	A	B	C	A x B x C		
Do-Minimum			400		€39	€
Scheme Option A			400		€39	€
Scheme Option B			400		€39	€
etc						

Noise and Vibration Score

- 7.15 Noise impacts from road schemes can arise during both the construction phase and the operational phase.
- 7.16** Construction stage impacts predominately relate to mobile and stationary equipment that is utilised in the construction of road schemes. Whilst it may be important to note this factor as part of the total environmental impact assessment of the scheme, it is not usually quantified, and is unlikely to be a significant factor in the choice of schemes to progress.
- 7.17 Noise impacts associated with the operational stage of a road scheme can be separated into two main components, noise from:

<sup>3</sup> Revised arrangements regarding Department of Finance’s *Guidelines for the Appraisal and Management of Capital Expenditure Proposals in the Public Sector* (2005) and *Proposed Working Rules for Cost Benefit Analysis* (1999)

- Vehicle engines and windrush, which is a function of type, number and speed of vehicles; and
- The interaction of vehicle tyres with the road surface, which depends on road structure – design, construction and materials.

7.18 The number of households affected by a change in noise impacts should be identified using Geodirectory data – this provides a complete database of address points in the Republic of Ireland.

7.19 An appropriate simple appraisal method for NM schemes is to record the number of occupied dwellings within 300m where the edge of the running lane moves closer to or further from the dwelling (positive or negative impact).

7.20 Given appropriate mitigation measures, the scale of impact from NM schemes would not be expected to fall outside the range [3.5 – 4.5].

#### Landscape and Visual Quality Score

7.21 Visual sensitivity is a combination of the sensitivity of the human receptor (i.e. resident; commuter; tourist; walker; recreationist; or worker) and the quality of view experienced by the viewer. In the case of NM schemes, the impact to visual receptors will be highly localised, and unless there are particular issues of significance the impact should be scored as 4 (neutral).

#### Biodiversity Score

7.22 Biodiversity is approached based on risk to designated sites. For NM schemes the impact should be scored as neutral, unless there is a designated site within a radius of 1km of the scheme in which case the procedure in PAG unit 12.0: National Secondary Roads Projects should be followed.

#### Cultural Heritage Score

7.23 The scoring system for cultural heritage follows the same principle as the one for biodiversity. Impact may be scored as neutral if:

- There is no designated monument or site within a 1km radius; or
- The view from the monument and level of traffic noise/vibration at the monument are unaffected or marginally improved by the proposed change in road alignment.

7.24 Otherwise, the procedures in PAG unit 12.0: National Secondary Roads Projects should be followed.

#### Land Use Score

7.25 In many cases the impact of land lost to the scheme (or released into productive use by the scheme) will be fully reflected in the element of scheme costs that refers to

costs of land acquisition. If this is the case then the land use impact should be scored as 4 (neutral) to avoid double-counting.

- 7.26 Where the impact is not fully reflected in the cost – e.g. where land of no commercial value has a significant recreational or environmental worth – then the score should reflect this.

#### Water Resource Score

- 7.27 The scoring system for water resources follows the same principles as the one for biodiversity.
- 7.28 If there are no significant changes to drainage or to structures over water bodies, then the impact can be scored as 4 (neutral). Otherwise, the procedures in *PAG Unit 12.0: National Secondary Roads Projects* should be followed.

#### *Safety Criteria*

#### Accident Reduction Score

- 7.29 Changes in accident numbers and severities are monetisable. The COBA software does this, taking into account not only the discount rate for monetisable benefits but also relevant trends in accident rates, accident severities, and the value that people place on avoiding casualties.
- 7.30 However, the accident rates in COBA are relatively high-level averages, which do not distinguish between different standards of improved or unimproved road.
- 7.31 One of the main benefits of NM schemes designed in accordance with TA 85/11 is the reduction in road collisions resulting from improved consistency of road standard along the route.

#### Security Score

- 7.32 This subcriterion is to do with the fear of mishap in using the transport system. This is difficult to quantify; the current recommended approach is to use the simplest form of assessment.
- 7.33 Most NM schemes will score 4 (neutral) unless the proposed scheme addresses the only section of a route which is perceived as dangerous to pedestrians, in which case there may be significant positive benefits.



*Economic Criteria**Transport Efficiency & Effectiveness (TEE) Score*

- 7.34 The COBA run as described in Section 4 above gives the Present Value of Cost (PVC) for the scheme, and a partial estimate of the Present Value of Benefits (PVB), split into:
- Benefits to business users; and
  - Benefits to non-business (consumer) users.
- 7.35 These items can be entered directly into the PABS table. No assessment is required of the user delays that would occur during construction and maintenance.
- 7.36 For most NM schemes any increases in walking and cycling resulting from the scheme will be negligible unless the scheme is specifically targeted at delivering facilities for these modes.
- 7.37 In order to derive a TEE score, the non-negligible elements of PVB – benefits to business traffic, to non-business traffic, and the benefit to government of the residual value of the scheme - are added together and compared with the PVC of the scheme. If this ratio exceeds 1.75 then the scheme achieves a maximum positive score of 7.0, otherwise a proportionally lower score is calculated:

$$\text{Score} = 4 + 3 \times ( \text{PVB}_{\text{TEE}} / \text{PVC} ) / 1.75$$

*Wider Economic Impacts Score*

- 7.38 Economic research suggests that there are a number of other economic impacts above and beyond journey time savings, principally relating to business responses to better accessibility. Of these, the most relevant for NM schemes is to do with an economic gain from increased output by firms under conditions of imperfectly competitive markets. A broad estimate of this impact can be obtained by uprating the business time savings by one tenth. The monetised benefit from wider economic impacts should therefore be taken to be 10% of the business benefit from the TEE subcriterion.
- 7.39 If the ratio of this benefit to the PVC exceeds 0.125 then the scheme achieves a maximum positive score of 7.0, otherwise a proportionally lower score is calculated:

$$\text{Score} = 4 + 3 \times ( \text{PVB}_{\text{wider\_econ\_impact}} / \text{PVC} ) / 0.125$$

*Funding Score*

- 7.40 Funding issues are specified as an appraisal sub-criterion within the Common Appraisal Framework, but are not likely to be a source of significant benefit or disbenefit for NM schemes. The heading should be included in the PABS table for completeness, but should be scored as 4 (neutral) in all cases.

- 7.41 On completion of the economic assessment, the overall PVB at the bottom of the table should be calculated as the sum of all the monetised (positive and negative) benefits. The BCR should be calculated as the ratio of PVB:PVC.

*Accessibility and Social Inclusion Criteria*

Vulnerable Groups Score

- 7.42 NM schemes will have minimal impact on vulnerable groups, and this subcriterion should be scored as 4 (neutral).

Deprived Areas Score

- 7.43 Time savings from road improvements have particular social inclusion benefits where access is improved between disadvantaged geographical areas and regional service centres.
- 7.44 The simplest method of taking account of this effect is with reference to existing work such as the National Secondary Roads Needs Study or previous appraisals of schemes in the same corridor, reducing the score in proportion to the smaller time savings offered by the proposed NM scheme.

*Integration Criteria*

- 7.45 Integration benefits may be an important part of the case for NM schemes, improving the national route in the context of the National Spatial Strategy for economic development.
- 7.46** However, NM schemes are likely to be too small to feature specifically in policy documents, particularly where value for money is being obtained by taking the opportunity to introduce small improvements on the back of planned maintenance work.
- 7.47 Most integration benefits apply equally to any improvement scheme within a specified national route corridor. Thus it is recommended that Integration scores be taken directly from existing work such as the National Secondary Roads Needs Study or previous appraisals of schemes in the same corridor.