



Department
for Transport

Value for Money Supplementary Guidance on Landscape

Moving Britain Ahead

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1. Introduction

Background

- 1.1 This document is intended as a supplement to the Value for Money Framework and provides guidance on undertaking an approach to indicatively monetising the landscape impacts of a transport proposal. It replaces existing guidance found within the September 2016 document, “Value for Money: Supplementary Guidance on Landscape” and should be read alongside the Value for Money Framework; TAG Unit [A3](#) on Environmental Impacts¹ and Her Majesty’s Treasury’s (HMT) [Guidance on Environmental Appraisal](#)² which supplements HMT’s [Green Book](#)³.

What is ‘landscape’?

- 1.2 Landscape means more than just ‘the view’. It is both the physical and cultural characteristics of the land itself (i.e. its use and management) and the way in which we perceive those characteristics. It is this mix of characteristics and perceptions that make up and contribute to landscape character and give a “sense of place”.
- 1.3 Landscape forms a key part of what is often referred to as our natural capital- the UK’s stock of natural assets (which also includes biodiversity, water, soil, for example).
- 1.4 The UK public derive a wide range of services from our natural capital. Our well-being, referred to in the Value for Money Framework as public value, is directly affected by these services, known as ‘eco-system services’.

How should landscape inform a value for money assessment?

- 1.5 Given the variety of landscapes, the range of services they can provide, and the difficulties in finding reliable estimates of just how much the public value them, deriving a methodology for including landscape impacts in a value for money assessment – especially in monetary terms – is challenging.
- 1.6 In a transport context, landscape is most often included in a value for money assessment as a non-monetised impact, alongside other environmental impacts. TAG Unit [A3](#), Section 6 provides guidance on how a non-monetised assessment of these impacts can be undertaken. This approach was developed by DfT together with Natural England (formerly the Countryside Agency and English Nature), English Heritage and the Environment Agency.
- 1.7 The TAG non-monetised assessment is wide-ranging and covers the impact of proposals on various aspects of landscape that affect the well-being of the public. This is combined with an understanding of the local and national importance of the landscape, and its relative rarity and substitutability.

¹ <https://www.gov.uk/government/publications/webtag-tag-unit-a3-environmental-impact-appraisal-december-2015>

² www.gov.uk/government/publications/green-book-supplementary-guidance-environment

³ <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

- 1.8 In all TAG-consistent appraisals, this non-monetised assessment should be undertaken and reported.
- 1.9 However, in some cases there is interest in finding a monetary valuation of the impact of landscape changes on public value. Chapter 2 of this document sets out a methodology applicable to any scheme (where appropriate), which can provide an indicative view of the scale of the monetary impact. This methodology is already widely used to assess landscape impacts for local authority transport proposals.
- 1.10 As a result of concerns over its robustness, this methodology is not contained within the Department's definitive analysis guidance, TAG. As a result, these values should not be included within the adjusted value for money metrics (BCR and NPPV).
- 1.11 Instead, the monetary value should be included in a value for money assessment as an 'indicative monetised impact', as set out within the Value for Money Framework and accompanying 'Supplementary Guidance on Categories'.
- 1.12 Since it is the ecosystem services provided by natural capital that affect public value, HMT and the Department for the Environment, Food and Rural Affairs (Defra) recommend the use of approaches based on an understanding of ecosystem services to measure impacts on natural capital in appraisal and value for money assessments.
- 1.13 The non-monetised approach set out in TAG Unit A3 does not explicitly assess impacts on ecosystem services, but it considers many of the same impacts. Section 5 of TAG Unit A3 discusses this in greater detail.⁴
- 1.14 The indicative monetised approach set out in this document partially assesses impacts on ecosystem services by allowing for the valuation of two specific landscape-related services – the value of carbon sequestration and storage from habitats lost or gained (global climate regulation) and the value of air pollutant removal by vegetation lost or gained (air pollutant removal) – using the Landscape Monetisation Workbook published alongside TAG.⁵

Reporting Landscape Assessments

- 1.15 The results of any landscape assessment – both monetised and non-monetised – should be appropriately reported in the Value for Money Statement, as set out in the Value for Money Framework.
- 1.16 The landscape assessment is subject to analytical assurance considerations, with the rest of the value for money assessment, and should be discussed in analytical assurance statements where relevant. The Department's Analytical Assurance Framework, [Strength in Numbers](#), contains guidance on this subject.

⁴ See in particular Box 1 on page 35:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/940947/tag-unit-a3-environmental-impact-appraisal.pdf.

⁵ <https://www.gov.uk/government/publications/tag-environmental-impacts-worksheets>.

2. An Approach to Indicatively Monetising Landscape Impacts

- 2.1 This chapter provides guidance on using an indicative approach to monetising the impact of an infrastructure scheme on landscape.
- 2.2 The values used in this approach help provide an indicative estimate of the monetary value of impacts, but they are not suitable for giving precise estimates. They should therefore not be included in the initial or adjusted value for money metrics.
- 2.3 The following approach should be used in conjunction with the assessment outlined in TAG Unit 3.3.7.
- 2.4 Box 2.1 below summarises the seven-step procedure to follow:

Box 2.1 Summary of Landscape Assessment Process

Step	Description
1. Identify landscape features	Utilises information from the landscape worksheet ⁶ and an environmental constraints map (identify moderate or large landscape impacts).
2. Segment the scheme	Segment the scheme where landscape impacts vary significantly.
3. Determine land type	From information or other sources (eg an environmental constraints map), determine the appropriate (mix of) land type.
4. Determine landscape 'footprint'	Determine the size of the area affected by the landscape changes.
5. Mitigation	Identify any current mitigation structures or measures proposed to reduce impacts on the landscape.
6. Landscape impact valuation – using landscape values	Use the landscape values recommended in this guidance and the Landscape Monetisation Workbook to assess the landscape impact in monetary terms.

⁶ <https://www.gov.uk/government/publications/tag-environmental-impacts-worksheets>

7. Additional landscape impact valuation – based on an ecosystem services approach	Assess additional landscape impacts arising from ecosystem services (air quality regulation by vegetation, carbon sequestration) using the information obtained from steps 1-5 and the Landscape Monetisation Workbook.
8. Sensitivity tests	Sensitivity analysis for the key assumptions used in the assessment. This could include use of upper and lower bound landscape values.

Step 1

- 2.5 First, conduct the TAG non-monetised landscape valuation.⁷
- 2.6 If the non-monetised landscape impact is assessed as neutral or slight, in most cases it is not proportionate to carry out further analysis.
- 2.7 If the non-monetised impact is assessed as large or moderate, it may be useful to undertake a monetised assessment to provide a further indication of the impact on public value resulting from the landscape changes of the scheme.

Steps 2 and 3

- 2.8 Segment components of the scheme into different land types, where the value of changes to the landscape differ.
- 2.9 Allocate each segment of the scheme to the correct 'land type' as set out in Box 2.2 below.
- 2.10 These steps require the practitioner to make a judgement and can be aided through a variety of sources such as environmental constraints maps, Ordnance Survey maps, environment statements, aerial photos, artists' impressions, digital images, site visits, and consultation/engagement with local communities.

Step 4

- 2.11 It is essential to identify the "footprint" of the scheme or the area judged to be most affected. This should be done by considering the type of infrastructure being introduced, the setting and topography of the impacted area, and who or what will be affected (the receptors).
- 2.12 However, a simplification may be to assume that the scheme will affect the landscape up to 500m either side of the scheme. A linearly declining impact is also assumed. These assumptions would lead to a footprint for each kilometre of the scheme of 50 hectares (25 hectares at either side of the scheme).

Step 5

- 2.13 The assessment should also consider mitigation measures as these may imply a lower footprint. Mitigation for landscape impacts can take various forms:
 - Existing structures: where existing structures are nearby, the footprint of the existing and proposed development may overlap. For example, a proposal to widen an existing road is likely to have a smaller impact than developments that

⁷ TAG Unit A3, Chapter 6.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/940947/tag-unit-a3-environmental-impact-appraisal.pdf

are offline. Similarly, the impact of existing housing or woodlands may act as a screen. The assessment should then only account for the marginal impact.

- Mitigation within the scheme design: the scheme may include mitigation directly, for example through use of tree planting or sympathetic materials.

2.14 If consideration of any mitigations is included in the assessment, what these are and how they have been incorporated should be reported in the Value for Money Statement and Economic Case.

Step 6

- 2.15 This step entails the indicative monetary valuation of the impact of the scheme on landscape.
- 2.16 Box 2.2 provides the basic calculation used to arrive at the indicative monetary valuation of the change in public value resulting from a proposal's landscape impact.

Box 2.2 Basic calculation to arrive at indicative value of landscape impact

$$V_{s,l} = Length \times Value_l \times A_s$$

So that V is the present value of the landscape impact associated with scheme s on land type l .

V is measured in £s, length in kilometres, value in £/ha and A is ha/km.

This shows that V is calculated by:

- multiplying the scheme length (for linear based schemes) by the appropriate landscape value for land type l (in present value terms); then
- multiplying this by a further factor A , which establishes the area of the land type which is impacted upon (i.e. the number of hectares per km of scheme). This factor is discussed in steps 2 and 3.
- For simplicity, the typical value of A is 50 ha/km (25 either side of the proposal).

- 2.17 In this methodology, the per hectare values used vary by 'land type'. These are given in Table 2.3.⁸
- 2.18 The landscape values in Table 2.3 were originally sourced from a study published in 2002 by the Department of Communities and Local Government. The figures were obtained from an extensive literature review that consolidated and considered evidence from 47 relevant studies, mainly from the UK but also from the United States, Europe and Australia, dating from 1984 to 2001.
- 2.19 In 2018, the Department commissioned an expert-led review of the original landscape values, the existing methodology behind landscape monetisation, and the scope for introducing approaches based on ecosystem services.⁹ The final published review recommended a number of revisions to the assumptions that underpin the original landscape values to ensure they are aligned with the latest evidence, up to date forecasts, as well as best practice in natural capital accounting as seen in the UK natural accounts published by the Office for National Statistics (ONS) and natural capital guidance published by the Department for Environment, Food & Rural Affairs

⁸ The landscape values are based on the original DCLG study values, the majority of which present willingness to pay estimates for the environmental benefits provided by different types of undeveloped land. These have been presented in 2010 prices using the GDP deflator and rounded to the nearest hundred (for the annual values) and thousand (for the infinite values).

⁹ Temple, eftec and TRL, "Valuation of Landscape Impacts of Transport Interventions & Mitigations Using an Ecosystem Services Approach", January 2019. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/942839/valuation_of_landscape_impacts_of_transport_interventions-document.pdf

(Defra).^{10,11} These recommendations were also endorsed by an independent peer review of the study.¹²

2.20 The underlying assumptions that have been updated relate to projected income growth, population growth, the assumed income elasticity of willingness-to-pay for landscape preservation, discounting assumptions over time, and the relevant appraisal period to assume for landscape impacts.

¹⁰ ONS, "UK natural capital accounts: 2020", November 2020.

<https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapitalaccounts/2020>

¹¹ Defra, "Enabling a Natural Capital Approach (ENCA)", January 2020. <https://www.gov.uk/guidance/enabling-a-natural-capital-approach-enca>

¹² Simetrica, "Technical Advice Note: Landscape monetisation", June 2019. URL:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/902167/technical-advice-note-landscape-monetisation.pdf

Table 2.3: Landscape values for different landscapes

Land type	Present Value per hectare (£) (2010 prices, for an appraisal start year of 2021 ^a)			Comments
	Central values <i>100-year appraisal period assumed</i>	Lower bound sensitivity values <i>60-year appraisal period assumed</i>	Upper bound sensitivity values <i>250-year appraisal period assumed</i>	
Urban core	4,378,481	3,068,371	8,544,302	Central urban area. Examples include public spaces and city parks.
Urban Fringe (greenbelt)	72,069	50,505	140,637	Areas of transition where urban areas meet countryside.
Urban Fringe (forested land)	218,944	153,433	427,255	Forested land on urban fringes, more valuable than typical urban fringe.
Rural forested land (amenity)	537,282	376,519	1,048,468	This value represents the range of forests in the UK, including both commercial and amenity forests.
Agricultural Land (extensive)	255,416	178,991	498,426	Areas of rough grassland where extensive agricultural practices such as sheep farming dominate. May include farm buildings forming part of the agricultural holdings.
Agricultural Land (intensive)	8,331	5,838	16,258	This type of land is usually in farmland under intensive agriculture (usually land under food production). May include farm buildings forming a part of the agricultural holdings.
Natural and semi-natural land	536,466	375,947	1,046,877	This includes uncultivated areas, wetlands, and areas with nature conservation designations.

^a Users who require values for alternative appraisal start years should refer to the Landscape Monetisation Workbook

2.21 In spite of the latest revisions, the derivation of the values in Table 2.3 is still subject to a number of known concerns, which emphasises the importance of understanding that this approach does not produce precise estimates, and should only be used to provide indicatively monetised valuations of landscape impacts:

- **Double-counting:**

- The reported landscape valuations do not just include landscape amenity benefits (where landscape character and quality combine to produce attractive views). They may also include the external benefits of recreation, biodiversity, cultural heritage, water environment and tranquillity. Some of these benefits may have been captured elsewhere in the appraisal, and so simply adding them to the appraisal may lead to an over statement of the impact.

- **Appraisal period:**

- In the previous edition of this guidance, landscape impacts were assumed to exist in perpetuity. That is, even if a road lasts in a useable state for 60 years, its impact on the landscape was assumed to continue, unless the costs of returning the landscape to its original form were included in an appraisal. While the central set of landscape values in this guidance reflects an appraisal period of 100 years – in line with the asset life of renewable ecosystem services in ONS/Defra natural capital accounting principles – the remaining uncertainty around the appropriate appraisal period for landscape impacts is reflected by the choice of alternative appraisal periods to support the upper and lower bound sensitivity values (250 and 60 years respectively).

- **Green Book compliance:**

- The original landscape values assumed a 3% rate of increase to annual per hectare values, composed of an income growth parameter of 2.5% per annum and an income elasticity of 1.2 – allowing for landscape values to increase faster than income. However, both parameter assumptions pre-dated and differed from default values in the HMT Green Book and have been revised accordingly.
- The original values also pre-dated Green Book discount rates, and so assumed a constant 3.5% discount rate over time rather than the declining discount rate schedule recommended by the Green Book. The values in this document have been revised to be consistent with the most recent edition of the Green Book.¹³

Step 7

2.22 This step comprises the assessment of additional ecosystem services associated with landscape that are not considered to be captured by the values in Table 2.3. The Landscape Monetisation Workbook allows for the assessment of two such services following their recommendation for inclusion in the recent review of guidance: **air quality regulation by vegetation** and **carbon sequestration**.

¹³ HM Treasury, "The Green Book: Central government guidance on appraisal and evaluation", 2020. URL: <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>. See Table 7 in Annex A6: Discounting (p123) for the standard discount rates and associated discount factors.

a) Air quality regulation by vegetation

- 2.23 This service relates to the removal of air pollutants by absorption into (or deposition onto) vegetation. The effectiveness of the service is determined by the type and the quantity of pollutants and the surface area of vegetation. The value of the benefits provided are also dependent on the dispersal of pollutants and the numbers of people that would have been exposed to them if not absorbed by vegetation. Recent modelling (Jones et al. 2017, 2019) suggests that the service has a significant value across the country.
- 2.24 The Landscape Monetisation Workbook permits indicative monetary estimates of impacts from this service to be derived using available estimates of hectares lost or gained as a result of a scheme, for both woodland and non-woodland habitats. Ideally, any estimates of woodland impacts should be disaggregated by local authority. These estimates may be obtained from a variety of sources, including GIS tools.¹⁴
- 2.25 When deriving estimates of hectares lost or gained, in most cases it would be proportionate to ignore temporary gains and losses and instead only consider permanent effects. However, in some cases, this may lead to an underestimation of the total effect – for example, if there are significant temporary land losses during construction.
- 2.26 Where a scheme is expected to lead to the removal of existing woodland and/or the planting of new trees, use of the online Pollution Removal by Vegetation tool is recommended: <https://shiny-apps.ceh.ac.uk/pollutionremoval/>. First released in 2019, this tool has been developed by the UK Centre for Ecology & Hydrology and Economics for the environment consultancy to allow users to explore the change in value resulting from the addition or removal of woodland and its ability to remove PM2.5 pollution.
- 2.27 This information can then be combined with indicative values of the present value of the service provided per hectare lost or gained – based on findings from Jones et al. 2017 and Jones et al. 2019 – to derive a final estimate.

b) Carbon sequestration

- 2.28 Vegetation can contribute to global climate regulation through the sequestration and storage of carbon. Woodlands tend to sequester carbon at the highest rate per hectare relative to other habitats. A 2015 study estimated that in 2012, UK woodlands held 213 MtCO_{2e} across 2.8m hectares of woodland, which gives an average stock of 77tC per hectare. When scheme construction results in a loss of woodland, the carbon stored in that woodland is assumed to be released to the atmosphere. Similarly, it is assumed that carbon stored in peat soils would be released due to construction because the soil would need to be drained. Furthermore, loss of habitats also results in the loss of their ability to sequester carbon in future.
- 2.29 While detailed estimates of carbon sequestration rates are subject to significant uncertainty, a simplifying assumption can be to derive an average carbon sequestration rate for adult trees, which in turn simplifies the method for valuing this

¹⁴ See 2.10.

service provided by woodland habitats. For example, the Woodland Carbon Code (Forestry Commission, 2018) assumes a commitment for long-term management of the land as woodland habitat, and then ascribes the average annual rate of carbon sequestration to each year of woodland management. The 2018 landscape monetisation review considered this approach suitable for the appraisal of transport schemes.

- 2.30 Consequently, estimating the value of this service using the Landscape Monetisation Workbook only requires estimates of total woodland area lost and gained as a result of a scheme, which are then combined with an estimated average annual rate of carbon sequestration (5tCO₂e/ha/yr) to derive a final monetary estimate.

Step 8

- 2.31 Informed judgement is required at many stages of this assessment process, and the quoted values are subject to known uncertainties. As a result, sensitivity analysis should be undertaken to test the assumptions used.
- 2.32 This could take the form of a "best case" scenario and a "worst case" scenario with varying assumptions for mitigation, landscape character and the design envelope of the scheme. To support such analysis, Table 2.3 provides two sensitivity sets of landscape values. In some cases, it may be proportionate to carry out more detailed analysis including consideration of the timing of the impacts. The impact of these can then be presented within the Value for Money conclusions.