BREEAM®

TECHNICAL MANUAL - SD6053

BREEAM Infrastructure: Projects

International | Version 6

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Cover image

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About this document

This document is the technical manual for BREEAM Infrastructure Projects. It describes a sustainability performance standard against which civil engineering, infrastructure, landscaping, and public realm projects outside the UK and Ireland can be assessed for a BREEAM Infrastructure rating.

This document is intended for use by trained and qualified BREEAM Infrastructure Assessors and Verifiers in accordance with the procedural and operational requirements of BREEAM Infrastructure.

This technical manual replaces CEEQUAL for Projects, Version 5.2 (issued on 23 December 2015).

Issues and revisions

This document is subject to revision and can be re-issued from time to time by BRE Global. A schedule of the publication date for each issue is provided below.

Document reference	Version / issue number	Issue date
SD6053	6.0.0 (Issue 0.0)	30/09/2019
	6.0.1 (Issue 0.1)	19/11/2020
	6.0.2	12/10/2022
	6.0.3	01/11/2022

Schedule of changes

6.0.3

Location	Description of change
Multiple	Fixed display of missing equations in guidance for 7.1, 7.4, 7.6, 7.7, 7.8, and 8.2. (PDF only)

6.0.2

Location	Description of change
All	New issue as BREEAM Infrastructure (formerly CEEQUAL).
	Updated online format.
	Updated PDF format.
	Fixed typographical errors.
3.2, Evidence	Fixed evidence guidance for 3.2.4.
4.1, Evidence	Fixed evidence guidance for 4.1.1.
4.4, Evidence	Fixed missing evidence guidance for 4.4.2.
7.3, Guidance	Fixed numbering of lists in guidance for 7.3.1.
7.4, Assessment criteria	Fixed criteria for 7.4.12 and 7.4.13. Removed incorrect reference to "off site".
7.5, Assessment criteria	Updated 7.5.6 to clarify that it refers to the use of "locally sourced and recycled material".
7.6, Guidance	Fixed guidance for 7.6.10. Removed repeated information.
7.6, Evidence	Fixed evidence guidance for 7.6.8.
7.7, Evidence	Fixed evidence guidance for 7.7.6. The correct guidance is now shown for 7.7.5 and 7.7.6.
8.2, Guidance	Fixed guidance for 8.2.9. The correct headings are now used for the guidance for 8.2.7, 8.2.8, 8.2.9, and 8.2.10.

6.0.1 (Issue 0.1)

Location	Description of change
All	New online format.
	Updated PDF format.
	Fixed typographical errors.
	Fixed or removed broken links.
About this document	Removed section: 'Status of CEEQUAL Version 6'.

Introduction

About BREEAM Infrastructure

BREEAM Infrastructure (formerly CEEQUAL) is the sustainability assessment and rating methodology initiated by the Institution of Civil Engineers (ICE) for the assessment of all types of civil engineering, infrastructure, landscaping, and public realm projects and contracts. CEEQUAL launched publicly in 2003 with Version 2 of the methodology and has been progressively updated and upgraded to broaden and deepen the assessments.

In November 2015, CEEQUAL Ltd was acquired by BRE Global and CEEQUAL became part of the BREEAM family of schemes. In October 2022, CEEQUAL was renamed to become BREEAM Infrastructure.

Objectives of BREEAM Infrastructure

The objectives of BREEAM Infrastructure are to:

- Create a climate of sustainability awareness - and of continuous improvement - in the profession and industry.
- Promote the importance of setting and delivering a sustainability-driven strategy for the project or contract being assessed.
- Promote improved sustainability performance in project or contract specification, design and construction.
- Recognise and promote the attainment of high economic, environmental and social performance in all forms of civil engineering - infrastructure, landscaping and the public realm works.

Other BREEAM Infrastructure schemes

BREEAM Infrastructure is available as two schemes:

- **BREEAM Infrastructure Projects** for civil engineering, infrastructure, landscaping and public realm works.
- **BREEAM Infrastructure Term Contracts** for maintenance of infrastructure networks and assets.

BREEAM Infrastructure Projects is divided into two editions:

- UK & Ireland
- International

Other BREEAM schemes

BRE Global is the scheme operator of BREEAM, HQM, and CEEQUAL in the UK. We develop and operate schemes designed to assess the sustainability performance of buildings or infrastructure assets at various stages in the life cycle. These include:

- **BREEAM Communities** for the master-planning of a larger community of buildings.
- **BREEAM New Construction** for new build non-domestic buildings.
- **BREEAM In-Use** for existing non-domestic buildings in-use.
- **BREEAM Refurbishment and Fit-out** for domestic and non-domestic building fit-outs and refurbishments.
- **HQM** for new build domestic buildings (in the UK only).

Using this document

This document is structured in three main parts:

- **Scope:** describes the types of infrastructure project that this version of the BREEAM Infrastructure scheme can be applied to. The scope section can be used by clients and Assessors to check whether this is the correct scheme to use for their project.
- **Scoring and rating:** describes how the BREEAM Infrastructure rating is calculated and includes information on the rating level benchmarks, minimum standards, and category weightings.
- **Categories and assessment issues:** presents the assessment issues in BREEAM Infrastructure organised by category. Each issue defines a level of performance (the assessment criteria) against which the assessed project demonstrates compliance (using appropriate project information, i.e. evidence) in order to achieve credits.

Each assessment issue contains:

- **Aim:** outlines the objective of the issue and the impact it measures or mitigates.
- **Assessment scope:** indicates how to apply the issue for different types of assessment and project-specific circumstances.
- **Credit summary:** indicates the number of credits available for each assessment criteria at each assessment stage (strategy, design, construction).
- **Assessment criteria:** the requirements of the issue and the means by which the issue aim is achieved. Where the project complies with all or some of the relevant criteria, as determined by the Assessor, the associated number of credits can be awarded.
- **Guidance:** provides supporting information on the interpretation and application of the assessment criteria. The guidance is informative only and the exact approach taken will depend on the nature, complexity and context of the project.
- **Evidence:** suggests types of information that could be provided to demonstrate performance against the assessment criteria and justify the credits awarded. This guidance is informative only, given the range of assets to which BREEAM Infrastructure can be applied, the exact evidence types could be different to those stated.

Where necessary, some assessment issues also include:

- **Definitions:** any specific definition of terms used in the assessment issue.
- **Additional information:** sources of additional information that may be of use in addressing the issue.

Categories and assessment issues in BREEAM Infrastructure

BREEAM Infrastructure Version 6 contains thirty assessment issues arranged in eight categories, as shown in Table 1.

Table 1 Categories and assessment issues in BREEAM Infrastructure Version 6

Category	Assessment issues
1 Management	1.1 Sustainability leadership
	1.2 Environmental management
	1.3 Responsible construction management
	1.4 Staff and supply chain social governance
	1.5 Whole life costing
2 Resilience	2.1 Risk assessment and mitigation
	2.2 Flooding and surface water run-off
	2.3 Future needs
3 Communities and stakeholders	3.1 Consultation and engagement
	3.2 Wider social benefits
	3.3 Wider economic benefits
4 Land use and ecology	4.1 Land use and value
	4.2 Land contamination and remediation
	4.3 Protection of biodiversity
	4.4 Change and enhancement of biodiversity
	4.5 Long-term management of biodiversity
5 Landscape and historic environment	5.1 Landscape and visual impact
	5.2 Heritage assets
6 Pollution	6.1 Water pollution
	6.2 Air, noise and light pollution
7 Resources	7.1 Strategy for resource efficiency
	7.2 Reducing whole life carbon emissions
	7.3 Environmental impact of construction products
	7.4 Circular use of construction products
	7.5 Responsible sourcing of construction products
	7.6 Construction waste management
	7.7 Energy use
	7.8 Water use
8 Transport	8.1 Transport networks
	8.2 Construction logistics

Scope

Project types

BREEAM Infrastructure Projects can be used on any infrastructure project that involves the construction of new assets or refurbishment of existing assets. It does not include assessment at the operation or maintenance stage. BREEAM Infrastructure Term Contracts should be used to assess the maintenance of assets or the construction of small repetitive works.

BREEAM Infrastructure Projects can be used on any type of civil engineering, infrastructure, landscaping or public realm project. This includes the construction or refurbishment of assets such as roads, railways, ports, wind farms, flood alleviation schemes, wastewater treatment works, and utilities, plus specialist projects such as demolition or remediation works.

Where an infrastructure project includes occupied buildings, these buildings should be assessed using an appropriate BREEAM scheme unless the building is deemed to be an ancillary part of an infrastructure project (e.g. a waiting room on a station platform). Structures that cover industrial or process plants are not deemed to be buildings. If in doubt, please contact the BREEAM Infrastructure team (BREEAMInfrastructure@bregroup.com).

This International edition is designed for use on projects anywhere outside the UK and Ireland.

Assessment stages

BREEAM Infrastructure Projects can be used to assess and rate the sustainability performance of infrastructure projects at the following stages:

- Strategy
- Design, or Interim Design
- Construction

The requirements that are assessed at each stage, and the credits available, are detailed in the 'Credit summary' tables at the beginning of each assessment issue. The requirements at each stage are broadly intended to align with the project stages shown in Figure 1 below.

The exact timing of the assessment, verification, and certification of each stage is not fixed and can be chosen based on the project's requirements and procurement route. Where there are actions given in the scheme that must be completed within a specific timeframe then these are stated as part of the assessment criteria.

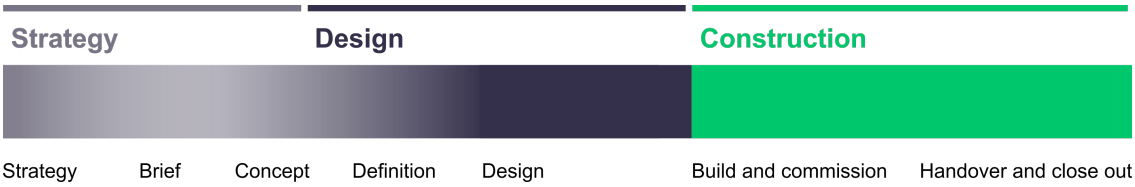

Figure 1 Assessment stages in BREEAM Infrastructure Version 6 against typical project stages (from the UK BIM Task Group Digital Plan of Work)

Assessment types

There are five different assessment types that can be conducted using BREEAM Infrastructure Projects. The assessment stages included within the scope of each of the five assessment types is shown in Table 2 below.

Table 2 Assessment types in BREEAM Infrastructure Projects

Assessment type	Assessment stages included in scope of assessment		
	Strategy	Design	Construction
Whole Project	✓	✓	✓
Strategy & Design	✓	✓	
Design only		✓	
Design & Construction		✓	✓
Construction only			✓

Whole Project

The **Whole Project** assessment is applied for jointly by of on behalf of the Client, Designer and Principal Contractor(s), with the final verification and certification completed a the end of construction. This assessment type should be used whenever a client specifies that a BREEAM Infrastructure assessment be undertaken so that their role in the project can be assessed alongside those of the Designer and Contractor. Whole Project assessments can also optionally include assessments of the strategy stage, design stage, or interim design stage.

Strategy & Design

The **Strategy & Design** assessment is for a joint application by the Client and Designer and is available before construction has started. This could be in a situation where approval for the construction stage has not yet been secured or where the contractor does not wish to participate in a Whole Project assessment.

Design only

The **Design only** assessment is intended for lead Designer(s) and enables the Designer to secure experience of BREEAM Infrastructure without the involvement of the other parties to the project or where the Designer wishes to gain recognition for their contribution to a project when the Client and Contractor do not wish to participate.

Design & Construction

The **Design & Construction** assessment is for a joint application by the lead Contractor(s) and the project Designer(s) and can be used where the Designer and Contractor wish to gain recognition for their contribution to a project when the Client does not wish to participate.

Construction only

The **Construction only** assessment is intended for lead Contractor(s) and enables a Contractor to secure experience of BREEAM Infrastructure without the involvement of the other parties to the contract or where the Contractor wishes to gain recognition for their contribution to a project when the Client and Designer do not wish to participate.

Verification and certification points

As a minimum, a project must be verified once at the end of its scope for an assessment to be certified. This mandatory verification will cover all assessment stages within the scope of the assessment. For example, a Design only assessment must be verified at end of design and a Whole Project assessment must be verified at the end of construction.

All the other verification points are optional. These optional verification points are designed to allow projects to measure performance over the course of the project or at key milestones, including planning, tendering, or the end of detailed design. For example, a Whole Project assessment can be optionally verified at the end of design, with both the strategy and design stages included in the verification, and then complete the mandatory verification at the end of construction (which would cover the construction stage only).

Table 3 below shows the different mandatory and optional verification points for each type of assessment in BREEAM Infrastructure Version 6.

Interim Design stage certification is only available as part of a Whole Project assessment. The Interim Design assessment is flexible and can be completed at any point during the design stage. It is intended to be undertaken at the point a client lets a tender for a design and construct contract. With the Interim Design certification, it is possible to defer design credits to the final design stage to cover design activities that will be part of the tendered contract.

Table 3 Verification points in BREEAM Infrastructure Version 6 (O - Optional, M - Mandatory)

Assessment type	Assessment stage			
	Strategy	Design		Construction
Whole Project	O	(interim) O	O	M
Strategy & Design	O		M	
Design only			M	
Design & Construction			O	M
Construction only				M

Subprojects

For many infrastructure projects the criteria in the scheme can be applied to a whole project to give a single overall score and rating. However, for other infrastructure projects, such as some nationally significant infrastructure projects, it may be more appropriate to split the project into a series of subprojects and assess these individually.

When a project uses the latter approach, the strategy criteria should still be assessed for the whole project. The score achieved at the strategy stage is transferred to each subproject and the design and construction criteria assessed at a subproject level. The strategy stage score for the whole project is then added to the scores at the design and construction stages for the subproject resulting in an overall score for the subproject assessment. Whole projects may be split where the sustainability outcomes for different subprojects may be different. For example, where:

1. Different project teams or contractors are developing sections of the project and therefore are approaching design or construction in a different way across the project.
2. The project is assessed across numerous sites (e.g. linear projects) where the impacts of the project will have varying impact on the sustainability issues covered within this scheme.

Where a client wishes to split their project for a reason not listed above (for example in the case of separately tendered enabling works), please contact BRE Global.

Once a project is completed all subproject scores are amalgamated based on contract values to give a rating for the overall project.

System boundaries

Infrastructure assets exist as part of a complex system-of-systems and this means that the boundary of a BREEAM Infrastructure assessment - what is included or excluded - is not always immediately obvious. It is necessary to establish this system boundary for BREEAM Infrastructure assessments to provide a fair, accurate, and comparable assessment of the design and construction of new infrastructure assets.

Due to the variety of activities and impacts that are addressed within the scheme, BREEAM Infrastructure does not define a single, overall boundary for a project (or subproject). Instead, the necessary boundaries vary by assessment issue. These are defined within the technical requirements of the scheme by one or more of the following:

- Explicit geographical, temporal, or functional limits
- National or international standards
- National industry or government best practice guidance
- Specific BREEAM Infrastructure methodologies
- Specific minimum requirements for content or activities
- Consultation with relevant stakeholders
- Deferral to the judgement of a suitably qualified professional
- The judgement of the BREEAM Infrastructure Assessor and project team with verification from the BREEAM Infrastructure Verifier.

The adopted boundaries are designed to support the individual issue aims and the overall aims and objectives of this scheme. In some cases, there is greater flexibility in the definitions so that assessments remain feasible or so that unforeseen scenarios are not inappropriately excluded.

Where judgement is required to establish a boundary, either from a BREEAM Infrastructure Assessor or a suitably qualified professional, then the following questions should be considered:

- Does including this within the assessment support the issue aim?
- Will including this provide a more accurate reflection of how the assessment demonstrates achievement of this issue?
- Is the inclusion of this feasible, justifiable, and proportional?

In some cases, it is appropriate to simplify boundaries to ensure that an assessment remains proportional to the scale of a project and its associated impacts. The boundaries as currently defined within BREEAM Infrastructure are often scalable in this way, including where the decision has been deferred to the judgement of a suitably qualified professional. In some instances, the method of establishing the boundary can be particularly complex or challenging (e.g. require specialist expertise) and alternative requirements are given for projects where this level of complexity is not appropriate.

Scoring and rating

Rating levels

The rating levels for projects assessed using BREEAM Infrastructure Version 6 are given in Table 4 below. Earlier versions of CEEQUAL did not include an Outstanding rating.

Table 4 Rating levels in BREEAM Infrastructure Version 6

BREEAM Infrastructure rating	Overall score, %
Outstanding	≥ 90
Excellent	≥ 75
Very Good	≥ 60
Good	≥ 45
Pass	≥ 30
Unclassified	< 30

Minimum standards

BREEAM Infrastructure Projects introduces minimum standards of performance to ensure fundamental issues are not overlooked in the achievement of specific ratings. Where applicable, minimum standards must be met for a given rating to be awarded. The minimum standards in BREEAM Infrastructure Projects are currently limited to the Outstanding rating only and are given in Table 5 below.

Table 5 Minimum standards in BREEAM Infrastructure Projects - International

Rating level	Assessment issue	Assessment criteria	Minimum standard
Outstanding	2.1 Risk assessment and mitigation	2.1.2 Identifying dependencies (fixed)	All credits for 2.1.2 and 2.1.3 achieved (84 credits)
		2.1.3 Communicating dependencies (fixed)	
	4.4 Change and enhancement of biodiversity	4.4.1 Change in ecological value	No net loss of ecological value (20 credits)
	7.2 Reducing whole life carbon emissions	7.2.2 Independent third-party certification of carbon management	Carbon management process independently third-party certified to PAS 2080 (9/18/27 credits)
	7.4 Circular use of construction products	7.4.2 Business models for a circular economy – implemented	At least one business model has been implemented (2 credits)

Category weightings

Weightings are a fundamental part of any sustainability assessment method. They provide a means of defining and ranking the relative impact of different sustainability categories by taking account of the scale of impact and influence that works under assessment typically have on various sustainability issues. BREEAM Infrastructure uses an explicit weighting system to determine the overall BREEAM score. The credits given in each of the assessment issues within this document include the weightings shown in Table 6 below.

The weightings have been derived from an assessment of both CEEQUAL Version 5 and BREEAM Infrastructure Pilot weightings with adjustments based on how the scope of each section has changed in BREEAM Infrastructure Version 6.

Where necessary, these weightings may be adjusted to suit specific national or regional contexts through completion of a formal weightings exercise. For more details please contact BRE Global.

Table 6 Category weightings in BREEAM Infrastructure Version 6

Category	Category weighting, %
Management	11
Resilience	12
Communities and stakeholders	11
Land use and ecology	12
Landscape and historic environment	9
Pollution	8
Resources	
Materials, including waste	16
Energy and carbon (operational)	4
Energy and carbon (construction)	5
Water use	4
Transport	8

Assessment issues and credits

BREEAM Infrastructure Projects consists of thirty assessment issues arranged in eight categories. Each assessment issue addresses a specific sustainability issue.

There are 5000 credits in total within the scheme. The number of credits available in each assessment issue varies and this generally reflects the importance of mitigating the impact of the assessment issue relative to the other issues in the category. For some criteria, the number of credits available is based on a sliding scale (or benchmark) with progressively higher standards of performance rewarded with a higher number of credits.

In addition to category scores, the overall score, and the final BREEAM rating, verified against individual assessment issues also provides users with a credible set of key performance indicators for a range of impacts across the project life cycle.

Prerequisites

Prerequisites are included at the start of some BREEAM Infrastructure assessment issues and must be achieved in order to award any credits within that assessment issue.

Prerequisites differ from minimum standards in that they do not directly influence the overall BREEAM rating, but they do influence the achievement of credits within an assessment issue.

Table 7 Prerequisites in BREEAM Infrastructure Projects - International

Category	Assessment issue	Prerequisite
4 Land use and ecology	4.3 Protection of biodiversity	4.3.1 Prerequisite: Surveys for protected species
		4.3.2 Prerequisite: Injurious or invasive species
7 Resources	7.5 Responsible sourcing of construction products	7.5.1 Prerequisite: Legal and sustainable timber
	7.6 Construction waste management	7.6.1 Prerequisite: Duty of care (fixed)
		7.6.2 Prerequisite: Permitting for waste treated or used on site
		7.6.3 Prerequisite: Hazardous waste

Innovation credits

BREEAM Infrastructure seeks to support innovation within the construction industry and its supply chain. One way it does this is through the availability of additional credits to recognise sustainability related benefits or performance levels not currently recognised by standard BREEAM Infrastructure assessment issues and criteria. This rewards developments that go beyond best practice in a particular aspect of sustainability.

Awarding credits for innovation enables clients and project teams to add to their overall BREEAM score and helps to support the market for new innovative technologies, design, or construction practices.

Innovation credits can be achieved by the BREEAM Infrastructure Assessor applying to BRE Global to have a technology, feature, design, product, construction method, or process recognised as 'innovative'. If the application is successful, and compliance is subsequently demonstrated, then an innovation credit may be awarded.

Each innovation credit achieved adds 1% to an asset's overall score. The maximum number of innovation credits that can be awarded for any one asset is 10. Therefore, the maximum additional score available from innovation credits is 10%.

Innovation credits can be awarded regardless of the final BREEAM rating (i.e. they can be awarded at any BREEAM rating level) however the overall rating will be capped at 100%.

Evidence requirements

For credits to be awarded in BREEAM Infrastructure, evidence must be provided to demonstrate that all relevant criteria in the scheme have been met. Example evidence sources are listed in each assessment issue for guidance. Appropriate evidence for a project may be agreed between the Assessor and Verifier.

Calculating a BREEAM Infrastructure rating

BREEAM Infrastructure ratings must be determined by BREEAM Infrastructure Assessors using the appropriate assessment tool. Only certified assessments can claim a BREEAM rating.

An example BREEAM Infrastructure score and rating calculation is given in Table 8 below.

Table 8 Example score and rating calculation for BREEAM Infrastructure Projects Version 6

Category	Category weighting, %	Credits available (max.)	Credits available (after scoping)	Credits achieved	Credits achieved, %
Management	11%	550	492	411	83.5%
Resilience	12%	600	526	453	86.1%
Communities and stakeholders	11%	550	480	445	92.7%
Land use and ecology	12%	600	550	502	91.3%
Landscape and historic environment	9%	450	212	212	100%
Pollution	8%	400	369	340	92.1%
Resources					
Materials, including waste	16%	800	725	703	97.0%
Energy and carbon (operational)	4%	200	101	92	91.1%
Energy and carbon (construction)	5%	250	188	173	92.0%
Water use	4%	200	138	122	88.4%
Transport	8%	400	341	267	78.3%
TOTAL	100%	5000	4122	3720	90.2%
Innovation		500	-	-	2.00%
BREEAM score					**92.2%**
Minimum standards achieved					Yes
BREEAM rating					**Outstanding**

1 Management

Summary

The Management category considers how sustainability issues are incorporated into the overall management of the project. It covers the principles of sustainable development and the management of environmental and social performance throughout the planning, design and construction of a project.

Category summary table

Assessment issues	Credits available
1.1 Sustainability leadership	173
1.2 Environmental management	254
1.3 Responsible construction management	36
1.4 Staff and supply chain social governance	60
1.5 Whole life costing	27
	550

1.1 Sustainability leadership

Aim

To ensure the adoption of sustainable development principles and the consideration of environmental and social issues throughout the planning, design and construction of the project.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
1.1.3 Selection process for designers and contractors	Scope out for Design Only Assessments where the Designer has no input to the Contractor selection process.
1.1.6 Environmental targets for key sub-contractors	There may be circumstances where it is appropriate to scope out this criteria, for example if there are no sub-contractors involved.
1.1.7 Sustainability targets for operation	Scope out if the scheme concerned is intrinsically not 'operable', such as flood defence banks.
1.1.8 Workforce consultation on sustainability performance	The decision to scope out will depend on the nature, scale, location and context of the project, and on the interests and responsibilities of the parties to the project.
1.1.9 Communicating best practice	The decision to scope out will depend on the nature, scale, location and context of the project, and on the interests and responsibilities of the parties to the project.

Credit summary

Assessment criteria	Strategy	Design	Construction
1.1.1 Principles of sustainable development (fixed)	19	12	4
1.1.2 Construction management strategy (fixed)		5	6
1.1.3 Selection process for designers and contractors	24 (up to)		12
1.1.4 Environmental and social performance in contracts (fixed)	20		
1.1.5 Sustainability targets for construction (fixed)		12 (up to)	
1.1.6 Environmental targets for key sub-contractors			12 (up to)
1.1.7 Sustainability targets for operation	16		
1.1.8 Workforce consultation on sustainability performance			16
1.1.9 Communicating best practice	5	5	5

Assessment criteria

1.1.1 Principles of sustainable development (fixed)

Str	Des	Con
19	12	4

1.1.1.1 The project team has actively considered the principles of sustainable development in the planning, design and construction of the project.

1.1.2 Construction management strategy (fixed)

Str	Des	Con
	5	6

1.1.2.1 The project team has actively adopted a sustainability-driven approach to the development of the construction management plan for the project.

1.1.3 Selection process for designers and contractors

Str	Des	Con
24 (up to)		12

1.1.3.1 The selection process for (i) the principal Designer, (ii) the principal Contractor, and (iii) the key sub-contractor(s) included past environmental and social performance as one of the evaluation criteria.

	Role appointed by selection process	Credits (each)	Assessment stage
(i)	Principal Designer	12	Strategy or Design
(ii)	Principal Contractor	12	
(iii)	Key sub-contractor(s)	12	Construction

1.1.4 Environmental and social performance in contracts (fixed)

Str	Des	Con
20		

1.1.4.1 The contract requirements for the Designers and Contractors expressly included:

a. achievement of specified environmental and social performance; and
b. a requirement to monitor and report on environmental and social performance during the contract.

1.1.5 Sustainability targets for construction (fixed)

Str	Des	Con
	12 (up to)	

1.1.5.1 During the concept and design process, specific targets have been set for the environmental and social performance of the project during construction.

1.1.5.2 During the construction stage, progress towards the targets has been monitored, reported, and shared with the staff and workforce.

	Sustainability targets for construction	Credits
(a)	Targets set, but no formal monitoring in place.	6
(b)	Targets set and progress monitored, reported, and shared at the construction stage.	12

1.1.6 Environmental targets for key sub-contractors

Str	Des	Con
		12 (up to)

1.1.6.1 Relevant key environmental objectives and performance targets have been set for key sub-contractors and they have been monitored against performance.

	Environmental targets for key sub-contractors	Credits
(a)	Targets set, but no formal monitoring in place.	6
(b)	Targets set and progress monitored, reported, and shared with the staff.	12

1.1.7 Sustainability targets for operation

Str	Des	Con
16		

1.1.7.1 During the design process, specific targets have been set for the environmental and social performance of the project during operation and there is a monitoring programme in place for the operational phase.

1.1.8 Workforce consultation on sustainability performance

Str	Des	Con
		16

1.1.8.1 Ongoing engagement or two-way dialogue between project staff and the construction workforce has been undertaken with regards to management of environmental and social issues and the suggestions from these discussions have been considered in the construction stage.

1.1.9 Communicating best practice

Str	Des	Con
5	5	5

1.1.9.1 At each project stage, the project team has shared any innovation or best practice in sustainability-driven management and practice with other parts of the civil engineering sector or other relevant sectors.

Guidance

Principles of sustainable development (1.1.1)

The incorporation of sustainable development principles within a project requires the consideration of a number of different issues. These can include effects of the works on the local environment, impacts on society and the economic impacts of the works on the local community, both during the construction of the project and the subsequent operation and eventual decommissioning. A number of these issues are covered in more detail by other requirements within BREEAM Infrastructure, so what this criterion is looking for is whether there is an overarching objective within the project team to consider the broader concepts of sustainable development within the project decision-making.

Further guidance on the principles of sustainable development can be found in the Royal Academy of Engineering's guide *Engineering for Sustainable Development: Guiding principles* (2005), which is available online at www.raeng.org.uk/publications/reports/engineering-for-sustainable-development.

Construction management strategy (1.1.2)

The incorporation of sustainability-driven principles for a construction management strategy requires the consideration of a number of different but inter-related issues. These can include but are not limited to:

- effects of the construction processes on the environment and neighbours;
- materials selection and sourcing;
- transport of people and physical resources;
- wider impacts on the community locally or regionally, depending on the project's geographic scale and timescale; and
- the economic impacts of a project on the local or regional community.

Development of the strategy should start during the development of the project and be incorporated into the outline Construction Sustainability (or Environmental) Management Plan that should be handed over by the Client and Designer to the chosen Contractor for further development.

A number of these issues are covered in more detail by other criteria in other sections within BREEAM Infrastructure. This criterion requires an overarching approach within the project team to consider and adopt appropriately the broader concepts of sustainability and sustainable development in planning the execution of the construction stage.

Further guidance on the principles of sustainable development can be found in the Royal Academy of Engineering's guide *Engineering for Sustainable Development: Guiding principles* (2005), which is available online at www.raeng.org.uk/publications/reports/engineering-for-sustainable-development.

Environmental and social performance in contracts (1.1.4)

It is well known that different forms of contract can significantly influence the behaviour of the contracting parties, especially to those issues that are *implied* as being necessary rather than expressly stated. What is being sought here is that environmental and social performance requirements are expressly stated so that there is no doubt as to those requirements and the Designers and Contractors are properly resourced to deliver them.

Social performance could relate to a wide variety of issues, but some generic examples could include:

- levels of engagement with the local community on consultation issues;
- engagement with local schools to raise awareness of civil engineering;
- contribution to the local economy, for instance through use of local labour on the project;
- enhancement to community facilities as part of the contract;
- requiring express commitments to minimising nuisance to neighbours within the constraints of the necessary construction processes.

Note that this question only requires evidence that the Client is specifying environmental and social performance issues in contract requirements. Opportunities for the Designer and Contractor to score for their own setting of targets is covered in 1.1.5 and 1.1.6. Actual monitoring and reporting mechanisms are also covered in 1.1.5 and 1.1.6. Achievement is covered in other sections of this manual.

Sustainability targets for construction (1.1.5)

Targets should be quantifiable and where possible refer to timescales (i.e. SMART targets: Specific, Measurable, Achievable, Realistic, Timely).

Best practice suggests that environmental and social performance is highest if the Client is involved in setting the requirements for the contract. However, if the Client does not specify this then there are still opportunities for the Designer to influence what happens during the construction stage.

It should be noted that the Client requirement is covered in 1.1.4. If this has been scored, then this requirement is about evidencing that the contract requirements have been translated into practice on the project and communicated. If 1.1.4 has *not* been scored, then evidence for this requirement also needs to demonstrate that appropriate targets are being set in relation to the significant aspects identified in 1.1.4.

Sustainability targets for operation (1.1.7)

Targets have to be set for operating the completed works and a monitoring programme, to be undertaken once construction is complete, must be in place in order to score. Target setting without monitoring progress is considered to be of little or no use.

Operational targets are likely to relate to quantifiable measures, such as waste production, energy consumption, carbon dioxide production, natural resource consumption or pollution prevention. For example, an operational target might state that 50% of waste produced in tonnes during the first year of operation is to be recovered through either re-use, recycling or composting. Targets may also cover maintenance issues such as paints to be used or how to deal with waste arising from maintenance. Note that compliance with legislation cannot be regarded as an appropriate operational target.

Common minimal levels include targets for waste management and energy/CO_2 reduction in design or in use. Targets need to be 'measurable' so that they can be monitored and measured against. Evidence needs to demonstrate that these have been 'signed up to' by those responsible for the project during operation. This could be completed during a formal meeting or similar, which could be evidenced by meeting minutes.

Workforce consultation on sustainability performance (1.1.8)

Experience so far on BREEAM Infrastructure-assessed projects indicates that the BREEAM Infrastructure process often triggers improvements to practice during both design and construction. This criterion focuses on steps at the construction stage within the project team for dialogue between project staff and the construction workforce that is aimed at identifying and communicating the lessons learnt and at seeking out further improvements that can be made.

Communicating best practice (1.1.9)

This is not aimed at trying to persuade project team members to disclose commercially competitive information freely. Rather, it is aimed at rewarding project team members who prepare papers in professional journals or report innovation in case studies prepared for BREEAM Infrastructure or other websites that promote innovation in construction, so that at least the principles of the best practice or innovation are made more widely known and therefore potentially exploitable by other teams.

The aim is to encourage and reward BREEAM Infrastructure users that:

- report and demonstrate a practice that has gone beyond current engineering practice; and
- is widely distributed and can be picked up by other parties and applied.

For innovation, the project team needs to demonstrate that a practice is being done for the first time rather than 'best practice' that is a further application of actions that have been carried out once.

For the credits to be scored, it is not necessary to demonstrate that the method reported is being used by other parties, but that effective dissemination has been achieved.

Evidence

Assessment criteria	Evidence guidance
1.1.1 Principles of sustainable development (fixed)	Evidence could be a sustainable development policy that cascades into a sustainability framework for the project. Further evidence that this has received active consideration could include design team meeting records, or a sustainability assessment or appraisal report.
1.1.2 Construction management strategy (fixed)	Evidence is likely to be the whole construction plan or specific parts of it, in meeting records, or a sustainability assessment or appraisal report on the construction stage.
1.1.3 Selection process for designers and contractors	Evidence could include supplier appraisals, quality submissions, and information on environmental and social issues during tender stage.

Assessment criteria	Evidence guidance
1.1.4 Environmental and social performance in contracts (fixed)	Evidence could include output from any contract strategy meetings or reports that show consideration of environmental and social issues as a factor in the choice of procurement method. Evidence could also include key environmental and social performance targets within contract and monitoring/reporting requirements. Simply specifying that a project has applied for a BREEAM Infrastructure assessment, or that a specific rating is achieved, is not considered appropriate evidence.
1.1.5 Sustainability targets for construction (fixed)	Evidence could include the setting of targets for achieving or exceeding target levels (such as water quality targets) or specifying targets for completion of work elements to avoid 'closed' seasons (such as nesting birds). Evidence must also be provided to demonstrate that the targets were regularly monitored for the credits to be awarded.
1.1.6 Environmental targets for key sub-contractors	Evidence for monitoring of targets could include inspection of sub-contractors and continued good performance, toolbox talks, or actual measures such as waste produced or number of environmental incidents.
1.1.7 Sustainability targets for operation	Evidence needs to demonstrate that such targets have been positively adopted by the design team, for example through project team meeting minutes or equivalent. Although an Environmental Statement (ES) may include targets or equivalent statements on a wide range of issues such as operational noise or air pollution control, the presence of the ES is not considered sufficient evidence here. Evidence could include targets that set numerical figures to manage and reduce carbon and energy emissions during the lifetime of the project, commit to an effective lifecycle waste management, and manage and reduce water use. Other targets could be set for increasing biodiversity or commitments to improve social transport links.
1.1.8 Workforce consultation on sustainability performance	Evidence could include records of meetings, forums, or toolbox talks, plus site posters, environmental close calls, good practice reporting, or case studies.
1.1.9 Communicating best practice	Evidence could include briefing sheet(s) published either internally or in industry publications, or presentations to other companies or professional bodies, or involvement with universities and students in related disciplines. All parties can get full credits if the project team has created a single joint case study that meets the criteria.

1.2 Environmental management

Aim

To ensure social and environmental risks or opportunities are identified and appropriately managed throughout the planning, design and construction of the project.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
1.2.2 Implementing environmental enhancements	It is unlikely that 1.2.2 and 1.2.3 will ever be scoped out but it is possible that and Environmental Statement may not contain any promises of enhancements and produce no matters that need including in contract documentation.
1.2.3 Supporting environmental benefits in contracts	

Credit summary

Assessment criteria	Strategy	Design	Construction
1.2.1 Environmental impacts and benefits assessment (fixed)	8		
1.2.2 Implementing environmental enhancements	24 (up to)		
1.2.3 Supporting environmental benefits in contracts	8		
1.2.4 Environmental impacts during construction (fixed)			25 (up to)
1.2.5 Environmental and social aspects assessment (fixed)	8	4	4
1.2.6 Co-ordination of environment and social aspects (fixed)	8	8	8
1.2.7 Identification and prioritisation of impacts (fixed)	13 (up to)	13 (up to)	13 (up to)
1.2.8 Sustainability management mechanisms (fixed)	4	8	8
1.2.9 Implementation of mechanisms (fixed)	4	8	8
1.2.10 Success of the mechanisms (fixed)	4	8	8
1.2.11 Sustainability training (fixed)	10	10	10
1.2.12 Project team communications (fixed)	4	8	8

Assessment criteria

1.2.1 Environmental impacts and benefits assessment (fixed)

Str	Des	Con
8		

1.2.1.1 The Client or the Designers have undertaken an environmental impacts and benefits assessment of the project on a wider scope than just the project owners' interests and appropriate to the nature, scale, design life and location of the project, including assessments of possible enhancements to the local environment.

1.2.2 Implementing environmental enhancements

Str	Des	Con
24 (up to)		

1.2.2.1 The enhancements identified in the environmental impacts and benefits assessment have been delivered in the design alongside those for environmental mitigation and compensation.

	Percentage of identified enhancements delivered	Credits
(a)	25% or more	6
(b)	50% or more	12
(c)	75% or more	18
(d)	90% or more	24

1.2.3 Supporting environmental benefits in contracts

Str	Des	Con
8		

1.2.3.1 Where appropriate, actions to support the results of the environmental impacts and benefits assessments have been included within relevant contract documentation.

1.2.4 Environmental impacts during construction (fixed)

Str	Des	Con
		25 (up to)

1.2.4.1 The Construction Team have undertaken an environmental impacts and benefits assessment of the construction stage of the project and used the results in the development and implementation of the construction management plan (CMP).

	Environmental impacts during construction	Credits
(a)	Results from an environmental impacts and benefits assessment have been used in the development of the construction management plan.	9
(b)	Environmental aspects of the developed construction management plan have been implemented.	25

1.2.5 Environmental and social aspects assessment (fixed)

Str	Des	Con
8	4	4

1.2.5.1 There was a documented commitment to consider and assess the environmental and social aspects of the project.

1.2.6 Co-ordination of environment and social aspects (fixed)

Str	Des	Con
8	8	8

1.2.6.1 A member of the project team was appointed as responsible for co-ordinating the management of the environmental and social aspects of the project and was aware of the duties and responsibilities involved.

1.2.7 Identification and prioritisation of impacts (fixed)

Str	Des	Con
13 (up to)	13 (up to)	13 (up to)

1.2.7.1 The environmental risks, impacts, and opportunities for environmental enhancements, and the associated social issues, have been (a) identified and clearly recorded for each stage and (b) prioritised according to significance.

	Identification and prioritisation of impacts	Credits
(a)	Identified and clearly recorded for each stage	8
(b)	Prioritised according to significance	13

1.2.8 Sustainability management mechanisms (fixed)

Str	Des	Con
4	8	8

1.2.8.1 Appropriate mechanisms have been put in place to manage the project's environmental and social risks, impacts and opportunities.

1.2.9 Implementation of mechanisms (fixed)

Str	Des	Con
4	8	8

1.2.9.1 Regular checks have been made to ensure that the sustainability management mechanisms have been implemented.

1.2.10 Success of the mechanisms (fixed)

Str	Des	Con
4	8	8

1.2.10.1 The results (success or otherwise) of the implementation of the sustainability management mechanisms have been assessed.

1.2.11 Sustainability training (fixed)

Str	Des	Con
10	10	10

1.2.11.1 At each project stage, there has been a programme of training on environmental and social issues relevant to the project delivered at an appropriate level for those engaged in the project.

1.2.12 Project team communications (fixed)

Str	Des	Con
4	8	8

1.2.12.1 At each project stage, all those directly engaged in the project have been informed of the significant environmental impacts and opportunities, and associated social issues, of their part or stage of the project.

Guidance

Environmental impacts and benefits assessment (1.2.1)

In many areas of the world, project teams are required by regulations to undertake formal Environmental Impact Assessments (EIAs) as part of the consents process. However, this is not always a statutory requirement and the distances beyond the boundaries of the project site within which impacts are assessed can vary widely from one EIA to another.

It is vital to securing the best sustainability-driven project decisions that EIAs, whether statutorily required or not, are undertaken within the most appropriate time and geographical boundaries. This is to minimise the chances of significant adverse impacts that occur remotely from the project being ignored, and to maximise the chances of environmental enhancements associated with the project being realisable.

Environmental impacts during construction (1.2.4)

This criterion is seeking for the Contractor to have actively assessed in advance the environmental aspects and impacts of the works, including those generated by their supply chain, and planned the works accordingly. Issues that need to be addressed in such an assessment include but are not necessarily limited to:

- impacts of the production of materials used in the works;
- minimising the use of any hazardous materials to be used in the construction stage;
- minimising water use during construction (consistent with other requirements such as dust control);
- energy consumption and carbon emissions during the construction stage;
- pollution prevention, especially of any water bodies near or under the site;
- impacts on flora and fauna;
- dealing with any contaminated soils or other materials and components on the site;
- dealing with excavation arisings and wastes from the works.

Guidance on these issues is available in the appropriate sections of this manual.

Environmental and social aspects assessment (1.2.5)

It is considered vital for the successful management of the environmental and social aspects of a project for the commitment to their consideration, assessment and delivery to not only be made by the senior management of each major party to the project but also written down so that it can be readily communicated to project team members and stakeholders.

Co-ordination of environment and social aspects (1.2.6)

Every project, irrespective of size, should have someone designated as being responsible for its environmental and social aspects. On smaller projects, a member of the project team may be responsible for this along with their other duties. On larger-scale projects, it is likely to be a dedicated Sustainability or Environmental Manager or Coordinator. On partnership projects, it may be the same person at each stage.

For the score to be awarded detailed duties and responsibilities in relation to the project must have been set out on appointment.

Identification and prioritisation of impacts (1.2.7)

All adverse environmental risks and impacts of the project– and the associated social issues – should be identified, as well as positive impacts and opportunities for environmental and social improvements resulting from the project.

The significance of adverse impacts is usually assessed by a combination of the potential severity and the likelihood of the impact occurring if no action is taken to avoid it. The result of this assessment then enables prioritisation of risks and impacts according to significance, which assists in setting the priorities for mitigation measures.

The significance of positive impacts and opportunities is similarly assessed according to the expected environmental benefit and the likelihood of their occurring or being able to be carried out as part of the project. This will then guide decisions on which of the opportunities the project team should concentrate.

Sustainability management mechanisms (1.2.8)

At design stage, 'appropriate mechanisms' could be in the form of a Project Environmental Management Plan (PEMP) or Action Plan with active monitoring of progress against the plan. However, the fact that an environmental impact assessment has been undertaken for the project is not regarded as evidence that mechanisms for the management of issues identified in such a study are being operated effectively and appropriately.

At construction stage, 'appropriate mechanisms' could be in the form of a Site Environmental Management Plan (SEMP) or an Integrated Site Management Plan that includes coverage and management of environmental and social issues again with active monitoring of progress against the plan. Such a plan would cover the management of all significant environmental and social aspects of the construction process and would be drawn up specifically for the relevant site and project. It should address issues such as minimising nuisance to neighbours, the management of sub-contractors' and suppliers' environmental performance, and training requirements. It should also include procedures for monitoring its implementation, emergency response plans, and operational control procedures (for example, for waste disposal and spill prevention).

It is very important that Designers positively seek information on, and get copies of, agreements, commitments and undertakings made during the consents process and integrate their contents into the design process. Equally, Contractors need to secure and act on similar information from the consents and design processes that relate to the construction stage to ensure that commitments made earlier in the project are adhered to and that inappropriate actions are avoided.

Implementation of mechanisms (1.2.9)

Interpretation of 'regular' depends on the size of the project and, in particular, the length of time the works are predicted to take. On the majority of projects, a review on a three-monthly basis would be acceptable, but this should be more frequent on projects or project phases of 6 months or less. If the review period is longer, and this is still considered acceptable, then it should be justified. In any case, it is essential that the extent of the reviews should be appropriate to the environmental risks and scale of the project.

On longer-duration or larger projects these checks are likely to include formal internal environmental audits. However, these may not be appropriate on smaller or shorter duration projects.

The important thing to demonstrate for this criterion is that some form of checking has taken place to ensure the mechanisms referred to in 1.2.8 have been implemented and are effective. On smaller projects, this could, for instance, simply be records of reviews in weekly meeting minutes.

Success of the mechanisms (1.2.10)

As opposed to the regular checks of implementation referred to in 1.2.9, this criterion asks about the review of the results of implementation, which implies a further step and a more proactive review, looking at the outcome of the implemented mechanisms, not just whether they have been undertaken.

Sustainability training (1.2.11)

Project-specific environmental training should at a minimum cover the significant environmental impacts and opportunities identified (see 1.2.7), as well as instructions on how to deal with them. It can also include the issues of Site Waste Management Plans (SWMP), waste reduction, material resource efficiency, energy performance over the whole life of the completed works, and water consumption minimisation. These issues can be dealt with in a wide range of training sessions, including formal courses for project team members, sessions within project team meetings, or via site inductions and toolbox talks. Resources such as the CIRIA's Environmental good practice on site guide (C741, 2015) and its associated pocket book (C762, 2016) provide useful information to support site environmental management. Records of the should be available.

Project team communications (1.2.12)

Assessment of impacts and opportunities (see 1.2.7) must have been carried out to be able to score here.

This would cover the outcome of any environmental or social impact assessment undertaken and can be relayed via contract documents and invitations to bid, project environmental management plans, method statements, start-up and progress meetings, or work instructions.

'All those directly engaged in the project' includes project management, designers, contractors and sub-contractors, and anyone else actively engaged in the work, but not people from extractive industries or the factories or offices of suppliers of materials or services.

Evidence

Assessment criteria	Evidence guidance
1.2.1 Environmental impacts and benefits assessment (fixed)	Evidence of the analysis could be in the form of an Environmental Statement (ES), environmental assessment report, or environmental commentary prepared during development of the project and submitted for the planning and consents processes. It will be necessary to demonstrate that the scoping and boundary setting for the assessments were carefully set to maximise the chances of significant adverse impacts that occur remotely from the project being included.
1.2.2 Implementing environmental enhancements	Evidence is likely to be in the form of design drawings and design details but will also need to be linked to the environmental impacts and benefits assessment and demonstrate that the design incorporates the enhancements identified.
1.2.3 Supporting environmental benefits in contracts	Evidence will be relevant contract clauses.
1.2.4 Environmental impacts during construction (fixed)	Evidence will be in the reports of the assessments and in the CMP or equivalent.
1.2.5 Environmental and social aspects assessment (fixed)	Evidence could include a written commitment from the Project's Directors, a Project Environmental Policy Statement, a Project Sustainability Statement, or objectives and targets. However, a general Company Environmental Policy Statement is not sufficient, unless it includes a specific commitment to consider and assess environmental and social aspects for every project. Additionally, specifying that a project has applied for a BREEAM Infrastructure assessment is not considered appropriate evidence.
1.2.6 Co-ordination of environment and social aspects (fixed)	Evidence could be a formal note of the appointment; records of meetings where the role is clearly set out; reports from the identified person to the project team; or an organogram or similar identifying roles and responsibilities within the project team or project management structure.
1.2.7 Identification and prioritisation of impacts (fixed)	Evidence could be a report on the impact and opportunity assessments, minutes of team meetings at which the process was undertaken, or the charts prepared after such discussions. Evidence for the score in the Strategy and Design columns in a Whole Project Assessment or Strategy & Design Assessment must demonstrate that this work has been undertaken or specified by the Client and the outcomes accepted by them.
1.2.8 Sustainability management mechanisms (fixed)	Evidence could be procedures, flowcharts, checklists or documented control measures, and would form part of an Environmental Management System (EMS) if there were one in place. However, an EMS is not a prerequisite and, in smaller companies or projects, evidence could be minutes of meetings at which these issues, and the mechanisms to be used, are discussed and agreed. Appropriate mechanisms could have been put in place without the existence of a full EMS. However, they do need to be documented in some form and should clearly state the steps to be taken and any roles and responsibilities to be assumed. They also need to match the level of complexity of environmental issues relevant to the project. The output from an environmental impact assessment (EIA) that included discussion of how the project's environmental issues, impacts and opportunities are to be managed would not be sufficient evidence to gain the credits for this requirement. Evidence is required that such EIA outputs have been translated into action.

Assessment criteria	Evidence guidance
1.2.9 Implementation of mechanisms (fixed)	Evidence could be site review meeting minutes, site inspections, checklists, or audit reports.
1.2.10 Success of the mechanisms (fixed)	Evidence could include actions shown as closed off in minutes, close-out of audit non-conformance reports, or other evidence demonstrating completion of actions arising from site inspections as well as evidence that a review that took place routinely as opposed to being only as a result of a check that has taken place in 1.2.9. For instance, a standing item in project progress meetings or reports, which routinely review environmental and social performance and the success of control mechanisms established, would be acceptable. Evidence could also include the achievement of appropriate targets set for environmental and social performance.
1.2.11 Sustainability training (fixed)	Evidence could include records of site inductions or toolbox talks, more- formal training workshops for the project, briefings or other training on specific issues for the project (such as on otter holt construction or use of new equipment), plus workshops with the Client, Designer and project team members to review and establish environmental risk.
1.2.12 Project team communications (fixed)	Evidence for the Client could include communication of environmental and social impacts and opportunities within tender documents or specifications. For the Designer, this could include how they have briefed their team on the environmental and social issues that require consideration or provision of information in the design drawings or risk register. For the Contractor, it could include the incorporation of environmental mitigation actions in method statements, toolbox talks or other site briefings or inductions communicating the requirements of the SEMP, information posted via site information boards or similar. For any stage, it could also include more project workshops, such as on value management and value engineering, that includes consideration of the environmental and social impacts and opportunities on the project.

1.3 Responsible construction management

Aim

To avoid adverse effects on neighbours and local communities during construction.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
1.3.2 Independent assessment of considerate behaviour	It may be appropriate in limited circumstances to scope out 1.3.2, for example on very short duration projects.

Credit summary

Assessment criteria	Strategy	Design	Construction
1.3.1 Considerate behaviour (fixed)	16		
1.3.2 Independent assessment of considerate behaviour			5
1.3.3 Visual impact during construction (fixed)			15

Assessment criteria

1.3.1 Considerate behaviour (fixed)

Str	Des	Con
16		

1.3.1.1 The project has a policy or code of practice regarding considerate behaviour by construction companies and the policy has been:

a. Communicated to all appropriate people working on the project.
b. Embedded in the project's management system.

1.3.2 Independent assessment of considerate behaviour

Str	Des	Con
		5

1.3.2.1 The implementation of the project's policy or code of practice regarding considerate behaviour has been independently assessed and judged to be at least satisfactory.

1.3.3 Visual impact during construction (fixed)

Str	Des	Con
		15

1.3.3.1 Measures have been taken to minimise the adverse visual impact of the site during the construction stage.

Guidance

Considerate behaviour (1.3.1, 1.3.2)

If the Contractor has their own policy or Code of Practice, then it needs to cover, at a minimum:

- relations with neighbours;
- communications to neighbours;
- good housekeeping;
- presentation of the site;
- relations with other stakeholders;

- complaints procedures;
- auditing process; and
- commitment to thorough and systematic implementation of the policy.

There is little value in having a policy if it is not then communicated, implemented and monitored. Communication should be both within the project team and externally to interested stakeholders.

Visual impact during construction (1.3.3)

A common complaint about construction sites is that they look a mess. Materials are too often scattered all over the place along with various items of litter. Proper storage of materials can result not only in a tidier site that is visually less unpleasant but also in a safer site and can also significantly reduce wastage. Regular clearance of litter makes the site look tidier and enhances a culture of environmental care amongst staff.

Example measures include appropriate site screening, allocation of stacking areas, tidy storage of materials, a regular site inspection, litter-pick and site tidy-up, and inspection and cleaning of site hoardings.

Evidence

Assessment criteria	Evidence guidance
1.3.1 Considerate behaviour (fixed)	Evidence could be a Code of Practice or Policy statement, registration with an appropriate third-party scheme, plus assessment results.
1.3.2 Independent assessment of considerate behaviour	
1.3.3 Visual impact during construction (fixed)	These measures could be laid out as part of a SEMP or equivalent. Other evidence is required to identify the measures taken and verify their implementation, for example, site records, photographic evidence, or audit reports commenting on the site's appearance.

1.4 Staff and supply chain social governance

Aim

To promote ethical employment procedures and processes within organisations across the supply chain.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
-	-

Credit summary

Assessment criteria	Strategy	Design	Construction
1.4.1 Organisational plans and policies for ethical labour practices (fixed)	4	4	4
1.4.2 Application of ethical labour plans and policies to the project (fixed)	8 (up to)		10
1.4.3 Monitoring ethical labour practices during construction (fixed)			18
1.4.4 Independent verification or certification of ethical labour plans and policies (fixed)	4	4	4

Assessment criteria

1.4.1 Organisational plans and policies for ethical labour practices (fixed)

Str	Des	Con
4	4	4

1.4.1.1 The project team organisations (client, design team, principal contractor) each have corporate plans and policies regarding ethical labour practices.

1.4.1.2 The plans and policies:

a. Are publicly available.
b. Have been signed-off by the company directors (or equivalent).
c. Cover all individuals working permanently or temporarily for the organisation and, in the case of the client and principal contractor, all workers on the project construction site(s).
d. Include a named individual with specific responsibilities regarding ethical labour practices.
e. Include specific commitments to improve ethical labour practices year on year.

1.4.1.3 Progress against commitments to improve ethical labour practices is regularly reported and made publicly available.

1.4.2 Application of ethical labour plans and policies to the project (fixed)

Str	Des	Con
8 (up to)		10

1.4.2.1 The selection process for (i) the design team, (ii) the principal contractor, and (iii) sub-contractor(s) included performance against their ethical labour plans and policies as one of the evaluation criteria.

1.4.2.2 The contract requirements for (i) the lead designer(s), (ii) the principal contractor, and (iii) sub-contractor(s) expressly include achievement of their ethical labour plans and policies on the project.

	Application of ethical labour plans and policies	Credits	Assessment stage
(i)	The client's procurement of design team organisations	2	Strategy or Design
(ii)	The client's procurement of the principal contractor	6	
(iii)	The principal contractor's procurement of sub-contractors	10	Construction

1.4.3 Monitoring ethical labour practices during construction (fixed)

Str	Des	Con
		18

1.4.3.1 The principal contractor's plans and policies regarding ethical labour practices have been implemented and performance against them has been regularly monitored throughout the construction stage.

1.4.4 Independent verification or certification of ethical labour plans and policies (fixed)

Str	Des	Con
4	4	4

1.4.4.1 The project team organisations (client, design team, principal contractor) have each been verified or certified by an independent third party to a recognised ethical labour scheme.

1.4.4.2 A summary of the verification or certification report by the independent third party is publicly available.

Guidance

Organisational plans and policies for ethical labour practices (1.4.1)

As a minimum, the following items - taken from the Ethical Trading Initiative (ETI) Base Code should be reflected in the organisation's plans, policies, or procedures regarding labour practices:

1. Employment is freely chosen
2. Freedom of association and the right to collective bargaining are respected
3. Working conditions are safe and hygienic
4. Child labour shall not be used
5. Living wages are paid
6. Working hours are not excessive
7. No discrimination is practiced
8. Regular employment is provided
9. No harsh or inhumane treatment is allowed

And the following additional items, not included in the ETI Base Code, should also be included as a minimum:

a. Avoidance of bribery and corruption
b. Promotion and support for learning and development
c. Flexible working practices to encourage and allow a healthy and practical life balance

The ETI Base Code is founded on the conventions of the International Labour Organisation (ILO) and is an internationally recognised code of good labour practice. For more information about the ETI Base Code visit www.ethicaltrade.org/eti-base-code.

The organisation's plans and policies must define how the organisation has interpreted each of the above items and how they will be monitored and enforced for each country/region it operates in.

The named individual will be someone senior enough within the organisation to be able to act to monitor and rectify non-compliance. They must be named, and their specific responsibilities defined in the plans and policies.

Application of ethical labour plans and policies to the project (1.4.2)

During the selection process for the design team and principal contractor, the client should require potential project team organisations to provide an implementation plan showing how their relevant plans and policies (see 1.4.1) will be specifically met on the project. The organisation's implementation plans should then be included in their appointment contract.

At the construction stage, the principal contractor should require potential sub-contractor organisations to provide an implementation plan showing how the principal contractor's relevant plans and policies (see 1.4.1) will be specifically met on the project. The sub-contractor's implementation plans should then be included in their appointment contract.

Monitoring ethical labour practices during construction (1.4.3)

As a minimum, the principal contractor must monitor performance against their plans and policies for ethical labour practices for all workers on site during construction.

These credits can only be awarded if the construction stage credits in 1.4.1 have been awarded.

Independent verification or certification of ethical labour plans and policies (1.4.4)

Third party verification or certification at an organisational level is considered best practice and provides assurance that policies are likely to be applied at a project level.

BREEAM Infrastructure currently recognises the ethical labour schemes listed in the table below. If an organisation is verified or certified to an ethical labour scheme not listed below, please contact BRE Global as soon as possible to apply for recognition.

Location	Scheme name	Minimum level
UK	BES 6002 Ethical Labour Sourcing Standard	Baseline Maturity in all 12 issue areas

Evidence

Assessment criteria	Evidence guidance
1.4.1 Organisational plans and policies for ethical labour practices (fixed)	Evidence is likely to be found in company policies, reports, and action plans. Evidence could also be an ETI principles of implementation report or a self-assessment using the Ethical Labour Sourcing Standard (ELS). Evidence must demonstrate that the organisation's plans and policies cover all the items listed in the guidance (as a minimum).
1.4.2 Application of ethical labour plans and policies to the project (fixed)	Evidence will be in the form of tender specification documents outlining the requirements tenderers should demonstrate, evaluation documents that show how consideration has been given to ethical labour issues, and contractual requirements for appointed organisations.
1.4.3 Monitoring ethical labour practices during construction (fixed)	Evidence is likely to be in the form of routine data gathering and reporting.
1.4.4 Independent verification or certification of ethical labour plans and policies (fixed)	Evidence could include an organisation's statement of verification against the Ethical Labour Sourcing Standard (ELS) or an issued certificate.

Additional information

BES 6002 Ethical Labour Sourcing Standard

The Ethical Labour Sourcing Standard, BES 6002, is a mechanism for demonstrating, via an independent third party, the maturity of an organisation's ethical labour practices and the organisation's commitment to continuous improvement. For more information about the ELS visit www.bregroup.com/services/standards/ethical-labour-sourcing-standard.

1.5 Whole life costing

Aim

To deliver whole life value by ensuring consideration of whole life costing principles throughout the planning, design and construction of the project.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
-	-

Credit summary

Assessment criteria	Strategy	Design	Construction
1.5.1 Whole life costing (fixed)	8	19	

Assessment criteria

1.5.1 Whole life costing (fixed)

Str	Des	Con
8	19	

1.5.1.1 The Client and the design team have completed a whole life cost assessment for the project in line with ISO 15686-5:2017 (or country specific equivalents).

1.5.1.2 The whole life cost assessment has influenced the design of the project.

Guidance

Whole life costing (1.5.1)

The principles of life-cycle costing for construction are set out in the International Standard ISO 15686-5 *Buildings and constructed assets. Service life planning. Life-cycle costing*. Where available, projects may use national implementations of ISO 15686-5.

Having carried out a study, additional credits may follow from appropriate design or specification to allow for efficient or reduced levels of maintenance, and for ease of deconstruction and recycling at the end of life. These aspects are assessed in Resources.

Evidence

Assessment criteria	Evidence guidance
1.5.1 Whole life costing (fixed)	Evidence will need to be in the form of a report from the process, plus evidence of how this has influenced the design of the project.

2 Resilience

Summary

The Resilience category encourages proactive hazard identification, risk evaluation and risk management for assets and the infrastructure systems within which they sit. Issues include assessing and mitigating risks from natural hazards, intentional threats, and climate change plus designing for future needs. The section considers the risks to the asset and its dependencies and consequently the required asset resilience. Specific environmental risks resulting from the asset's construction and operation are covered separately in Pollution.

Category summary table

Assessment issues	Credits available
2.1 Risk assessment and mitigation	269
2.2 Flooding and surface water run-off	229
2.3 Future needs	102
	600

2.1 Risk assessment and mitigation

Aim

To assess and mitigate the risks and negative impacts associated with natural hazards, intentional threats and climate change over the design life of the asset.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
-	-

Credit summary

Assessment criteria	Strategy	Design	Construction
2.1.1 Identifying resilience requirements (fixed)	17		
2.1.2 Identifying dependencies (fixed)	21	21	
2.1.3 Communicating dependencies (fixed)	21	21	
2.1.4 Identifying and assessing risks (fixed)	42 (up to)	21 (up to)	14 (up to)
2.1.5 Communicating risks (fixed)	9	9	9
2.1.6 Resilience plan (fixed)		32	32

Assessment criteria

2.1.1 Identifying resilience requirements (fixed)

Str	Des	Con
17		

2.1.1.1 Before the end of the strategy stage, the relevant resilience requirements for the project have been identified based on a current risk assessment for the project (see 2.1.4) and consultation with relevant experts.

2.1.2 Identifying dependencies (fixed)

Str	Des	Con
21	21	

2.1.2.1 At strategy and design stages, relevant stakeholders have identified (or reviewed):

a. Dependencies associated with the asset and its function(s)
b. The criticality of the asset and its components

2.1.3 Communicating dependencies (fixed)

Str	Des	Con
21	21	

2.1.3.1 At each applicable project stage, the identified dependencies and criticality of the asset have been appropriately communicated to relevant project team members.

2.1.4 Identifying and assessing risks (fixed)

Str	Des	Con
42 (up to)	21 (up to)	14 (up to)

2.1.4.1 At each project stage, using current project information, risks and impacts have been identified and assessed (or reviewed and updated) for one or more resilience topics in accordance with the guidance.

	Resilience topic	Credits available at each assessment stage		
		Strategy	Design	Construction
(i)	Natural hazards	14	7	7
(ii)	Climate change	14	7	-
(iii)	Security	14	7	7

2.1.5 Communicating risks (fixed)

Str	Des	Con
9	9	9

2.1.5.1 At each project stage, the risks and impacts identified in the current risk assessment have been appropriately communicated to relevant project team members.

2.1.6 Resilience plan (fixed)

Str	Des	Con
	32	32

2.1.6.1 During design and construction, using current project information, a resilience plan has been developed (or updated) based on a current risk assessment(s) and an appraisal of potential solutions to enhance resilience and meet the resilience requirements for the project.

2.1.6.2 The resilience plan has been:

a. Distributed to all relevant stakeholders
b. Updated, if needed (for example due to changes in the design or construction process)
c. Implemented during design and construction

2.1.6.3 Any deviation from the risk assessment or resilience plan has been supported by written justification.

2.1.6.4 Where necessary, any realised risk event has been reported with appropriate and proportional weight or focus to relevant national, local, or project specific authorities.

Guidance

Identifying resilience requirements (2.1.1)

Resilience requirements for the project could include:

- Minimum regulatory requirements relating to resilience
- Corporate requirements relating to resilience
- Business dependencies that influence the project development process
- Recommendations made by relevant experts

This cannot be scored if no score has been achieved at the strategy stage for 2.1.4.

Identifying dependencies (2.1.2)

Dependencies must be identified using an industry recognised approach (methodology, tool, or model), where available and suitable. Methodologies must involve relevant stakeholders (for example, through structured workshops); tools and models must be independent or peer reviewed. If no suitable approach exists then a bespoke methodology, tool, or model for the project must be devised and justified by relevant stakeholders. As a minimum, the approach must:

- Consider direct 'one tier up or down' dependencies (i.e. parts of the system that, if impacted, would have a direct effect on the asset such as the energy supply or communication system).
- Be current and up-to-date.

The criticality of the asset and its components (for example, national, regional, or local) should be identified by the project team, including the owner or operator. The criticality of assets will vary by national infrastructure sector and not every asset within a given sector will be judged to be 'critical'. Critical National Infrastructure is defined in the Definitions section.

Communicating dependencies (2.1.3)

As a minimum, relevant information regarding the identified dependencies and criticality of the asset must be communicated to:

- design team during concept design
- construction team before the start of construction.

Identifying and assessing risks (2.1.4)

The risk assessment process should:

1. Formulate a series of disruptive events to determine risks associated with the asset during its whole life (i.e. construction, operation, and end of life).
2. Assess and grade the likelihood and severity of risks.
3. Establish the maximum tolerable levels of risk for the project.
4. Identify how risks can be reduced through planning, design, construction, and operation to an agreed tolerable level or as low as reasonably practicable (ALARP).
5. Identify how any residual risks can be managed.

Further guidance for managing risk is available in ISO 31000:2018 *Risk management – Guidelines*.

Scope (of risk assessments)

Risk assessments must include the scale and duration of the risk associated with:

- Health and safety of operators, users, or others.
- Commercial or economic losses (for example, failure to meet contractual obligations, physical damage, destruction).
- Reputational damage (for example, negative media coverage, loss of trust).
- Business disruption (for example, loss of essential services).
- Regulatory action (for example, from loss of life, serious injury, or environmental damage).
- The environment (for example, damage to the natural environment).

Disruptive events (for risk assessments)

All disruptive events (see Definitions) must:

- Be informed by consultation and advice from:
    a. Relevant experts (see Definitions)
    b. Relevant stakeholders (see Definitions)
- Address high probability low impact events and low probability high impact events
- Consider events over the whole life of the asset.

Data sources (for risk assessments)

As a minimum, the data sources used must:

- Be independent and have been subject to peer review
- Include the national risk register, if available
- Include sector specific resilience plans

Additional guidance on data sources for specific risk assessments is provided in the table below.

Topic	Guidance on data sources for specific risk assessments
Natural hazards	Data sources for natural hazards could include strategic level risk assessments.
Climate change	Data sources for climate change could include national or international projections for climate change. Where major investment in long term infrastructure is being considered, results from international climate modelling centres should be referred to. Results from the Intergovernmental Panel on Climate Change models can be viewed using the IPCC Data Distribution Centre visualisation tools (apps.ipcc-data.org/maps/).
Security	Data sources for security and intentional threats could include local police statistics, national crime statistics, insurance claim data, corporate expenditure on maintenance and repair.

Communicating risks (2.1.5)

As a minimum, relevant information regarding the identified risks must be communicated to:

- Design team during concept design (for example, through a project brief or equivalent)
- Construction team before the start of construction (for example, through the project documents)

- Owner/operator before the end of handover (for example, in formal operation and maintenance documentation)

Resilience plan (2.1.6)

The resilience plan must outline:

- How the design and construction teams address the identified risks
- The role of people and procedures in addressing the identified risks
- The performance requirements of proposed resilience measures
- Management measures required to mitigate the impact of potential hazards

When appraising options to enhance resilience, the following could be considered:

- Effectiveness in reducing risks
- Proportionality given the risks
- Whole life costs and the service life of the asset including maintenance, replacement, upgrades, and operational costs
- Impacts on dependencies
- The balance between investment in the infrastructure and investment in emergency response and recovery capabilities
- Uncertainties over the life of the asset

Evidence

Assessment criteria	Evidence guidance
2.1.1 Identifying resilience requirements (fixed)	Project brief, specification.
2.1.2 Identifying dependencies (fixed)	Meeting records, risk assessment information.
2.1.3 Communicating dependencies (fixed)	Project brief, specification. Design documentation. Operation and maintenance documentation.
2.1.4 Identifying and assessing risks (fixed)	Risk assessment documentation, meeting records, list of consultees.
2.1.5 Communicating risks (fixed)	Project brief, specification, risk assessment. Design drawings, risk assessment. As built drawings, handover documentation, contingency plans, operation and maintenance manuals, commissioning testing reports.
2.1.6 Resilience plan (fixed)	Resilience plan.

Definitions

Critical National Infrastructure

For the purpose of this assessment issue, Critical National Infrastructure (CNI) is defined as:

"Those critical elements of infrastructure (namely assets, facilities, systems, networks or processes and the essential workers that operate and facilitate them), the loss or compromise of which could result in:

a. Major detrimental impact on the availability, integrity or delivery of essential services – including those services whose integrity, if compromised, could result in significant loss of life or casualties – taking into account significant economic or social impacts; and/or
b. Significant impact on national security, national defence, or the functioning of the state."

From *Summary of the 2015-16 Sector Resilience Plans* (Cabinet Office, 2016) available online at assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/526351/2015_16_summary_of_the_srp.pdf

Dependencies

A dependency is a relationship between two products or services in which one product or service is required for generating the other product or service (or both are interdependent on each other). In the context of infrastructure projects, dependencies can be defined as other assets, the community, or the environment that would be impacted if the asset was to fail or not function as intended.

A dependency may be:

- **Digital**: A cyber connection between infrastructure assets or a shared dependency by two or more elements on the transfer of information from a third party.
- **Geographical**: The proximity of infrastructure assets, systems or networks makes them susceptible to the same incident.
- **Organisational**: Shared ownership, governance, financing mechanisms 'soft' infrastructure.
- **Physical**: A physical connection between different infrastructure assets, systems, or networks (for example, one asset uses fuel supplied by another).

A dependency may fall upstream or downstream of the asset location:

- **Downstream**: Where the infrastructure asset provides a product or service to another infrastructure asset which is dependent on that service.
- **Upstream**: Where the infrastructure asset is dependent on a product or service provided by other infrastructure

When considering infrastructure assets, interdependencies should also be considered. Interdependency is a mutual reliance among infrastructure owners and operators on products or services from other suppliers.

Disruptive events
Events established to predict risks over the life of the asset.

In this issue, there are two types of disruptive event:

- **Design Basis Events**: A series of disruptive events based on natural hazards (including the effects of climate change).
- **Design Basis Threats**: A series of disruptive events based on intentional threats.

Intentional threats
Man-made threats including fire and crime (theft, arson, vandalism, terrorist attacks, cybersecurity etc.). These are not usefully informed by historical data due to their nature and are best assessed using a series of credible threat events to allow risk analysis and assessment of asset vulnerability.

Natural hazards
A natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Natural hazards include:

- Flooding
- Hazards of geological origin (such as volcanic eruptions, earthquakes and landslides)
- Hazards of climatic or meteorological origin (such as extreme rainfall events, average and extreme temperatures, droughts, avalanches, wave surges including tsunamis and tidal waves, and wind storms including cyclones, hurricanes, tornadoes, tropical storms and typhoons)
- Wildfires

The relevance of different natural hazards will be dependent on local geography, geology, hydrology and climate factors. The assessment of natural hazards tends to be based on historical data but should also consider climate scenarios and potential future risk.

Relevant experts

- For natural hazards, relevant experts have technical and professional experience in determining:
    - the possible natural hazards in the region,
    - the likely impacts on the project, and
    - appropriate mitigation measures for the project.
- For climate change, relevant experts have technical and professional experience in predicting and understanding the impacts of climate change on the built environment and advising on mitigation measures.
- For security (or intentional threats), relevant experts have technical and professional experience in designing appropriate security measures and hold a relevant professional qualification.

Relevant stakeholders
For the purposes of this issue, relevant stakeholders include as a minimum:

- The owner/operator
- Representatives from local public services, including the emergency services, local authorities, health services and environmental agencies.
- Stakeholders upstream and downstream of the project reasonably considered to be at risk of (i) impacts arising from the project or (ii) having an impact on the project.

Additional relevant stakeholders for specific resilience topics are given below.

- When considering natural hazards or climate change, additional relevant stakeholders could include:
    - Recognised leaders in the resilience sector
    - Climate change experts
    - Owners or operators of other similar infrastructure assets
    - Customers
    - Members of the public, where affected
    - Local interest groups
- When considering security or intentional threats, additional relevant stakeholders could include:
    - Corporate ICT and cybersecurity specialists
    - National security organisations
    - Police forces
    - Security specialists

Resilience

The ability of assets, networks and systems to anticipate, absorb, adapt or rapidly recover from a disruptive event.

Resilience can be considered in a range of ways including:

- **Resistance**: Designing the asset to withstand predicted impacts, e.g. barriers to prevent water entering the asset or walls with the strength to withstand the impact of flood water.
- **Reliability**: the asset or systems required to operate under a range of set conditions for a specified period, this might include raising critical components above the design flood level, or using specifications that address identified risks, e.g. burglar alarms or anti-graffiti coatings. It can also include non-technical items such as flood warning schemes, staff training and good practice guidance to ensure that staff can respond to events to ensure continuity of service in a safe manner.
- **Redundancy**: The availability of backup installations or spare capacity within a system to enable operations to be switched or diverted to alternative parts of the system in the event of disruption to ensure continuity of service. The resilience of networks reduces when running at or near capacity, although in some sectors or organisations it is recognised that it may not always be feasible to operate with significant spare capacity within the network.
- **Recovery**: Preparations for fast and effective response and recovery from disruptive events and will include processes for dealing with an event if it occurs to ensure that the asset can continue to operate.

In the context of flood risk, resistance and resilience are often used as follows:

- **Resistance**: where measures prevent water from being in contact with the asset.
- **Resilience**: where the asset is designed to withstand contact with the water.

Resilience topics

The table below defines the scope of the three resilience topics within the context of this issue.

Topic	Guidance on scope
Natural hazards	Any natural hazard that could damage or compromise the asset or its critical functions. See the definition of natural hazards.
Climate change	Climate change events that could damage or compromise the asset or its critical functions (for example, flooding, surface water runoff, temperature fluctuations, weather volatility, water resource strain, ground condition changes).
Security	Any threats that could damage or compromise the asset or its critical functions (for example, physical, cyber, personnel).

Additional information

Confidentiality or national security

The information assessed as part of this assessment issue may have specific requirements related to confidentiality or national security. Where relevant, please contact us for more information on conducting the assessment and demonstrating compliance.

SABRE – Security assessment standard for buildings and built infrastructure assets

SABRE is a security assessment and certification scheme for buildings and built infrastructure assets operated and maintained by BRE Global. The scheme provides owners, occupiers, and interested parties with:

- an independently assessed security risk management rating for a facility
- the ability to measure, compare and evaluate the security performance of a facility against a range of credible security threats.

For more information about SABRE visit www.bregroup.com/sabre.

2.2 Flooding and surface water run-off

Aim

To minimise the negative effects of flooding.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
2.2.2 Flood risk based enhancements	Scope out if an appropriate flood risk assessment has been carried out and did not require any measures to be taken. This cannot be scoped out if 2.2.1 has failed to score.
2.2.3 Sustainable drainage systems	Scope out only for marine and offshore projects, where there is clearly no prospect of SuDS being applicable, and on refurbishment projects where drainage is not part of the scope of works.
2.2.4 Long-term flood resilience and adaptation	The decision to scope out will depend on the nature, scale, location and context of the project.
2.2.5 Implementation of flood-risk-based enhancements	Scope out if an appropriate assessment has been carried out to satisfy 2.2.2 and this did not require any measures to be taken.
2.2.6 Implementation of sustainable drainage systems	Scope out only if credits have been scored on 2.2.3 and SuDS have been deemed inappropriate for the project (for example, on a river wall strengthening project).
2.2.7 Managing run-off at source	Scope out only for marine and offshore projects or if infiltration has been deemed inappropriate by the assessment carried in 2.2.3 (for example, due to poor infiltration potential or ground contamination risks).

Credit summary

Assessment criteria	Strategy	Design	Construction
2.2.1 Flood risk assessment (fixed)		18	
2.2.2 Flood risk based enhancements		56	
2.2.3 Sustainable drainage systems		5	
2.2.4 Long-term flood resilience and adaptation		56	
2.2.5 Implementation of flood-risk-based enhancements		56 (up to)	
2.2.6 Implementation of sustainable drainage systems		14	
2.2.7 Managing run-off at source		24 (up to)	

Assessment criteria

2.2.1 Flood risk assessment (fixed)

Str	Des	Con
	18	

2.2.1.1 The run-off, flood risk, and potential increased flood risk elsewhere as a result of the completed works have all been assessed over their expected working life, **and** appropriate flood management measures included in the design.

2.2.2 Flood risk based enhancements

Str	Des	Con
	56	

2.2.2.1 The design team has actively considered opportunities for providing enhancements as part of the flood risk management measures **and/or** the merits of designing for a larger event or for greater flood resilience than required by planning regulations or guidance.

2.2.3 Sustainable drainage systems

Str	Des	Con
	5	

2.2.3.1 The use of SuDS has been considered for incorporation into the design.

2.2.4 Long-term flood resilience and adaptation

Str	Des	Con
	56	

2.2.4.1 The project team has designed for long-term flood resilience and adaptation.

2.2.5 Implementation of flood-risk-based enhancements

Str	Des	Con
	56 (up to)	

2.2.5.1 The proposals recommended in 2.2.2 have been included in the design and incorporated in the project.

	Outcome	Credits
(a)	Proposals included in the design	28
(b)	Proposals incorporated in the project	56

2.2.6 Implementation of sustainable drainage systems

Str	Des	Con
	14	

2.2.6.1 SuDS have been incorporated into the project where appropriate.

2.2.7 Managing run-off at source

Str	Des	Con
	24 (up to)	

2.2.7.1 A percentage of total surface water run-off from the completed project has been managed at source through infiltration.

	Percentage of total surface water run-off managed at source	Credits
(a)	Up to 30%	6
(b)	Up to 60%	12
(c)	Up to 90%	18
(d)	Above 90%	24

Guidance

Flood risk assessment (2.2.1)

Any assessment has to be in line with the requirements of planning policy guidance or its equivalent.

Any development, whether or not situated in a floodplain, can contribute to increased flood risk. Creating additional sealed surfaces on previously open ground will increase run-off, which, if fed into existing rivers or sewerage systems, adds to the existing load. Climate change has been predicted to lead to increased rainfall, increased intensities and increased numbers of incidences of extremely heavy rains, the type of events that cause flooding as a result of sewerage systems and rivers not being able to cope with the sudden volume of water run-off.

For new developments, run-off should be controlled such that it is no larger than would be the case from a Greenfield site of the same size. Increased flood risk elsewhere as a result of the development should be minimised, and appropriate flood management measures should be included in the design.

Note also that even refurbishment projects may create additional sealed surfaces and a run-off assessment should be carried out in any case, to ensure that run-off does not exceed the capacity of existing systems.

Appropriate flood risk management measures could materially affect the overall design of the project, for example raising the level of a road so that flood risk is reduced, with culverts incorporated to allow water to flow under it.

Flood risk based enhancements (2.2.2)

Opportunities for improving existing or future flood risk conditions can be explored for any works that have a flood-risk impact. What is defined here as enhancements in a flood-risk context could be achieved through reducing surface water run-off to rates

below those currently experienced or designing for a greater increase in rainfall intensity due to climate change effects than the minimum required by regulatory bodies. Designing for larger events or for greater flood resilience may be appropriate for particular sites that are very sensitive to intense rainfall, or run-off from nearby sites, or greater resilience may be appropriate for regional or national strategic assets such as power stations or grid facilities, water treatment works or wastewater treatment works.

By reducing surface water run-off beyond current conditions (or beyond the minimum required by the regulatory bodies), downstream flood risks and flood risks associated with smaller flood events could be improved. Similarly, designing for a greater increase in rainfall intensity could improve the whole-life performance of the system and provide more on-site attenuation to cater for extreme events.

Sustainable drainage systems (2.2.3)

For example, rainwater retention, balancing ponds, reedbed systems, and/or grass roofs.

For guidance on SuDS refer to CIRIA publications:

- *The SuDS Manual* (C753, 2015).
- *Site handbook for the construction of SuDS* (C698, 2007).
- *Retrofitting to manage surface water* (C713, 2012).
- *Managing urban flooding from heavy rainfall – encouraging the uptake of designing for exceedance* (C738, 2014).

The incorporation of SuDS must be actively considered. If the project generates no additional run-off, or if after consultation with the local authority SuDS are found not to be beneficial or to be inappropriate in a particular case – this should be a conscious and informed decision – then 2.2.6 can be scoped out.

Long-term flood resilience and adaptation (2.2.4)

Even when flood risks are taken into consideration during the design of a new development, some residual flood risk will still exist. This could be a result of an extreme storm event beyond that considered in 2.2.1, breach in flood defences or from overland flow caused by blockages in the surface water management systems. The potential effects of climate change could also increase storm intensity to beyond that currently experienced and for which existing drainage systems are designed.

Management of these residual risks can be achieved in a number of ways. For example, new developments can be built using materials that are suited to inundation, or that can be easily repaired after a flood event. Electrical installations can be positioned above the line of the predicted flood level.

Implementation of flood-risk-based enhancements (2.2.5)

See guidance for 2.2.2.

Implementation of sustainable drainage systems (2.2.6)

The score is shown across the Design and Construction columns, which means that the Designer not only has to have incorporated SuDS into the design but for the score to be gained in a Whole Project assessment the SuDS need to have actually been constructed (not just designed).

Also see guidance for 2.2.3.

Managing run-off at source (2.2.7)

Calculations to be based on the 1 in 30 annual probability event.

The use of SuDS can provide numerous benefits to flood risk, water quality and water resource availability. Many SuDS will attenuate flow and provide water treatment through entrapment or settlement and the use of these systems are addressed in 2.2.3 and 2.2.6. This criterion specifically relates to managing surface water run-off through infiltration. Infiltration of surface water run-off can provide betterment in terms of flood risk from the receiving watercourse and can aid with aquifer recharge.

Evidence

Assessment criteria	Evidence guidance
2.2.1 Flood risk assessment (fixed)	Evidence is likely to need to include a review of existing flood risk from all sources that have the potential to affect the project and a summary of proposed flood management measures, if deemed required. On certain types of projects, especially small ones – for example small bridges over a river or canal or strengthening of a river or canal bank – a qualitative assessment may be sufficient evidence. For example, the assessment may have been made at and recorded in minutes of a design meeting. For risks associated with surface water run-off, evidence would include assessment or calculations of run-off or, for larger projects, consultants' reports and/or evidence of consultations with appropriate regulators.
2.2.2 Flood risk based enhancements	Evidence should show what measures (such as the ones mentioned above) have been incorporated into the design. This could be in the form of drawings, specifications or other design output documents.
2.2.3 Sustainable drainage systems	Evidence should be provided to demonstrate that SuDS have been considered. This could be notes from a design meeting or part of the Client's brief.
2.2.4 Long-term flood resilience and adaptation	Evidence could be provided in the form of a technical note or drawings that demonstrate incorporation of measures.
2.2.5 Implementation of flood-risk-based enhancements	Evidence should show that the measures identified for 2.2.2 have been incorporated into the final works. This could be in the form of drawings, specifications or other design output documents, and construction records or photographs to demonstrate their construction.
2.2.6 Implementation of sustainable drainage systems	Evidence should be provided to demonstrate that SuDS have been implemented where appropriate. Evidence may include drawings or specifications showing the incorporation of SuDS.
2.2.7 Managing run-off at source	Evidence would include calculations demonstrating management of surface water run-off and plans illustrating the areas of the site that drain to infiltration systems.

2.3 Future needs

Aim

To encourage appropriate adaptability for future needs in a way that avoids unnecessary disruption, inconvenience, and cost.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
-	-

Credit summary

Assessment criteria	Strategy	Design	Construction
2.3.1 Identifying future needs (fixed)	19	9	
2.3.2 Opportunities to address future needs (fixed)	25	12	
2.3.3 Designing for future needs (fixed)		37	

Assessment criteria

2.3.1 Identifying future needs (fixed)

Str	Des	Con
19	9	

2.3.1.1 During strategy and design, the expected future needs of the asset have been identified (or reviewed and updated) by:

a. Assessing predicted changes that are expected to be critical to the sector or asset
b. Using robust data to support predictions
c. Consulting relevant stakeholders

2.3.1.2 Before the start of design, the expected future needs of the asset have been communicated to the design team.

2.3.2 Opportunities to address future needs (fixed)

Str	Des	Con
25	12	

2.3.2.1 During strategy and design, the project team have identified (or reviewed and updated) opportunities to adapt the design to address or more easily accommodate the expected future needs of the asset.

2.3.2.2 A qualitative assessment of the predicted costs and benefits of adapting the design to address the expected future needs of the asset has been completed (or reviewed and updated).

2.3.2.3 Before the start of design, the client has communicated to the design team through a project brief (or equivalent):

a. Any identified opportunities to address or accommodate future needs
b. Any requirements to address or accommodate future needs

2.3.3 Designing for future needs (fixed)

Str	Des	Con
	37	

2.3.3.1 The design has incorporated opportunities to address or more easily accommodate the expected future needs of the asset in one or more areas identified as most critical for the sector or asset.

2.3.3.2 The design allows the expected future needs to be accommodated without destruction of the asset and with minimal disruption.

Guidance

Identifying future needs (2.3.1)

When assessing predicted changes, the project team should consider:

- Population growth
- Changing demographic
- Customer expectations
- Integrated systems
- Resource availability
- New and existing technology
- Flexibility of the asset
- Industry changes

Potential considerations for each of these topics are given in the table below.

Topic	Potential considerations
Population growth	Predicted future demand and capacity including potential future expansion and upgrades, whether further assets will be required to meet predicted needs, how future growth or adaptation can be safeguarded or incorporated into the current design to allow future needs to be more easily met, how innovation could be used to meet the demands of a growing population. Potential future functional changes. Potential future access requirements.
Changing demographic	Age (children, young people, older people and the ageing population). Disability. Gender and sexual orientation. Religion or belief. Race. Deprivation (this includes income, employment, health and disability, education, barriers to housing and services, crime, and the living environment). Health (life expectancy, obesity, physical activity, mortality associated with illnesses, dementia, depression, mental health). Employment (sectors, incomes, businesses, working patterns, economic activity, unemployment). Education, skills and training. Population projections. The current demographic profile should be available from the local authority and census data.
Customer expectations	How customers will interact with the asset in the next 5, 10, 20(+) years. Improved cost efficiency over the life of the asset. Meeting increasing customer expectations for reliability, comfort, safety, security and information (where relevant). Accessibility of services for future upgrades.
Integrated systems	The asset as part of the system within which it operates now and over its life. How technical aspects of the asset interact with (potentially changing) operational aspects over the life of the asset (for example, telecommunications, energy sectors). Opportunities for current or future interconnections to other assets of the same sector or different sector (for example, water/water, energy/water). Potential shared facilities, energy and infrastructure (for example, sustainable drainage systems, amenity spaces and cables). Working with other organisations, through multi-agency communication and coordination. Future dependencies (upstream and downstream) and also interdependencies through use of tools, models, and consultation with (upstream and downstream) stakeholders. Being aware and planning for potential dependency is crucial to designing for future needs; if these dependencies are not taken into account, the measures taken to design for future needs will be at best limited and at worst totally ineffective.
Resource availability	Future demand of resources needed by the asset over its life and delivered by the asset over its life including: materials requirements over the life of the asset in terms of robustness and predicted or possible changes in material supply; energy and water requirements over the life of the asset and predicted or possible changes in supply, demand, and type.

Topic	Potential considerations
New and existing technology	Smart technology for operation and maintenance purposes (for example, intelligent distribution networks that automatically reroute when equipment fails and smart metering to allow customers to make informed decisions about when to use their power). Techniques and technologies that could be implemented to meet predicted future needs (for example, dual use for an asset such as a road tunnel that can act as storm water storage at times of high rainfall).
Flexibility of the asset	Flexibility of the asset or system (for example, through identifying a diverse set of solutions to meet customer and operator needs). Layered fall-back arrangements to mitigate unavailability. Implementing ideas which will allow assets to be self-sufficient (for example, generate more of their own energy or have dual functionality). How to ensure the functionality of the asset is not compromised based on future predictions. Whether the asset can be designed to be part of a flexible system now and in the future (possibly more relevant for energy and communications sectors).
Industry changes	How legislation is likely to change and what effect this will have on the service provided by the asset. Predicted changes to the infrastructure industry and how might this affect the service provision of the asset.

Opportunities to address future needs (2.3.2)

This can only be scored if credits have been achieved for 2.3.1 at the current or previous assessment stage.

Designing for future needs (2.3.3)

This can only be scored if credits have been achieved for both 2.3.1 and 2.3.2 at the current or previous assessment stage.

An acceptable level of minimal disruption cannot be absolutely defined and will vary by project. There must be evidence that disruption to the asset and future users has been appropriately considered within the design and mitigated where possible.

Evidence

Assessment criteria	Evidence guidance
2.3.1 Identifying future needs (fixed)	Assessment of future needs, meeting records, list of consultees, data sources.
2.3.2 Opportunities to address future needs (fixed)	Meeting records, results of qualitative assessment, design drawings, specification. Project brief.
2.3.3 Designing for future needs (fixed)	Design drawings, as built drawings, meeting notes, list of recommendations, handover documentation.

Definitions

Relevant stakeholders (future needs)

For the purpose of this issue, relevant stakeholders are knowledgeable and representative and include as a minimum:

- The owner/operator, where known
- Individuals with:
    - Experience in operating similar assets
    - Specialist knowledge and experience of the sector
    - An understanding of how the sector is likely to evolve in the future
    - An understanding of new and relevant technologies
    - An understanding of sector specific dependencies, e.g. energy, communications
    - An understanding of the asset's resource requirements and availability, e.g. energy, water

3 Communities and stakeholders

Summary

This category addresses issues regarding the wider social and economic effects of a project on local communities and other relevant stakeholders who might be impacted directly or indirectly by a project's delivery and/or the asset's operation. It covers initial and subsequent engagement and consultation on the proposed project through inception, design and construction – and how it might impact on wider community issues – to maximise the wider social and economic benefits that a project can achieve.

Category summary table

Assessment issues	Credits available
3.1 Consultation and engagement	225
3.2 Wider social benefits	242
3.3 Wider economic benefits	83
	550

3.1 Consultation and engagement

Aim

To establish effective engagement with communities and stakeholders throughout the planning, design and construction of the project to identify and monitor stakeholder concerns and opportunities, so promoting 'ownership' and buy-in across the affected communities.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
3.1.2 Further community consultation	If the initial consultation established that there are no interested parties, then this can be scoped out for design and construction.
3.1.4 Assessing community demographics	The decision to scope out depends on the nature, scale, location and context of the project.
3.1.6 Community engagement	It will be very unusual for this requirement to be scoped out. There may be very rare circumstances where no interested parties have been identified during the initial consultation and therefore a continuing community engagement programme might be considered unnecessary. However, it can be argued there is always opportunity and potential benefit for a project team to engage with local communities or other stakeholders (see Guidance).
3.1.7 Recording community comments	The decision to scope out depends on the nature, scale, location and context of the project.
3.1.8 Assessing community comments during design	The decision to scope out depends on the nature, scale, location and context of the project.
3.1.9 Assessing community comments during construction	Scope out if the community engagement programme was organised and managed by others and the Contractor was not involved separately from other members of the team in considering the responses from the programme. This requirement can also be scoped out where the community engagement programme is the sole responsibility of the Client.

Credit summary

Assessment criteria	Strategy	Design	Construction
3.1.1 Initial community consultation (fixed)	10		
3.1.2 Further community consultation		11	5
3.1.3 Stakeholder consultation on effects during construction and operation (fixed)		16	
3.1.4 Assessing community demographics	33		
3.1.5 Responsibility for ongoing community consultation (fixed)	3	3	3
3.1.6 Community engagement	11	11	11
3.1.7 Recording community comments	4	4	4
3.1.8 Assessing community comments during design		48 (up to)	
3.1.9 Assessing community comments during construction			48 (up to)

Assessment criteria

3.1.1 Initial community consultation (fixed)

3.1.1.1 A community consultation exercise has been carried out by the Client and the results have been passed to appropriate members of the project team and, as and where appropriate, the results fed back to consultees.

Str	Des	Con
10		

3.1.2 Further community consultation

3.1.2.1 A community consultation exercise has been carried out at the design and construction stages of the project and the results have been passed to appropriate members of the project team and, as and where appropriate, the results fed back to consultees.

Str	Des	Con
	11	5

3.1.3 Stakeholder consultation on effects during construction and operation (fixed)

3.1.3.1 All relevant stakeholders have been consulted regarding the effects on neighbours that are expected to occur during both the construction stage and operation of the completed works.

Str	Des	Con
	16	

3.1.4 Assessing community demographics

3.1.4.1 Community demographics have been assessed to ensure that communications are appropriately targeted during community consultation exercises or any ongoing community engagement.

Str	Des	Con
33		

3.1.5 Responsibility for ongoing community consultation (fixed)

3.1.5.1 A member of the project team has been made responsible for ongoing community consultation.

Str	Des	Con
3	3	3

3.1.6 Community engagement

3.1.6.1 There has been a continuing community engagement programme covering all relevant project stages.

Str	Des	Con
11	11	11

3.1.7 Recording community comments

3.1.7.1 There has been a mechanism to ensure that all comments from the local community were recorded.

Str	Des	Con
4	4	4

3.1.8 Assessing community comments during design

3.1.8.1 The Client and design team have assessed all the responses from the community engagement programme **and** taken appropriate action within the project decision making and design.

Str	Des	Con
	48 (up to)	

	Outcome	Credits
(a)	Responses assessed by the Client and design team	10
(b)	Plus, appropriate action taken within the project decision making and design	24
(c)	Plus, feedback provided to relevant stakeholders	38
(d)	Plus, stakeholders satisfied with feedback	48

3.1.9 Assessing community comments during construction

3.1.9.1 The construction team has assessed the responses from the community engagement programme **and** taken appropriate action within the construction stage.

Str	Des	Con
		48 (up to)

	Outcome	Credits
(a)	Responses assessed by the construction team	10
(b)	Plus, appropriate action taken within the construction stage	24
(c)	Plus, feedback provided to relevant stakeholders	38
(d)	Plus, stakeholders satisfied with feedback	48

Guidance

Initial community consultation (3.1.1)

Ideally, consultation should be carried out early for *each stage* of the overall process (for example, at planning proposal stage, during design and before construction starts). Consultation exercises can take the form of a simple public meeting or a full action-planning event, depending on the scale and profile of the project. Other methods can be door-to-door surveys, leaflet drops and newsletters, though the latter should mainly be a way of following up consultation that has already taken place. Increasingly, such exercises are regarded as the start of an 'Engagement Strategy' with the local community rather than a community consultation.

It is important to bear in mind that simply providing *information* does not constitute *consultation*. True consultation will offer other stakeholders the opportunity to become involved – at least to a certain extent – in decision-making. Any kind of consultation exercise must therefore include a 'feedback loop' allowing the community to respond and their comments to be taken into account as and where appropriate.

This requirement cannot be scoped out because even for a remote location with no immediate neighbourhood there may be other stakeholder groups that ought to be consulted. This could include local or regional authorities, local or national interest organisations, or national environment agencies.

Stakeholder consultation on effects during construction and operation (3.1.3)

Relevant stakeholders could include:

- Local community (including residents, business owners, or schools)
- Local authorities
- Local interest groups or organisations
- National authorities or agencies

This must be scored before credits can be awarded for 6.2.3 Mitigating effects on neighbours in operation and 6.2.5 Mitigating effects on neighbours in construction because the designed mitigation should have been discussed with relevant stakeholders.

Assessing community demographics (3.1.4)

In a community where the majority of residents are pensioners, a website and emails may not be the most effective form of communication. Equally, holding public meetings and open days during working hours is likely to exclude a certain demographic of the community. It is important to arrange project communications to reflect demographics to maximise their reach and benefit.

Responsibility for ongoing community consultation (3.1.5)

For each project there should be someone nominated to be responsible for ongoing community consultation, even if it is merely to handle enquiries from interested parties.

Community engagement (3.1.6)

Whereas a community consultation exercise is a specific milestone event – which may be carried out at more than one stage of a project – a community engagement programme is an ongoing effort to maintain a dialogue with all community stakeholders throughout the planning, design and construction processes. It should not be just a mechanism for handling complaints; it should be a two-way engagement with the community.

A thorough and effective community engagement programme should consider environmental, social and economic effects including, for example, the following elements:

- the significant environmental impacts of the final constructed asset
- the significant environmental impacts of the construction stage
- transportation impacts
- livelihood impacts of the construction process
- timing and programme of the works for design and construction stages
- employment and skill development opportunities during the works and resulting from the final project

These effects may have been identified as part of an Environmental Impact Assessment (EIA) or Transport Impact Assessment (TIA).

An effective community engagement programme should also manage the expectations of the consultees. In other words, consultation should not lead to unrealistic expectations of the project.

If no interested parties have been identified during the initial consultation (and therefore a continuing community engagement programme might be regarded as unnecessary) it is important to recognise four main issues that may arise:

- The initial consultation may not have reached a representative sample of the community.
- Sensitivities are not always flushed out at the start – it can take a very long time for all interested parties to catch on to the proposal for or existence of a project.
- However remote the site, change to it could affect neighbours in ways not obvious to the project team.
- Even if the community is generally supportive, sensitivities and opportunities may only become apparent further into the project lifespan.

Metric guidance

Assessment of this issue can be assisted by carrying out demographic surveys or desk studies of the affected community, ideally in the very early stages of the project, to identify the community demographic distributions and groups. Examples of these different groups include minority ethnic groups, gender, local business owners and employees, different age groups, senior citizens, disabled people, religion groups and social-economic groups.

The effectiveness of the community engagement program and consultation exercises may be measured and reported through a metric such as:

Percentage of the population of each identified demographic group within the affected community that has participated, using a formula such as:

$$\frac{Number\ of\ participants\ from\ a\ given\ identified\ demographic\ group}{Total\ population\ of\ the\ same\ identified\ demographic\ group\ within\ affected\ community} \times 100$$

Assessing community comments during design (3.1.8)

There is no intent with this criterion for the Client and design team to always accede to actions requested in the responses, only to have a process for incorporating them into project decision-making and the design team, and for feeding outcomes back to relevant stakeholder(s).

Assessing community comments during construction (3.1.9)

There is no intent with this criterion for changes to be made that the project team judge are needless or pointless just to score credits.

Evidence

Assessment criteria	Evidence guidance
3.1.1 Initial community consultation (fixed)	Evidence could be reports or minutes of meetings with appropriate groups that are carried out at appropriate stages of the project. Evidence should also be provided to show how information from these exercises is then communicated to the project team.
3.1.2 Further community consultation	
3.1.3 Stakeholder consultation on effects during construction and operation (fixed)	Evidence could be reports or minutes of meetings with appropriate groups that are carried out at appropriate stages of the project.

Assessment criteria	Evidence guidance
3.1.4 Assessing community demographics	Evidence could include a communication strategy that identified the demographics of the local community and how communications should be targeted accordingly. Evidence could alternatively include the calculation and reporting of the metric-based guidance described under 3.1.6.
3.1.5 Responsibility for ongoing community consultation (fixed)	Evidence could be in the form of a letter appointing someone to be responsible or it could be included in a Project Management Plan. In either case, responsibilities need to be defined.
3.1.6 Community engagement	Evidence needs to show a programme of community engagement activities carried out. These could include leaflet drops, press releases, websites, documentation of open evenings, minutes from regular liaison group meetings. However the programme is constructed it must include two-way dialogue. Evidence needs to show these activities taking place and the relevant groups having been invited or taking part. This could be in the form of meeting minutes, correspondence, or attendance lists.
3.1.7 Recording community comments	Evidence could be in the form of meeting minutes with liaison groups. A complaints procedure may also provide evidence, but the definition of a complaint may restrict what is recorded.
3.1.8 Assessing community comments during design	Appropriate evidence could show how comments from the community have been assessed and taken into account in the decision-making process or design, such as a Consultation Report or Statement of Community Involvement. Feedback and evidence of stakeholders' satisfaction may be through feedback questionnaires and surveys.
3.1.9 Assessing community comments during construction	Evidence could be any amendments to proposals or designs as a result of comments from consultation with the community. There should be a record of any consultation that has taken place and changes or arrangements as a result of this (for example, changing the alignment of an access road), as well as the record of complaints or comments and what action was taken as a result.

3.2 Wider social benefits

Aim

To identify and implement actions that minimise negative social impacts and increase wider social benefits during the project's construction and operation.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
3.2.3 Supporting social benefits in contracts	Scope out only if there are genuinely no issues to be addressed from 3.2.1.
3.2.4 Wider social benefits	It is unlikely that 3.2.4 will be scoped out often and is likely to be justified only on very small projects, but it is possible, particularly on small projects, that the social impacts will be judged to be not significant enough to warrant a formal social impacts assessment. Therefore, the decision to scope out will depend on the nature, scale, location and context of the project.
3.2.6 Community diversity	Can be scoped out on projects where there are no identifiable occupiers or users.
3.2.7 Enhancement beyond functional requirements	This can only be scoped out if 3.2.4 has been scoped out.
3.2.10 Implementing partnership links during construction	Only scope out on Design & Construction or Construction Only assessments where it can be demonstrated that the responsibility for implementing partnership links are controlled by the client and the contractor is not permitted to establish alternative partnership links.

Credit summary

Assessment criteria	Strategy	Design	Construction
3.2.1 Social impacts and benefits assessment (fixed)	10		
3.2.2 Significant social benefits (fixed)	28 (up to)		
3.2.3 Supporting social benefits in contracts	11		
3.2.4 Wider social benefits	18	14	
3.2.5 Health and wellbeing of future users or neighbours (fixed)	14	11	
3.2.6 Community diversity	19	19	
3.2.7 Enhancement beyond functional requirements	10	16	6
3.2.8 Partnership links (fixed)		13	
3.2.9 Social impacts and benefits during construction (fixed)			24 (up to)
3.2.10 Implementing partnership links during construction			29 (up to)

Assessment criteria

3.2.1 Social impacts and benefits assessment (fixed)

Str	Des	Con
10		

3.2.1.1 The Client and/or the Designers have undertaken a social impacts and benefits assessment of the project on a wider scope than just the project owners' interests.

3.2.2 Significant social benefits (fixed)

Str	Des	Con
28 (up to)		

3.2.2.1 The assessment demonstrates significant social benefits of the project to wider society on the following or similar issues that are relevant to the project:

	Outcome	Credits (each)
(i)	Renewal and revitalisation of the social fabric of the community in which the project is placed	7 for each feature (up to a maximum of 4 features)
(ii)	Enhancement of community quality of life	
(iii)	Developing local skills and capabilities	
(iv)	Provision of amenity features or community resources	
(v)	Reduction of flood risk	
(vi)	Improving local air quality	
(vii)	Reducing crime risks	
	Or, if fewer than four features apply to the project being assessed and significant social benefits of the project to wider society are demonstrated on all of them	28

3.2.3 Supporting social benefits in contracts

Str	Des	Con
11		

3.2.3.1 Where appropriate, actions to support the results of the social impacts and benefits assessments have been included within relevant contract documentation.

3.2.4 Wider social benefits

Str	Des	Con
18	14	

3.2.4.1 Due consideration has been given, during the project's feasibility stage and during design, to wider social benefits of the project during construction and operation, **and** to the effects of the completed project on the human environment.

3.2.5 Health and wellbeing of future users or neighbours (fixed)

Str	Des	Con
14	11	

3.2.5.1 Potential impacts of the project on the health and wellbeing of any future occupants, users, neighbours or operational staff have been considered, **and** the design modified as a result.

3.2.6 Community diversity

Str	Des	Con
19	19	

3.2.6.1 The diversity of the local community has been considered and respected in the design solution to promote equal access for all (for example, disabled, elderly people, and different cultures and religions) **and** the specification achieved in the completed project.

3.2.7 Enhancement beyond functional requirements

Str	Des	Con
10	16	6

3.2.7.1 Consideration has been given to enhancing the project design features, user enjoyment and additional facilities for the benefit of users beyond functional requirements of the facility **and** this has been fully achieved in the construction stage.

3.2.8 Partnership links (fixed)

Str	Des	Con
	13	

3.2.8.1 Partnership links have been actively pursued through the design process **and** promoted for the construction stage.

3.2.9 Social impacts and benefits during construction (fixed)

Str	Des	Con
		24 (up to)

3.2.9.1 The Construction Team has undertaken a social impacts and benefits assessment of the construction stage of the project and used the results in the development and implementation of the construction management plan.

	Outcome	Credits
(a)	Results from a social impacts and benefits assessment have been used in the development of the construction management plan.	8
(b)	Plus, social aspects of the developed construction management plan have been implemented.	24

3.2.10 Implementing partnership links during construction

Str	Des	Con
		29 (up to)

3.2.10.1 The Contractor has implemented partnership links identified by the Client, or significant links that the Client has not identified.

	Percentage of Client-identified partnership links implemented	Credits
(a)	25% or more	6
(b)	50% or more	12
(c)	75% or more	18
(d)	100%	24
	Alternative partnership links have been established that the Client did not identify	Additional 5

Guidance

Social impacts and benefits assessment (3.2.1)

The analysis of direct benefits to the Client arising from their project is not a matter assessed by BREEAM Infrastructure. However, the non-economic aspects of the project justification, and therefore decision-making about whether to proceed with a project have a wider context.

There is an increasing view that project teams should seek to deliver genuine benefits to a wider group than just the Client's narrow interests, socially as well as economically and environmentally. A social impacts and benefits analysis and assessment of the project on a wider scope than just the project owners' interests is likely to lead to identification of opportunities to deliver enhanced social benefits to the community in which the project is constructed and will operate.

Issues that such an analysis is likely to have to cover to be of significance to the project and community are listed in 3.2.2 but need not be limited to the aspects listed. The aim should be for the study to be in scale with the nature, location, context and size of the project and seek the greatest social good for the investment involved, without detracting from – and more likely enhancing – the Client's case to the planning authority. Equality impact assessments should be included.

Generic guidance is also available in the FIDIC Project Sustainability Management guidance – see fidic.org/books/project-sustainability-management-guidelines-2004.

Significant social benefits (3.2.2)

The issues addressed should match the project being assessed. For example, a chemical works or power station will not usually reduce flood risk directly.

Wider social benefits (3.2.4)

There are three main issues to be considered for this criterion and 3.2.5:

- social impacts *during construction* on the workforce and on the local community, for example facilities for the workforce, increased traffic, congestion, influx of the workforce into the local community, and potential severance through the location of, and arrangement for, site access;
- social impacts on the local community as a result of the *existence of the finished project*, for example, severing communities (by a road scheme), linking communities (bridge), increased traffic, greater mobility, improved services, and/or increased employment; and
- social impacts on users and/or occupiers of the completed project, which are influenced by its *design*.

Health and wellbeing of future users or neighbours (3.2.5)

These measures must be beyond the legislation requirements of health and safety regulations. These recommendations may come from a Health Impact Assessment (HIA).

Whilst Health and Safety Plans do require consideration of the health of operators, this requirement is looking for the less tangible health issues that are not covered by legal requirements. Examples include the provision of natural light within buildings (such as covered wastewater treatment works), provision of planters for growing fruit and vegetables, or facilities for sports and outdoor games which will indirectly improve the wellbeing of operators. If the recommendations of a HIA for the project have been incorporated into the design, credits can be awarded.

Community diversity (3.2.6)

In terms of the needs of disabled people and the elderly, consideration needs to be given to the needs of people with non-physical impairments (such as sensory impairments). The detailed execution at the construction stage is key to the usability of a project or asset by people with disabilities – such as if health and safety requirements result in a toilet door being hung the opposite way it may result in the toilet being unusable by a wheelchair user. With regards to different cultures, consideration should be given to using clear visual messages and using different languages in signage.

Enhancement beyond functional requirements (3.2.7)

Example measures could include: providing viewing points, picnic areas and lay-bys with toilets on road and bridge projects; viewing points and picnic/leisure areas on dams and reservoirs; footpath access to river frontages after new flood defence schemes are built; providing additional moorings on waterway embankment protection works. For the construction stage, measures could include high quality screening.

A key aspect that can affect what is often termed 'joy in use' is the detailed execution at the construction stage. Poor detailing can negate the best design by either adding a point of visual dysfunction or result in the asset being less user-friendly. Examples can be the late addition of ventilation units to a structure due to poor specification or inappropriate design changes, or pathways that make sudden turns to avoid other infrastructure. Alternatively, positive changes during the construction stage can improve 'joy in use'.

Partnership links (3.2.8)

For every project, at the design and construction stage, even in remote locations or on small projects, there is likely to be potential to establish links with local schools, residents or community groups, or other organisations that could benefit from an exchange of skills or donation of material or knowledge. Examples of links could include donation of surplus materials to community organisations (such as local construction colleges, or voluntary groups), physical improvement of community infrastructure (such as repairs to village halls, community centres or parks) or links with schools to raise awareness of the role of civil engineering in society and the career paths it has to offer.

Social impacts and benefits during construction (3.2.9)

This is seeking for the Contractor to have actively assessed in advance all of the effects of the works on neighbours and the local community and compared them to the background conditions. The assessments need to include those generated by their supply chain, and the works planned accordingly. Issues that need to be addressed in such an assessment include but are not necessarily limited to:

- Nuisances such as noise, dust, vibration, odour, light pollution and blown waste.
- Impacts on traffic and available road space from delivery of materials and components, collection of wastes, and staff travel.
- Visual impact of the site and its boundary fencing.
- Vibration effects on neighbouring buildings.
- Effects on nearby historic assets.
- The potential increase in flood risk to others arising from the construction stage, especially of temporary works.
- Respect shown to neighbours and passers-by by the staff and workforce.
- Opportunities for work on the project by local people.
- Management of access to or viability of local businesses or community facilities.

Guidance on these issues is available in the appropriate sections of this manual.

Implementing partnership links during construction (3.2.10)

For Design & Construction Assessments or Construction Only Assessments where the Client has not identified any partnership links, the Designer or Contractor may identify partnership links in place of the Client.

Evidence

Assessment criteria	Evidence guidance
3.2.1 Social impacts and benefits assessment (fixed)	Evidence could be a document entitled 'Social Impacts and Benefits Analysis' or similar with the attributes indicated in 3.2.2 and the guidance. Alternatively, it could be a series of less-broad analyses that, taken together, provide the high-level, strategic overview that can provide significant input to the project concept and design. Note that evidence for 3.2.1, 3.2.2 and 3.2.3 could be found in the results of a combined economic and social impacts and benefits study.
3.2.2 Significant social benefits (fixed)	
3.2.3 Supporting social benefits in contracts	
3.2.4 Wider social benefits	Evidence could include a formal social impact assessment, the human factors aspects of an environmental appraisal, records of wide-ranging stakeholder consultation or similar. Any evidence provided should demonstrate consideration of all three points listed in the guidance.
3.2.5 Health and wellbeing of future users or neighbours (fixed)	Evidence could include the design brief, meeting minutes, and reports from assessments and/or consultation. A Health and Safety Plan, Construction Phase Plan and/or Health and Safety Records File prepared for health and safety regulations that does not expressly also include future users and occupants of the completed project is not sufficient.
3.2.6 Community diversity	Evidence would be in the design brief, design team meeting minutes, civic awards, or code of construction practice.
3.2.7 Enhancement beyond functional requirements	Evidence can be in the form of briefs, specifications and other documents that demonstrate inclusion of features that give benefit to occupiers and/or users. At design stage, design records or drawings could show incorporation of these features. At the construction stage, photographs or 'as complete' drawings which demonstrate how the design concept has been met or exceeded.
3.2.8 Partnership links (fixed)	Evidence of partnership links that have been identified and promoted, for example in reports or records of meetings.
3.2.9 Social impacts and benefits during construction (fixed)	Evidence will be in the reports of the assessments and in the CMP or equivalent.
3.2.10 Implementing partnership links during construction	Appropriate evidence needs to be provided to show the relationships formed and how extensive they are in relation to the scale of the project.

3.3 Wider economic benefits

Aim

To identify and implement actions that minimise negative economic impacts and increase wider economic benefits during the project's construction and operation.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
3.3.3 Supporting economic benefits in contracts	This can be scoped out only if there are genuinely no issues to be addressed from 3.3.2.

Credit summary

Assessment criteria	Strategy	Design	Construction
3.3.1 Economic impacts and benefits assessment (fixed)	10		
3.3.2 Significant economic benefits (fixed)	28 (up to)		
3.3.3 Supporting economic benefits in contracts	11		
3.3.4 Involvement of local firms (fixed)	17		17

Assessment criteria

3.3.1 Economic impacts and benefits assessment (fixed)

Str	Des	Con
10		

3.3.1.1 The Client and/or Designers have undertaken an economic impacts and benefits assessment of the project on a wider scope than just the project owners' interests.

3.3.2 Significant economic benefits (fixed)

Str	Des	Con
28 (up to)		

3.3.2.1 The assessment demonstrates significant economic benefits of the project to wider society on the following or similar issues that are relevant to the project:

	Outcome	Credits (each)
(i)	Promoting other beneficial development	7 for each feature (up to a maximum of 4 features)
(ii)	Economic renewal and revitalisation of the community in which the project is placed	
(iii)	Creation of new construction jobs, skills, apprenticeships or work experience opportunities	
(iv)	Creation of long-term, post-construction jobs and/or skills enhancements	
(v)	Reduction of travel times	
(vi)	Increased export opportunities	
(vii)	Efficiency improvements that have wide application	
	Or, if fewer than four features apply to the project being assessed and significant economic benefits of the project to wider society are demonstrated on all of them	28

3.3.3 Supporting economic benefits in contracts

Str	Des	Con
11		

3.3.3.1 Where appropriate, actions to support the results of these economic impacts and benefits assessments have been included within relevant contract documentation.

3.3.4 Involvement of local firms (fixed)

Str	Des	Con
17		17

3.3.4.1 The Client has specific plans or targets to *actively encourage* local firms to quote for work, competitively or otherwise. These plans or targets have been implemented or achieved during construction. Or evidence is provided showing why local firms are not appropriate.

Guidance

Economic impacts and benefits assessment (3.3.1)

BREEAM Infrastructure leaves to the Client their own economic analysis, justification and decision-making about whether to proceed with a project – it is the Client's business and BREEAM Infrastructure does not seek to make judgements about that aspect of project development. However, there is an increasing view that project teams should seek to deliver genuine benefits to a wider group than just the Client's narrow interests. An economic benefits assessment of the project on a wider scope than just the project owners' interests is likely to lead to identification of opportunities to deliver enhanced value to the community in which the project is constructed and will operate.

Issues that such an analysis is likely to have to cover to be of significance to the project and community are listed in 3.3.2 but need not be limited to the aspects listed. The aim should be for the study to be in scale with the nature, location, context and size of the project and seek the greatest social and environmental good for the investment involved, without detracting from the Client's economic case and benefits.

Significant economic benefits (3.3.2)

The issues addressed should match the project being assessed. For example, a water treatment works will not usually reduce journey times.

Involvement of local firms (3.3.4)

Plans or targets for showing *active encouragement* does not mean asking specific companies to bid based on their location. It simply means giving every company an opportunity. Making sure the opportunity is advertised in the right places (e.g. local papers as well as the European Union (EU) Journal) is an example of showing active encouragement. Competition rules may prevent selection on grounds of location or proximity, but do not prevent *encouraging* local firms to bid for work on the same terms as any other bidder.

Encouraging local companies to work on the project is part of thinking more broadly about how the works can provide additional value to the local community, from a combined economic, social and environmental perspective. Following on from a review of the economic, social and environmental impacts, the use of local skills and labour can have additional benefits in community pride and perceived ownership. For supply of specialist items or services, local may mean neighbouring countries, as opposed to remote countries in other continents.

Metric guidance

Metrics or targets set by the Client may include the proportion of materials and services sourced from within a certain radius of the projects (such as 40 km) or a defined geographical area (such as local authority boundary). The benefits of setting aspirational targets to source materials and services locally include community engagement and 'ownership' of the scheme, providing jobs to the local community, reducing transportation costs and use of fossil fuel.

The aspirational targets set and measures of how the targets have been met will require a justifiable geographic definition of the chosen local boundaries of the project. An example of a measure for reporting achievement may be:

Proportion of local firms or suppliers that have quoted for appropriate work packages, calculated using a formula such as:

$$\frac{Applications/quotations\ received\ from\ local\ firms\ or\ suppliers}{Total\ number\ of\ identified\ viable\ local\ firms\ or\ suppliers} \times 100$$

Evidence

Assessment criteria	Evidence guidance
3.3.1 Economic impacts and benefits assessment (fixed)	Evidence could be a document entitled 'Economic Benefits Analysis' or similar, with the attributes indicated in 3.3.2 and the guidance. Alternatively, it could be a series of less-broad analyses that, taken together, provide the high-level, strategic overview that can provide significant input to the project concept and design. Note that evidence for this criterion and 3.2.1, 3.2.2, 3.2.3 could be found in the results of a combined economic and social impacts and benefits study.
3.3.2 Significant economic benefits (fixed)	
3.3.3 Supporting economic benefits in contracts	
3.3.4 Involvement of local firms (fixed)	Evidence could be a copy of the Client's requirements to encourage local firms to apply for work and a summary of materials or services to procure in line with these requirements. The mere fact that one or two suppliers happened to have been local cannot be considered as sufficient evidence. Evidence could alternatively include the calculation and reporting of the metric-based guidance.

4 Land use and ecology

Summary

This category aims to promote the reuse of previously disturbed land so minimising negative impacts on biodiversity and the natural environment generally. It promotes outcomes that enhance ecological value through protection and enhancement of habitat in support of biodiversity whilst also promoting the enhancement of associated social and health value wherever possible.

Category summary table

Assessment issues	Credits available
4.1 Land use and value	187
4.2 Land contamination and remediation	186
4.3 Protection of biodiversity	92
4.4 Change and enhancement of biodiversity	90
4.5 Long-term management of biodiversity	45
	600

4.1 Land use and value

Aim

To encourage the efficient use of land, minimise the use of undeveloped land, and enhance land value on and around the project site.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
4.1.1 Land use strategy	This can be scoped out if there are genuinely no new uses of land associated with the project (for example, the creation of an offshore wind farm that uses only existing on-land facilities).
4.1.2 Project location alternatives	This can only be scoped out in situations where the Client can demonstrate that they had absolutely no choice about the project's location, for projects that involve structures that are necessary for health and safety (for example, navigation equipment along coastlines or in the sea, or improvements to waste-water treatment plants) or to enable access to a site for public education or enjoyment.
4.1.3 Consideration of project location alternatives	
4.1.4 Site suitability	This can only be scoped out on projects that can demonstrate site suitability is not relevant, such as land remediation works.
4.1.5 Justification of site suitability	
4.1.6 Land use efficiency	Scope out for refurbishment projects that do not involve any change to the land take or seabed use of the facilities to be refurbished or for projects where the project team genuinely has no ability to consider land take.
4.1.7 Selecting temporary land	Scope out only if the project team can demonstrate that no land is used for temporary facilities. An example could be an offshore wind farm where all land-based activities use existing facilities such as factories, roads and ports.
4.1.8 Temporary land use	
4.1.9 Previous use of the site	Scope out only for marine and offshore projects where there is no use of land on shore.
4.1.10 Conservation of soils and other on-site resources	The decision to scope out will depend on the nature, scale, location and context of the project.

Credit summary

Assessment criteria	Strategy	Design	Construction
4.1.1 Land use strategy	3		
4.1.2 Project location alternatives	27		
4.1.3 Consideration of project location alternatives	27		
4.1.4 Site suitability	27 (up to)		
4.1.5 Justification of site suitability	27		
4.1.6 Land use efficiency		26	
4.1.7 Selecting temporary land	2	2	4
4.1.8 Temporary land use			8
4.1.9 Previous use of the site	20 (up to)		
4.1.10 Conservation of soils and other on-site resources	14		

Assessment criteria

4.1.1 Land use strategy

4.1.1.1 The project brief includes instructions to consider how to balance land use efficiency with other priorities.

Str	Des	Con
3		

4.1.2 Project location alternatives

4.1.2.1 The Client has collected sufficient, relevant information to be able to make appropriate and positive decisions on the project's location.

Str	Des	Con
27		

4.1.3 Consideration of project location alternatives

4.1.3.1 There was a demonstrable process for considering the relative merits of the project location alternatives.

Str	Des	Con
27		

4.1.4 Site suitability

4.1.4.1 Desk and site studies have been undertaken that assisted the Client in confirming that their chosen site was suitable.

Str	Des	Con
27 (up to)		

	Outcome	Credits
(a)	Comprehensive desk study.	19
(b)	Comprehensive information, thorough desk study, and site walkover.	27

4.1.5 Justification of site suitability

4.1.5.1 There was a clear process for the evaluation of the key risks and opportunities of the site.

Str	Des	Con
27		

4.1.6 Land use efficiency

4.1.6.1 The land-take of different scheme designs, process designs and layouts of the planned works has been calculated, and these calculations have influenced the design process and the land-use efficiency of the final design.

Str	Des	Con
	26	

4.1.7 Selecting temporary land

4.1.7.1 A formal process for selecting temporary land for construction has been employed.

Str	Des	Con
2	2	4

4.1.8 Temporary land use

4.1.8.1 The construction team has made effective use of land resources made available to them **and** minimised the long-term adverse impacts of the temporary greenfield land take during construction.

Str	Des	Con
		8

4.1.9 Previous use of the site

4.1.9.1 The site has been previously used for built development.

Str	Des	Con
20 (up to)		

	Outcome	Credits
(a)	25% or more previously developed	4
(b)	50% or more previously developed	12
(c)	75% or more previously developed	20
(d)	Refurbishment project	20

4.1.10 Conservation of soils and other on-site resources

Str	Des	Con
14		

4.1.10.1 Apart from the actual land take, the site selection and design of the project also took into consideration the conservation of topsoils, subsoil, seabed surface geology, and conservation or use of on-site mineral resources.

Guidance

Project location alternatives (4.1.2)

In civil engineering, there is often little or no choice of project location – for example a remodelling of a motorway or railway junction. However, there *are* projects where there are opportunities for an active choice of site location to be made on a range of grounds – for example lighthouses, canal-side or riverside marinas, water treatment works or a new reservoir – so this is challenging Clients to actively consider issues of site characteristics, environmental issues and flood risk in their selection of the most appropriate location for their project.

Site suitability (4.1.4)

In addition to site visits, information on past land or seabed uses may have been collected through research of historic maps and charts. Site condition reports that summarise a range of previously collected data are commercially available in some countries. National government departments or agencies may also provide background information on site sensitivities and land condition.

Studies should also include consideration of current planning policies or resource development policies.

Justification of site suitability (4.1.5)

The collected information from 4.1.4 must be systematically analysed to establish the key risks and opportunities of the site. This may or may not have included attributing scores or weight to different areas but understanding the character of the site is key to designing an appropriate development. Such a study may result in a different site selection, i.e. the current site may be different from the original site proposed as a result of this process.

Land use efficiency (4.1.6)

Although it is always important to use land efficiently, it is increasingly clear that in certain circumstances minimising the use of land increases adverse impacts in other areas of environmental and social concern. For example, in Ireland, there is increasing use of constructed wetlands for wastewater treatment works.

These 'consume' land for the constructed beds, but are created in such a way that the paths around them can be used for recreation, and the energy consumption of the 'works' is as low as 6kW total installed capacity, which runs a few hours each day. This solution 'trades' the use of land for reduced energy consumption and is regarded as a more-sustainable solution than conventional works when the land and topography suits the need.

Selecting temporary land (4.1.7)

Contractors are sometimes left with the responsibility of obtaining additional land for construction compounds; spoil storage sites and stocking yards. Primarily this will relate to temporary land use, in particular whether selection and use of site compounds and material storage areas have considered the environment, and to any efforts made to minimise land take for temporary compounds and works.

Metric guidance

This may be assessed by calculation of the land take of temporary works, in relation to total land take of both permanent and temporary works, through a metric such as:

Percentage of temporary (construction works) land take to total temporary and permanent land take of all civil engineering works, using a formula such as:

$$\frac{\textit{Total land take of works} - \textit{Land take of completed permanent works}}{\textit{Total land take of project for all construction and operation of completed works}} \times 100$$

The resultant value of this measure should be as small as possible and evidence of measures taken to reduce it should be provided. This calculation can also be complemented by classification of the previous use of the land taken for temporary works.

Like permanent land take, temporary land take should not use land with high biodiversity nor should it obstruct or consume public pathways or active social spaces.

Previous use of the site (4.1.9)

Construction of civil engineering projects on previously developed sites assists with regeneration, potentially revitalising local communities and conserving undeveloped land (called 'Greenfield land' or 'Greenfield sites' by many references). Land re-use is in line with government policy, current thinking on planning, and compatible with the principles of sustainable development.

However, such previously developed sites (called 'Brownfield' or 'derelict' land or sites by many references), particularly in industrial or urban areas, may also have special ecological and/or historical interest. They may provide temporary open space that is especially valued in a neighbourhood and may need to be replaced with permanent open space rather than be developed. To take account of this, for the purposes of this document, the definitions of the terms 'Greenfield' (undeveloped) and 'Brownfield' (previously developed) have been adapted accordingly and are given in the definitions below.

Integral areas of infrastructure that are 'green', such as grass verges or embankments that are included in the project area or site boundary, should be considered in the scoring and if, for example, they make up 45% of site then score as >50% previously-developed but not >75%.

If a site is being developed that falls under the exclusions given below in the definition of "previously developed", then it should be treated as an undeveloped ('Greenfield') site and awarded zero credits.

Conservation of soils and other on-site resources (4.1.10)

The emphasis of this criterion is on the avoidance of the highest value and/or most productive soils. Soils can be of high value because of the habitats they support, the role they play in wider environmental quality, the carbon they contain or simply highly valued in their own right. Lack of use of soils and minerals due to poor quality of these materials can still score credits, but evidence of this must be presented – 'best use' can be the non-use of soils and minerals, which also minimises the environmental impacts of excavation, transport and/or disposal of the excavated material.

Note: Further credits for the preparation and implementation of a soil management plan and for the re-use of subsoil and topsoil are available in 7.4 Circular use of construction products.

Evidence

Assessment criteria	Evidence guidance
4.1.1 Land use strategy	Evidence is likely to be found in contract documents. The evidence must be in scale to the nature, location, context and size of the project. A two-page summary report would be insufficient for a multi-million-pound project, yet a 100-page detailed analysis is very unlikely to be appropriate for projects in the region of £1M.
4.1.2 Project location alternatives	Evidence must be provided to demonstrate that genuine consideration of options has been undertaken.
4.1.3 Consideration of project location alternatives	
4.1.4 Site suitability	Evidence would ideally be in the form a single comprehensive desk study. It may be that the information is a collation of existing site assessments, investigations, and evaluation reports (such as archaeological or geotechnical reports and data searches). The desk study will contain information that is relevant to other sections of the BREEAM Infrastructure Assessment. Alternatively, desk studies could identify issues from previously completed investigations. It is possible that the EIA could provide some of the information. Note that to score as 'comprehensive' the reports should include not just geo-environmental information but a general assessment of the site with regard to engineering, environmental and planning policies. The report should identify shortfalls in available information.
4.1.5 Justification of site suitability	
4.1.6 Land use efficiency	Evidence must be provided to demonstrate that specific attention, above normal practice, has been given to the scheme design with the express intention of enhancing land-take efficiency

Assessment criteria	Evidence guidance
4.1.7 Selecting temporary land	Evidence could be found in evaluation of options: calculations derived from alternative site layouts, including identified environmental constraints; comparisons between land made available to the construction team and land actually used; plans; site guidelines; a method statement for set-up of the compound; and photographs. Evidence could also cover the areas of temporary land take that have been avoided to prevent disturbance, such as cordoning off woodlands or grass verges from the site. Photographs may also provide evidence of land use. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
4.1.8 Temporary land use	
4.1.9 Previous use of the site	Evidence could include calculations derived from site layouts or information contained in the EIA, historic photos and maps. Photographs may also provide evidence of existing land use.
4.1.10 Conservation of soils and other on-site resources	Evidence could be in the form of a Soils Resource Plan, documented statements in appropriate reports or meeting notes about the optimal use of soils.

Definitions

Previously developed (or 'Brownfield')

Previously developed (or 'Brownfield') land or sites are those that have been used for built development, and this use is still evident in the form of buildings or structures or their remains, a significant cover of made ground, or soil or groundwater pollution from activities conducted on the site. They may or may not be contaminated. Brownfield sites are sites which, according to the Concerted Action on Brownfield and Economic Regeneration Network (CABERNET) (2007):

- have been affected by former uses of the site or surrounding land;
- are derelict or under-used;
- are mainly in fully or partly developed urban areas;
- may have real or perceived contamination problems; and/or
- require intervention to bring them back to beneficial use.

In respect of development on previously used land, a useful definition is:

"Previously-developed land is that which is or was occupied by a permanent structure, including the curtilage of the developed land and any associated fixed surface infrastructure."

Exclusions to 'previously developed land' include:

- Land that is or has been occupied by agricultural or forestry buildings.
- Land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures.
- Land in built-up areas such as parks, recreation grounds and allotments, which, although it may feature paths, pavilions and other buildings, has not been previously developed.
- Land that was previously developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time (to the extent that it can reasonably be considered as part of the natural surroundings).

If land is being developed that falls under the above exclusions, then it should be treated as undeveloped ('Greenfield') land.

Undeveloped (or 'Greenfield')

Undeveloped (or 'Greenfield') land or sites are defined as those that are *essentially covered in vegetation* whether natural or cultivated, with no evidence of substantive *recent* built development remaining (although they could encompass sites of archaeological importance), or where uses have been essentially restricted to agriculture, gardens, parkland or playing fields.

4.2 Land contamination and remediation

Aim

To encourage the appropriate use of land affected by contamination and to promote sustainable land and ground water remediation.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
4.2.2 Further assessment of contamination	This can be scoped out only if the formal study in 4.2.1 indicated that these additional studies would be unnecessary or inappropriate.
4.2.3 Land contamination specialists	If no study(ies) has taken place as part of 4.2.1, then it is unlikely that this can be scoped out. The decision to scope out will depend on the outcome of the formal study in 4.2.1 or on the nature, scale, location and context of the project.
4.2.4 Land contamination management procedures	If no study(ies) has taken place as part of 4.2.1, then it is unlikely that this can be scoped out. The decision to scope out will depend on the outcome of the formal study in 4.2.1 or on the nature, scale, location and context of the project.
4.2.5 Evaluation of remediation options	Scope out if remediation was not part of the scope of work being assessed. If no study (ies) has taken place as part of 4.2.1, then it is unlikely that this can be scoped out. The decision to scope out will depend on the outcome of the formal study in 4.2.1 or on the nature, scale, location and context of the project.
4.2.6 Ground-generated gases	Scope out if the studies answering 4.2.1 show that no ground-generated gases were present. If no study(ies) has taken place as part of 4.2.1, then it is unlikely that this can be scoped out. The decision to scope out will depend on the outcome of the formal study in 4.2.1 or on the nature, scale, location and context of the project.
4.2.7 Implementation of remedial solution	The decision to scope out will depend on the nature, scale, location and context of the project
4.2.8 Long-term effectiveness of remedial solution	The decision to scope out will depend on the nature, scale, location and context of the project
4.2.9 Prevention of future contamination	This can be scoped out if no on-site contamination had been identified and therefore no remediation was necessary and there is no new or existing use on or near the site involving any potential contaminants.

Credit summary

Assessment criteria	Strategy	Design	Construction
4.2.1 Contamination risk assessment (fixed)		8	
4.2.2 Further assessment of contamination		14 (up to)	
4.2.3 Land contamination specialists		27	
4.2.4 Land contamination management procedures		14 (up to)	
4.2.5 Evaluation of remediation options		38 (up to)	
4.2.6 Ground-generated gases		27 (up to)	
4.2.7 Implementation of remedial solution			17

Assessment criteria	Strategy	Design	Construction
4.2.8 Long-term effectiveness of remedial solution		30 (up to)	
4.2.9 Prevention of future contamination		11	

Assessment criteria

4.2.1 Contamination risk assessment (fixed)

Str	Des	Con
	8	

4.2.1.1 The desk study covered by 4.1.4 was a formal study assessing risk and implications that may be associated with the land or seabed. It includes issues related to soil, groundwater, gas, residual man-made structures and surrounding land uses, or it has been extended into such a suitably formal and detailed study. The study required for this may not be the same one used in 4.1.4.

4.2.2 Further assessment of contamination

Str	Des	Con
	14 (up to)	

4.2.2.1 The study goes beyond the requirements of 4.2.1 to provide additional input to project decision-making.

	Outcome	Credits
(a)	Comprehensive information through desk study, site walkover or subsea survey, and adequacy of information assessed against risk.	6
(b)	The desk study additionally includes visual and descriptive illustrations of the links between contaminant source, pollution pathways and receptors on site.	14

4.2.3 Land contamination specialists

Str	Des	Con
	27	

4.2.3.1 If the studies mentioned in 4.2.1 and 4.2.2 have suggested that contamination may be present on site, then a suitably experienced chartered land contamination specialist has been consulted.

4.2.4 Land contamination management procedures

Str	Des	Con
	14 (up to)	

4.2.4.1 If contamination was present on site, the site was assessed in line with appropriate local procedures for the management of land contamination or, where not available, in accordance with other internationally recognised best practice.

	Outcome	Credits
(a)	A report defining risk assessment	9
(b)	A report evaluating feasible remediation options and determining the most appropriate remediation strategy for the site	14

4.2.5 Evaluation of remediation options

Str	Des	Con
	38 (up to)	

4.2.5.1 If the site had been contaminated, and remediation was part of the scope of work being assessed, there is evidence that one of the following outcomes has been achieved.

	Outcome	Credits
(a)	Feasible remediation options have been evaluated and the most appropriate remediation strategy determined for the site as agreed by an appropriate expert.	18
(b)	The remedial solution removed or eliminated the need to landfill and material removed in the remediation was utilised in other construction projects (other than landfill construction or cover).	28

	Outcome	Credits
(c)	If the remediation options were evaluated and agreed by an appropriate expert, the selected remedial solution was above the minimum requirements of the regulatory authority and either used innovative technology or innovative application of existing technology or increased the potential utility of the project site beyond the immediate project.	38

4.2.6 Ground-generated gases

Str	Des	Con
	27 (up to)	

4.2.6.1 If ground-generated gases were present, there is evidence of risk reduction and management in place and fully implemented.

	Outcome	Credits
(a)	Yes	11
(b)	Yes, and design and implementation was not reliant on management and intervention that was 'fit and forget'.	27

4.2.7 Implementation of remedial solution

Str	Des	Con
		17

4.2.7.1 The impacts of the implementation of the remedial solution have been assessed **and** appropriate control measures been put in place.

4.2.8 Long-term effectiveness of remedial solution

Str	Des	Con
	30 (up to)	

4.2.8.1 The effectiveness and durability of the remedial solution, and maintenance and monitoring, have been considered over the lifetime of the project and beyond, **and** operational information conveyed to the operator.

	Outcome	Credits
(a)	Some evidence	10
(b)	Evidence is captured in a Validation Report and Operations Manuals	25
(c)	If warranties and insurance are in place in addition to having a Validation Report and Operations Manuals	30

4.2.9 Prevention of future contamination

Str	Des	Con
	11	

4.2.9.1 Pollution control measures are in place to prevent any future contamination occurring in relation to the site.

Guidance

Contamination risk assessment (4.2.1)

This is addressed once a site has been chosen for the project. A suitable formal desk study has to be carried out in order to establish whether there is a potential for a site to be contaminated.

A formal desk study will involve a review of published data and site surveys and should cover at least the following aspects:

- Identification of the regulatory regime for the site or area
- Review of historical maps
- Review of the underlying geology and hydro-geological regime
- Walk-over survey of the site

The study should include a preliminary qualitative risk assessment based on the above data followed by an overall identification of potential environmental liabilities associated with the site.

The information identified in the study covered by 4.1.4 will be drawn on but the adequacy of the information may be insufficient to allow confidence in the risk assessment and more work may need to be undertaken.

Note that in some cases, 4.1.4 and 4.2.1 may be answered by the same study – it will depend upon how the project development has been organised and upon the site options available to the Client.

Further assessment of contamination (4.2.2)

Physical inspection of the site in the form of a walkover is important in understanding the dynamics of the site. Walkovers and investigations have to be carried out before the design process commences so that the design can take the results into account.

Land contamination specialists (4.2.3)

A suitably experienced chartered land contamination specialist will be a recognised professional ***and*** **have appropriate relevant professional land contamination experience**.

Land contamination management procedures (4.2.4)

No specific guidance provided.

Evaluation of remediation options (4.2.5)

Use of soil (bio) treatment centres is welcomed but the product must be put back into the chain of utility and not simply used to provide cover or construction materials for landfill projects.

An innovative technology or innovative application is one where, for example:

- it can be defined as a new application in the country or region; and
- there is other substantial information such as reported research to demonstrate innovation.

Which technology is most appropriate will depend on the site conditions, the type and extent of contamination, and the intended use. 'Dig and encapsulate on site' includes cover layers and vertical barriers such as slurry walls, which can contain, but do not destroy, contaminants. Cement-based technologies (stabilisation or solidification) can immobilise contaminants for several decades or longer. Physical remedial processes can result in concentrated residues or transfer of contaminants to an alternative media (for example, soil washing, and soil vapour extraction). Biological remedial processes breakdown or change organic contaminants in soil or groundwater into less mobile or less harmful form (bioremediation). Chemical remedial methods involve the addition of chemicals to soil or groundwater to make contaminants less harmful.

In each case, the most sustainable remediation solution should be identified through an appraisal of options.

Ground-generated gases (4.2.6)

This includes protective measures in the ground or in buildings and structures.

Protection from hazardous gases can be achieved through creating barriers to prevent migration into buildings or between sites, or to create preferential pathways through which gases can be safely vented.

Verification may be required through long-term monitoring of potential pathways or accepted compliance points to ensure no further increase in the levels of contamination (for example from 'bounce-back' from some remediation processes) and/or confirm reducing pollutant values, which is a particular requirement for monitored natural attenuation.

Externally verified validation of remediation is often not conducted, and there is still little information on the long-term performance of many remediation technologies.

Implementation of remedial solution (4.2.7)

All appropriate control measures should have been in place for noise, dust and pollution control during the remediation phase. For example, for transport of contaminated soil off-site, this would include wheel washing, sheeting and the provision of relevant documentation. On-site measures may include fencing off and signposting the contamination, as well as ensuring that no migration of the contamination is taking place. No significant negative impacts should result from the remediation process.

Storage of material on site prior to disposal may fall under the relevant waste management controls and therefore the appropriate permits, licenses or exemptions will be required. The management of waste is covered in Resources, but activities involving the storage and collection of waste should also be recorded in the Site Waste Management Plan.

Long-term effectiveness of remedial solution (4.2.8)

Evidence should be available regarding the longevity of the remedial solution and normal maintenance requirements. The projected lifetime of the development must not be greater than the lifetime of the remedial solution. Long-term monitoring is

required to ensure the continued effectiveness of some solutions, including natural attenuation, permeable reactive barriers, slurry walls, ongoing process-based treatments for groundwater.

Monitoring arrangements will depend on the type of remediation method chosen and its projected lifetime. Where monitoring is necessary, there should also be contingency plans in case monitoring data should demonstrate any fault or deterioration in the remedial solution

Prevention of future contamination (4.2.9)

This applies to any possible contamination resulting from the new use of the site or any other potentially contaminating use adjacent to the site. How likely this is, how severe any potential contamination would be, and what kind of preventative measures should have been taken, depends on the nature of the project and should be assessed accordingly.

For example, in the design of new facilities such as offshore pipelines and oil and gas production facilities, fuel tanks, waste storage areas, chemical stores or processes that include chemical use, new infrastructure should be built to current standards to prevent future contamination of ground and groundwater. Where the subject site has been cleaned up, but the neighbouring site is potentially contaminated and there is a risk of migration onto the site resulting in recontamination, evidence should be available to demonstrate that measures have been taken to control the risk.

Evidence

Assessment criteria	Evidence guidance
4.2.1 Contamination risk assessment (fixed)	Evidence should include an outline study including a risk assessment of contamination affecting current and future receptors including consideration of how the outline proposals will affect any source-pathway-receptor linkages. This is best represented in an outline conceptual site model.
4.2.2 Further assessment of contamination	
4.2.3 Land contamination specialists	Evidence could include further reports or notes of discussions with a specialist or even a specialist in land condition verifying the initial findings and where appropriate identifying strategies to deal with contamination.
4.2.4 Land contamination management procedures	Evidence could be in the form of a remediation strategy outlining the methods and values to be achieved.
4.2.5 Evaluation of remediation options	Evidence could again be in the form of a remediation strategy and action plan, which has been approved by a relevant local or national government department, agency, or regulator. Evidence is also required of any relevant permits, licenses or exemptions. To award full credits the innovative technology must fit the criteria specified above.
4.2.6 Ground-generated gases	Evidence will be likely to include design details and a monitoring plan.
4.2.7 Implementation of remedial solution	Control measures, monitoring data, regulatory visits and actions and waste disposal activities should all be documented, and this documentation should be available to demonstrate that this was the case, for example a SWMP, other site records (photographic or otherwise), delivery, transfer or consignment notes, or invoices.
4.2.8 Long-term effectiveness of remedial solution	Evidence should demonstrate that the remedial solution appropriately meets the requirements outlined in the guidance above.
4.2.9 Prevention of future contamination	Evidence could show the implementation of recommendations from any remediation strategy, including provision of appropriate monitoring facilities. Evidence could be drawings or photographs showing the installed features.

4.3 Protection of biodiversity

Aim

To avoid biodiversity loss wherever possible and limit negative impacts on biodiversity arising as a result of the project where these are unavoidable.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
4.3.1 Prerequisite: Surveys for protected species	The decision to scope out will depend on the nature, scale, location and context of the project.
4.3.2 Prerequisite: Injurious or invasive species	If no surveys have taken place to identify injurious or invasive species, then it is unlikely that this can be scoped out. The decision to scope out will depend on the outcome of the surveys or on the nature, scale, location and context of the project.
4.3.3 Survey and evaluation of ecological value	The decision to scope out will depend on the nature, scale, location and context of the project.
4.3.5 Further consultation with nature conservation organisations	If the initial consultation in 4.3.4 has established that there are no nature conservation matters to consider, then 4.3.5 may be scoped out for design and construction.
4.3.6 Land of high ecological value	This can only be scoped out if the project involves structures that are necessary for health and safety (for example, navigation equipment along coastlines), to enable access to a site for public education or enjoyment, or for refurbishment projects that happen to be in areas of high ecological value. In addition, for a Design Only Assessment or for town/city centre works in public spaces schemes, this can be scoped out in situations where the Designer had no influence over the choice of location. Evidence for this would be in the brief.
4.3.8 Managing negative impacts on existing ecological value	This can only be scoped out if surveys have shown there are no existing ecological features on site.
4.3.9 Monitoring protection, mitigation, and compensation measures	This can only be scoped out if surveys have shown there are no existing ecological features on site.
4.3.10 Success of protection, mitigation, and compensation measures	Scope out if the timescale of the assessment does not allow for gathering of conclusive monitoring data.

Credit summary

Assessment criteria	Strategy	Design	Construction
4.3.1 Prerequisite: Surveys for protected species	-		
4.3.2 Prerequisite: Injurious or invasive species		-	
4.3.3 Survey and evaluation of ecological value	18		
4.3.4 Initial consultation with nature conservation organisations (fixed)	4		
4.3.5 Further consultation with nature conservation organisations		2	2
4.3.6 Land of high ecological value	17		
4.3.7 Ecological works plan (fixed)	4	4	4

Assessment criteria	Strategy	Design	Construction
4.3.8 Managing negative impacts on existing ecological value		18 (up to)	
4.3.9 Monitoring protection, mitigation, and compensation measures			8
4.3.10 Success of protection, mitigation, and compensation measures			11

Assessment criteria

4.3.1 Prerequisite: Surveys for protected species

Str	Des	Con
-		

4.3.1.1 Appropriate surveys for protected plant and animal species have been specified by the Client and the resources provided to undertake them effectively.

4.3.1.2 Appropriate surveys for protected plant and animal species have been undertaken at each stage of the project.

4.3.1.3 If protected plant and animal species have been found on the project site or temporary working areas, plans for protecting these have been:

a. Drawn up and approved
b. Monitored and achieved throughout all site investigation, preparation and construction works

4.3.2 Prerequisite: Injurious or invasive species

Str	Des	Con
	-	

4.3.2.1 If invasive animal or plant species or injurious weeds have been found on site, a method statement (or equivalent) for their control and management has been:

a. Drawn up and approved before the start of construction
b. Monitored and achieved during construction

4.3.3 Survey and evaluation of ecological value

Str	Des	Con
18		

4.3.3.1 A suitably qualified ecologist has been appointed at a stage that ensures involvement with decisions relating to general and detailed site configuration and, where necessary to ensure that protection and enhancement opportunities can be realised, influence on strategic planning decisions.

4.3.3.2 Before the completion of the Brief project stage, a suitably qualified ecologist has carried out an appropriate level of survey and evaluation for the site and its zone of influence to determine the ecological baseline including:

a. Current and potential ecological value and condition of the site and related areas within the zone of influence
b. Direct and indirect risks to current ecological value
c. Capacity and feasibility to enhance the ecological value of the site and, where relevant, areas within the zone of influence.

4.3.3.3 The information and data has been collated and shared with the project team to inform the site preparation, design, and construction works.

4.3.4 Initial consultation with nature conservation organisations (fixed)

Str	Des	Con
4		

4.3.4.1 The Client has consulted with relevant nature conservation organisations on the ecological impact of the proposals and communicated the results to project team members.

4.3.5 Further consultation with nature conservation organisations

Str	Des	Con
	2	2

4.3.5.1 Consultation with relevant nature conservation organisations on the ecological impact of the proposals has been undertaken and communicated to all relevant project team members at both design and construction stages of the project.

4.3.6 Land of high ecological value

Str	Des	Con
17		

4.3.6.1 The project, including land used for temporary works, has not been placed on or used land or seabed that has been identified as of high ecological value or as having species of high value.

4.3.7 Ecological works plan (fixed)

Str	Des	Con
4	4	4

4.3.7.1 An ecological works plan or an ecological section in the integrated project management plan or site environmental management plan has been drawn up, and then implemented during construction.

4.3.8 Managing negative impacts on existing ecological value

Str	Des	Con
	18 (up to)	

4.3.8.1 Negative impacts on existing ecological value from site preparation and construction works have been managed according to the mitigation hierarchy and an outcome listed in the table below has been achieved.

	Outcome	Credits
(a)	The loss of ecological value has been limited as far as possible	9
(b)	No overall loss of ecological value has occurred	18

4.3.9 Monitoring protection, mitigation, and compensation measures

Str	Des	Con
		8

4.3.9.1 The implementation of recommendations for existing ecological features has been monitored throughout the course of the contract.

4.3.10 Success of protection, mitigation, and compensation measures

Str	Des	Con
		11

4.3.10.1 Monitoring data shows that implementation of the recommendations for existing ecological features has been successful.

Guidance

Prerequisite: Surveys for protected species (4.3.1)

Plans are likely to include guidance on appropriate times for carrying out work – for example, clearing vegetation outside the nesting season or avoiding works during spawning – together with method statements and instructions for relocation of species. Plans should be approved by all relevant parties such as the Client, Contractor and Ecologist. Under certain circumstances, especially when dealing with protected species, licences may have to be acquired and associated plans and method statements may need approval by a statutory agency.

Note that 'achievement' must be assessed appropriately up to the point of assessment, not against a prediction of what is anticipated to be achieved in the long term.

Prerequisite: Injurious or invasive species (4.3.2)

In some cases, it may not be possible to be sure that any measures to eradicate injurious or invasive plants have been wholly successful, at least not for some time after the project is completed. *Therefore the evidence to look for is whether or not all the actions that were set out in the method statement have been carried out*. If they have, the control of the plants should also have been achieved. So 'achievement' must be assessed appropriately up to the point of assessment, not against a prediction of what is anticipated to be achieved in the long-term. Constraints maps as a record of areas treated can also be a useful tool to judge whether the objectives of invasive species control has been or is being achieved.

Some other species of plants may be considered invasive and/or injurious if they cause problems to third parties. For example, in the UK, common ragwort (*Senecio jacobaea*) is a native plant that is poisonous to grazing animals, but which is of value in terms of biodiversity, not least because it is a host plant for the larvae of a UK BAP species, the cinnabar moth (*Tyria jacobaeae*). Such species should only be considered under this section if identified as a specific problem in regard to the site in question and its neighbours.

Many introduced animal species can also be classified as invasive because of reproductive or competitive advantage. Method statements are required to prevent the spread of these species to areas where they are not already present. Note also that some species of animal are also called pest species, for example brown rat and feral pigeon. However, the occurrence of these species is not usually increased by civil engineering works, and they are more a health and safety hazard for the workers than of strictly environmental concern. Their control is more closely related to good housekeeping and hence they are not dealt with here.

Note that 'achievement' must be assessed appropriately up to the point of assessment, not against a prediction of what is anticipated to be achieved in the long term.

Survey and evaluation of ecological value (4.3.3)

Where appropriate, the survey(s) must include:

1. Determining the zone of influence for the site including neighbouring land and habitats
2. Current flora, fauna (including permanent and transient species) and habitat characteristics (including but not limited to ecological features in or on built structures)
3. Habitat extent, quality, connectivity and fragmentation
4. Recent and historic site condition
5. Existing management and maintenance levels and arrangements
6. Existing ecological initiatives within the zone of influence
7. Identification of, and consultation with, relevant stakeholders impacted or affected by the site.
8. Local knowledge or sources of information.

Where appropriate, the evaluation must include:

1. Current value and condition of the site and, where relevant, the zone of influence in terms of:
    a. Features including habitats, species, food sources and connectivity
    b. Broader biodiversity and ecosystem services benefits or opportunities
2. Direct and indirect risks to current ecological value:
    a. Sensitive areas and features on or near the site
    b. Direct risks including those from human activity (such as construction work), habitat fragmentation, and potentially harmful species
    c. Indirect risks including water, noise, vibration, or light pollution
3. Capacity and feasibility to enhance the ecological value
4. Habitat restoration and creation potential
5. Impact of the proposed design, construction works and operations on site.

There may be some projects where not all items listed above will be applicable or appropriate to the site. In these cases, the ecologist should clearly state their professional view that the items are considered not applicable.

Initial consultation with nature conservation organisations (4.3.4)

Appropriate nature conservation organisations could include national, regional or local statutory bodies, plus international bodies (such as the UN or EU) and a range of non-governmental or voluntary organisations. Organisations consulted should be appropriate to represent the scope of biodiversity and ecosystems present on site and in the wider zone of influence.

This initial consultation cannot be scoped out as, even for a remote location with no apparent nature conservation interests, there may be organisations and groups that ought to be consulted.

Further consultation with nature conservation organisations (4.3.5)

See guidance for 4.3.4.

Land of high ecological value (4.3.6)

Land or marine areas that are of 'high ecological value' are:

a. those which are designated for their nature conservation value (or importance as a green corridor) by an official conservation body or local statutory body (e.g. environmental or development control authority).
b. those which have been identified as being of ecological importance by an ecological assessment of the site carried out prior to any site clearance or other activity. Any ecological assessment should have been carried out by, or carefully supervised by, a suitably qualified ecologist.

A site may be considered to be of ecological importance if it comprises national or local priority habitats or hosts high value species. Species are deemed to be of high value if they are:

- protected by international, national, or regional law
- a national or local priority species
- a Species or Habitat of Principal Importance for Biodiversity
- an International Union for Conservation of Nature (IUCN) Red List species
- nationally or locally identified as being at risk of population decline

Note that this guidance refers to any part of a site that may be of high ecological value. It may be that there are parts of a site that are of low ecological value that can be developed without any significant impact on biodiversity, even though the site itself includes land of high ecological value.

Note also that 'hosting of high value species' also includes occupation or use of air space over a site. For example, if a regular flight-path or foraging route for a protected species such as birds or bats passes through a site, then that site should be deemed to host a high value species.

As long as damage to the areas of high ecological value is avoided, the credits can be awarded.

Note that for land-based projects, designation of land as of high landscape value and high ecological value are not necessarily coincident – land can be one but not necessarily the other. Hence this requirement appears here as well as near-equivalent requirements in Landscape and historic environment.

Note also that credits cannot be scored here unless surveys or desk studies are carried out to identify the ecological value of the site.

Ecological works plan (4.3.7)

Such a plan should be of appropriate quality and should include issues such as appropriate seasons for carrying out works in order to minimise adverse impacts on wildlife, the methods to be used if this proves impossible, responding to unexpectedly finding wildlife on site, control of noxious plants, methods to prevent colonisation of the site during the project (if inappropriate), communication about these issues with project staff, and procedures for regular monitoring and reviewing.

If a plan has *not* been prepared by the Client or Designer and thus zero credits have been scored in the Strategy and Design columns, the Contractor can still score credits if they prepare *and* implement their own plan at the construction stage.

An Ecological Works Plan or an ecological section in the Site Environmental or Integrated Project Management Plan is designed to be implemented at the construction stage of the project. A site ecologist may need to be appointed to assist with implementation. Depending on the size of the project and the ecological issues involved, this can be full-time, part-time or on a Watching Brief basis as appropriate for the scale, nature and location of the project.

A form of plan or statement for considering ecological aspects of the project should be drawn up by the Client, and a preliminary version of the plan should be drawn up at the design stage. BREEAM Infrastructure is not prescriptive on the form that these plans take, and they may be included in broader planning documents as long as they are clearly identifiable and monitored. The credits for these roles are scored for drawing up the preliminary plans at the relevant stage in the project. The full score for Construction can be awarded only if there is evidence for correct implementation of the plan.

Managing negative impacts on existing ecological value (4.3.8)

The following hierarchy must be followed when managing negative impacts of the site preparation and construction works:

1. **Avoid** negative impacts on habitats and features of ecological value on the site. If it is not possible to avoid negative impacts, then:
2. **Protect** habitats and features of ecological value from damage in accordance with best practice guidelines during development works. If it is not possible to avoid all negative impacts or to protect habitats and features of ecological value, then:
3. **Reduce, limit or control** negative impacts as far as possible. Where it is not possible to avoid, protect, limit or control the negative impacts on features of ecological value on site, then:
4. **Compensate** to ensure the existing ecological value is maintained during and after the project. Compensation should be of benefit to the local ecosystems affected by the project works wherever possible.

Monitoring protection, mitigation, and compensation measures (4.3.9)

No specific guidance provided.

Success of protection, mitigation, and compensation measures (4.3.10)

The Assessor should judge these factors against recommendations and observations contained in any ecological assessment of the site. Note that 'success' must be assessed appropriately up to the point of assessment, not against a prediction of what is anticipated to be achieved in the long term.

Evidence

Assessment criteria	Evidence guidance
4.3.1 Prerequisite: Surveys for protected species	Some evidence of steps taken to safeguard protected species may be gained from documentation such as a SEMP, but a site visit or detailed records including photographs may be required to see or demonstrate examples of practical measures that have been implemented. It may also be necessary to talk to relevant staff.
4.3.2 Prerequisite: Injurious or invasive species	Evidence should be in the form of method statements or other appropriate management control. Monitoring and achievement should be evidenced by documentation that demonstrates that the method statements have been adhered to.
4.3.3 Survey and evaluation of ecological value	A formal habitat assessment or other equivalent type of assessment can act as acceptable evidence as long as it can be shown that the content of the criteria has been covered.
4.3.4 Initial consultation with nature conservation organisations (fixed)	Evidence would be demonstration of the consultation in the form of a report, minutes or correspondence. Evidence of communication would be through team meeting minutes or other briefing note.
4.3.5 Further consultation with nature conservation organisations	
4.3.6 Land of high ecological value	Evidence would be in the EIA, ecological assessment or some other environmental assessment as defined in the footnote on the previous page.
4.3.7 Ecological works plan (fixed)	Evidence needs to identify that ecological considerations (such as nesting seasons, spawning grounds, and/or protected areas of the site) have been built into the project planning. At the Strategy & Design stage, this may be incorporation of requirements into project briefs and/or tender documents and specifications. At Construction stage, it may be a stand-alone plan or part of other, more-generic, project planning documentation. Evidence of implementation should be shown through routine project progress monitoring and reporting.
4.3.8 Managing negative impacts on existing ecological value	Evidence will identify how the mitigation hierarchy has been followed and the actions taken to avoid, protect, limit, or compensate for negative impacts on existing ecological value. The outcome achieved may be demonstrated through the professional judgement of a suitably qualified ecologist.
4.3.9 Monitoring protection, mitigation, and compensation measures	Evidence could include site records that contain data and appropriate reporting/communication that shows that monitoring has taken place or is taking place.
4.3.10 Success of protection, mitigation, and compensation measures	Evidence could include site records that contain monitoring data and appropriate reporting/communication that shows measures have been successful.

Definitions

Biodiversity

The variety of plant and animal life in the world or in a particular habit at the following levels of organisation: landscape, ecosystem, habitat, community, species, population, individual, and the structural and functional relationships within and between these.

Compensation
Measures taken to make up for the loss of, or permanent damage to, ecological features despite mitigation (e.g. replacement habitat or improvements to existing habitats similar in terms of biological features and ecological functions to that lost or damaged). Compensation can be provided either within or outside the project site, in line with the following hierarchy: within site, adjacent to site, and off-site (offsetting) as a last resort.

Connectivity
The degree to which the configuration of habitat facilitates movement between and across resource patches.

Ecological baseline
The ecological baseline is the ecological value of the site before construction. The ecological baseline is used to compare performance after construction to determine if it is the same or significantly changed.

Ecological value
The importance, worth, or usefulness of a species, habitat or ecosystem in terms of its impact on other species and/or habitats, as well as the other environmental, social, cultural and economic value that can be delivered from species and habitats and their interactions (ecosystem services), specific to a geographical frame of reference.

Ecosystem
An ecosystem is a dynamic complex of plant, animal, and micro-organism communities and the non-living environment interacting as a functional unit. Ecosystems vary enormously in size; a temporary pond in a tree hollow and an ocean basin can both be ecosystems.

Ecosystem services
Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; economic value such as tourism; and cultural or social services such as health and wellbeing, recreational, spiritual, religious and other non-material benefits.

Fragmentation
The breaking up of a habitat, ecosystem or land-use type into smaller parcels with a consequent impairment of ecological function, connectivity and long-term viability.

Habitat
A place in which a particular plant or animal lives. It is often used in the wider sense referring to major assemblages (a group of species found in the same location) of plants and animals found together.

No overall loss
There has been no overall loss of ecological value on the site as a result of activities to avoid, protect, reduce, limit, control or compensate for impacts in line with the hierarchy set out in the assessment criteria in this issue. Where statutory designated sites, irreplaceable habitats or legally protected species have been impacted, all statutory requirements are met and are agreed with the relevant statutory bodies as necessary.

Suitably Qualified Ecologist (SQE)
An individual achieving all the following items can be considered 'suitably qualified' for the purposes of compliance with BREEAM Infrastructure:

1. Holds a degree or equivalent qualification in ecology or a related subject.
2. Is a practising ecologist with a minimum of three years of relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting ecology in relation to construction and the built environment including acting in an advisory capacity to provide recommendations for ecological protection, enhancement, and mitigation measures.
3. Is covered by a professional code of conduct and subject to peer review.

Zone of influence
Areas of land or water bodies impacted by the site undergoing assessment. These areas can be adjacent to the site or can be areas that are dependent on the site but not physically linked, including areas downstream from a site. Areas within the zone of influence can be negatively affected by changes on an assessment site, but they also provide further opportunity to maximise enhancement activities.

4.4 Change and enhancement of biodiversity

Aim

To enhance ecological value wherever possible on and off site as a result of the project through creation, and management of habitats and ecological features.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
4.4.1 Change in ecological value	This can only be scoped out if surveys have shown no direct or indirect risks to current ecological value and no capacity to enhance the ecological value of the site or areas within the zone of influence.
4.4.2 Enhancing existing ecological features	This can only be scoped out if surveys have shown there are no existing ecological features on site.
4.4.3 New wildlife habitats	The decision to scope out will depend on the nature, scale, location and context of the project.
4.4.4 Special structures or facilities for wildlife	Scope out only if there are genuinely no opportunities for installing such structures or if doing so is regarded as actively unhelpful, for example in reducing amenity use of the project.
4.4.5 Improving the water environment	Scope out only where there are no water bodies local to the project.
4.4.6 Improving the water environment – implementation	Scope out if the consideration for 4.4.5 concludes that no opportunities were appropriate.
4.4.7 Incorporating existing water features	This can be scoped out for marine and offshore projects or if there are no existing water features present on or near the site.

Credit summary

Assessment criteria	Strategy	Design	Construction
4.4.1 Change in ecological value		40 (up to)	
4.4.2 Enhancing existing ecological features		4	
4.4.3 New wildlife habitats		4 (up to)	8 (up to)
4.4.4 Special structures or facilities for wildlife		4	9
4.4.5 Improving the water environment		4	
4.4.6 Improving the water environment – implementation			4
4.4.7 Incorporating existing water features		13	

Assessment criteria

4.4.1 Change in ecological value

Str	Des	Con
	40 (up to)	

4.4.1.1 The change in ecological value occurring as a result of the project has been calculated in accordance with the methodology described in *GN36 BREEAM, CEEQUAL, and HQM Ecology Calculation Methodology – Route 2* (or an agreed equivalent) and the project has achieved one of the levels given in the table below.

	Outcome	Credits
(a)	Minimising loss of ecological value (75-94%)	10
(b)	No net loss of ecological value (95-104%)	20
(c)	Net gain of ecological value (105-109%)	30
(d)	Significant net gain of ecological value (110% or more)	40

4.4.2 Enhancing existing ecological features

Str	Des	Con
	4	

4.4.2.1 Recommendations for enhancing the existing ecological features of the site (in addition to any conservation, mitigation, or compensation of existing features) have been identified by a relevant specialist and incorporated in the project.

4.4.3 New wildlife habitats

Str	Des	Con
	4 (up to)	8 (up to)

4.4.3.1 Recommendations or opportunities for creating new wildlife habitats have been identified by a relevant specialist and incorporated in the project.

	Outcome	Credits	Assessment stage
(a_1)	Plans for creating new habitats have been drawn up	2	Design
(b_1)	Plans include highly significant habitats or species	4	
(a_2)	New habitats have been incorporated in the project	4	Construction
(b_2)	Highly significant habitats or species have been incorporated in the project	8	

4.4.4 Special structures or facilities for wildlife

Str	Des	Con
	4	9

4.4.4.1 Recommendations or opportunities for installing special structures or facilities for encouraging or accommodating appropriate wildlife (especially BAP species) have been identified and incorporated in the project.

	Outcome	Credits	Assessment stage
(a_1)	Plans for installing special structures of facilities have been drawn up	4	Design
(a_2)	Special structures or facilities have been incorporated in the project	9	Construction

4.4.5 Improving the water environment

Str	Des	Con
	4	

4.4.5.1 Opportunities to improve the local water environment have been considered and identified, and, where appropriate, included in the design.

4.4.6 Improving the water environment – implementation

Str	Des	Con
		4

4.4.6.1 The designed features have been implemented.

4.4.7 Incorporating existing water features

4.4.7.1 Existing water features have been incorporated in the design of the project.

Str	Des	Con
	13	

Guidance

Change in ecological value (4.4.1)

The calculation methodology set out in *GN36 BREEAM, CEEQUAL, and HQM Ecology Calculation Methodology – Route 2* builds on the 'Defra biodiversity metric'. The methodology quantifies the impact of a development in terms of 'biodiversity units' based on habitat types and their (a) distinctiveness, (b) condition and (c) area or length throughout the assessed project life cycle.

The calculation methodology has two routes depending on (i) the project's scale and size and (ii) the distinctiveness of the habitats on the site:

1. **Full methodology**: pre-development habitats are above the set size threshold of 0.05 hectares (in total) or are of high distinctiveness.
2. **Simplified methodology**: pre-development habitats are below the set size threshold and are of low or medium distinctiveness.

For both approaches, linear and area-based habitats must be accounted for separately. For full details of the methodology and calculation procedure see *GN36 BREEAM, CEEQUAL, and HQM Ecology Calculation Methodology – Route 2*.

An alternative methodology for calculating the change in ecological value may be agreed with BRE Global.

New wildlife habitats (4.4.3)

Habitat in this context refers to an area of unified vegetation or ecosystem, such as ponds, reed beds (or other wetland features), species-rich hedgerow, broadleaved woodland, and/or grassland. Artificial features such as bird boxes, bat boxes, badger setts, or otter holts, which are covered in 4.4.4 do not constitute habitats in this context although they may contribute to the creation of one. New habitats are those that currently do not exist on the site but may otherwise be appropriate as they support the wider ecosystem and local biodiversity in the area. Habitat creation proposals may be on-site or off-site. Examples of the latter would include landscape scale conservation and green infrastructure where benefits can be significant if strategically planned and implemented. A specialist in habitat creation or in a particular group of animals should be consulted in drawing up these proposals.

Special structures or facilities for wildlife (4.4.4)

Structures or facilities that support local wildlife but do not in themselves create a self-supporting habitat. They will typically reinforce existing facilities in and around the site or provide a means of controlling and protecting wildlife to facilitate safe and secure passage, nesting, roosting or feeding.

Such structures or facilities may include artificial bat roosting boxes, bird nesting opportunities, artificial badger setts or otter holts, green bridges, green roofs and walls or tunnels under roads or railways. The provision of such measures should be appropriate to the scale, nature, and location of the project. For example, one bat box on a large project would be insufficient. The advice of an ecologist or relevant wildlife organisation should be sought as to what would be considered appropriate.

As with newly created habitats, any structures or facilities should have been recommended, designed and sited by, or in consultation with, a suitably qualified ecologist or relevant wildlife specialist.

Improving the water environment (4.4.5)

Examples of opportunities to improve the local water environment (whether fresh or marine) include cleaning up existing degraded or silted-up ponds or waterways, introducing aquatic plants that help cleanse the water in existing surface waters, and the removal of invasive and damaging aquatic plants and sources of water pollution.

Capturing rain and surface water for beneficial use, including the adoption of various SuDS techniques, can provide new water features or aquatic habitat to enhance biodiversity. Retained water could also offer other benefits such as an alternate water resource or local heat sink or amenity feature.

In Europe, the Water Framework Directive (WFD) is striving to restore, improve and enhance the quality of European water resources, as well as prevent further deterioration. Contribution to achieving WFD targets should be therefore explored and incorporated were possible in new developments in Europe.

Incorporating existing water features (4.4.7)

Incorporation of water features can provide amenity benefit (or other benefits, including site drainage), but water features that are incorporated into the project must form an integral part of the design and not reduce the ecological or environmental quality of the water feature.

Evidence

Assessment criteria	Evidence guidance
4.4.1 Change in ecological value	Completed copy of the BREEAM Change in Ecological Value Calculator or a report showing the methodology followed to calculate the change in ecological value. Evidence will show the pre- and post-development biodiversity units. It should include the areas and lengths of different habitat types and the values used for distinctiveness, condition, and habitat creation risk factors (spatial risk, delivery risk, temporal risk).
4.4.2 Enhancing existing ecological features	Evidence would be in the form of drawings and specifications showing that the recommendations were incorporated into the planned works and delivered.
4.4.3 New wildlife habitats	Evidence could be drawings and photographs of what has been included. To score for BAP habitats, it would be necessary to refer back to relevant authority plans or an ecological assessment of the project. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
4.4.4 Special structures or facilities for wildlife	Evidence could be in the form of photographs or drawings that show incorporation of special facilities. Reference also needs to be made to the ecological assessment to ensure that these facilities are not being provided merely as mitigation.
4.4.5 Improving the water environment	Evidence needs to demonstrate that features (such as the examples above) have been included in the works. This needs to demonstrate both design stage consideration (such as through drawings or specifications) and construction stage implementation (such as through photographs).
4.4.6 Improving the water environment – implementation	
4.4.7 Incorporating existing water features	Evidence needs to be appropriate to the type of scheme and could include drawings or photographs showing how existing features have been incorporated.

Definitions

See definitions in 4.3 Protection of biodiversity

Enhancement

Improved management of ecological features or provision of new ecological features, resulting in a net benefit to biodiversity, which is unrelated to a negative impact or is 'over and above' that required to mitigate or compensate for an impact.

Green infrastructure

Multi-functional space, urban and rural, that can form a network or be self-contained, which is capable of delivering a wide range of environmental and quality of life benefits for local communities. It covers both 'green' and 'blue' (water environment) features of the natural and built environments. Examples include parks, open spaces, playing fields, woodlands, wetlands, grasslands, river and canal corridors, allotments, private gardens and living (green) roofs and façades.

4.5 Long-term management of biodiversity

Aim

To secure ongoing monitoring, management, and maintenance of habitats and ecological features to ensure intended long-term outcomes are realised.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
4.5.1 Ongoing ecological management	Scope out only if the nature and scope of the project mean that there is no need for ongoing ecological management of habitats and species conservation measures.
4.5.2 Programme for monitoring	The decision to scope out will depend on the nature, scale, location, duration and context of the project.

Credit summary

Assessment criteria	Strategy	Design	Construction
4.5.1 Ongoing ecological management	27		
4.5.2 Programme for monitoring	18		

Assessment criteria

4.5.1 Ongoing ecological management

Str	Des	Con
27		

4.5.1.1 A landscape and ecology management plan, or equivalent, has been developed that covers, as a minimum, the first five years after project completion and includes:

a. Actions and responsibilities, prior to handover, to give to relevant individuals.
b. The ecological value and condition of the site over the development life.
c. Identification of opportunities for ongoing alignment with activities external to the project which support the aims of the BREEAM UK Strategic Ecology Framework.
d. Identification and guidance to trigger appropriate remedial actions to address previously unforeseen impacts.
e. Clearly defined and allocated roles and responsibilities.

4.5.1.2 The landscape and ecology management plan or similar has been updated as appropriate to support maintenance of the ecological value of the site.

4.5.2 Programme for monitoring

Str	Des	Con
18		

4.5.2.1 There is a programme in place (for the years after project completion) for monitoring the success or otherwise of any management, habitat creation, or translocation and species conservation measures undertaken.

Guidance

Ongoing ecological management (4.5.1)

An appropriate landscape and ecology management plan for the aftercare of ecology is essential to ensure benefits are realised from the actions undertaken to protect or enhance biodiversity. The plan should consider actions on and near site and, where relevant, within the wider zone of influence.

Where appropriate, the management plan should be developed in accordance with Section 11.1 of BS 42020:2013 *Biodiversity – Code of practice for planning and development* (or equivalent national standard).

More information on the aims of the BREEAM UK Strategic Ecology Framework is available online at www.breeam.com/resources/strategy/breeam-uk-strategic-ecology-framework.

Programme for monitoring (4.5.2)

Ecological aspects of a project take time to establish and mature. Throughout the design, construction and management of ecological features it is necessary to monitor and review progress against the objectives and targets set. The ongoing programme for monitoring is often not given enough prominence in implementation plans and project programmes. This can mean that opportunities are missed and expected benefits are not realised, potentially leading to the failure of the initiative.

Evidence

Assessment criteria	Evidence guidance
4.5.1 Ongoing ecological management	Evidence could be a LMP with specific reference to requirements of ecological habitat management or species conservation measures.
4.5.2 Programme for monitoring	Evidence could be a specific monitoring plan or part of a more-generic maintenance plan that demonstrates that monitoring is in place.

Definitions

See definitions in 4.3 Protection of biodiversity

5 Landscape and historic environment

Summary

This category encourages consideration of the landscape and associated heritage features within and surrounding a project site. It aims to protect and enhance both landscape character and heritage assets where present. Aesthetic value and visual impact of a project are addressed as well as actions taken to protect and enhance the historic environment for the benefit of present and future generations.

Category summary table

Assessment issues	Credits available
5.1 Landscape and visual impact	225
5.2 Heritage assets	225
	450

5.1 Landscape and visual impact

Aim

To ensure the character of the landscape is respected and, where possible, enhanced through the design approach and careful location of features in a manner that is appropriate to the local environment and community needs and wishes.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
5.1.1 Landscape and visual factors	Scope out for marine and offshore projects only if the permanent works involved are out of sight of land, and there is no use of land, and therefore effects on the landscape, for temporary works.
5.1.2 Impact on landscape character	
5.1.3 Landscape development policies	Scope out on projects where there are no landscape works required by planning conditions or other commitments. Care must be taken here to ensure that landscape works are not excluded from a contract merely for convenience.
5.1.4 Local landscape character	Scope out for marine and offshore projects only if the permanent works involved are out of sight of land, and there is no use of land, and therefore effects on the landscape, for temporary works.
5.1.5 Advance landscape works	Scope out for marine and offshore projects only if the permanent works involve no use of land, and therefore no opportunities for landscape works, even for temporary works; or on Construction Only Assessments where the Contractor genuinely had no opportunity to influence any advance works.
5.1.6 Appropriateness of species selected	Scope out only on projects where no planting works are possible or on Construction Only Assessments where the Contractor genuinely had no opportunity to influence the landscaping design.
5.1.7 Assessment of existing vegetation	Scope out only if no substantial vegetation is present on site (including temporary areas such as construction compounds).
5.1.8 Retention of existing vegetation	
5.1.9 Non-vegetation features	Scope out on marine projects where there are no landscape features or views to be lost.
5.1.10 Landscape proposals	Scope out for marine and offshore projects only if the permanent works involve no use of land, and therefore no opportunities for landscape works, even for temporary works.
5.1.11 Protection of existing vegetation during construction	Scope out only if no substantial vegetation is present on site (including temporary areas such as construction compounds).
5.1.12 Long-term management plan	Scope out only on projects where there was no opportunity or scope for planting works (such as marine and offshore projects with no land connection).
5.1.13 Responsibility for long-term management	

Credit summary

Assessment criteria	Strategy	Design	Construction
5.1.1 Landscape and visual factors	16	11	
5.1.2 Impact on landscape character	26 (up to)		
5.1.3 Landscape development policies	9 (up to)		

Assessment criteria	Strategy	Design	Construction
5.1.4 Local landscape character		24 (up to)	
5.1.5 Advance landscape works	16	10	
5.1.6 Appropriateness of species selected		26	
5.1.7 Assessment of existing vegetation		9	
5.1.8 Retention of existing vegetation		4 (up to)	
5.1.9 Non-vegetation features		18 (up to)	
5.1.10 Landscape proposals			17 (up to)
5.1.11 Protection of existing vegetation during construction			5
5.1.12 Long-term management plan	14	3	
5.1.13 Responsibility for long-term management	17		

Assessment criteria

5.1.1 Landscape and visual factors

Str	Des	Con
16	11	

5.1.1.1 Landscape and visual factors have been considered by a suitably qualified landscape professional at each stage of the project, including the evaluation of scheme options.

5.1.2 Impact on landscape character

Str	Des	Con
26 (up to)		

5.1.2.1 The impact of the development on the character of the area has been assessed as neutral or positive.

	Impact on landscape character	Credits
(a)	Neutral	10
(b)	Positive	26

5.1.3 Landscape development policies

Str	Des	Con
9 (up to)		

5.1.3.1 The landscape proposals meet, or go beyond, the aims of applicable landscape development or enhancement policies published by the relevant local, regional, or national authority.

	Outcome	Credits
(a)	Policies have been met	4
(b)	Policies have been exceeded	9

5.1.4 Local landscape character

Str	Des	Con
	24 (up to)	

5.1.4.1 The project design fits the local landscape character in terms of the items listed in the table below.

	Aspect of landscape character	Credits (each)
(i)	Landform or levels	4 for each
(ii)	Materials	
(iii)	Planting	
(iv)	Style and detailing	
(v)	Scale	
(vi)	Landscape or townscape pattern	

5.1.5 Advance landscape works

Str	Des	Con
16	10	

5.1.5.1 Opportunities for advance landscape works have been considered, such as planting prior to construction.

5.1.6 Appropriateness of species selected

Str	Des	Con
	26	

5.1.6.1 Planting design has taken the appropriateness of species selection into account to include factors such as climate adaptation, local provenance and soil stability.

5.1.7 Assessment of existing vegetation

Str	Des	Con
	9	

5.1.7.1 The condition of existing vegetation has been assessed and the retention of vegetation with high or moderate value has influenced design proposals.

5.1.8 Retention of existing vegetation

Str	Des	Con
	4 (up to)	

5.1.8.1 Based on the assessment of the condition of existing vegetation, a percentage of vegetation of high or moderate quality has been retained as part of the design.

	Outcome	Credits
(a)	25% or more	1
(b)	50% or more	2
(c)	75% or more	3
(d)	90% or more	4

5.1.9 Non-vegetation features

Str	Des	Con
	18 (up to)	

5.1.9.1 The landscape and amenity value of other features (not vegetation) has been assessed **and** the retention of valuable, distinctive or historic features has influenced design proposals.

	Outcome	Credits
(a)	Yes, but negative impact	7
(b)	Yes, neutral impact or impact avoided	11
(c)	Yes, enhanced setting	18

5.1.10 Landscape proposals

Str	Des	Con
		17 (up to)

5.1.10.1 A system or plan has been implemented during the construction period to ensure that:

a. Planning and third-party commitments were implemented
b. Best practice was applied for planting or habitat areas to avoid damage to landscape features
c. Soil conditions met the requirements for successful establishment of the landscape design

	Outcome	Credits
(a)	Plan prepared	14
(b)	Plan prepared and implemented	17

5.1.11 Protection of existing vegetation during construction

Str	Des	Con
		5

5.1.11.1 Vegetation (including root protection areas) that is being retained as part of the design has been adequately protected during construction.

5.1.12 Long-term management plan

Str	Des	Con
14	3	

5.1.12.1 A management plan has been developed that:

a. Defines long-term landscape objectives
b. Establishes recommendations for work required to ensure that objectives are achieved
c. Sets a programme for ongoing monitoring and review to assess the effectiveness of maintenance operations

5.1.13 Responsibility for long-term management

Str	Des	Con
17		

5.1.13.1 Responsibility for the implementation of the management plan has been allocated to an appropriate individual or organisation.

5.1.13.2 The appropriate skills and resources (including financial) have been committed.

5.1.13.3 A programme of monitoring is in place beyond the normal planting establishment period.

Guidance

Landscape and visual factors (5.1.1)

A suitably qualified landscape professional would normally be a Landscape Architect, but could include a Landscape Manager, Garden Designer, Arboriculturalist or other landscape professional depending on the nature of the project.

Strategy stage credits are awarded where the brief actively encourages consideration of landscape and visual factors at each stage. At design stage, considerations could include siting, massing, colour, texture, materials, earthworks, lighting, street furniture, planting and relationship with buildings or structures.

Note that temporary construction impacts are assessed by 1.3.3 Visual impact during construction (fixed).

Impact on landscape character (5.1.2)

A project's impact on local landscape character is typically assessed using a landscape and visual impact assessment.

Landscape development policies (5.1.3)

Compliance with relevant landscape policies is considered a basic requirement of all schemes; however, there may be scope for going beyond these basic requirements to provide further benefit or enhancement.

Local landscape character (5.1.4)

Ideally, any new land-based project should respond to the surroundings and blend in with, or enhance, the local character. This does not imply that it has to look vernacular. A structure can be contemporary, yet still reflect local relationships, design elements, colour and material combinations. The way in which a scheme is set into the landform or townscape surroundings can have a major influence on its acceptability; appropriate choice is needed of levels, gradients, profiles, soil stabilisation, and retention. Detailing of walls (for example, regional styles in dry stone walls), facings, fences, posts, hard surfaces and lighting can respond to area-specific factors.

The mere planting of 'indigenous' species or 'same as next door' is not sufficient in this context. Planting should represent or complement the truly local character of the area in terms of vegetation type and structure (for example, woodland pattern and structure, the form of a windbreak or shelterbelt, hedgerow character, coppice, designed landscape elements, meadows, heathland, wetland, urban squares and parks) as well as choice of species and the matching of species to soil type.

Advance landscape works (5.1.5)

Advance landscape works would normally consist of planting to provide structure to a development, screening of views or early impact, but may equally include construction of earthworks or other landscape features to fulfil a landscape function such as screening.

Appropriateness of species selected (5.1.6)

Species selection is an important consideration for planting works. The appropriateness of certain species will depend on the nature of the development. Ornamental and architectural planting schemes may be appropriate for urban or commercial developments but are unlikely to be appropriate for rural schemes. Local provenance is often regarded as important for native planting schemes but may not be appropriate for climate change adaptation. The landscape design should be supported by evidence that factors determining species selection have been considered and that the most relevant factors have been used to develop the criteria for planting design.

Assessment of existing vegetation (5.1.7, 5.1.8)

'Vegetation' can include trees, shrubs, grasses, and cacti.

Vegetation, often forms an important part of the landscape. The landscape value of existing vegetation should be considered in the context of the development.

Significant vegetation, including trees or other vegetation protected by local regulation, would normally be considered valuable landscape features. However, it is important to consider that size and protection are not the only factors to determine landscape value, for example small windswept trees may form interesting features in exposed coastal locations and groups of small trees may provide an important screening function. Therefore, evidence must demonstrate that a strategy for retention of trees or other existing vegetation has been developed based on their value in the context of the development. Veteran trees and ancient woodland even if not formally recognised or protected must be considered as significant.

Non-vegetation features (5.1.9)

Other (non-vegetation) landscape features include topography, rocks, boulders, ponds, brooks, swamps, wetland areas, parks, plazas, squares, views and vistas. The last five items are of particular importance in urban areas. Retention of trees and other vegetation is considered in 5.1.7 and 5.1.8.

Landscape proposals (5.1.10)

Civil engineering work can cause damage to landscape features. A system or plan should be in place to ensure that such effects are avoided or mitigated. It should allocate responsibility for control measures and establish procedures for monitoring and reviewing the effectiveness of the system or plan. Mechanisms for ensuring that commitments made during the planning process, to statutory bodies or third parties are implemented, should also be included in the system or plan.

The plan must be in place early enough to permit implementation from the start of work on site and should be reviewed on a regular basis throughout the implementation of the project.

CIRIA publication *The benefits of large species trees in urban landscapes: a costing, design and management guide* (C712, 2012) provides guidance in this area, and for 5.1.6.

Protection of existing vegetation during construction (5.1.11)

BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations* provides guidance on protection of trees during construction.

Long-term management plan (5.1.12, 5.1.13)

The Management Plan can either have been prepared as part of the Landscape Management Strategy (LMS) or Landscape Works Plan (LWP) or can be a separate document (for example, a Landscape Management Plan).

The programme or plan should include detailed descriptions of any maintenance tasks that have to be carried out on a regular basis (for example, grass to be cut to a particular height, grass cuttings left or collected, selective tree-felling or pruning, further planting) including an indication of frequency (for example once a fortnight, once a year, every six years) and, where applicable, time (for example, for meadows the right timing of cuts is crucial). Hard landscape maintenance tasks should be included where appropriate (for example, graffiti and chewing gum to be removed from hard surfaces).

Note that the review programme or plan needs to go significantly beyond the normal maintenance carried out during a planting establishment period (often three to five years).

Evidence

Assessment criteria	Evidence guidance
5.1.1 Landscape and visual factors	Evidence could include the project brief, a landscape or townscape assessment report, a comparison of alternatives at the design stage, site visit reports, photographs, meeting minutes, or management plans.
5.1.2 Impact on landscape character	Evidence could be a landscape and visual impact assessment, judgements from a Landscape Character Assessment, or a relevant section of an Environmental Impact Assessment (EIA).
5.1.3 Landscape development policies	Evidence of compliance with authority plans and policies could be in the form of a planning approval. If planning approval is not needed, then evidence of consultation with relevant authorities would be needed. It will be up to the Assessor and Verifier to agree how exceedance of requirements is demonstrated.
5.1.4 Local landscape character	Evidence could be in the form of relevant instructions in the brief, or evidence of research into and understanding of local character all related to the design and completed scheme.
5.1.5 Advance landscape works	Evidence should include documented evidence that advance landscape works have been considered, even if the possibility of implementation has been ruled out.
5.1.6 Appropriateness of species selected	Evidence could include a review of the criteria used to determine plant selection.
5.1.7 Assessment of existing vegetation	Evidence could include arboricultural reports, survey data, tree constraints plan, tree retention strategy, photographs, or a site visit to the completed scheme.
5.1.8 Retention of existing vegetation	
5.1.9 Non-vegetation features	Evidence could be in the form of a landscape constraints plan, comparison of drawings or photomontages showing change of land use and new landscape features. What is seen as enhancement may be a matter of judgement and agreement between Assessor and Verifier.
5.1.10 Landscape proposals	Evidence could include a LMS, LWP or equivalent section in a SEMP. Evidence of consultation with relevant statutory bodies and other relevant third parties should be included in the plan.
5.1.11 Protection of existing vegetation during construction	Evidence could include method statements, photographs, records of site visit(s) during construction, monitoring of protection measures, or a site visit to the completed scheme.
5.1.12 Long-term management plan	Evidence should be in the form of a plan covering landscape management objectives and measures, together with evidence that the responsibility for long-term maintenance has been allocated and resourced appropriately.
5.1.13 Responsibility for long-term management	

5.2 Heritage assets

Aim

To ensure the protection of heritage through known physical and other assets on or near the project site that have value because of their contribution to society, knowledge and/or culture over and above local and international requirements. Also to identify and exploit opportunities to enhance knowledge, understanding, and appreciation of the historic, social and cultural environment.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
5.2.3 Consultation	Scope out on projects where it can be demonstrated that there were no significant changes to the historic environment.
5.2.4 Reporting baseline studies and surveys	This can only be scoped out where there has been no archaeology or historic buildings work undertaken for the project, including any formal output from 5.2.1 and 5.2.2.
5.2.5 Integration of listed or registered heritage assets	Scope out only if statutory listed or registered heritage assets have not been identified within the development area in 5.2.1 and 5.2.2.
5.2.6 Integration of non-registered heritage assets	Scope out only if non-registered heritage assets have not been identified within the development area in 5.2.1 and 5.2.2.
5.2.7 to 5.2.13	The decision to scope out will depend on the nature, scale, location and context of the project.
5.2.14 Use of appropriate materials	Scope out if the evidence demonstrates that there has been no restoration or enhancement works to heritage assets.
5.2.15 Use of specialist skills	The decision to scope out will depend on the nature, scale, location and context of the project.
5.2.16 Reporting mitigation works	Scope out if the project does not require a formal post-excavation phase or require the completion of building recording reports.
5.2.17 Public learning	This may not be scoped out if any credits have been awarded in this issue.

Credit summary

Assessment criteria	Strategy	Design	Construction
5.2.1 Baseline studies and surveys (fixed)	9 (up to)		
5.2.2 Use of suitable professionals and standards (fixed)	14 (up to)		
5.2.3 Consultation	12 (up to)		
5.2.4 Reporting baseline studies and surveys	16		
5.2.5 Integration of listed or registered heritage assets	14 (up to)		
5.2.6 Integration of non-registered heritage assets		16	
5.2.7 Setting for listed or registered heritage assets		13 (up to)	
5.2.8 Surveys for archaeological remains		13	
5.2.9 Mitigation strategy for archaeological investigation		14 (up to)	
5.2.10 Mitigation design for loss of heritage assets		14 (up to)	
5.2.11 Mitigation of impacts on archaeological remains			13

Assessment criteria	Strategy	Design	Construction
5.2.12 In-situ protection of heritage assets			13 (up to)
5.2.13 Monitoring mitigation works			13
5.2.14 Use of appropriate materials		4	5
5.2.15 Use of specialist skills		9	
5.2.16 Reporting mitigation works			17 (up to)
5.2.17 Public learning			16 (up to)

Assessment criteria

5.2.1 Baseline studies and surveys (fixed)

Str	Des	Con
9 (up to)		

5.2.1.1 A baseline historic environment study or survey has been carried out at the project planning stage and has considered the full range of registered and non-registered historic environment assets.

	Aspects covered by baseline studies and surveys	Credits (each)
(i)	Historic built heritage assets	1 for each
(ii)	Historic landscape/townscape/seascape	
(iii)	Below-ground and/or underwater archaeological remains (on or offshore)	
(iv)	Non-registered or non-designated assets	3 for each
(v)	Reference to existing characterisation studies or regional research agendas	

5.2.2 Use of suitable professionals and standards (fixed)

Str	Des	Con
14 (up to)		

5.2.2.1 The baseline study or survey has been prepared by a suitably qualified historic environment professional and has been prepared to a recognised standard appropriate to the scope and location of the project.

	Outcome	Credits
(a)	Prepared or authorised by a suitably qualified historic environment professional.	6
(b)	Plus, prepared to a recognised standard appropriate to the scope and location of the project.	14

5.2.3 Consultation

Str	Des	Con
12 (up to)		

5.2.3.1 Consultations have been carried out with all relevant stakeholders.

	Outcome	Credits
(a)	Consultations have been conducted with all relevant stakeholders	5
(b)	Consultations have been conducted with all relevant stakeholders prior to planning application submission or approval.	12

5.2.4 Reporting baseline studies and surveys

Str	Des	Con
16		

5.2.4.1 The reports and archives from the baseline studies stage have been prepared **and** submitted before the end of construction.

5.2.5 Integration of listed or registered heritage assets

Str	Des	Con
14 (up to)		

5.2.5.1 If statutory listed or registered heritage assets have been identified within the development area, the project design has enabled their retention, restoration, and successful re-use or integration into the development.

5.2.5.2 A future management strategy has been agreed for any statutory listed or registered heritage assets that have been integrated into the development.

	Outcome	Credits
(a)	The project design has enabled their retention, restoration and successful re-use or integration into the development.	7
(b)	Plus, a future management strategy has been agreed.	14

5.2.6 Integration of non-registered heritage assets

Str	Des	Con
	16	

5.2.6.1 The project design has enabled the retention, restoration, and successful re-use or integration of non-registered assets into the development.

5.2.7 Setting for listed or registered heritage assets

Str	Des	Con
	13 (up to)	

5.2.7.1 The design has successfully addressed any setting issues and provided a neutral or enhanced setting for listed buildings, scheduled monuments or historic landscape areas.

	Impact on the setting of listed or registered heritage assets	Credits
(a)	Neutral	8
(b)	Enhanced	13

5.2.8 Surveys for archaeological remains

Str	Des	Con
	13	

5.2.8.1 If the potential for significant below-ground archaeological remains has been identified, the appropriate staged surveys have been undertaken to establish the extent and condition of these *prior to* the design being finalised and in time to influence designs.

5.2.9 Mitigation strategy for archaeological investigation

Str	Des	Con
	14 (up to)	

5.2.9.1 If the surveys identified in 5.2.8 above have revealed the presence of significant archaeological remains, a mitigation strategy document has been prepared for archaeological investigation **and** agreed with the relevant development control archaeologist.

	Outcome	Credits
(a)	Yes	7
(b)	If it contains an element of preservation in-situ of archaeological remains	14

5.2.10 Mitigation design for loss of heritage assets

Str	Des	Con
	14 (up to)	

5.2.10.1 If registered or non-registered historic environment assets have been demolished or removed, an appropriate mitigation design has been developed and agreed with the relevant conservation or heritage agency. (This may include proposals for relocation, restoration or replacement, or in-situ building recording.)

	Outcome	Credits
(a)	Building recording has taken place	4
(b)	Historic materials have been salvaged for re-use in another historic context	6
(c)	An asset has been relocated off site to an appropriate place	8
(d)	An asset has been re-sited within the site	14
(e)	If a mixture of (d) plus (b) or (c)	10

5.2.11 Mitigation of impacts on archaeological remains

Str	Des	Con
		13

5.2.11.1 The mitigation designs referred to in 5.2.9 and 5.2.10 have been implemented, managed and monitored in accordance with a SEMP or other site management framework.

5.2.12 In-situ protection of heritage assets

Str	Des	Con
		13 (up to)

5.2.12.1 Sensitive assets to be retained have been cordoned off or other protection measures have been put in place to avoid accidental damage and site staff have received appropriate instruction (such as via toolbox talks).

	Outcome	Credits
(a)	Protective measures have been put in place	8
(b)	Appropriate instructions have also taken place	13

5.2.13 Monitoring mitigation works

Str	Des	Con
		13

5.2.13.1 An appropriate historic environment professional (archaeologist, conservation architect or historic buildings specialist) has been appointed to manage and monitor the mitigation works.

5.2.14 Use of appropriate materials

Str	Des	Con
	4	5

5.2.14.1 If restoration or enhancement works to heritage assets have been completed, there is evidence that current best practice has been applied and historically appropriate materials used.

5.2.15 Use of specialist skills

Str	Des	Con
	9	

5.2.15.1 The project has been able to contribute to maintaining key specialist conservation skills and creating sustainable heritage employment.

5.2.16 Reporting mitigation works

Str	Des	Con
		17 (up to)

5.2.16.1 The final output from the mitigation works (such as archaeological excavation or building recording works) have been prepared and archives submitted.

	Outcome	Credits
(a)	In preparation by end of construction stage	5
(b)	Completed by end of construction stage	17

5.2.17 Public learning

Str	Des	Con
		16 (up to)

5.2.17.1 There has been public opportunity provided to learn about, observe or take part in activities to understand or promote the historic environment local to the project.

	Opportunities provided for public learning	Credits (each)
(i)	Information board on site only	2
(ii)	Leaflets printed or other active publicity such as web-based information or media interest.	2
(iii)	Educational activities carried out with the local community, or local voluntary organisations invited to participate in assessment or mitigation works.	5
(iv)	Access to sites to view finds or other activity to participate in offsite events.	7

Guidance

Baseline studies and surveys (5.2.1)

It is important that historic environment interests are identified at a pre-design stage and significant related issues are incorporated into the design and planning of the project. Best practice requires that sufficient surveys (desk study and site-based investigations as appropriate) are carried out before design works are substantially complete, in order to determine the extent, nature and significance of any archaeological resource and/or historic structures, and to consider the significance of any impact. The results of these surveys should (where significant) be shown to have influenced the design as submitted for planning and have led to options for alterations at the detailed design stage to be set out.

The basic principles are as follows:

- **Initial appraisal**: Undertake sufficient preliminary desk studies to identify all significant historic environment constraints and opportunities associated with the project.
- **Assessment and reconnaissance**: Assess the likely impact of development options on identified or potential assets through for example application of reconnaissance surveys, detailed desk-based assessment, and/or historic buildings assessment. This information should be used to focus the design options early on to minimise harm to the historic environment and create opportunities for positive enhancement. Field surveys and the techniques used should be recorded.
- **Site evaluation**: Depending on the level of archaeological or historical significance identified, this stage may include site specific targeted surveys to evaluate the extent and significance of buried archaeological remains or undertake intrusive investigation on standing structures to determine suitability for conversion, alteration or protection measures.

The baseline should also identify what outline mitigation proposals should be developed and implemented, and adequate time and resources needs to have been allocated in the project design.

Use of suitable professionals and standards (5.2.2)

Suitably qualified may be indicated by being a member of a professional heritage body. Additionally, it is expected that the qualified person will hold a relevant historic, conservation or archaeology degree level qualification. Note that a general environmental management qualification is not considered sufficient.

A recognised standard may be those published by the national heritage agencies or other bodies specific to the work being undertaken.

Consultation (5.2.3)

Relevant stakeholders could include:

- Local government departments of officers
- National government departments or agencies
- Local interest organisations
- National interest organisations
- Any statutory consultees

Voluntary consultation with other local and amateur organisations demonstrates a commitment to public engagement and identifying additional local knowledge, concerns and possible positive enhancements to the historic environment. Consultation should be done as early as practicable so that guidance or advice can be properly taken into account in the design. It is also likely to continue into construction on some larger schemes.

Reporting baseline studies and surveys (5.2.4)

Where original baseline historic environment study or survey documents have been prepared but no work has progressed from then, the credits can be scored for submitting the information gained from the studies (such as desk-based assessments) to the relevant local government historic environment record (HER).

Integration of listed or registered heritage assets (5.2.5)

No specific guidance provided.

Integration of non-registered heritage assets (5.2.6)

Non-registered assets may be equally significant. Retention, reuse and enhancement of non-registered assets should also be considered.

Setting for listed or registered heritage assets (5.2.7)

The design must demonstrate that specific measures have been agreed with the relevant development control conservation team or national heritage body to integrate the design successfully with the existing character of the place.

Surveys for archaeological remains (5.2.8)

Significant archaeological remains are those that are assessed to be of more than local importance in the evidence set out in 5.2.1 or those that are of exceptional importance locally and may be identified as such in local planning policy and regional and national research agendas.

The surveys may include both non-intrusive and intrusive methods as identified in CIRIA *Archaeology and Development – a good practice guide to managing risk and maximising benefit* (C672, 2008).

Note that implementation is covered in 5.2.11, 5.2.12 and 5.2.13.

Use of appropriate materials (5.2.14)

It is acknowledged that the most appropriate material for an historic structure may not necessarily be the best material from an environmental point of view. For instance, the material may have to be transported a long distance even though a more local, but less historically appropriate, material might be available. A balance has to be struck between historically appropriate refurbishment and environmental considerations, and the decision will depend on the emphasis given to the project by the stakeholders and the importance of the historical feature. However, an informed decision can only be made if an assessment of this issue has been carried out by the project.

Use of specialist skills (5.2.15)

It is important that where historic materials or methods are utilised the project team considers how it can ensure that the industry is able to maintain the necessary skill-sets within the industry to ensure the future maintenance of historic assets.

Reporting (5.2.16)

Final outputs may comprise historic building recording records, archaeological fieldwork reports, or laboratory-based analytical reports, texts and figures for publication.

Where post-excavation analysis or building recording reporting has been carried out, then full credits can only be scored if they are completed by the time construction of the project is complete. If the post-excavation analysis or building recording reporting has commenced and is in preparation but is not complete at the end of the construction stage, then score as indicated in the scoring scale.

Public learning (5.2.17)

A project may involve an extensive and visible archaeological excavation, and/or the dismantling, refurbishment or restoration of an historic feature. There is often a high level of public interest in these issues and value may be generated by the project through public access to the site or by publicity materials such as providing site visits and information boards. It may also be generated through involving amateur and local interest groups in surveys, publications, or in producing other media such as leaflets (or web-based material).

The project team may also be able to contribute to local education objectives through providing site visits, talks (to schools and local groups), and materials for curriculum activities. Communication with the public may also be achieved by liaison with the media and museum exhibitions.

The possibility of allowing members of the public, via their local historical or archaeological societies, access to view the site or to contribute to desk based or field-based activities should be considered. This will help to maintain relations with the local community, provide positive public relations, and help meet a historic environment objective to communicate new knowledge about the past. The access can be at a specified time outside operating hours, although a member of the site management team will have to be present. Alternatively, it can be in an area partitioned off from the rest of the site, or visits can be arranged in guided groups.

Evidence

Assessment criteria	Evidence guidance
5.2.1 Baseline studies and surveys (fixed)	Evidence may be in the form of stand-alone desk-based assessments and other survey reports, and/or a chapter in an Environmental Statement or other supporting documents or correspondence with local development control office for archaeology and conservation. Note that this section of BREEAM Infrastructure covers both below-ground and above-ground historic assets, so any evidence must include a summary of the baseline for all types of potential constraints and opportunities that may be significant. Typical headings may comprise archaeological remains, built heritage assets setting and townscape, historic landscape and seascape (if applicable). Evidence needs to show that a specialist has been consulted during the design option phase to ensure the proposed designs have taken account of historic environment constraints and opportunities. This could be a formal report from the specialist or notes of a meeting with them.
5.2.2 Use of suitable professionals and standards (fixed)	
5.2.3 Consultation	Evidence may be summarised in a section of the documents reviewed at 5.2.1 or be contained in correspondence and/or meeting notes with the relevant consultees.
5.2.5 Integration of listed or registered heritage assets	Evidence should show that the issues have been recognised and design solutions been found, and that specific specialist studies to address urban design and setting issues and/or historic views have been conducted if necessary. Evidence could also include agreements with the development control conservation team and or national heritage body in the form of correspondence and/or meeting notes.
5.2.6 Integration of non-registered heritage assets	
5.2.7 Setting for listed or registered heritage assets	Evidence should show that the issues have been recognised and design solutions been found, and that specific specialist studies to address urban design and setting issues and/or historic views have been conducted if necessary. Evidence could also include agreements with the development control conservation team and/or national heritage agency in the form of correspondence and/or meeting notes.
5.2.8 Surveys for archaeological remains	Evidence should establish how the project has positively protected any historic environment assets, how good design has enhanced and valued the historic environment, how any innovative methods or collaborations have enabled the conservation of historic environment assets, and how any archaeological investigation or building recording have contributed to local and national research agendas. Evidence may include conservation management plans, mitigation design reports, evidence of partnership with owners and/or regulators, correspondence, meetings notes, use of research agendas and, for larger projects, preparation of specific research strategies or frameworks. Evidence for 5.2.8 must demonstrate that the staged surveys were commissioned by the Client or Designer and their reports delivered prior to the finalisation of the design.
5.2.9 Mitigation strategy for archaeological investigation	
5.2.10 Mitigation design for loss of heritage assets	
5.2.11 Mitigation of impacts on archaeological remains	Evidence could be in the form of registers for site briefings and associated attendance sheets, signed site instructions, Permits to Dig with note of required archaeological or building recording works prior to demolition and completion certificates, photographic evidence or drawings showing protection measures. Evidence needs to be appropriate to the level of credits being sought. Evidence should be provided that mitigation works have been managed and monitored by a qualified person.
5.2.12 In-situ protection of heritage assets	
5.2.13 Monitoring mitigation works	
5.2.14 Use of appropriate materials	Evidence could be in the form of a design report or notes assessing the different material options (including those that are historically appropriate). If the use of appropriate materials were considered feasible then evidence of details being incorporated into the specifications would be appropriate. Evidence is likely to include documentation of consultation with relevant expert organisations, and/or receipts of material purchase. If the materials have actually been used, then photographs could also be used as evidence. Maintaining specific heritage conservation skills is an important aspect of restoration and enhancement works evidence could include specifications, training records, and meeting minutes
5.2.15 Use of specialist skills	

Assessment criteria	Evidence guidance
5.2.16 Reporting mitigation works	Evidence will include a project design for post excavation assessment and analysis, details of proposed or completed publications (journal articles, books and monographs), details of archives prepared and submitted (to local museums or to digital online archives). Evidence needs to be provided to support the level of credits being scored. There should be evidence that the project design has been reviewed and accepted by the relevant heritage agency and/or funding body.
5.2.17 Public learning	Evidence must be provided to demonstrate the level of public access that was achieved. This could be in the form of visitors' books, press advertisements of access and/or tour times on site, or photographs of public events or information boards provided off site.

6 Pollution

Summary

This category promotes actions that address and minimise air, water, and noise pollution resulting from the construction and operation of the asset. It focusses on carrying out risk assessments, developing and implementing appropriate mitigation strategies, and monitoring the effectiveness of the mitigation measures to maximise their outcomes.

Category summary table

Assessment issues	Credits available
6.1 Water pollution	172
6.2 Air, noise and light pollution	228
	400

6.1 Water pollution

Aim

To protect the local water environment from pollution and damage arising as a result of the delivery and/or operation of an asset.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
6.1.2 Preventing pollution in operation	This may be scoped out if no significant or sensitive ground and surface waters or features are within or near the site and if the project has no connection to the sea.
6.1.4 Long-term monitoring of impacts on the water environment	The decision to scope out will depend on the nature, scale, location and context of the project.
6.1.6 Preventing pollution during construction	This may be scoped out if no significant or sensitive ground and surface waters or features are within or near the site and if the project has no connection to the sea.
6.1.7 Protecting existing water features during construction	This may be scoped out if no significant or sensitive ground and surface waters or features are within or near the site and if the project has no connection to the sea.
6.1.8 Monitoring water quality during construction	This may be scoped out for marine and offshore projects or if no significant or sensitive body of ground or surface water is within or near the site.

Credit summary

Assessment criteria	Strategy	Design	Construction
6.1.1 Consultation with regulatory authorities (fixed)	6	6	6
6.1.2 Preventing pollution in operation		14	
6.1.3 Control of impacts on the water environment from the completed project (fixed)		22	22
6.1.4 Long-term monitoring of impacts on the water environment		18	
6.1.5 Control of impacts on the water environment during construction (fixed)			29
6.1.6 Preventing pollution during construction			20
6.1.7 Protecting existing water features during construction			9
6.1.8 Monitoring water quality during construction			20 (up to)

Assessment criteria

6.1.1 Consultation with regulatory authorities (fixed)

Str	Des	Con
6	6	6

6.1.1.1 Consultation has been undertaken with regulatory authorities about water issues related to the project, including the need for any consents, and the outcome has been communicated to project team members at each stage of the project.

6.1.2 Preventing pollution in operation

Str	Des	Con
	14	

6.1.2.1 Specific measures have been incorporated in the design to prevent pollution of groundwater, existing freshwater features or the sea (as appropriate) during operation and maintenance.

6.1.3 Control of impacts on the water environment from the completed project (fixed)

Str	Des	Con
	22	22

6.1.3.1 A plan to control the impacts of the completed project on the water environment (fresh and/or marine as appropriate) has been produced and necessary elements of the plan have been incorporated in the design.

6.1.3.2 The plan to control the impacts of the completed project on the water environment has been implemented as far as practicable up to the end of construction.

6.1.4 Long-term monitoring of impacts on the water environment

Str	Des	Con
	18	

6.1.4.1 Measures (or equipment) have been incorporated in the project that will allow long-term monitoring of the project's impact on the freshwater and/or marine environments as appropriate.

6.1.5 Control of impacts on the water environment during construction (fixed)

Str	Des	Con
		29

6.1.5.1 A plan to control the impacts of the project on the water environment (fresh and/or marine as appropriate) *during construction* has been produced **and** this plan has been implemented.

6.1.6 Preventing pollution during construction

Str	Des	Con
		20

6.1.6.1 Specific measures have been taken to prevent pollution of groundwater, existing freshwater features or the sea (as appropriate) during construction.

6.1.7 Protecting existing water features during construction

Str	Des	Con
		9

6.1.7.1 Existing water features have been protected from degradation or physical damage by construction plant and processes.

6.1.8 Monitoring water quality during construction

Str	Des	Con
		20 (up to)

6.1.8.1 If the works could affect a body of ground or surface waters, the water quality of that water body has been monitored before construction and then regularly during construction in accordance with the regime identified as appropriate in the risk assessment.

	Outcome	Credits
(a)	Monitoring system established in accordance with the results of the risk assessment.	10
(b)	Monitoring shows adverse effect, but effective mitigation measures can be demonstrated.	13
(c)	Monitoring shows no adverse effect.	20

Guidance

Consultation with regulatory authorities (6.1.1)

It is advisable to consult the relevant regulatory authorities on any potential impacts a civil engineering project may have on the freshwater and marine environments. Consultation will promote discussion on how the project's environmental performance could be improved and whether discharge or other consents are required. This includes projects where effects on water are not immediately obvious as, for example, hydro-geological issues, which are not instantly visible, may apply to the site.

Preventing pollution in operation (6.1.2)

For preventing pollution in operation, the actions called for include the location of storage for fuels, chemicals or other potentially polluting substances away from sensitive areas, restriction on the use of chemical weedkillers near a watercourse or the sea, separating foul and surface water, and inclusion of interceptors and drainage channels.

Control of impacts on the water environment from the completed project (6.1.3)

This requirement cannot be scoped out as it is very important that **all** project teams should consider the potential impacts of their project on the freshwater environment and, where appropriate, the marine environment in order to minimise potential impacts at the operational stage (i.e. through design) and at the construction stage.

The plan can be part of a PEMP, SEMP or equivalent, or can be a separate document. It should assess questions such as:

- Is the project likely to affect adversely the local surface water and groundwater including groundwater flows?
- Is the project likely to affect the fresh or marine environment including from run-off or discharges from the completed works and during construction?
- Do the above include consideration of the potential effects of climate change and the potential for more intense rainfall events to wash pollutants into the water environment?
- Could measures be implemented to reduce the project's impact on water quality and could these protect or enhance the water environment?

The need for abstraction, land drainage or discharge consents and/or land drainage appraisals has to be considered as part of such a plan, as well as possible designs for drainage systems. As with all plans of this type, it needs to include procedures for regular monitoring and reviewing.

Bearing in mind that a BREEAM Infrastructure Whole Project Assessment is completed at or towards the end of construction, 'implementation' can only be assessed at the completion of the assessment and the extent of implementation of the plan that could have been expected by that time.

Long-term monitoring of impacts on the water environment (6.1.4)

Examples include measuring run-off quantities, establishing adequacy of compensation water from a dam project, monitoring hydrological impacts of projects that involve changes to existing watercourses, groundwater quality monitoring, use of flow recorders or level monitors, and monitoring discharges to the sea from coastal or offshore facilities.

Control of impacts on the water environment during construction (6.1.5)

See guidance for 6.1.3 For further guidance regarding construction impacts see the CIRIA publications:

- *Environmental good practice on site - fourth edition* (C741, 2015)
- *Control of water pollution from linear construction projects – Technical guidance* (C648, 2006)
- *Control of water from linear construction projects – Site guide* (C649, 2006)
- *Control of water pollution from construction sites – guidance for consultants and contractors* (C532, 2001).

Preventing pollution during construction (6.1.6)

For preventing pollution during construction, actions could include measures to prevent leakage of pollutants into a watercourse or the sea, such as bunding, appropriate storage, spill kits, and/or emergency response plans. Other issues must also be considered, such as run-off containing high volumes of silt and poor site management. Procedures for managing these risks must also be implemented.

In relation to water features, a distinction must be made between *pollution-related* issues (6.1.6) and *physical damage* to the water feature (6.1.7).

Early consideration should be given to construction risks at the design stage to enable appropriate systems of work or appropriate site layouts to be prepared, as well as to ensure that risks identified during an earlier environmental assessment are incorporated into the construction plan.

Protecting existing water features during construction (6.1.7)

Examples include protection of banks of ponds, lakes, streams, rivers, canals, the seashore or seabed against damage by construction plant or processes.

Monitoring water quality during construction (6.1.8)

Visual inspection of watercourses is considered to be standard industry practice on sites with ground and surface waters or features on or near them, due to the ease with which silt, in particular, can enter and be detected. Risk assessment of the water quality impacts on the environment should be undertaken to establish appropriate level of on-site monitoring and chemical analysis. The outcome of the risk assessment may require additional monitoring and analysis above the standard industry practice.

Monitoring may be carried out in liaison with local or national government departments or agencies. However, it is considered good practice for Contractors to be proactive in establishing a monitoring regime – and it is in their own interest to do so.

In this section, emphasis is placed on monitoring, both short-term and long-term. Evaluation of the long-term impact of materials may be difficult if materials have been used that have not had long-term research carried out on them. For example, these may have delayed pollution characteristics, which would be costly and possibly difficult to rectify.

Evidence

Assessment criteria	Evidence guidance
6.1.1 Consultation with regulatory authorities (fixed)	Evidence could be in the form of meeting notes or letters regarding obtaining consents or licences. At construction stage, it could be actual applications and granting of licences. Evidence also needs to be shown for appropriate communication of the outcomes of the consultations or applications. These could be circulation of design notes, team briefings or incorporation of licence and/or consent conditions into method statements.
6.1.2 Preventing pollution in operation	Evidence could be drafts of operation and maintenance manuals, minutes of meetings and other documentation. Evidence of positive measures should be documented at design stage.
6.1.3 Control of impacts on the water environment from the completed project (fixed)	Evidence could include assessment of run-off, hydrological impacts, surface and groundwater quality impacts, and/or risk assessments, and subsequent incorporation into the design.
6.1.4 Long-term monitoring of impacts on the water environment	Evidence will vary greatly depending on the type of project being assessed. Appropriateness of measures will have to be judged and agreed by the Assessor and Verifier. However, the guidance above gives examples of the sorts of measures that could be considered.
6.1.5 Control of impacts on the water environment during construction (fixed)	Evidence could include assessment of run-off, hydrological impacts, surface and groundwater quality impacts, and/or risk assessments, and subsequent incorporation into construction plans.
6.1.6 Preventing pollution during construction	Evidence during construction could be in the form of photographs and other documentation or could be gained from a site visit. To score credits during construction stage, evidence must be robust to ensure that all risks to the freshwater and marine environments have been considered and mitigated. Note that company-wide key performance indicators are insufficient as evidence.
6.1.7 Protecting existing water features during construction	
6.1.8 Monitoring water quality during construction	Evidence can be in the form of monitoring data and other documentation showing the methods of monitoring used.

6.2 Air, noise and light pollution

Aim

To minimise, mitigate, and manage the negative effects of air, noise, and light pollution arising as a result of the delivery and ongoing operation of the asset.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
6.2.1 Identification of potential effects on neighbours during construction	To scope out there must be evidence that there were genuinely no nuisance (noise, vibration, dust, odour, air quality or lighting) effects of any kind that needed consideration on the project or no neighbours, sensitive wildlife habitats (not just protected species) or public recreation areas that might be affected by the works.
6.2.2 Identification of potential effects on neighbours in operation	
6.2.3 Mitigating effects on neighbours in operation	
6.2.4 Innovative solutions for nuisance mitigation in operation	The decision to scope out will depend on the nature, scale, location and context of the project. For projects that have strict planning agreements, this can only be scoped out where evidence can demonstrate that appropriate mitigation measures have been included in the design and innovative solutions are not appropriate.
6.2.5 Mitigating effects on neighbours during construction	To scope out there must be evidence that there were genuinely no nuisance (noise, vibration, dust, odour, air quality or lighting) effects of any kind that needed consideration on the project or no neighbours, sensitive wildlife habitats (not just protected species) or public recreation areas that might be affected by the works.
6.2.7 Implementation of mitigation measures during construction	Only scope out if 6.2.6 shows that there are genuinely no construction related nuisance issues of any kind.
6.2.8 Innovative solutions to minimise nuisance during construction	
6.2.9 Monitoring of effects on neighbours	Only scope out if 6.2.1 shows that there are genuinely no construction related nuisance issues of any kind.
6.2.10 Achievement of effective mitigation during construction	It is not possible to scope this out if 6.2.9 has failed to score. The decision to scope out will depend on the nature, scale, location and context of the project (for example, only very short duration projects).
6.2.11 Physical damage by vibration	Only scope out if there was genuinely no vibration caused by the project during construction.
6.2.12 Mitigation of operation effects	Scope out if 6.2.3 has been scoped out. If 6.2.3 is not scoped out, then this can only be scoped out in the unlikely event that all of the intended mitigation implementation is to be done separately after the construction stage of the project is completed.

Credit summary

Assessment criteria	Strategy	Design	Construction
6.2.1 Identification of potential effects on neighbours during construction	11		
6.2.2 Identification of potential effects on neighbours in operation	11		

Assessment criteria	Strategy	Design	Construction
6.2.3 Mitigating effects on neighbours in operation		11	
6.2.4 Innovative solutions for nuisance mitigation in operation		40	
6.2.5 Mitigating effects on neighbours during construction		11	
6.2.6 Construction effects on neighbours (fixed)			30 (up to)
6.2.7 Implementation of mitigation measures during construction			29
6.2.8 Innovative solutions to minimise nuisance during construction			29
6.2.9 Monitoring of effects on neighbours			17
6.2.10 Achievement of effective mitigation during construction			12 (up to)
6.2.11 Physical damage by vibration			7
6.2.12 Mitigation of operation effects			20

Assessment criteria

6.2.1 Identification of potential effects on neighbours during construction

Str	Des	Con
11		

6.2.1.1 Baseline studies and predictions for all potential effects on neighbours have been carried out for the project **and** proposals have been put forward for mitigating effects potentially occurring *during construction*.

6.2.2 Identification of potential effects on neighbours in operation

Str	Des	Con
11		

6.2.2.1 Baseline studies and predictions for all potential effects on neighbours have been carried out for the project **and** proposals have been put forward for mitigating effects potentially occurring *during operation*.

6.2.3 Mitigating effects on neighbours in operation

Str	Des	Con
	11	

6.2.3.1 Appropriate proposals to mitigate effects on neighbours *during operation* have been incorporated into the design(s) (as consulted with stakeholders).

6.2.4 Innovative solutions for nuisance mitigation in operation

Str	Des	Con
	40	

6.2.4.1 There are innovative technical solutions included in the design of the project that go beyond those agreed at an earlier planning permission or consenting stage that are intended to mitigate any nuisance caused by the operation of the scheme once constructed.

6.2.5 Mitigating effects on neighbours during construction

Str	Des	Con
	11	

6.2.5.1 Appropriate proposals to mitigate effects on neighbours *during construction* have been incorporated into the design(s) or construction methodology (as consulted with stakeholders).

6.2.6 Construction effects on neighbours (fixed)

Str	Des	Con
		30 (up to)

6.2.6.1 A SEMP or equivalent section in a PEMP has considered the effects of the construction process on neighbours.

	Outcome	Credits
(a)	The plan includes all issues described in the guidance below.	12
(b)	Plus, the plan has been implemented.	18
(c)	Plus, implementation of the plan has been monitored including corrective action.	30

6.2.7 Implementation of mitigation measures during construction

Str	Des	Con
		29

6.2.7.1 The proposals to mitigate for all potential effects on neighbours during the construction period have been implemented.

6.2.8 Innovative solutions to minimise nuisance during construction

Str	Des	Con
		29

6.2.8.1 The Contractor has applied innovative solutions within the construction methodology designed to remove or minimise any nuisance during the construction phase.

6.2.9 Monitoring of effects on neighbours

Str	Des	Con
		17

6.2.9.1 All aspects that could have had potential effects on neighbours (identified in 6.2.1) were monitored at appropriate intervals throughout the construction stage.

6.2.10 Achievement of effective mitigation during construction

Str	Des	Con
		12 (up to)

6.2.10.1 The monitoring of aspects assessed in 6.2.9 demonstrated that acceptable levels of emissions from all aspects (leading to potential effects) were achieved throughout the construction stage.

	Outcome	Credits
(a)	No, but corrective action successfully taken	6
(b)	Yes, in full	12

6.2.11 Physical damage by vibration

Str	Des	Con
		7

6.2.11.1 On completion of the contract, no physical damage has been caused to buildings and structures by vibration from construction processes.

6.2.12 Mitigation of operation effects

Str	Des	Con
		20

6.2.12.1 The proposals for mitigation of all potential effects for the *operational stage* have been implemented in full as far as can be expected at the end of construction.

Guidance

Identification of potential effects on neighbours (6.2.1, 6.2.2)

Although noise and vibration effects are the first to come to mind as effects on those close to new schemes, consideration must be given to all forms of potential pollution emissions and nuisance that could affect neighbours (including wildlife and certain plant life) in the proximity of the scheme during both the construction (6.2.1) and operational stages (6.2.2). Baseline studies required will be dependent upon each individual project location and operations, though these should be predictable, assessable and documented.

Mitigating effects on neighbours in operation (6.2.3)

This can only be scored if a score has been achieved for 3.1.3 (because the designed mitigation should be discussed with appropriate stakeholders).

Examples of possible mitigation measures for effects on neighbours in operation include:

Local air quality: Appropriate measures may include low-emission boilers for water and wastewater treatment plants, fitment of covers to tanks at such works, and spray facilities at solid-waste treatment facilities.

Innovative solutions for nuisance mitigation in operation (6.2.4)

Innovative solutions can be new or advanced methods, products or ideas. Note, however, that some measures may need regulatory approval.

Mitigating effects on neighbours during construction (6.2.5)

This can only be scored if a score has been achieved for 3.1.3 (because the designed mitigation should be discussed with appropriate stakeholders).

Examples of possible mitigation measures during construction include:

Noise: Example measures could include the early development of bunds that help screen construction noise and later become part of the overall landscaping of a project, or Designer input in the phasing of the development or the timing of noisy works. Other possible measures to limit disruption could include time restrictions to limit noisy operations to certain hours of the day (or to limit very noisy operations to short, intermittent spells), using mufflers or silencers on equipment, reducing drop heights into lorries or skips, or erecting noise screens around the site.

Vibration: For example, use of hydraulic shears instead of hydraulic impact breakers; jacking of steel sheet piles instead of hammer-driven piling; use of chemical splitters or falling weight breakers instead of pneumatic breakers and drills.

Emissions (including dust and odour): Example measures include damping down haul roads and siting of dust-producing operations away from neighbours, or appropriate selection of construction plant and its regular maintenance to ensure emissions are kept within strict limits

Light: All lighting for the final project, as well as all compound, site, and depot lighting, should be designed to prevent spillage of light into neighbouring buildings or areas. Construction lighting is often extremely powerful to allow work to continue safely outside daylight hours. Apart from causing considerable nuisance and disrupting the sleep of site neighbours, it can also cause disruption to wildlife.

Construction effects on neighbours (6.2.6)

Credits can only be scored if the plan is comprehensive. Included in this plan or section of a plan should be:

- guidance or method statements on how to avoid unnecessary noise and ground-borne noise;
- measures to reduce disruption caused by site traffic;
- measures to minimise dust and odour emissions; and
- measures to avoid light pollution.

Note that the plan needs to cover all four issues to score these credits.

Some examples of such measures are listed in the relevant sub-sections in this chapter. For further guidance see *CIRIA Environmental good practice on site guide (fourth edition)* (C741, 2015).

Corrective actions are steps that are taken to eliminate the causes of existing nonconformities in order to prevent recurrence. The corrective action process tries to make sure that existing nonconformities and potentially undesirable situations don't happen again.

Implementation of mitigation measures during construction (6.2.7)

No specific guidance provided.

Innovative solutions to minimise nuisance during construction (6.2.8)

Examples of innovative solutions provided by submitted BREEAM Infrastructure assessments for 6.2.8 include: Hydrogen fuel cell lighting rigs, high strength polystyrene blocks to reduce noise from falling demolition, sound jackets on jack hammers, king sheet piles, electronic ticketing systems for vehicle deliveries, Building Information Modelling (BIM) for concrete supply calculations, geotextiles/soil stabilisation for access roads and crane hardstanding, foldable and moveable noise barriers, water and mist diffuser, 'Right of Way' for local residents affected by site location, and sound-silencer for cutting stone.

Monitoring of effects on neighbours (6.2.9)

It is acknowledged that it is very easy to accidentally exceed emission restrictions for short periods. What is assessed here is whether monitoring has taken place and has effectively assisted in alerting site staff to breaches in limits so that appropriate control measures could be taken.

Achievement of effective mitigation during construction (6.2.10)

No specific guidance provided.

Physical damage by vibration (6.2.11)

This focuses on *vibration*, rather than on physical damage that may have other causes (such as trucks damaging verges). It is one of BREEAM Infrastructure's criteria that cannot be proved by positive evidence – hence the requirement for a signed statement from the Project Director.

Mitigation of operation effects (6.2.12)

The proposals being assessed for implementation in this criterion are the proposals assessed in 6.2.3.

Note that 'implemented' must be assessed appropriately up to the point of the assessment being done. If all mitigation measures are included in the scope of the project being assessed, then credits can be scored only if they have been implemented in full. However, if the measures need to be implemented during the early stages of operation after the completion of the construction stage, then the assessments must be against what can reasonably be achieved by the end of construction, not against a prediction of what is anticipated to be implemented in the long term.

Evidence

Assessment criteria	Evidence guidance
6.2.1 Identification of potential effects on neighbours during construction	Evidence could be a written report on the results of the baseline studies appropriate to the scale of the project. Evidence may also be found in the environmental assessment if one was completed.
6.2.2 Identification of potential effects on neighbours in operation	
6.2.3 Mitigating effects on neighbours in operation	Evidence would include two-way correspondence with relevant stakeholders with regard to predicted impacts and proposed mitigation measures, particularly including the local authority on noise and air quality related matters.
6.2.4 Innovative solutions for nuisance mitigation in operation	Evidence needs to be provided to show design changes made subsequent to planning approval that were not also planning conditions. Further Contractor evidence may be in the form of As Built Drawings. The ability of these changes to mitigate nuisance needs to be mutually agreed between Assessor and Verifier.
6.2.5 Mitigating effects on neighbours during construction	Evidence would include two-way correspondence with relevant stakeholders with regard to predicted impacts and proposed mitigation measures, particularly including the local authority on noise and air quality related matters.
6.2.6 Construction effects on neighbours (fixed)	Evidence can be in the form of a SEMP or appropriate section of a PEMP supported by consultation documents such as letters or emails, project newsletters and public event notices.
6.2.7 Implementation of mitigation measures during construction	Evidence can be included in the relevant sections of the SEMP or in drawings and specifications, minutes of site meetings or photographic evidence for physical measures.
6.2.8 Innovative solutions to minimise nuisance during construction	
6.2.9 Monitoring of effects on neighbours	Evidence would include Pollution Prevention and Control plans and Action Plans to prevent excessive emissions. These should include appropriate emission monitoring records and methods statements if these were considered needed. Any monitoring of noise should be appropriate to the frequencies likely to be encountered.

Assessment criteria	Evidence guidance
6.2.10 Achievement of effective mitigation during construction	Evidence would need to show that any exceedances have been acted upon promptly and effectively. Such evidence may be found within a complaints procedure and associated remediation action plans and/or follow-up procedures and records. For full credits, a full set of monitoring data for the full length of the construction works must be provided. This must demonstrate that there were no exceedances, or that any exceedances due to unpredictable circumstances were managed, remedied within an acceptable timeframe with "lessons learned", and communicated to relevant stakeholders.
6.2.11 Physical damage by vibration	Evidence could be a signed statement from the Project Director that the project caused no vibration damage during construction.
6.2.12 Mitigation of operation effects	Evidence needs to show that all proposals for mitigation have been implemented or installed during construction. This could be in the form of construction records or a written report by the Designer or equivalent person closely involved in the development of the mitigation proposals. If it is not possible to show full implementation at the end of construction then the evidence should demonstrate that the implementation is 'on track' for achieving the aimed-for final condition.

7 Resources

Summary

The Resources category promotes the prudent and responsible use of all physical resources including materials, energy, and water. It focuses on reducing whole life impacts from resource use by encouraging consideration of the environmental impacts of design, construction, and operation throughout the life of the asset. The category encourages users to evaluate resource use within the context of a circular economy taking actions that are focused on reducing waste in accordance with the waste hierarchy.

Category summary table

Assessment issues	Credits available
7.1 Strategy for resource efficiency	107
7.2 Reducing whole life carbon emissions	108
7.3 Environmental impact of construction products	152
7.4 Circular use of construction products	254
7.5 Responsible sourcing of construction products	49
7.6 Construction waste management	130
7.7 Energy use	450
7.8 Water use	200
	1450

7.1 Strategy for resource efficiency

Aim

To embed consideration of the efficient use of energy, water, and materials throughout the project's planning, design, and delivery.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
7.1.3 Policies and targets for resource efficiency in operation	This can only be scoped out on projects that can demonstrate operation of the works is not relevant, such as land remediation works or flood defence banks.

Credit summary

Assessment criteria	Strategy	Design	Construction
7.1.1 Project resources strategy (fixed)	10 (up to)		
7.1.2 Supporting resource efficiency objectives in contracts (fixed)	4		
7.1.3 Policies and targets for resource efficiency in operation	5 (up to)	5 (up to)	
7.1.4 Policies and targets for resource efficiency during construction (fixed)		5 (up to)	5 (up to)
7.1.5 Implementing policies and targets for resource efficiency (fixed)	7	7	7
7.1.6 Implementing the project resources strategy (fixed)		10 (up to)	
7.1.7 Material resource efficiency plan (fixed)		10 (up to)	
7.1.8 Construction resources strategy (fixed)			6
7.1.9 Implementing the construction resources strategy (fixed)			12 (up to)
7.1.10 Implementing the material resource efficiency plan (fixed)			14

Assessment criteria

7.1.1 Project resources strategy (fixed)

Str	Des	Con
10 (up to)		

7.1.1.1 The Client and/or the Designers have prepared a project resources strategy in line with the guidance and covering the aspects below.

	Aspect covered	Credits (each)
(i)	Energy	2 for each
(ii)	Water	
(iii)	Materials sourcing	
(iv)	Reuse and recycling	
(v)	Wastes management	

7.1.2 Supporting resource efficiency objectives in contracts (fixed)

Str	Des	Con
4		

7.1.2.1 Resource efficiency objectives and (where appropriate) benchmarks and/or targets have been included within relevant contract documentation.

7.1.3 Policies and targets for resource efficiency in operation

Str	Des	Con
5 (up to)	5 (up to)	

7.1.3.1 All those directly engaged in the strategy and design of the project have formal corporate-level policies and targets for ensuring physical resources can be used in the most efficient way in the operation of the works.

	Outcome	Credits (each, per stage)
(i)	Using materials more efficiently	1 for each (at each stage)
(ii)	Reducing waste	
(iii)	Using water more efficiently	
(iv)	Using energy more efficiently	
(v)	Reducing carbon emissions	

7.1.4 Policies and targets for resource efficiency during construction (fixed)

Str	Des	Con
	5 (up to)	5 (up to)

7.1.4.1 All those directly engaged in the project have formal corporate-level policies and targets for ensuring physical resources are used in the most efficient way in the design and construction process.

	Outcome	Credits (each, per stage)
(i)	Using materials more efficiently	1 for each (at each stage)
(ii)	Reducing waste	
(iii)	Using water more efficiently	
(iv)	Using energy more efficiently	
(v)	Reducing carbon emissions	

7.1.5 Implementing policies and targets for resource efficiency (fixed)

Str	Des	Con
7	7	7

7.1.5.1 The policies and targets described in 7.1.3 and 7.1.4 have been implemented and monitored on the project.

7.1.6 Implementing the project resources strategy (fixed)

Str	Des	Con
	10 (up to)	

7.1.6.1 The resources strategy for the project in 7.1.1 has been implemented in, and significantly influenced, the design and covers the aspects below.

	Aspect implemented	Credits (each)
(i)	Energy	2 for each
(ii)	Water	
(iii)	Materials sourcing	
(iv)	Reuse and recycling	
(v)	Wastes management	

7.1.7 Material resource efficiency plan (fixed)

Str	Des	Con
	10 (up to)	

7.1.7.1 A plan that identifies opportunities for improving material resource efficiency and reducing waste using the five key principles has been prepared.

	Key principle	Credits (each)
(i)	Reuse and recovery	2 for each
(ii)	Off-site construction	
(iii)	Materials optimisation	
(iv)	Waste efficient procurement	
(v)	Deconstruction and flexibility	

7.1.8 Construction resources strategy (fixed)

Str	Des	Con
		6

7.1.8.1 The construction team has developed their own resources strategy for the construction stage of the project or reviewed and refined the strategy developed by the Client and Designers. The strategy covers the following:

- the key materials and components to be incorporated in the project
- the remote impacts of winning those materials from the planet
- the sourcing of energy supplies for the construction stage
- the use and management of other resources

7.1.9 Implementing the construction resources strategy (fixed)

Str	Des	Con
		12 (up to)

7.1.9.1 The actions (by number) identified in the construction stage resources strategy in 7.1.8 have been implemented.

	Outcome	Credits
(a)	25% or more	3
(b)	50% or more	6
(c)	75% or more	9
(d)	90% or more	12

7.1.10 Implementing the material resource efficiency plan (fixed)

Str	Des	Con
		14

7.1.10.1 The material resource efficiency plan in 7.1.7 has been implemented and monitored.

Guidance

Project resources strategy (7.1.1)

A 'Project Resources Strategy' is important to enable delivery of the performance-orientated criteria in BREEAM Infrastructure. The materials element of such a strategy would be expected to be based on a life-cycle analysis and the cradle-to-cradle principle but does not have to be generated that way. It would be expected to cover but not be limited to:

- the key materials and components to be incorporated in the project (by volume, value and/or propensity to be wasted);
- the remote impacts of extracting those materials from the planet and then processing them for use or into components;
- opportunities to improve the resource efficiency of the project;
- the sourcing of energy supplies for operation of the works if relevant;
- the use and management of other resources to be used for operation of the completed works; and
- sustainability considerations at the end of the useful life – for example design for re-use and recycling at end of life.

Examples of the remote impacts could be from mining of bulk materials or ores. Examples of the resources used in operation of the completed works could include process chemicals in water and wastewater treatment plants, salt and other chemicals for road or airport de-icing; and feedstock fuels for power stations.

The EU Resource Efficiency Roadmap is part of the Resource Efficiency Flagship of the Europe 2020 Strategy. The Europe 2020 Strategy is the European Union's growth strategy for the present decade and is aimed at establishing a smart, sustainable and inclusive economy with high levels of employment, productivity and social cohesion. The Roadmap can be helpful in developing the materials elements of a resource strategy - see ec.europa.eu/environment/resource_efficiency/index_en.htm.

Such a strategy is only of value if it is actively implemented in the design and construction so 7.1.6 seeks evidence that that the strategy has been implemented at the design stage, while 7.1.2 seeks evidence that the requirements of the strategy have been cascaded into the contract documentation for implementation during the construction stage.

Supporting resource efficiency objectives in contracts (7.1.2)

This seeks evidence that the requirements of the strategy have been cascaded into the contract documentation for implementation during the construction stage. This cannot be scoped out if 7.1.1 has failed to score.

Policies and targets for resource efficiency in operation (7.1.3, 7.1.4, 7.1.5)

This focuses on integrating material, waste and water-specific objectives throughout the project cycle to demonstrate that good practice has been adopted from the earliest possible stage.

All organisations directly appointed to the project should have corporate environmental policies that set out at a high level their commitments to managing the environmental impacts of their operations and activities. However, for the purpose of this requirement an environmental policy is not considered sufficient in isolation. To score, organisations should be able to demonstrate that they have adopted specific policies, which have then been translated into specific actions and targets on the project.

Key issues for Clients to consider include setting corporate objectives and targets for material use, waste and water use in their operations and, ensuring these are transferred to the project team in project procurement (appointing Designers and Contractors, tender and contract documentation) and engaging with the supply chain.

For Designers, this means demonstrating that they are actively working with Clients and Contractors to identify opportunities and design solutions that minimise waste and use materials, energy and water more efficiently, both in operation of the completed project and in the construction process.

Similarly, Contractors need to demonstrate that corporate policies are being implemented within the project, including setting requirements for and engaging with their sub-contractors and suppliers. In common with Clients, Contractors would be expected to have in place measurement, monitoring and reporting procedures to capture achievements.

For all organisations, corporate reporting is also an important aspect to demonstrate that the improvements as a result of policies and commitments are being measured and monitored. For Designers, this means measuring the potential improvement at project level and reporting this at a corporate level to demonstrate how proactively they consider the issues in their work.

There is increasing focus on the broader impacts of resources and the need to move to a more circular economy where waste is designed out and there is a stronger emphasis on the life cycle value of the product or asset. Organisations in the construction industry are increasingly demonstrating their commitment to a more resource efficient industry.

Implementing the project resources strategy (7.1.6)

This seeks evidence that the strategy has been implemented at the design stage. This cannot be scoped out if 7.1.1 has failed to score.

Material resource efficiency plan (7.1.7)

This embodies the five key principles that are set out in the WRAP guidance *Designing out waste: a design team guide for civil engineering* and can be adopted to improve material resource efficiency and reduce waste through design or planning. The principles should be applied as early as possible in the design life cycle to give the maximum scope for achieving efficiencies. They also need to be applied throughout the project life cycle to ensure that the potential improvements identified are achieved during construction. Therefore, the maximum score can only be achieved when the incorporation of all five principles are clearly demonstrated. It is acknowledged that not all of these principles are applicable to all projects, for example, where off-site construction is just not possible. However, a score can still be achieved where it is shown that the principle has been considered even if it was then discounted.

Metric guidance

Material resource efficiency plans may include targets that have been set for each of the five key principles. The following (see below) metrics are examples that could be used. Others may be used if they are felt to be more suitable and can be justified as leading to reduced environmental impact:

Design targets for reuse and recovery, reported through metrics such as:

Percentage by volume of predicted suitable/usable material from demolition or deconstruction that should be incorporated into the project, using a formula such as:

$$\frac{\textit{Expected total volume of usable materials from demolition or deconstruction used}}{\textit{Total volume of all materials in permanent works}} \times 100$$

Percentage by volume of predicted excavated material that should be beneficially reused on site, using a formula such as:

$$\frac{\textit{Expected total volume of excavated material beneficially reused on site}}{\textit{Volume of all materials incorporated in permanent works}} \times 100$$

Design targets for off-site construction, reported through a metric such as:

Percentage by volume of components constructed off-site (components capable of being constructed off-site), using a formula such as:

$$\frac{\textit{Expected total volume of components constructed offsite}}{\textit{Total volume of all components capable of being constructed offsite}} \times 100$$

Design targets for materials optimisation, reported through a metric such as:

Predicted wastage rate per £100k project construction value, using a formula such as:

$$\frac{\textit{Total quantity (tonnes or kg) of materials unused or identified as waste}}{\textit{Total project construction value £}} \times 100,000$$

Construction resources strategy (7.1.8)

This is seeking for the Contractor to have a strategy in place, including for their supply chain.

Guidance on improving the resource efficiency of construction and on using procurement to set requirements for Constructors is available from CIRIA.

The CIRIA guidance sets the requirement for the supply chain to set corporate level commitments to improving resource efficiency. This commitment is then embedded into contract or sub-contract documentation and construction processes in line with the sustainability-driven strategy for the project. All actions, targets or benchmarks, and actual performance should be captured within a RMP and Record (or similar) for the project.

Other approaches to meeting these requirements would include the use of specific resource efficiency metrics (such as materials use, wastage or embodied carbon) together with an action plan that sets out clear responsibilities for specific parties in improving resource efficiency. There should be a contractual requirement to develop and/or implement such an action plan.

Finally, it should be noted that, since sustainability is about balancing the environmental, social and economic aspects of a project, this means that the best (sustainability-driven) option for a project does not necessarily mean it will be the best environmental option.

Implementing the material resource efficiency plan (7.1.10)

Implementation needs to demonstrate that practices have been implemented that clearly demonstrate material resource efficiencies and/or waste reductions.

Metric guidance

Implementation of the resource efficiency plan may be reported by providing evidence of measuring and monitoring against the targets set in 7.1.7, by calculation of:

Percentage by volume of suitable/usable material from demolition or de-construction on site that has been incorporated into the works, using a formula such as:

$$\frac{\textit{Total volume of usable materials from onsite demolition or deconstruction used}}{\textit{Total volume of all materials in permanent works}} \times 100$$

Percentage by volume of excavated material that has been beneficially reused on site, using a formula such as:

$$\frac{\textit{Total volume of excavated material beneficially reused onsite}}{\textit{Volume of all materials incorporated in permanent works}} \times 100$$

Achieved for off-site construction:

Percentage by volume of components actually constructed off-site, using a formula such as:

$$\frac{Total\ volume\ of\ material\ constructed\ offsite}{Total\ volume\ of\ all\ materials\ incorporated\ in\ permanent\ works} \times 100$$

Achieved material optimisation:

Wastage rate per £100k project construction value, using a formula such as:

$$\frac{Total\ volume\ of\ materials\ unused\ or\ identified\ as\ waste}{Total\ project\ construction\ value\ £} \times 100,000$$

Percentage reduction of total material consumed, per £100k project construction value, based on a measure of:

$$\frac{Total\ volume\ of\ materials\ consumed\ (tonnes\ or\ kg)}{Total\ project\ construction\ value\ £} \times 100,000$$

The total volume of materials should be a sum of all materials ordered and delivered to site or derived from site, for use or to aid the construction of the finished works.

Evidence

Assessment criteria	Evidence guidance
7.1.1 Project resources strategy (fixed)	Evidence could be a document entitled 'Project Resources Strategy' with the attributes indicated in the guidance or could be a series of less-broad analyses that, taken together, provide the high-level, strategic overview that can provide significant input to the project concept and design. The evidence must be in scale to the nature, location, context and size of the project. A two-page summary report would be insufficient for a multi-million-pound project, yet a 100-page detailed analysis is very unlikely to be appropriate for projects in the region of £1M.
7.1.2 Supporting resource efficiency objectives in contracts (fixed)	Evidence of the contract should be provided which should contain suitable resource efficiency clauses within it.
7.1.3 Policies and targets for resource efficiency in operation	Evidence could be a copy of specific, formally adopted policies and targets. For 7.1.5 evidence could include action plans that demonstrate implementation of the policies or copies of annual reports (such as an Environmental or Corporate Social Responsibility (CSR) report) demonstrating the measurement of performance against targets. Evidence could also outline the policies and targets that have been set and any monitoring metrics or measures set to be used throughout the project to monitor their achievement. Additional evidence would be copies of the procurement documentation and contracts showing these requirements have been cascaded throughout the supply chain and adopted in the project.
7.1.4 Policies and targets for resource efficiency during construction (fixed)	
7.1.5 Implementing policies and targets for resource efficiency (fixed)	
7.1.6 Implementing the project resources strategy (fixed)	Evidence is likely to be design stage reports showing how the resources strategy for the project has influenced the design.
7.1.7 Material resource efficiency plan (fixed)	Evidence could be a specific materials plan or a specific consideration recorded within design meeting records. It could also include the reports from a formal workshop. Implementation of the recommendations could be demonstrated by incorporation into specifications and drawings, or through physical evidence such as photographs. Evidence could also include data quantifying material savings or waste reductions, which could include decisions and information recorded in the SWMP. Evidence could alternatively include the calculation and reporting of the metric-based guidance.

Assessment criteria	Evidence guidance
7.1.8 Construction resources strategy (fixed)	Evidence will be in the reports of the assessments and in the CMP or equivalent. Evidence should involve demonstration of how the Client's commitment and resources strategy (assessed under 7.1.1 has been addressed in the planning and preparation for the construction stage – for example, evidence of a RMP, a resources section of a Construction Management Plan, or similar. Such documents should be detailing both predicted and actual performance against benchmarks for metrics such as energy consumption, water use, materials consumption, and waste minimisation. Simply specifying that a practitioner is committed but without any further evidence is insufficient for achieving the credits.
7.1.9 Implementing the construction resources strategy (fixed)	
7.1.10 Implementing the material resource efficiency plan (fixed)	Implementation of the plan could be demonstrated by incorporation into specifications, drawings and materials orders, or through construction records and physical evidence such as photographs. Evidence could alternatively include the calculation and reporting of the metric-based guidance.

7.2 Reducing whole life carbon emissions

Aim

To drive the assessment, reporting, and reduction of whole-life carbon emissions throughout the project's planning, design, delivery and future management.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
7.2.2 Independent third-party certification of carbon management	This can be scoped out on very small value or short duration projects that are not part of a programme of work. It may also be scoped out in countries or regions where it is not possible to receive independent third-party certification.

Credit summary

Assessment criteria	Strategy	Design	Construction
7.2.1 Carbon management (fixed)	18 (up to)	18 (up to)	18 (up to)
7.2.2 Independent third-party certification of carbon management	9	9	9
7.2.3 Achieving carbon reduction targets (fixed)	27 (up to)		
7.2.4 Exemplary level: Net zero carbon (fixed)	1% (exemplary)		

Assessment criteria

7.2.1 Carbon management (fixed)

Str	Des	Con
18 (up to)	18 (up to)	18 (up to)

7.2.1.1 A carbon management approach has been adopted during the strategy, design, or construction of the project that fully or partially conforms with PAS 2080 as indicated in the table below.

	Parts of PAS 2080 conformed with					Credits (per stage)
	Clause 7 Quantification of GHG emissions	Clause 8 Target setting, baseline setting and monitoring	Clause 9 Reporting	Clause 10 Continual improvement	All other clauses	
(a)	✓	✗	✗	✗	✓	4
(b)	✓	✓	✗	✗	✓	8
(c)	✓	✓	✓	✗	✓	12
(d)	✓	✓	✓	✓	✓	18

7.2.2 Independent third-party certification of carbon management

Str	Des	Con
9	9	9

7.2.2.1 The carbon management process adopted during the strategy, design, and construction of the project in 7.2.1 has been independently third-party certified as fully conforming with PAS 2080.

7.2.3 Achieving carbon reduction targets (fixed)

Str	Des	Con
27 (up to)		

7.2.3.1 The project has achieved its carbon emission reduction targets identified in the carbon management process in 7.2.1.

	Outcome	Credits
(a)	Targets not met, but lessons learned have been documented and publicly shared in a case study.	13
(b)	Targets have been met or exceeded.	27

7.2.4 Exemplary level: Net zero carbon (fixed)

Str	Des	Con
1% (exemplary)		

7.2.4.1 The PAS 2080 compliant results demonstrate that the project has achieved net zero carbon on its whole life emissions.

Guidance

Carbon management (7.2.1)

PAS 2080 is applicable to anyone involved in the delivery of infrastructure, including asset owners/managers, designers, constructors and product/material suppliers. Complying with the requirements of PAS 2080 will help all value chain members understand and manage carbon associated with the development of infrastructure from its inception to its end-of-life and is equally applicable to individual assets or to programmes.

Relevant value chain members must be involved in the carbon management process at each stage of the project. If partial conformity with PAS 2080 is being sought then the value chain members that must be involved at each assessment stage, as a minimum, are given in the table below. All value chain members must be involved for Whole Project Assessments.

Assessment stage	Required value chain members (as a minimum)
Strategy	Client
Design	Design team organisation(s)
Construction	Principal contractor

Where the project is claiming full conformance with PAS 2080, this must be in accordance with one of the three claims of conformity recognised in clause 12 of PAS 2080:

a. Independent third-party certification (clause 12.2.2) – also see 7.2.2 below
b. Other-party validation (clause 12.2.3)
c. Self-validation (clause 12.2.4)

Some of the requirements of PAS 2080, including those set out in clause 5 (Leadership and Governance) and clause 6 (Carbon Management Process), are covered by BREEAM Infrastructure in 1.1 Sustainability leadership and 7.1 Strategy for resource efficiency. Parts of clause 7 (Quantification of GHG Emissions) are covered in 7.3 Environmental impact of construction products.

Independent third-party certification of carbon management (7.2.2)

Independent third-party certification to PAS 2080, as described in clause 12.2.2 of the standard, offers the greatest level of assurance of the carbon management process used on a project or programme. Certification of the process – including the quantification methodology and data sources used to calculate carbon impacts and reductions – increases the confidence that other stakeholders can have in the results.

Carbon reporting is also increasingly important for project financing, especially those seeking Green Investment Bonds. Some projects will also be reported through the GRESB infrastructure annual survey or funded through government investment and thereby also require high levels of reporting assurance to demonstrate compliance with international climate commitments.

The credits in 7.2.2 can only be awarded if full credits in 7.2.1 have been achieved.

Achieving carbon reduction targets (7.2.3)

There are no set or fixed carbon emission reductions required as these should be calculated and assessed in relation to the specifics of each project. Providing that the project or programme has undertaken quantification of emissions, created a robust target for reduction, and shown that appropriate actions have resulted in a reduction in carbon then credits can be awarded in accordance with the table.

Exemplary level: Net zero carbon (7.2.4)

The Paris Agreement, under the United Nations Framework Convention on Climate Change (UNFCCC), provides a framework for governments as well as businesses and investors to keep global warming well below 2°C and seeks to limit the temperature increase to 1.5°C.

BREEAM Infrastructure wholly supports the need to dramatically cut greenhouse gas emissions and therefore awards exemplary performance credits where a net-zero carbon target can be demonstrated as being met.

Evidence

Assessment criteria	Evidence guidance
7.2.1 Carbon management (fixed)	Evidence should cover the items set out in PAS 2080. It should include information on quantification of carbon emissions, setting baselines and targets, monitoring and reporting, and processes for continual improvement (as applicable). Evidence for full conformity to PAS 2080 could include assessment reports that identify the basis of the claim of conformity (self-validation, other-party validation, or independent third-party certification).
7.2.2 Independent third-party certification of carbon management	Evidence will include the certificate(s) from an independent third-party showing that the carbon management process used on the project has fully conformed with PAS 2080.
7.2.3 Achieving carbon reduction targets (fixed)	Evidence will come from the carbon management process and will need to show how the reduction target was set, the calculated baseline carbon emissions, and the final calculated carbon emissions. Whether meeting the target or not, evidence should show to what extent the carbon reduction target has been met. Where targets haven't been met, a publicly shared case study that explains the lessons learned should be provided in addition to the requirements above.
7.2.4 Exemplary level: Net zero carbon (fixed)	Evidence is likely to be an output from a formal carbon management process that shows the calculated whole life carbon emissions for the project are zero or negative. Evidence should include details of the calculation methodology, sources of data, and any assumptions or limitations. Evidence at the construction stage must reflect the project as built at practical completion.

Definitions

Net zero carbon

At present there is no specific methodology for assessing net zero carbon within infrastructure. As a pragmatic response, that encourages users to seek to meet this challenge starting today, BREEAM Infrastructure has therefore adapted the current definition for net zero carbon from the UKGBC Advancing Net Zero Programme.

The UKGBC definition of net zero carbon does not yet provide a complete definition of net zero carbon for the whole life of an asset. It does provide a definition of net zero carbon for 'construction' and 'operational energy', as follows, which together form the minimum scope accepted by BREEAM Infrastructure for net-zero carbon.

Net zero carbon – construction: When the amount of carbon emissions associated with [an asset's] product and construction stages up to practical completion is zero or negative, through the use of offsets or the net export of on-site renewable energy.

Net zero carbon – operational energy: When the amount of carbon emissions associated with [the asset's] operational energy on an annual basis is zero or negative. A net zero carbon [asset] is highly energy efficient and powered from on-site and/or off-site renewable energy sources, with any remaining carbon balance offset.

Additional information

PAS 2080 Carbon management in infrastructure

PAS 2080:2016 Carbon management in infrastructure is a framework for managing whole life carbon emissions for all value chain members involved in delivering infrastructure assets and programmes of work. It was commissioned by the Green Construction Board to reduce carbon, reduce cost, and promote innovation through more collaborative ways of working.

PAS 2080 can be downloaded from: shop.bsigroup.com/ProductDetail/?pid=000000000030323493.

A detailed supporting guidance document for PAS 2080 is also available for free from: www.constructionleadershipcouncil.co.uk/wp-content/uploads/2019/06/Guidance-Document-for-PAS2080_vFinal.pdf

UKGBC Advancing Net Zero

Although UKGBC main focus is on buildings their recent net zero framework guide provides useful reference for the understanding of the challenge and practical actions necessary to make progress in dealing with net zero carbon challenge.

A free copy of the publication, entitled *Net Zero Carbon Buildings: A Framework Definition* (dated April 2019), can be obtained from: www.ukgbc.org/ukgbc-work/advancing-net-zero/

7.3 Environmental impact of construction products

Aim

To reduce the burden on the environment from construction products through the use of life cycle assessment (LCA) and the adoption of best practice in selection of products with a low environmental impact (including embodied carbon) over the life cycle of the asset.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
7.3.3 Hazardous materials	The decision to scope out will depend on the nature, scale, location and context of the project.
7.3.4 Low-VOC and/or biodegradable coatings	The decision to scope out will depend on the nature, scale, location and context of the project.
7.3.5 Application of coatings	Scope out if no coatings or treatments used, or if factory application is impossible or impractical – for example if coatings to in-situ concrete are the only coatings used.

Credit summary

Assessment criteria	Strategy	Design	Construction
7.3.1 Life cycle assessment (fixed)	100 (up to)		
7.3.2 Environmental Product Declarations (EPDs) (fixed)		17	
7.3.3 Hazardous materials		12	
7.3.4 Low-VOC and/or biodegradable coatings		6 (up to)	6 (up to)
7.3.5 Application of coatings			11

Assessment criteria

7.3.1 Life cycle assessment (fixed)

Str	Des	Con
100 (up to)		

7.3.1.1 A life cycle assessment (LCA) has been undertaken and used to reduce the environmental impact of the project.

	Outcome	Credits
(a)	Product life cycle assessments	15
(b)	Screening carbon footprint	50
(c)	Complete carbon footprint	75
(d)	Screening life cycle assessment	50
(e)	Simplified life cycle assessment	75
(f)	Complete life cycle assessment	100

7.3.2 Environmental Product Declarations (EPDs) (fixed)

Str	Des	Con
	17	

7.3.2.1 The suitably experienced carbon or LCA practitioner identifies ten key products within the assessed asset. Five of these products are specified within the final asset based on the analysis of product specific, independently verified, third party Environmental Product Declarations.

7.3.2.2 The EPDs must inform specification recommendations made by the suitably experienced carbon or LCA practitioner and the EPDs relating to the products used in the final asset must be requested and documented.

7.3.3 Hazardous materials

Str	Des	Con
	12	

7.3.3.1 An assessment has been made at the design stage to substitute hazardous materials with less hazardous materials wherever possible.

7.3.4 Low-VOC and/or biodegradable coatings

Str	Des	Con
	6 (up to)	6 (up to)

7.3.4.1 A percentage of all coatings and other treatments (for temporary and permanent works) have been specified as low-VOC and/or biodegradable and subsequently used as specified.

(i) Specified

	Percentage specified	Credits	Assessment stage
(a_1)	10% or more	2	Design
(b_1)	40% or more	4	
(c_1)	80% or more	6	

(ii) Used

	Percentage used	Credits	Assessment stage
(a_2)	10% or more	2	Construction
(b_2)	40% or more	4	
(c_2)	80% or more	6	

7.3.5 Application of coatings

Str	Des	Con
		11

7.3.5.1 All appropriate coatings and treatments for permanent work materials have been factory-applied (except for cut ends).

Guidance

Life cycle assessment (7.3.1)

Product life cycle assessments

1. A suitably experienced carbon or life cycle assessment (LCA) practitioner carries out product life cycle assessments for ten key products within the assessed asset using existing product specific Environmental Product Declarations (EPDs) or generic LCA data.
2. The suitably experienced practitioner considers a minimum of three functionally appropriate options for each key product and makes recommendations to the project team to reduce the environmental impact of each product. As a minimum, total carbon equivalent emissions should be considered over the expected lifetime over the asset.
3. The project team demonstrate how the recommendations have been taken forward for the fully constructed asset and report the LCA data for each product in the BREEAM Infrastructure online tool.

Screening carbon footprint

1. A screening carbon footprint in completed before finalising the concept design by a suitably experienced carbon or LCA practitioner to estimate the total carbon equivalent impact associated with the asset over its life cycle (modules A-C) set out in EN 15978.
2. The screening identifies the significant sources of emissions over the expected lifetime of the asset. Total carbon emissions or Global Warming Potential ($kgCO_2e$) are reported.
3. Recommendations are made to the project team to inform future design decisions and include the goal and scope of any further assessment.
4. The suitably experienced carbon or LCA practitioner uses appropriate standards and sources of data and documents the assessment process with all decisions justified.
5. Total carbon equivalent emissions of the asset are reported within the BREEAM Infrastructure online tool.

Cut-off criteria for the carbon impact assessment

Where the carbon equivalent impact of an activity is estimated to account for no more than 1% of the total impact of that module, that activity may be omitted from the assessment. The proportion of total neglected activities within a module, e.g. per module A1-A3, A4-A5, B1-B5, B6-B7, C1-4 and module D (where calculated) should not exceed 5% of the total impact within that module.

Although this rule should be upheld wherever possible it is appreciated that at the screening stage not all the detail of the project will be known. The practitioner can exceed this cut-off criteria where the corresponding impact can be deemed negligible and justified.

This cut off criteria cannot be applied in order to hide data. Any application of the cut-off criteria should be documented.

Screening life cycle assessment

1. A screening LCA is completed before finalising the concept design by a suitably experienced LCA practitioner to establish the environmental impact associated with the asset over its complete life cycle (modules A-C) in line with the principles set out in EN 15978 and the EeB Guidance document.
2. The screening identifies significant sources of the following indicators over the expected lifetime of the asset:
    a. Total carbon equivalent emissions or Global Warming Potential ($kgCO_2e$)
    b. Net use of freshwater (m^3)
    c. Hazardous waste disposed (kg)
    d. Non-hazardous waste disposed (kg)
3. Recommendations are made to the project team to inform future design decisions and include the goal and scope of any further assessment.
4. The suitably experienced LCA practitioner sources data in line with the principles set out in EN 15978 and the EeB Guide and documents the assessment process with all decisions justified.
5. The results of the screening LCA are reported in the BREEAM Infrastructure online tool for the four indicators listed above.

Complete carbon footprint

1. A complete carbon footprint is undertaken to establish the carbon footprint associated with all life cycle stages of the asset.
2. Total carbon emissions or Global Warming Potential ($kgCO_2e$) is evaluated and reported in line with the principles set out in EN 15978 and the EeB Guidance document for modules A-C and D (module D is optional but can be included where the carbon/LCA practitioner considers it feasible and relevant).
3. The suitably experienced carbon practitioner considers a range of functionally appropriate options and identifies impacts over the expected lifetime of the asset.
4. Recommendations are provided to minimise the carbon footprint, prioritising those that result in the biggest reduction in impact.
5. The project team demonstrate how the recommendations resulted in changes in the design and an overall reduction in impact.
6. Total carbon emissions or Global Warming Potential ($kgCO_2e$) is reported in the BREEAM Infrastructure online tool, including the total carbon equivalent reported in reference to the asset's capacity.

Simplified life cycle assessment

1. A simplified LCA is undertaken to establish the environmental impact associated with all life cycle stages of the asset.
2. The following indicators are evaluated and reported in line with the principles set out in EN 15978 and the EeB Guidance document for modules A-C and D (module D is optional but can be included where the carbon/LCA practitioner considers it feasible and relevant):

- Total carbon equivalent or Global Warming Potential ($kgCO_2e$)
- Net use of freshwater (m^3)
- Hazardous waste disposed (kg)
- Non-hazardous waste disposed (kg)

3. The suitably experienced LCA practitioner considers a range of functionally appropriate options and identifies impacts over the expected lifetime of the asset.
4. Recommendations are provided to minimise the environmental impact, prioritising those that result in the biggest reduction in impact.
5. The project team demonstrate how the recommendations resulted in changes in the design and an overall reduction in impact.
6. All LCA indicators investigated are reported in the BREEAM Infrastructure online tool, including the total carbon equivalent reported in reference to the asset's capacity.

Complete life cycle assessment

1. A complete LCA is undertaken to establish the environmental impact associated with all life cycle stages of the asset.
2. The following indicators are evaluated and reported in line with the principles set out in EN 15978 and the EeB Guidance document for modules A-C and D (module D is optional but can be included where the carbon/LCA practitioner considers it feasible and relevant):
    - Total carbon equivalent or Global Warming Potential ($kgCO_2e$)
    - Net use of freshwater (m^3)
    - Hazardous waste disposed (kg)
    - Non-hazardous waste disposed (kg)
    - Radioactive waste disposed (dm^3)
    - Ozone Depletion Potential (kg eq CFC 11)
    - Acidification Potential for Soil and Water (kg eq SO_2)
    - Eutrophication Potential (kg eq $(PO_4)^3$
    - Photochemical Ozone Creation (kg eq C_2H_4)
    - Abiotic Depletion Potential – Elements (kg Sbe)
    - Abiotic Depletion Potential – Fossil Fuels (MJe)
3. The suitably experienced LCA practitioner considers a range of functionally appropriate options and identifies impacts over the expected lifetime of the asset.
4. Recommendations are provided to minimise the environmental impact, prioritising those that result in the biggest reduction in impact.
5. The project team demonstrate how the recommendations resulted in changes in the design and an overall reduction in impact.
6. All LCA indicators investigated are reported in the BREEAM Infrastructure online tool, including the total carbon equivalent reported in reference to the asset's capacity.

Environmental Product Declarations (EPDs) (7.3.2)

In order to determine the ten key products to assess, the suitably qualified carbon or LCA practitioner must consider as a minimum the key elements of the infrastructure asset and their component products. A justification should be provided as to how the key products were selected in order to make recommendations that will have the largest positive impact.

Hazardous materials (7.3.3)

Clearly, the most environmentally beneficial approach is to avoid the use of hazardous substances altogether and then to use products of a less hazardous nature where complete substitution is not possible. Increasingly, manufacturers and suppliers are bringing to market products with lower levels of hazardous substances or which contain substances of a less hazardous nature. These include, for example, low-VOC coatings and treatments.

Low-VOC and/or biodegradable coatings (7.3.4)

It should be noted that low-VOC coatings and treatments are not always practical or appropriate for certain applications. In cases such as these, this requirement should be scoped out. See British Coatings Federation's publication, The VOC Handbook, available to download from www.coatings.org.uk, for advice and guidance.

Application of coatings (7.3.5)

Note that this applies to all coatings for the permanent works, not just to timber coatings.

Evidence

Assessment criteria	Evidence guidance
7.3.1 Life cycle assessment (fixed)	To encourage users to fully consider impacts of carbon over the lifetime of the asset, BREEAM Infrastructure permits evaluation to be undertaken in variety of ways with scores being granted on the basis comprehensiveness and robustness. This flexible approach is permitted in order to recognise that projects with differing scale and type will have differing levels of impact and access to expertise to assess the impacts and opportunities. In all cases evidence requirements of the assessments should demonstrate they have been prepared having fully engaged key representatives of the project delivery team including: 1. Suitably qualified carbon practitioner 2. Contractor 3. Designer 4. Owner/operator. A screening study should focus on the main contributors to the system under assessment, including (but not limited to) the input materials, water and energy use, and the transport of users (if relevant). In carrying out the screening carbon footprint or LCA care is needed to ensure that omitted products are not significant for the chosen environmental indicators. To undertake the LCA or carbon footprint it is not necessary to use a specific tool, however reputable sources of data should be used as detailed in EN 15978 (section 10, particularly 10.3 and 10.4) and the EeB Guide. When undertaking a complete LCA it is necessary to establish the environmental impact associated with all life cycle stages of the asset in line with the principles set out in EN 15978 and the EeB Guidance document for modules A-C and D (where appropriate).
7.3.2 Environmental Product Declarations (EPDs) (fixed)	Evidence should comprise an assessment of the products used by the LCA practitioner and the relevant EPD certificates.
7.3.3 Hazardous materials	Evidence could be a record that these issues have been considered and decisions acted upon. Meeting notes or material specifications showing the decisions made would be acceptable. It would also be acceptable to demonstrate that such requirements were included in contract documents.
7.3.4 Low-VOC and/or biodegradable coatings	Evidence could be in the form of specification or sub-contract records. Any evidence needs to substantiate the percentage being claimed.
7.3.5 Application of coatings	Evidence could be in the form of specification or sub-contract requirements, plus inspection reports or equivalent.

Definitions

Environmental Product Declarations (EPD)

ISO 14025 defines an environmental label or environmental declaration as a claim which indicates the environmental aspects of a product or service. ISO 14020 goes on to state that environmental labels and declarations provide information about a product or service concerning its overall environmental character, a specific environmental aspect, or any number of aspects. BRE are an example of an EPD provider via the BRE Environmental Profiles Scheme, which is now being replaced by a new EN 15804 compliant BRE EPD Verification scheme.

Suitably experienced carbon practitioner

An individual who can meet the following requirements can be deemed 'suitably experienced' for the purpose of a BREEAM Infrastructure assessment:

1. Can demonstrate that they do not have a vested interest in the outcome of the infrastructure project and are not professionally connected with any energy company, low or zero carbon technology, or construction product manufacturer.
2. Has a minimum of three years relevant experience (within the last five years) demonstrating a theoretical and practical understanding of carbon footprinting or LCA of construction projects. This shall include having significant technical roles

in producing carbon footprinting studies, or multi environmental indicator LCA studies, of buildings/assets. These studies shall be to ISO 14040 and ISO 14044 (or other relevant national, ISO or EN standards that are based on ISO 14040 and ISO 14044) and the scope shall include carbon emissions from the construction product, use and end of life stages.

Suitably experienced LCA practitioner

An individual who can meet the following requirements can be deemed 'suitably experienced' for the purpose of a BREEAM Infrastructure assessment:

1. Can demonstrate that they do not have a vested interest in the outcome of the infrastructure project and are not professionally connected with any energy company, low or zero carbon technology, or construction product manufacturer.
2. Has a minimum of three years relevant experience (within the last five years) demonstrating a theoretical and practical understanding of LCA of construction projects. This shall include having significant technical roles in producing multi environmental indicator LCA studies of buildings/assets. These studies shall be to ISO 14040 and ISO 14044 (or other relevant national, ISO or EN standards that are based on ISO 14040 and ISO 14044) and the scope shall include emissions from the construction product, use and end of life stages.

Independently verified third party Environmental Product Declarations (EPD)

For this issue, the independently verified third party EPDs can cover:

- Partial life cycle (cradle-to-gate or cradle-to-gate with options) OR
- Whole life cycle (cradle-to-grave)

Partial life cycle EPD can cover:

- The product stage only: such an EPD covers raw material supply, transport, manufacturing and associated processes; this EPD is said to be "cradle to gate"
- The product stage and selected further life cycle stages: such an EPD is said to be "cradle-to-gate with options".

In both cases, the EPD must be produced in accordance with the requirements within EN 15804 or the ISO 14020 series – particularly ISO 14025 – and ISO 14040 and ISO 14044 (life cycle assessment).

EeBGuide

The EeBGuide project provides information to support LCA which can be found here: www.eebguide.eu/?page_id=704.

Screening, Simplified, and Complete life cycle assessment

These are different levels of detail as defined in the EeB Guide for multi environmental category life cycle assessment.

Screening and Complete carbon footprint

These are different levels of detail as defined in the EeB Guide, but in the case of carbon footprint, shall be limited to the global warming potential (GWP) environmental category only.

7.4 Circular use of construction products

Aim

To maximise the ongoing value of construction and other resources through the careful design and specification of materials. This aims to ensure that resources remain in use for as long as possible, that maximum value is extracted whilst in use, and will be recovered and regenerated at the end of each service life as products and materials that maintain rather than degrade resource value.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
7.4.1 Business models for a circular economy – considered	There is no one-size-fits-all approach for an organization to deliver its defined circular economy objectives. The decision to scope out will depend on the nature, scale, location and context of the project.
7.4.2 Business models for a circular economy – implemented	
7.4.3 Durability and low maintenance	Scope out only if there are no structures or major components in the project.
7.4.5 Future disassembly / de-construction	The decision to scope out will depend on the nature, scale, location and context of the project.
7.4.7 Retention of existing structures and materials	Scope out if no existing structures on site.
7.4.8 On-site use of demolition arisings	Scope out only if there was no demolition or deconstruction as part of the assessed works or if the nature of the works meant there was genuinely no opportunity for re-use of the materials within the project.
7.4.9 Cut and fill optimisation	Scope out only on projects where there is no excavation or in situations where, for example, a structure such as a tank is completely underground and there are no options on size (for example storm tanks).
7.4.10 Soil management	The decision to scope out will depend on the nature, scale, location and context of the project.
7.4.11 Beneficial re-use of topsoil	The decision to scope out will depend on the nature, scale, location and context of the project.
7.4.13 Reclaimed or recycled bulk fill and sub-base	Scope out if the project used no bulk fill or sub-base.

Credit summary

Assessment criteria	Strategy	Design	Construction
7.4.1 Business models for a circular economy – considered	6 (up to)		
7.4.2 Business models for a circular economy – implemented	12 (up to)		
7.4.3 Durability and low maintenance		11	
7.4.4 Long-term planned maintenance (fixed)		12	
7.4.5 Future disassembly / de-construction		12 (up to)	
7.4.6 Materials register (fixed)			4

Assessment criteria	Strategy	Design	Construction
7.4.7 Retention of existing structures and materials	15 (up to)		
7.4.8 On-site use of demolition arisings	32 (up to)		
7.4.9 Cut and fill optimisation		11	
7.4.10 Soil management		17	
7.4.11 Beneficial re-use of topsoil			8 (up to)
7.4.12 Reclaimed or recycled materials (fixed)		7 (up to)	7 (up to)
7.4.13 Reclaimed or recycled bulk fill and sub-base		5 (up to)	5 (up to)
7.4.14 Beneficial re-use of excavated material (fixed)		32 (up to)	
7.4.15 Surplus materials (fixed)			20
7.4.16 Materials storage (fixed)			20
7.4.17 Beneficial use of surplus materials (fixed)			18 (up to)

Assessment criteria

7.4.1 Business models for a circular economy – considered

Str	Des	Con
6 (up to)		

7.4.1.1 The principles of a circular economy are considered via appropriate business models in line with BS 8001:2017. One or more of the following procurement models can be demonstrated.

	Procurement models considered	Credits (each)
(i)	On-demand	1 for each
(ii)	Dematerialization	
(iii)	Product life cycle extension/reuse	
(iv)	Recovery of secondary raw materials/by-products	
(v)	Product as a service/product-service system (PSS)	
(vi)	Sharing economy and collaborative consumption	

7.4.2 Business models for a circular economy – implemented

Str	Des	Con
12 (up to)		

7.4.2.1 The principles of a circular economy are implemented via appropriate business models in line with BS 8001:2017. One or more of the following procurement models can be demonstrated.

	Procurement models implemented	Credits (each)
(i)	On-demand	2 for each
(ii)	Dematerialization	
(iii)	Product life cycle extension/reuse	
(iv)	Recovery of secondary raw materials/by-products	
(v)	Product as a service/product-service system (PSS)	
(vi)	Sharing economy and collaborative consumption	

7.4.3 Durability and low maintenance

Str	Des	Con
	11	

7.4.3.1 Durability and low maintenance of structures and components have been actively considered in design and specification.

7.4.4 Long-term planned maintenance (fixed)

Str	Des	Con
	12	

7.4.4.1 Long-term planned maintenance has been considered properly in the design process.

7.4.5 Future disassembly / de-construction

Str	Des	Con
	12 (up to)	

7.4.5.1 A percentage (by volume) of components or pre-fabricated units used can be easily separated on disassembly/de-construction into material types suitable for recycling or reuse.

	Percentage of components that can be easily separated on disassembly	Credits
(a)	15% or more	2
(b)	30% or more	4
(c)	45% or more	6
(d)	60% or more	8
(e)	75% or more	10
(f)	90% or more	12

7.4.6 Materials register (fixed)

Str	Des	Con
		4

7.4.6.1 A materials register been provided to the Client or future managing agent at hand-over that identifies main material types to facilitate recycling during disassembly or de-construction.

7.4.7 Retention of existing structures and materials

Str	Des	Con
15 (up to)		

7.4.7.1 A percentage (by volume) of any existing structures and materials, such as roads, tanks and pipework, have been retained and used within the project as opposed to being demolished and crushed or disposed of.

	Percentage of existing structures and materials retained	Credits
(a)	25% or more	5
(b)	50% or more	10
(c)	75% or more	15

7.4.8 On-site use of demolition arisings

Str	Des	Con
32 (up to)		

7.4.8.1 A percentage (by volume) of suitable/useable material from demolition or de-construction on site has been incorporated into the project.

	Outcome	Credits
(a)	25% or more	6
(b)	50% or more	12
(c)	75% or more	18
(d)	90% or more	32

7.4.9 Cut and fill optimisation

Str	Des	Con
	11	

7.4.9.1 An assessment has been made at design stage to ensure optimisation of cut and fill to reduce the quantity of excavated material to be taken off site.

7.4.10 Soil management

Str	Des	Con
	17	

7.4.10.1 A soil management plan has been prepared and implemented.

7.4.11 Beneficial re-use of topsoil

Str	Des	Con
		8 (up to)

7.4.11.1 All topsoil has been re-used beneficially as topsoil on the site or on a site within a reasonable distance.

	Outcome	Credits
(a)	All beneficially re-used off site	2
(b)	Majority (over 50%) beneficially re-used on site	4
(c)	All beneficially re-used on site	8

7.4.12 Reclaimed or recycled materials (fixed)

Str	Des	Con
	7 (up to)	7 (up to)

7.4.12.1 A percentage (by volume) of materials (excluding bulk fill and sub-base) for use in the permanent works has been specified and made from reclaimed or recycled material, whether reclaimed from the site or elsewhere.

(i) Specified

	Percentage specified	Credits	Assessment stage
(a_1)	20% or more	1	Design
(b_1)	50% or more	4	
(c_1)	75% or more	7	

(ii) Used

	Percentage used	Credits	Assessment stage
(a_2)	20% or more	1	Construction
(b_2)	50% or more	4	
(c_2)	75% or more	7	

7.4.13 Reclaimed or recycled bulk fill and sub-base

Str	Des	Con
	5 (up to)	5 (up to)

7.4.13.1 A percentage (by volume) of bulk fill and sub-base material specified in the project is made from previously used material, whether reclaimed from the site or elsewhere.

(i) Specified

	Percentage specified	Credits	Assessment stage
(a_1)	40% or more	2	Design
(b_1)	60% or more	3	
(c_1)	80% or more	4	
	If this was generated on site (for example, demolition material crushed on site)	Add 1	

(ii) Used

	Percentage used	Credits	Assessment stage
(a_2)	40% or more	2	Construction
(b_2)	60% or more	3	
(c_2)	80% for more	4	
	If this was generated on site (for example, demolition material crushed on site)	Add 1	

7.4.14 Beneficial re-use of excavated material (fixed)

Str	Des	Con
	32 (up to)	

7.4.14.1 A percentage (by volume) of excavated material has been beneficially re-used on-site.

	Outcome	Credits
(a)	30% or more	14
(b)	50% or more	20
(c)	90% or more	26
(d)	100%	32

7.4.15 Surplus materials (fixed)

Str	Des	Con
		20

7.4.15.1 An assessment has been undertaken and implemented to reduce the amount of surplus materials ordered.

7.4.16 Materials storage (fixed)

Str	Des	Con
		20

7.4.16.1 Materials have been stored appropriately to avoid wastage.

7.4.17 Beneficial use of surplus materials (fixed)

Str	Des	Con
		18 (up to)

7.4.17.1 A percentage of unused (surplus) materials have been beneficially re-used (or stored for re-use).

	Outcome	Credits
(a)	50% or more	6
(b)	70% or more	9
(c)	90% or more	12
(d)	No or minimal unused materials	18

Guidance

Business models for a circular economy (7.4.1, 7.4.2)

BS 8001:2017 suggests there are six business model options that can support delivering a circular economy these include:

- On-demand
- Dematerialization
- Product life cycle extension/reuse
- Recovery of secondary raw materials/by-products
- Product as a service/product–service system (PSS)
- Sharing economy and collaborative consumption

The guide applies to all sectors however there some which are particularly relevant to the construction sector and already widely used but benefits are unreported. These new criteria are being introduced to make infrastructure developers, owners,

and operators aware of the wider social and economic benefits it can bring. For more information, see BS 8001:2007 *Framework for implementing the principles of the circular economy in organizations – Guide*.

Durability and low maintenance (7.4.3)

Extending the lifetime of a structure is likely to have considerable environmental benefits as it avoids the environmental impacts associated with later refurbishment or the building of a new structure. In the same way, a low maintenance structure reduces the environmental impacts relating to maintenance and is likely to enhance the structure's lifetime. Admittedly, there are likely to be trade-offs in this area, for example between more-durable paint systems and environmentally damaging treatments.

It is important to recognise that, in the context of BREEAM Infrastructure, what is being looked for in the assessment of these options is consideration of the environmental cost, and a judgement about which option has the greatest lifetime environmental benefit and least adverse impact. This may lead to reduced whole life costs of the structure. Synergies between financial and environmental savings will present a particularly compelling case to Clients.

It is essential that the desired lifespan of a built structure is reflected in every detail of a structure. Often durability is compromised by minor components within it that have a shorter design life than the structure itself and that were specified without bearing the overall objective in mind.

Long-term planned maintenance (7.4.4)

This should cover, at a minimum, the nature and practicality of work expected to be needed, the timescales for this work, and the provision of safe access for maintenance to be carried out. It should be written in a plan for maintenance for the project and delivered to the Client.

Future disassembly / de-construction (7.4.5)

Examples for suitable material types may include bricks, blocks, stone and concrete, treated and untreated timber, glass, PVC, different types of plastic, metal, paper and cardboard, and components (for example, sinks, toilets, radiators).

Materials register (7.4.6)

No specific guidance provided.

Retention of existing structures and materials (7.4.7)

This requirement is about the retention and re-use of existing structures. Any structures that are demolished, crushed and then re-used on the project are covered in 7.4.8, 7.4.12 and 7.4.13.

The appropriate re-use of structures and parts of structures can significantly reduce the demand for new construction materials and other environmental burdens resulting from a development.

A pre-demolition audit and other site surveys will provide information on the existing structures and materials present on site in order to support decision making around the feasibility of incorporating existing structures and materials into the project.

It is important that these issues are considered at feasibility stage so that the design process can be focussed on re-use rather than new construction. Actions to re-use or recover existing structures or materials may also lead to savings in cost and programme and a significant reduction in the carbon footprint of the project. Examples for this include re-use of existing foundations, roads or walls, or, for a flood defence project for instance, the re-use of an existing lock structure as part of new flood defence walls (see CIRIA publication Reuse of Foundations (C653, 2007)). The volume of the structures would normally be worked out as part of the bills of quantities and, where re-used, as part of an assessment of their suitability for re-use.

On-site use of demolition arisings (7.4.8)

A single score is given across all three roles, because the Client or Designer may specify this requirement, rather than just leave the Contractor to choose to do it.

Ideally a pre-demolition audit is completed by an independent and competent third party for any existing buildings, structures or hard surfaces that require demolition on site.

The key findings of the audit should be referenced within the Resource Management Plan (RMP) and include potential applications and any related issues for the reuse and recycling of the demolition materials in accordance with the waste hierarchy.

Targets for levels of reuse and recycling should be set by the project delivery team.

Post-construction, an evaluation of the difference between the actual and the predicted levels figures are reported to BREEAM Infrastructure.

Cut and fill optimisation (7.4.9)

'Cut and fill' is the term used to describe the whole process of profiling of the landform for the project – excavation in some parts, deposition and compaction of excavated and/or imported material in others. The balancing of these two elements leads to minimisation of the import or export of materials to and from the project. This balancing can be done by computer modelling or other, more-traditional methods.

Clearly, this requirement is most applicable to road and rail schemes, and sometimes to airports and industrial estate development. However, it does need to be considered in any project where there is major excavation. In particular, it applies to structures that are semi-buried (such as service reservoirs) where there may be scope to balance cut and fill with how much of the tank is below ground.

Note that, in this requirement excavated material does not include buried structures that are demolished. The re-use of this material is considered in 7.4.1.

Soil management (7.4.10)

Topsoil is correctly stored in stockpiles no higher than 2 metres. To avoid compaction of the soil, stockpiles must not be driven on by heavy machinery. Vegetating long-term stockpiles with suitable plants (for example, mustard or annual lupines) may help prevent dust blow and erosion, silt run-off, and should assist in preventing invasive and/or noxious weeds from invading the soil. However, the extent to which this is appropriate, and which plants should or should not be used depends on the intended use of the topsoil. Note: stockpiles should not be located within 10 metres of a watercourse.

Beneficial re-use of topsoil (7.4.11)

Refer to 7.6.1 if the topsoil is to be or has been moved off site because waste management controls may apply.

Topsoil is an organic material and is only re-used beneficially if layers are not applied too deep as this would destroy its structure. In addition, certain types of habitats actually require very little or no topsoil at all. Re-use on site for the sake of it, in places and at a thickness that is not required, would therefore not be 'beneficial' re-use. What represents a 'reasonable distance' must be judged in the context of the project and its location. It might be 15km in a built-up area, but up to 100km if the site generating the surplus topsoil is in a remote area.

Reclaimed or recycled materials (7.4.12)

Examples include reclaimed bricks, and elements or components using recycled materials such as recycled plastics or reprocessed timber. Recycled materials must satisfy the necessary performance and quality criteria.

Where materials are re-used or recycled, the highest grade of re-use possible will be the most environmentally beneficial. There are a number of opportunities to re-use or recycle materials:

- re-using or recycling materials already on site in the new works (which also minimises transport impacts);
- bringing in reclaimed or recycled materials from off site without imposing high transport impacts;
- seeking opportunities for use elsewhere of reclaimed or recycled on-site materials that cannot be used on site (also without imposing high transport impacts);
- ensuring that opportunities for the re-use and recycling of materials at the end of the structure's lifetime are maximised.

Metric guidance

In addition, to calculating the percentage by volume of materials used in permanent works made from reclaimed and recycled material, the recycled content by total project construction value may also be reported, through a metric such as:

Value (£) of recycled content per £100k project construction value, using a formula such as:

$$\frac{\textit{Value of recycled content in all materials in the permanent works}}{\textit{Total project construction value}\ £} \times 100,000$$

Recycled content for products used may be estimated based on standard industry practice for most products, or project specific data may be used for products where good practice is deliberately being used, i.e. the recycled content of given material product exceeds the industry standard.

Reclaimed or recycled bulk fill and sub-base (7.4.13)

See guidance for 7.4.12.

Beneficial re-use of excavated material (7.4.14)

Design for re-use and recovery of materials already on site is fundamental to achieving materials resource efficiency, minimising the quantities of materials that have to be imported or exported from site. The ability to score for the design stage reflects the importance of this stage in identifying and specifying materials for re-use especially as it is rarely possible to amend the design at construction stage to take advantage of any surplus excavation arisings.

Re-use near the site, as opposed to on the site, is covered in 7.6.10 and 7.6.11 on diversion of waste away from landfill. Re-use of excavated materials off site includes taking material to landfill if the material is genuinely inert and is used for beneficial re-use, such as for capping and other engineering purposes.

Surplus materials (7.4.15)

Over-ordering is still standard practice within construction, but it can contribute to the overall wastage rates if materials become surplus to requirements. Reducing over-ordering can help reduce the amount of waste produced as well as saving money. Examples of actions to reduce over-ordering include targeting accurate ordering (accurate material requirements, realistic wastage rates), logistics planning (delivery strategy, adequate storage, efficient movement of materials to the workface) or installation elements (efficient working and installation and storage of offcuts for reuse).

Metric guidance

Assessment and monitoring of measures taken to reduce surplus materials ordered may be reported as comparisons to initial targets set for minimum surplus materials ordered against actual ordered surplus materials, based on calculations of:

Percentage of materials ordered and not used in the completed permanent works, for all material ordered, using a formula such as:

$$\frac{Volume\ of\ all\ (material\ ordered - material\ used\ in\ permanent\ works)}{Total\ volume\ of\ materials\ ordered} \times 100$$

Surplus materials ordered per £100k project construction value, using a formula such as:

$$\frac{Volume\ of\ material\ ordered\ that\ is\ identified\ as\ surplus\ material}{Total\ project\ construction\ value\ £} \times 100,000$$

Total cost (£) of surplus materials per £100k project construction value, using a formula such as:

$$\frac{Volume\ of\ ordered\ surplus\ materials}{Total\ project\ construction\ value\ £} \times 100,000$$

Percentage of project construction value from ordered surplus materials, using the formula:

$$\frac{Total\ cost\ (£)\ of\ ordered\ surplus\ materials}{Total\ project\ construction\ value\ £} \times 100$$

Materials storage (7.4.16)

For guidance on this issue, see *CIRIA Environmental good practice on site guide (fourth edition)* (C741, 2015).

Beneficial use of surplus materials (7.4.17)

Unused (surplus) materials are any construction materials not used within the project (such as bricks, concrete, reinforcing mesh, timber and/or prefabricated components), but can also include bulk materials that are not only usable without processing, but are also movable to a site where such use is made of them. For the purposes of this criteria, the definition of re-use is that given in the Waste Framework Directive, i.e. any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

To achieve the maximum score for "no or minimal unused materials", the evidence must demonstrate that the assessment in 7.4.15 was fully implemented and no or minimal unused materials were generated.

Unused materials are, regrettably, almost inevitable on any civil engineering project, but this criterion is in no way meant to encourage their accumulation, nor to encourage breakages, just to score credits for their re-use elsewhere.

Some unused materials can be stored and re-used at another site or it may be possible to donate them to a local group or community project – seek advice from the appropriate authority or regulator first. For others this may not be practicable, but they may still be crushed and used as sub-base or fill (i.e. recycled in order to re-use the base material of which they were made).

The level that can be considered 'no surplus or minimal surplus materials' is related to the scale of the project and may require discussion between the Assessor and Verifier. Deciding the percentage of recycled or re-used materials will also require the Assessor and Verifier to make, and justify, a judgement on the value or volume of the project, but not necessarily calculate it.

Evidence

Assessment criteria	Evidence guidance
7.4.1 Business models for a circular economy – considered	To demonstrate that circular economy business models have been used the project team should provide evidence that one or more of the mentioned procurement models have been used for specific goods or services. If more than one procurement model can be demonstrated the score for each can be added together.
7.4.2 Business models for a circular economy – implemented	
7.4.3 Durability and low maintenance	Evidence should be found in the specifications or in the report of a life-cycle costing analysis or a value-engineering report.
7.4.4 Long-term planned maintenance (fixed)	Evidence could be found in the specifications, a hazard and operability study (HAZOP) assessment (or similar), in a contract maintenance schedule or in the form of a maintenance plan to be handed to the Client or managing agent.
7.4.5 Future disassembly / de-construction	Evidence needs to substantiate the percentage being claimed. This can be calculated by any appropriate means that assesses how materials are utilised and combined within the works. The volume of materials that contribute to 80% of the total by value should be used as a basis for the calculations.
7.4.6 Materials register (fixed)	Evidence can include a Health and Safety File, provided this has been extended to include information about material types that will enable recycling on demolition.
7.4.7 Retention of existing structures and materials	Evidence could include inclusion in a SWMP, site photographs, construction drawings, and/or bills of quantities, along with some form of substantiation of the percentage being claimed. Evidence could also include a comparison of design calculations with waste transfer notes or other quantity surveying documentation.
7.4.8 On-site use of demolition arisings	Evidence should be found in quantity surveyors' documentation or project accounts. The evidence provided should substantiate the percentage being claimed.
7.4.9 Cut and fill optimisation	Evidence could be in the form of calculations showing the cut and fill balance and/or contract drawings with mapped out areas for cut and fill.
7.4.10 Soil management	Evidence could be the results of the Soil Resource Survey and a copy of the Soil Management Plan. The Plan should contain detailed instructions on soil handling for the relevant project (not a general statement). Evidence could also include a soil handling and management strategy, or minutes of site meetings referring to the handling and storage of topsoil.
7.4.11 Beneficial re-use of topsoil	Evidence could be some form of calculation to support the credits awarded. This could be a comparison of design calculations to waste transfer notes. The definition of reasonable distance needs to be mutually agreed between the Assessor and Verifier.
7.4.12 Reclaimed or recycled materials (fixed)	Evidence could be in the form of specification requirements. Any evidence needs to substantiate the percentage being claimed. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
7.4.13 Reclaimed or recycled bulk fill and sub-base	Evidence could include bills of quantities, delivery notes, and/or a quantity surveyor's report, along with some form of substantiation of the percentage being claimed.
7.4.14 Beneficial re-use of excavated material (fixed)	Evidence should include some form of calculation to demonstrate the credits being awarded. This calculation could be on the basis of design calculations compared to information documented in the SWMP or equivalent and actual waste transfer notes or some other form of quantity surveying documentation.

Assessment criteria	Evidence guidance
7.4.15 Surplus materials (fixed)	Evidence would include documented evidence that material forecasting and logistics planning have been undertaken, which clearly illustrates how over-ordering has been addressed. Evidence of measures taken to record material ordered to site and then not used in works, could be within Site Waste Management Plan and/or other quantity surveying documentation. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
7.4.16 Materials storage (fixed)	This could be photographic evidence or site records. The Verifier should ascertain that photographs demonstrate a sustained achievement of this requirement for the duration of the project.
7.4.17 Beneficial use of surplus materials (fixed)	Evidence can include records that show that surplus materials have been taken to another site for use, compared with waste disposal records. Any records need to substantiate the percentage being claimed. A declaration made by the Contractor as to how surplus materials have been used and/or disposed of would be acceptable. The exact score and evidence acceptable must be at the discretion of the Verifier.

7.5 Responsible sourcing of construction products

Aim

To encourage the procurement and use of sustainably and responsibly sourced construction products and materials.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
7.5.1 Prerequisite: Legal and sustainable timber	Only scope out if no timber is used in the works.
7.5.6 Locally sourced and recycled materials - use	Only scope out where it can be demonstrated that the use of locally sourced and recycled material is not appropriate or feasible.

Credit summary

Assessment criteria	Strategy	Design	Construction
7.5.1 Prerequisite: Legal and sustainable timber			-
7.5.2 Responsible sourcing of construction products - consideration (fixed)		16	
7.5.3 Responsible sourcing of construction products - implementation (fixed)			18 (up to)
7.5.4 Locally sourced and recycled materials - early consideration (fixed)	5		
7.5.5 Locally sourced and recycled materials - further consideration (fixed)		5	
7.5.6 Locally sourced and recycled materials - use		5	

Assessment criteria

7.5.1 Prerequisite: Legal and sustainable timber

Str	Des	Con
		-

7.5.1.1 All timber and timber-based products used on the project are legally harvested and traded timber.

7.5.2 Responsible sourcing of construction products - consideration (fixed)

Str	Des	Con
	16	

7.5.2.1 The responsible sourcing of materials has been evaluated through the development of a sustainable procurement plan and specified as a project requirement prior to placing any orders.

7.5.3 Responsible sourcing of construction products - implementation (fixed)

Str	Des	Con
		18 (up to)

7.5.3.1 The specification for responsible sourcing has been achieved.

	Outcome	Credits
(a)	Less than 50% (by volume) achieved	5
(b)	50% or more (by volume) achieved	10
(c)	80% or more (by volume) achieved	18

7.5.4 Locally sourced and recycled materials - early consideration (fixed)

Str	Des	Con
5		

7.5.4.1 The Client required consideration be given to the use of locally sourced and recycled material.

7.5.5 Locally sourced and recycled materials - further consideration (fixed)

Str	Des	Con
	5	

7.5.5.1 The Designer and Contractor researched all locally available material sources, including recycled materials.

7.5.6 Locally sourced and recycled materials - use

Str	Des	Con
	5	

7.5.6.1 The Designer and Contractor adapted the designs and specifications to allow for the use of locally sourced and recycled material, where appropriate.

Guidance

Prerequisite: Legal and sustainable timber (7.5.1)

Legally harvested timber and wood-derived products are those that originate from a forest where the following criteria are met:

1. The forest owner or manager holds legal use rights to the forest
2. There is compliance by both the forest management organisation and any contractors with local or national legal criteria including those relevant to:
    a. Forest management
    b. Environment
    c. Labour and welfare
    d. Health and safety
    e. Other parties' tenure and use rights
    f. All relevant royalties and taxes are paid
3. There is full compliance with the criteria of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Legally traded means timber or products derived from legally harvested timber were:

1. Exported in compliance with exporting country laws governing the export of timber and timber products, including payment of any export taxes, duties or levies
2. Imported in compliance with importing country laws governing the import of timber and timber products, including payment of any import taxes, duties or levies
3. Traded in compliance with legislation related to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), where applicable.

Responsible sourcing of construction products (7.5.2, 7.5.3)

Responsible sourcing of materials covers a range of issues, including organisational management systems, supply chain management systems and a range of social and environmental issues (including greenhouse gas emissions, material traceability and life-cycle assessment).

The emphasis of these criteria rewards specifying and achieving responsible sourcing rather than just considering it. The scoring also rewards the consideration and specification of responsibly sourced materials at earlier stages in the project's lifecycle to reflect the greater influence that can be exerted at these stages.

Consideration to purchase materials from sustainable sources may be given via the specification of materials from the Client and/or Designer. Implementation will be in accordance with sector-specific schemes (for example, BES 6001), contract requirements, and/or the specification.

Locally sourced and recycled materials (7.5.4, 7.5.5, 7.5.6)

The traditional approach of using standard designs and specification clauses can lead to the exclusion of acceptable locally sourced and more-sustainable material choices. Good practice of actively seeking sustainable local materials on a site-specific basis should be encouraged.

Evidence

Assessment criteria	Evidence guidance
7.5.1 Prerequisite: Legal and sustainable timber	Evidence must show that all timber and timber-based products used on the project meet the requirements for legally harvested and traded timber.
7.5.2 Responsible sourcing of construction products - consideration (fixed)	Evidence in relation to 7.5.2 could be a statement in a Client tender brief or contract documents, or record of discussions. Evidence in relation to 7.5.3 could be a comparison of specification requirements to overall material purchase, sub-contract documents with general material suppliers, or a declaration from the supplier (usually provided as certificates). In any case, some substantiation of the specification being claimed needs to be provided. At the current time, only BES 6001-based schemes or schemes that are third party accredited as being compliant with BS 8902:2009 can be considered suitable sector-specific schemes. Schemes listed in Guidance Note 18 (GN18) are OK to submit as evidence.
7.5.3 Responsible sourcing of construction products - implementation (fixed)	
7.5.4 Locally sourced and recycled materials - early consideration (fixed)	Evidence could be the Client's tender brief, design briefs or reports from research into materials sourcing.
7.5.5 Locally sourced and recycled materials - further consideration (fixed)	
7.5.6 Locally sourced and recycled materials - use	

Definitions

Sustainable procurement plan

A plan that sets out a clear framework for the responsible sourcing of materials to guide procurement throughout a project and for all involved in the specification and procurement of construction materials. The plan may be prepared and adopted at an organisational level or be project specific and, for the purposes of BREEAM Infrastructure compliance, will cover the following as a minimum:

- Identification of risks and opportunities against a broad range of social, environmental and economic issues. BS 8902:2009 *Responsible sourcing sector certification schemes for construction products - Specification* can be used as a guide to identify these issues.
- Aims, objectives and targets to guide sustainable procurement activities. BS 8903:2010 *Principles and framework for procuring sustainably - Guide* can be used to inform setting of aims, objectives and targets.
- The strategic assessment of responsibly sourced materials available locally and nationally. There should be a policy to procure materials locally where appropriate and practical.
- Responsible sourcing policies that will be employed by the contractor and subcontractor.
- Procedures that are in place to check and verify that the sustainable procurement plan is being implemented and adhered to on individual projects. These could include setting out measurement criteria, methodology and performance indicators to assess progress and demonstrate success.
- Information on how the chain of custody of materials will be fully audited and evidenced.

Responsible sourcing

The management and implementation of sustainable development principles in the provision, procurement and traceability of construction materials and products. In BREEAM Infrastructure this is demonstrated through auditable third-party certification schemes.

Additional information

BES 6001:2008 Framework Standard for Responsible Sourcing of Construction Products

This is a BRE Global standard that provides a framework for the assessment and certification of the responsible sourcing of construction products. The standard has been structured so that compliance can be demonstrated through a combination of meeting the requirements of other recognised certification schemes, establishing written policies, setting objectives and targets and engaging with relevant stakeholders.

To comply with the standard a product must meet a number of mandatory criteria. Where a product demonstrates compliance beyond the mandatory levels, higher levels of performance can be achieved. The standard's performance ratings range from Pass to Good, Very Good, and Excellent.

The development of this standard and subsequent certification schemes will, it is envisaged, provide construction products, not wholly covered under current recognised standards, a means for demonstrating their responsibly sourced credentials. In turn this will allow clients, developers and design teams to specify responsibly sourced construction products with greater assurance and provide a means of demonstrating compliance with the assessment criteria in this issue.

To view a list of products approved to BES 6001 and additional information about the standard visit: www.greenbooklive.com.

Convention on International Trade in Endangered Species (CITES)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorised through a licensing system. Each Party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more scientific authorities to advise them on the effects of trade on the status of the species. The species covered by CITES are listed in three appendices, according to the degree of protection they need.

1. Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
2. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilisation incompatible with their survival.
3. Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

Appendices I and II of the CITES list illustrate species of timber that are protected outright. Appendix III of the CITES list illustrates species that are protected in at least one country. If a timber species used in the project is on Appendix III it can be included as part of the assessment as long as the timber is not obtained from the country or countries seeking to protect this species.

More information about CITES, including the full text of the convention, is available from www.cites.org.

7.6 Construction waste management

Aim

To minimise the amount of waste produced throughout the project and manage the waste produced in line with best practice requirements.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
7.6.2 Prerequisite: Permitting for waste treated or used on site	Scope out only on projects that do not treat waste on site or import waste for use on site.
7.6.3 Prerequisite: Hazardous waste	Scope out only on projects with no hazardous waste.
7.6.6 Clearance and disposal of existing vegetation - consideration	Scope out only if no vegetation is present on the site before work starts.
7.6.7 Clearance and disposal of existing vegetation - implementation	Scope out only if no vegetation is present on the site before work starts.
7.6.8 Hazardous material assessments	The decision to scope out will depend on whether there are any hazardous materials.
7.6.9 Transfer station/recycling centre performance	The decision on whether to scope out will depend on the nature, scale, location and context of the project.
7.6.10 Inert waste diverted from landfill	The decision to scope out will depend on the nature, scale, location and context of the project. Although scoping-out is unlikely.
7.6.11 Non-hazardous waste diverted from landfill	The decision to scope out will depend on the nature, scale, location and context of the project.

Credit summary

Assessment criteria	Strategy	Design	Construction
7.6.1 Prerequisite: Duty of care (fixed)			-
7.6.2 Prerequisite: Permitting for waste treated or used on site			-
7.6.3 Prerequisite: Hazardous waste			-
7.6.4 Site waste management planning - preparation (fixed)		11	
7.6.5 Site waste management planning - implementation (fixed)		16	
7.6.6 Clearance and disposal of existing vegetation - consideration		20	
7.6.7 Clearance and disposal of existing vegetation - implementation		18 (up to)	
7.6.8 Hazardous material assessments			7 (up to)
7.6.9 Transfer station/recycling centre performance			20
7.6.10 Inert waste diverted from landfill			18 (up to)
7.6.11 Non-hazardous waste diverted from landfill			20 (up to)

Assessment criteria

7.6.1 Prerequisite: Duty of care (fixed)

Str	Des	Con
		-

7.6.1.1 All waste produced on site has been managed to meet duty of care requirements, including:

a. All waste has been transported by licensed or otherwise suitably competent carriers.
b. All waste transfers have been recorded and records have been retained.
c. All waste has been taken to licensed, permitted or exempt facilities.
d. Transfer or disposal sites have been checked to ensure they are licensed or otherwise suitable to take the material.
e. Disposal or transfer sites have been checked to ensure the waste was taken there.

7.6.2 Prerequisite: Permitting for waste treated or used on site

Str	Des	Con
		-

7.6.2.1 The appropriate permits, licenses or exemptions have been obtained for waste that has been treated on site or for waste imported to site.

7.6.3 Prerequisite: Hazardous waste

Str	Des	Con
		-

7.6.3.1 Hazardous waste has been appropriately segregated (from other controlled waste) and stored appropriately on site.

7.6.3.2 This waste has been taken to a suitable facility and the construction site registered as a hazardous waste producer where appropriate.

7.6.4 Site waste management planning - preparation (fixed)

Str	Des	Con
	11	

7.6.4.1 A Site Waste Management Plan (SWMP) or waste section of a SEMP has been prepared and updated as appropriate for the duration of the project.

7.6.5 Site waste management planning - implementation (fixed)

Str	Des	Con
	16	

7.6.5.1 Targets or key performance indicators for waste reduction and waste recovery have been met.

7.6.6 Clearance and disposal of existing vegetation - consideration

Str	Des	Con
	20	

7.6.6.1 The most environmentally beneficial ways of dealing with clearance and disposal of existing vegetation have been explored and recommendations have been made.

7.6.7 Clearance and disposal of existing vegetation - implementation

Str	Des	Con
	18 (up to)	

7.6.7.1 These recommendations have been implemented for the majority of vegetation cleared.

	Percentage of recommendations implemented	Credits
(a)	40% or more	5
(b)	60% or more	10
(c)	80% or more	18

7.6.8 Hazardous material assessments

Str	Des	Con
		7 (up to)

7.6.8.1 The health and safety assessment process for hazardous materials has been:

	Outcome	Credits
(a)	Extended to cover the wider environmental impacts of those materials.	2
(b)	And the results of this have been used in drawing up the SEMP or equivalent.	7

7.6.9 Transfer station/recycling centre performance

Str	Des	Con
		20

7.6.9.1 If transfer stations and/or recycling facilities have been used, the recycling rate of the facilities was considered prior to placing the order.

7.6.10 Inert waste diverted from landfill

Str	Des	Con
		18 (up to)

7.6.10.1 A percentage (by volume) of inert waste material has been segregated (on or off site) in accordance with the SWMP or RMP and diverted from landfill.

	Outcome	Credits
(a)	70% or more	6
(b)	85% or more	12
(c)	95% or more	18

7.6.11 Non-hazardous waste diverted from landfill

Str	Des	Con
		20 (up to)

7.6.11.1 A percentage (by volume or weight) of non-hazardous waste material has been segregated (on or off site) in accordance with the SWMP or RMP and diverted from landfill.

	Type of waste	Diversion (by volume)	Diversion (by weight)	Credits
(a)	Construction	92%	95%	13
	Demolition	80%	90%	
(b)	Construction	98%	98%	20
	Demolition	85%	95%	

Guidance

Prerequisite: Duty of care (7.6.1)

Some countries have rigorous legal regimes covering the disposal of waste. If there are no legal requirements, it is still important to ensure that waste is dealt with in an environmentally responsible way. It must be transported by organisations who understand their responsibilities and be placed in facilities operated by similarly responsible and knowledgeable waste management specialists.

Prerequisite: Permitting for waste treated or used on site (7.6.2)

Some on-site waste treatment activities, such as the treatment of contaminated soils prior to re-use, might require an Environmental Permit, waste management license or registered exemption, depending on the nature of the process employed. Similarly, the use of waste materials imported to site might also require a permit, license or exemption.

Site waste management planning (7.6.4, 7.6.5)

To score credits on 7.6.4 the SWMP should be prepared at least in line with industry best practice or expectations.

It is good practice to initiate the SWMP at the design stage. The earlier in the project a SWMP is implemented, the greater the benefits that can be achieved with regard to waste reduction, recovery and recycling. Therefore, to score maximum credits a SWMP should have been developed by the Designers at design stage.

Forecasting waste streams as part of the SWMP process enables practical decisions to be taken about segregating materials on site for recycling and/or for disposal, as well as for the layout of site facilities, including waste storage. A properly prepared and maintained SWMP can be a powerful tool to help plan waste management activities and waste movements off site during

construction. With properly managed supporting documentation, it can also help ensure compliance with legislation around Duty of Care and other relevant waste management legislation. SWMPs can also be used to record progress against targets and savings in materials and waste disposal.

As with all such plans, the aim needs to clearly show the actions site staff and operatives should take when dealing with 'waste' (either surplus materials or genuine waste) in order to maximise practical re-use and recycling, and to make landfill genuinely the disposal route of last resort. Therefore, a properly implemented SWMP should also be accompanied by appropriate communication between Clients, Designers and Contractors and subsequently with sub-Contractors and other suppliers.

Metric guidance

Targets for site waste management can be accompanied by monitoring and calculations of the total waste produced, throughout the duration of the project. This will require monitoring all types of waste arisings and their end through metrics such as:

Total waste produced per £100k construction value (reference to targets set in 7.1.7), using a formula such as:

$$\frac{Volume\ of\ all\ site\ arisings,\ components\ and\ materials\ classified\ as\ waste\ on\ site}{Total\ project\ construction\ value\ £} \times 100,000$$

The above measure may be disaggregated into potential site waste streams (e.g. reused, composted, incinerated, recycled, recovered and landfilled) per £100k construction value, using a formula such as:

$$\frac{Identified\ volume\ of\ given\ site\ waste\ type\ (i.e.\ reused,\ composted,\ recycled)}{Total\ project\ construction\ value\ £} \times 100,000$$

The identified measure can then be compared to what is actually achieved on site. Targets and monitoring of waste diverted from landfill may be reported as:

Percentage of all on-site waste diverted from landfill using the formula:

$$\frac{Volume\ of\ all\ waste\ diverted\ from\ landfill}{Total\ volume\ of\ all\ waste\ arisings\ taken\ to\ landfill} \times 100$$

Waste arisings diverted from landfill per £100k construction value, using a formula such as:

$$\frac{Volume\ of\ all\ site\ waste\ diverted\ from\ landfill}{Total\ project\ construction\ value\ £} \times 100,000$$

Clearance and disposal of existing vegetation (7.6.6, 7.6.7)

The best method for dealing with and/or disposing of vegetation that needs to be cleared depends mainly on the type of vegetation involved. Options range from energy recovery, through chipping for composting or to provide mulch, to leaving log piles to provide shelter for amphibians or small mammals. If the vegetation contains noxious weeds or invasive plants, safe disposal according to the relevant guidance is the only option. Note that it is important to ensure beneficial use of any timber that has had to be felled to enable a project to proceed, ideally on the project itself but, if that is not possible, on a suitable other project as close by as possible.

Hazardous material assessments (7.6.8)

An example of a health and safety assessment being extended to cover environmental impacts might be guidance on how to store and dispose of materials to avoid pollution to the environment, as opposed to harm to humans in health and safety terms.

Transfer station/recycling centre performance (7.6.9)

This can be done by visiting the transfer station or recycling facility and completing an audit of where the material is taken after sorting or processing, or asking them to submit waste returns.

Inert waste diverted from landfill (7.6.10)

As a minimum waste should be segregated into inert, non-hazardous, and hazardous fractions. This can happen either on site or at a Waste Transfer Station. It should be noted that if hazardous wastes are encountered on sites these need to be segregated at source otherwise there is a risk of all wastes being classified under this class. For inert and non-hazardous waste segregated off-site, the waste contractor's activities must be checked to ensure they are rigorously segregating waste. It must be remembered that even if the waste contractor offers and is capable of delivering high levels of segregation and recycling, this may not be the best option for the project as some wastes will have an economic value and could be beneficially resold directly

by the project, although it must be noted that this may well require additional Environmental Permits to be applied for and gained.

Care should be taken to ensure segregated materials remain uncontaminated during storage, e.g. through contact with liquid or other wastes. This will ensure at the very least the lowest rate of landfill tax is paid on the genuinely inert material, and that hazardous wastes are dealt with at least as carefully as the virgin materials from which they were manufactured.

The aim here is to reward projects that go beyond such minima, and either capture the recyclable wastes identified in the SWMP dealt with under 7.6.4, or take the minimum of three waste streams described above to a construction and demolition waste recycling centre nearby, where the re-usable and recyclable materials are extracted. Where mixed non-hazardous wastes are sent off site to be separated for recycling, it is good practice to obtain evidence from the waste contractor of the amounts and/or proportions of collected waste that have been recycled or recovered.

It should be noted that any on-site re-use of waste must be undertaken in accordance with the relevant waste legislation as certain activities, such as crushing and screening of inert waste, may require either a waste licence an Environmental Permit or an Exemption. Examples for diverting waste from landfill can include waste sent for reprocessing, recovery for suitable use or recovered in an energy-from-waste plant.

Non-hazardous waste diverted from landfill (7.6.11)

See guidance for 7.6.10.

Note: Only volume or tonnage needs to be reported. The project team can choose whether to target the benchmarks for volume or tonnage to demonstrate compliance. For the avoidance of doubt both demolition and construction benchmarks must be met to achieve credits.

Evidence

Assessment criteria	Evidence guidance
7.6.1 Prerequisite: Duty of care (fixed)	Evidence could include documentary evidence retained in a straightforward file record, which should be available on site. The file record should include copies of waste carriers certificates for all carriers of waste materials, records of waste transfers (including waste types and quantities), copies of any Environmental Permits, Licenses and Exemptions for the sites to which the waste is sent and/or documented evidence that waste has been transported to the appropriate facility. This may include telephone checks, following trucks, and/or requiring completed transfer or consignment notes to be returned on a daily basis.
7.6.2 Prerequisite: Permitting for waste treated or used on site	Evidence would include documentary evidence showing that the appropriate permits, license or exemption have been obtained.
7.6.3 Prerequisite: Hazardous waste	Evidence could be within a SWMP supported by hazardous waste consignment notes and site photographs.
7.6.4 Site waste management planning - preparation (fixed)	Evidence would normally be copies of the SWMP, including the appropriate evidence to demonstrate that it has been updated, reviewed and implemented as appropriate. Evidence will also be required to show that waste reduction, recovery and recycling actions have been implemented and targets achieved. These can include design details and notes of meetings, data on waste collection and recycling rates, including waste transfer notes and waste Contractor returns. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
7.6.5 Site waste management planning - implementation (fixed)	
7.6.6 Clearance and disposal of existing vegetation - consideration	Evidence needs to show that the type of vegetation has been assessed and different options have been considered, leading to recommendations that take account of the environmental benefit of the suggested method.
7.6.7 Clearance and disposal of existing vegetation - implementation	Evidence will depend very much on the recommendations made but, in any case, site records need to demonstrate implementation. Records could include photographs, waste transfer notes, and/or evidence of exempt activity. Information should also be included within the SWMP.

Assessment criteria	Evidence guidance
7.6.8 Hazardous material assessments	Evidence needs to show specifically the environmental impacts. Standard COSHH assessment sheets are not acceptable. Evidence for (b) needs to demonstrate that these requirements have been incorporated in other management documents, which could include method statements or toolbox talks.
7.6.9 Transfer station/recycling centre performance	Whichever way the checks are carried out, they must be documented and satisfy legal requirements. If the project team has no direct control over the final destination of their waste, then evidence from the Waste Management Contractor that demonstrates where they will be taking the project's waste can be used.
7.6.10 Inert waste diverted from landfill	Evidence could be within a site waste management plan supported by waste transfer records and site photographs.
7.6.11 Non-hazardous waste diverted from landfill	Evidence could be in the form of waste transfer notes, photographs showing the different segregated groups or waste contractor returns showing the proportion of waste segregated for recycling or recovery.

7.7 Energy use

Aim

To reduce energy demands and increase energy efficiency during design, delivery and operation and minimise carbon emissions and other pollutants associated with energy consumption.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
7.7.1 Energy and carbon emissions reduction for operation	This can only be scoped out on projects that are not operable, such as land remediation works or flood defence banks.
7.7.2 Implementation of energy and carbon reductions for operation	Scope out if evidence to 7.7.1 shows that there are no energy-in-use issues to be considered (not even maintenance).
7.7.3 Opportunities for renewable / low-carbon / zero-carbon energy within the operational scheme	Scope out on projects where energy consumption in use is non-existent (for example, a flood defence).
7.7.4 Incorporating renewable / low-carbon / zero-carbon energy within the operational scheme	Scope out where it was considered (under 7.7.3) and found to be not possible or inappropriate. It is not possible to scope this out if 7.7.3 has failed to score.
7.7.6 Energy consumption during construction - incorporation in design	7.7.6 can be scoped out if there were genuinely no opportunities identified. It is unlikely that where 7.7.5 has failed to score that 7.7.6 can be scoped out, except where it can be demonstrated that there were no opportunities.
7.7.11 Renewable / low-carbon / zero-carbon energy during construction - implementation	7.7.11 can be scoped out only in the unlikely event that consideration of this issue identified no useful application of renewable and/or low- or zero-carbon resources. 7.7.11 cannot be scoped out if 7.7.10 has failed to score.

Credit summary

Assessment criteria	Strategy	Design	Construction
7.7.1 Energy and carbon emissions reduction for operation	45		
7.7.2 Implementation of energy and carbon reductions for operation		70 (up to)	
7.7.3 Opportunities for renewable / low-carbon / zero-carbon energy within the operational scheme		25	
7.7.4 Incorporating renewable / low-carbon / zero-carbon energy within the operational scheme		60 (up to)	
7.7.5 Energy consumption during construction - consideration during design (fixed)		45	
7.7.6 Energy consumption during construction - incorporation in design		62	
7.7.7 Energy consumption during construction - consideration by contractor (fixed)			36
7.7.8 Energy consumption during construction - implementation by contractor (fixed)			50 (up to)
7.7.9 Construction plant - selection and maintenance (fixed)			21

Assessment criteria	Strategy	Design	Construction
7.7.10 Renewable / low-carbon / zero-carbon energy during construction - consideration (fixed)			15
7.7.11 Renewable / low-carbon / zero-carbon energy during construction - implementation			21 (up to)

Assessment criteria

7.7.1 Energy and carbon emissions reduction for operation

Str	Des	Con
45		

7.7.1.1 The design has considered options for reducing both the energy consumption and carbon emissions of the project during operation, including the option of designing-out the need for energy-consuming equipment and the energy requirements in maintenance.

7.7.2 Implementation of energy and carbon reductions for operation

Str	Des	Con
	70 (up to)	

7.7.2.1 Appropriate measures have been incorporated in the design to reduce energy consumption and carbon emissions in use and a percentage of the recommended energy consumption reduction has been saved.

	Outcome	Credits
(a)	10% or more	14
(b)	20% or more	28
(c)	40% or more	42
(d)	60% or more	56
(e)	80% or more	70

7.7.3 Opportunities for renewable / low-carbon / zero-carbon energy within the operational scheme

Str	Des	Con
	25	

7.7.3.1 The design has explored opportunities for the incorporation of energy from renewable and/or low- or zero-carbon sources and thus a reduction in carbon emissions.

7.7.4 Incorporating renewable / low-carbon / zero-carbon energy within the operational scheme

Str	Des	Con
	60 (up to)	

7.7.4.1 Energy from renewable and/or low- or zero-carbon sources has been incorporated in the scheme where appropriate. A percentage of the identified potential renewable energy generation identified in 7.7.3 has been implemented.

	Outcome	Credits
(a)	10% or more	12
(b)	20% or more	24
(c)	40% or more	36
(d)	60% or more	48
(e)	80% or more	60

7.7.5 Energy consumption during construction - consideration during design (fixed)

Str	Des	Con
	45	

7.7.5.1 The Designer has identified opportunities to reduce the energy consumption of the project during construction.

7.7.6 Energy consumption during construction - incorporation in design

Str	Des	Con
	62	

7.7.6.1 The Designer has incorporated appropriate measures to reduce energy consumption during construction where feasible.

7.7.7 Energy consumption during construction - consideration by contractor (fixed)

Str	Des	Con
		36

7.7.7.1 The Contractor has considered measures to reduce the energy consumption and associated carbon emissions of the project during construction and these have been incorporated through an energy management plan or equivalent.

7.7.8 Energy consumption during construction - implementation by contractor (fixed)

Str	Des	Con
		50 (up to)

7.7.8.1 The measures in the plan have been monitored throughout the construction stage and the measures have been achieved.

	Outcome	Credits
(a)	Monitored	40
(b)	Monitored and achieved	50

7.7.9 Construction plant - selection and maintenance (fixed)

Str	Des	Con
		21

7.7.9.1 The selection and procurement/hiring of construction plant has been influenced by consideration of energy efficiency, energy type, or carbon emissions.

7.7.9.2 The construction plant and ancillary equipment has been maintained to maximise fuel efficiency and minimise carbon emissions.

7.7.10 Renewable / low-carbon / zero-carbon energy during construction - consideration (fixed)

Str	Des	Con
		15

7.7.10.1 Energy from renewable and/or low- or zero-carbon resources has been considered during construction.

7.7.11 Renewable / low-carbon / zero-carbon energy during construction - implementation

Str	Des	Con
		21 (up to)

7.7.11.1 A percentage of the savings from the above considerations has been implemented.

	Outcome	Credits
(a)	Up to 5%	7
(b)	5% or more	14
(c)	10% or more	21

Guidance

Energy and carbon emissions reduction for operation (7.7.1)

Consideration should be given to reducing the following over the expected lifetime of the asset:

- Operational energy demand
- Operational primary energy consumption
- Operational carbon emissions

Metric guidance

Resultant greenhouse gas emissions and equivalent carbon emissions for the operation of the works can be reported using equivalent carbon emissions per year, (tCO_2e /year). This could be calculated and reported through the following calculation:

$$\frac{Annual\ CO2e\ reductions\ achievable}{Initially\ estimated\ or\ baseline\ CO2e\ for\ given\ typology\ and\ operations} \times 100$$

Implementation of energy and carbon reductions for operation (7.7.2)

If a full LCA has been completed in 7.3.1, appropriate in this context means those measures that contribute to the LCA and not necessarily the lowest energy solution.

In demonstrating implementation of measures, it must be demonstrated that the original baseline was designed to current industry norms and not including unnecessarily high-energy consuming equipment.

Opportunities for renewable / low-carbon / zero-carbon energy within the operational scheme (7.7.3)

It is important to note that a project does not have to be an energy-consuming asset for it to be worth investigating the inclusion of renewables, nor does the installed capacity have to just match the demand of the works in question, especially if other consumers are close by.

Selection or rejection of suitable options should be informed by any life cycle assessment for the project and recommendations from a suitable practitioner. This assessment should be informed by modelling, setting out objectives or targets for the life cycle stages with estimates of savings of total carbon equivalent emissions.

Incorporating renewable / low-carbon / zero-carbon energy within the operational scheme (7.7.4)

As with other criteria in this section it should be stressed that the measurement has to be carried out from the baseline of current industry norms and not an artificial design.

As with 7.7.3, it is important to note that a project does not have to be an energy-consuming asset for it to be worth investigating the inclusion of renewables, nor does the installed capacity have to just match the demand of the works in question, especially if other consumers are close by.

Metric guidance

The implemented potential renewable energy generation may be calculated and reported using the following metrics:

Percentage of total energy consumed, using a formula such as:

$$\frac{Estimated\ annual\ implemented\ renewable\ energy\ consumed\ by\ works}{Estimated\ annual\ total\ energy\ consumed\ by\ works} \times 100$$

Percentage of renewable energy generated and consumed by the completed project to total energy consumed, using a formula such as:

$$\frac{Estimated\ annual\ implemented\ renewable\ energy\ generated\ and\ consumed}{Estimated\ annual\ total\ energy\ consumed\ by\ works} \times 100$$

It is possible for the renewable energy generated to be greater than the actual energy consumed during the operation of works. If this is the case, this is a positive outcome, only if the unused renewable generated energy is distributed and shared with consumers close by.

Energy consumption during construction - consideration during design (7.7.5, 7.7.6)

It is acknowledged that the responses to these criteria are going to be based on estimated savings and, in many cases, the savings may be anecdotal rather than quantified.

When designing and siting the asset the project team could consider:

1. Optimising earth movements required during the construction of the asset and the surrounding site
2. Reducing the amount of site clearance and demolition, e.g. by utilising existing structures where possible.
3. Minimising the dimensions of the asset without impacting on capacity, e.g. reducing length for a linear asset or overall dimensions for a point asset
4. Siting the asset to avoid destruction of existing carbon sinks, e.g. woodland
5. Minimising the extent of temporary works, e.g. length of fencing or access routes required.

When selecting construction methods the project team could consider the following.

Planning and design

1. Using off site construction techniques
2. Standardising permanent materials and components
3. Using ground improvement techniques to avoid excavating soft foundations

When exploring off-site construction techniques, the project team could:

1. Confirm if off-site construction is a viable alternative to traditional construction for aspects of the project through:
    a. Identifying parts of the asset that could be manufactured off site
    b. Identifying activities that could become assembly processes rather than construction processes.
    c. Liaising with all members of the project team including specialists affected by the identified off-site construction opportunities.
2. Compare the environmental impact of off-site construction with traditional on-site construction to determine if off-site construction would have a lower environmental impact than on-site construction. The comparison includes the following for either option:
    a. Potential waste generated.
    b. Predicted volume of materials used.
    c. Predicted impact of the transport of materials i.e. number of movements, distances travelled and where appropriate vehicle types and fuel consumption.
    d. Potential for reuse or recovery of the components at the end of the asset's life
3. Ensure the data gathering process and content of the study is not biased.

Note: Off-site could be considered 'not viable' where the risks of pursuing off-site construction outweigh the benefits e.g. risks may be introduced with regards to installation, procurement, timing, safety, maintenance or fitness for purpose.

Delivery

1. Reducing the overall construction time, e.g. to reduce the quantity of work required and to reduce ancillary energy requirements such as lighting and site accommodation.
2. Minimising use or designing out high energy-consuming plant and machinery, e.g. tunnel boring machines (TBMs), where feasible.

Energy consumption during construction - consideration by contractor (7.7.7, 7.7.8)

The primary purpose of 7.7.5, 7.7.6, 7.7.7 and 7.7.8 is to reward the reduction of energy and carbon during construction. It should be noted that if the team have done a full LCA and scored it in 7.3.1 then these issues may well have already been considered, if so then the same evidence can be used.

Monitoring energy use and carbon emissions can highlight differences in utilisation and control of energy, thus providing data for comparison and enabling energy savings in future.

Metric guidance

Energy consumption considerations on site could include the transportation, processing and assembly of materials to and from site; construction and assembly activities or processes; and general site operation and maintenance. Resultant carbon emissions during construction may be reported and calculated using:

Calculated impact of all major GHG emissions expressed as carbon dioxide equivalent (tCO_2e) relative to £100k project construction value, using a formula such as:

$$\frac{Identified\ CO2e\ emissions}{Total\ project\ construction\ value\ £} \times 100,000$$

Reductions achieved through energy management plan or equivalent, using a formula such as:

$$\frac{Identified\ CO2e\ reductions}{CO2e\ originally\ estimated\ (or\ typical\ values)} \times 100$$

Construction plant - selection and maintenance (7.7.9)

Considering the energy consumption of construction plant and machinery before purchase or hiring will ensure that the better environmental option can be chosen, and savings on fuel can be made in the long run. Regular maintenance of plant and machinery will ensure fuel efficiency and prolong the life of machines and power tools.

When selecting construction plant and machinery the project team could consider:

1. Selecting construction plant and machinery with a high efficiency (%), i.e. the percentage of output rating achieved under typical operating conditions
2. Selecting efficient ancillary equipment, e.g. accommodation, temporary lighting.
3. Select appropriately sized plant and machinery that will carry out the necessary work in the most energy efficient manner.
4. Select plant, machinery and ancillary equipment with timers and other automatic controls which:
    a. Lead to efficiency gains by avoiding additional work being carried out and reduction in the time taken to complete a task
    b. Switch off the lighting during daylight or curfew hours in outdoor areas

The following questions can be asked to assist in the selection of the most efficient equipment that is appropriate for the task:

1. Is the size (output) of the equipment appropriate for the size of the task?
2. At what speed can the equipment perform the task?
3. Is the equipment available?
4. What are the transport costs and associated energy use (distance travelled and mode of use)?
5. How is the performance of the equipment affected by:
    a. The soil characteristics on site?
    b. The geometrical characteristics of the task?
6. Are there space and weight constraints on site?
7. What is the energy source used by the equipment?

When selecting temporary lighting the project team could investigate:

1. The need for lighting on site during construction, including:
    a. Key locations on site where lighting is necessary, e.g. tunnels, and whether light could be limited to these areas
    b. Whether it is feasible to limit construction to daylight hours for all or part of the programme.
2. The applicability of curfews and automated controls to save higher levels of lighting for when needed
3. Opportunities for energy efficient and low carbon lighting solutions.

Renewable / low-carbon / zero-carbon energy during construction (7.7.10, 7.7.11)

As with 7.7.3, it is important to note that a project does not have to be an energy consuming asset for it to be worth investigating the use of renewables in the construction stage. Measures should be appropriate to the scale and nature of the project (for example, one solar panel on a multi-cabin site office for a multi-million-pound project would definitely be insufficient).

If the implementation includes use of blended biofuels, then the calculated savings should be based on national or international guidelines and methodologies .

Evidence

Assessment criteria	Evidence guidance
7.7.1 Energy and carbon emissions reduction for operation	If an LCA has been completed the evidence here will be a sub-set of that provided in 7.3.1. If an LCA has not been completed, then evidence could include project records and/or minutes of project team meetings. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
7.7.2 Implementation of energy and carbon reductions for operation	Evidence could include project records - minutes of project team meetings, technical reports, and/or drawings
7.7.3 Opportunities for renewable / low-carbon / zero-carbon energy within the operational scheme	Evidence could include minutes of project team meetings, technical reports, and/or drawings.
7.7.4 Incorporating renewable / low-carbon / zero-carbon energy within the operational scheme	Evidence could include drawings, specifications or photographs. Evidence could alternatively include the calculation and reporting of the metric-based guidance.

Assessment criteria	Evidence guidance
7.7.5 Energy consumption during construction - consideration during design (fixed)	Evidence could be in the form of design records or value engineering reports that demonstrate consideration of the construction methods, such as the size of components to enable efficient lifting and placing as well as the amount of on-site processing or handling of materials.
7.7.6 Energy consumption during construction - incorporation in design	
7.7.7 Energy consumption during construction - consideration by contractor (fixed)	Evidence can include records showing consideration of energy issues in site planning and demonstration that energy use and/or carbon emissions are assessed and then monitored. This can include evidence of actions to reduce consumption and emissions as appropriate. This could also include the setting of targets. Evidence could also show use of equipment to proactively manage consumption and emissions, such as timers and passive infrared sensors. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
7.7.8 Energy consumption during construction - implementation by contractor (fixed)	
7.7.9 Construction plant - selection and maintenance (fixed)	Evidence could be contract specifications and other procurement documents, or plant documentation (for example, records of regular maintenance and emission testing).
7.7.10 Renewable / low-carbon / zero-carbon energy during construction - consideration (fixed)	Evidence showing the source of site energy is needed. This could be copies of agreements with electricity suppliers showing use of certified fully-renewably-sourced 'green' tariffs or photographs showing use of alternative energy sources (such as wind turbines, solar panels, or small-scale combined heat and power). Evidence needs to show that the use of renewable, low- or zero-carbon energy is more than a token effort.
7.7.11 Renewable / low-carbon / zero-carbon energy during construction - implementation	

7.8 Water use

Aim

To reduce water demands and increase water efficiency during design, delivery and operation and minimise carbon emissions and other pollutants associated with water consumption.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
7.8.3 Capturing run-off for beneficial use	The decision to scope out will depend on the nature, scale, location and context of the project. For example, scope out on a refurbishment project that cannot affect the drainage arrangements.
7.8.4 Water consumption in operation - consideration during design	Scope out on projects where water consumption in use is not an issue, for example a flood defence bank.
7.8.5 Water consumption in operation - reduction measures included in the design	Scope out on projects where water consumption in use is not an issue (for example, a flood defence bank).
7.8.6 Water consumption in operation - reduction measures incorporated in the works	

Credit summary

Assessment criteria	Strategy	Design	Construction
7.8.1 Embodied water - consideration (fixed)		25	
7.8.2 Embodied water - implementation (fixed)			25
7.8.3 Capturing run-off for beneficial use		5	5
7.8.4 Water consumption in operation - consideration during design		16	
7.8.5 Water consumption in operation - reduction measures included in the design		25	
7.8.6 Water consumption in operation - reduction measures incorporated in the works			25
7.8.7 Water consumption during construction - client requirements (fixed)		17	
7.8.8 Water consumption during construction - policies, plans, and targets (fixed)			25
7.8.9 Water consumption during construction - implementation of plans and policies (fixed)			32 (up to)

Assessment criteria

7.8.1 Embodied water - consideration (fixed)

7.8.1.1 An assessment has been made at design stage considering the embodied water in the materials required during construction.

Str	Des	Con
	25	

7.8.2 Embodied water - implementation (fixed)

7.8.2.1 The outcomes of the assessment have been implemented.

Str	Des	Con
		25

7.8.3 Capturing run-off for beneficial use

7.8.3.1 The project team has made provision for capturing run-off for beneficial use on the project or nearby **and**, if appropriate, those provisions have been incorporated in the completed project.

Str	Des	Con
	5	5

7.8.4 Water consumption in operation - consideration during design

7.8.4.1 The potential impacts on water resources of the operation and maintenance of the completed project have been actively considered during design.

Str	Des	Con
	16	

7.8.5 Water consumption in operation - reduction measures included in the design

7.8.5.1 Measures to conserve water and reduce water consumption during operation and maintenance of the completed project have been included in the design.

Str	Des	Con
	25	

7.8.6 Water consumption in operation - reduction measures incorporated in the works

7.8.6.1 The measures referred to in 7.8.5 have been incorporated in the works.

Str	Des	Con
		25

7.8.7 Water consumption during construction - client requirements (fixed)

7.8.7.1 Specific and measurable requirements to measure, monitor, and minimise the consumption of mains or abstracted water during construction have been included in the project brief and the procurement documentation (such as Expressions of Interest, Pre-Qualification Questionnaires and/or Invitation to Tender).

Str	Des	Con
	17	

7.8.8 Water consumption during construction - policies, plans, and targets (fixed)

7.8.8.1 Formal project-level policies and identified measurable targets for reducing water usage during construction have been adopted; and a plan to measure, monitor, and minimise the consumption of mains, tankered, or abstracted water used during the construction process has been produced.

The water minimisation plan should specifically cover (as applicable):

a. Site welfare facilities
b. Dust suppression roads
c. Dust suppression of stockpiles
d. Washing facilities
e. Site staff training
f. Water Champion

Str	Des	Con
		25

7.8.9 Water consumption during construction - implementation of plans and policies (fixed)

7.8.9.1 The plan has been implemented and covers the following aspects.

Str	Des	Con
		32 (up to)

	Outcome	Credits (each)
(i)	Efficient use of water in site facilities	8
(ii)	Efficient use of water in construction activities	8
(iii)	Capturing runoff for reuse during construction	16

Guidance

Embodied water (7.8.1, 7.8.2)

The interest in the concept of a 'water footprint' and the accompanying methods and tools for its assessment are rooted in the recognition that human impacts on freshwater systems can ultimately be linked to human consumption and that issues like water shortages and pollution can be better understood and addressed by considering production and supply chains as a whole. Therefore, information on the embodied water of construction products can provide information to facilitate decisions that can help reduce the overall environmental impact of a project.

The water footprint concept and its use to inform materials or process selection is, however, still relatively new. Organisations such as the Water Footprint Network (www.waterfootprint.org) have published useful guidance documents, including The Water Footprint Assessment Manual: Setting the Global Standard (A. Hoekstra and A. Chapagain et al, 2011). ISO has also published *ISO 14046:2014 Environmental management – Water footprint – Principles, requirements and guidelines* to complement existing standards on life-cycle assessment (LCA).

Existing data that could be used to inform a study into the embodied water of construction materials can be found in sources such as the BRE Green Guide to Specification and Environmental Product Declarations.

Metric guidance

It would be advantageous if the volume of embodied water saved or reduced from implementing water efficient construction activity processes is monitored. This could be achieved through comparison and assessment of different design solutions and construction activity plans. Estimates and calculations could be supported by:

Consideration of embodied water in LCA of difference design schemes and procedures.

Additionally, the total embodied water may be calculated and reported respective to source type. Sources may include:

- Potable water (water fit or suitable for drinking, typically mains supplied)
- Rainwater
- Grey water (domestic wastewater, excluding sewage)
- Surface water (water from overland flow and storage, such as rivers and lakes)
- Seawater (water from sea or ocean)
- Groundwater (water held in and recovered from underground formation

Volume of water consumed from different sources during construction per £100k of project construction value.

The following formula for calculating embodied water may be used:

$$\frac{\textit{Total volume of particular source (e.g. potable water) of water consumed}}{\textit{Total project construction value } £} \times 100,000$$

Based on the above calculations, the reductions achieved from water efficient design and construction may be calculated and reported as:

$$\frac{\textit{Total embodied water savings (m3) achieved}}{\textit{Total project construction value } £} \times 100,000$$

Capturing run-off for beneficial use (7.8.3)

Flood risk from new developments can be reduced by keeping the number of sealed surfaces requiring drainage to a minimum (for example by using permeable paving materials or green roofs) and by introducing capture of run-off before it reaches the main drainage system. SuDS such as balancing ponds or wetlands are covered in 2.2 Flooding and surface water run-off.

However, this is focusing on capturing run-off for beneficial use, for example in tanks for non-potable uses on the site. This capture may involve systems included within the wide-ranging definition of SuDS, but it is the capture for beneficial use that is

important here. It is therefore possible that a project may be able to score both here and in 2.2 for the overall system they implement.

Water consumption in operation (7.8.4, 7.8.5, 7.8.6)

Measures to conserve water and reduce water consumption during operation and maintenance could include the use of water efficient or moisture controlled irrigation systems, the use of collected rainwater or greywater as an alternative non-potable water supply, or the installation of a leak detection system.

Options to mitigate the project's impact on the water environment could also include using captured water for energy generation, passive cooling, and/or district heating.

The consideration of these issues during design could be part of a PEMP or can be included in a separate document. The review should assess questions such as:

- What water use does the project entail?
- Are suitable water resources available?
- Are new water resources needed?
- Are they sustainable?
- Does the project endanger security of water supply to existing users?

Metric guidance

Potential reductions achieved from measures to conserve and reduce potable or mains water consumption during operation and maintenance of completed works can be reported through calculation of:

Potential percentage savings of operational annual water (m^3/year), using a formula such as:

$$\frac{\textit{Water consumed without reduction measures} - \textit{Water consumed with reduction measures}}{\textit{Estimated total volume of all water consumed annually for operation and maintenance}}$$

Percentage of total potential water consumed for maintenance and operation of completed works annually that is from a potable source, using a formula such as:

$$\frac{\textit{Estimated volume of potable water consumed annually}}{\textit{Estimated total volume of all water consumed annually for operation and maintenance}} \times 100$$

Water consumption during construction (7.8.7, 7.8.8, 7.8.9)

A proactive approach to reducing water usage in construction should begin at the procurement stage and it is the responsibility of the Client to ensure that requirements are set for water use in the construction process. Improving the efficiency of water use in construction follows the following hierarchy:

1. eliminate water wastage on site;
2. improve efficiency of water-using processes; and
3. offset consumption of mains water with alternative sources such as rainwater harvesting.

Key water using processes on construction sites are considered to be:

1. site cabins and temporary accommodation;
2. general site activities including tool washing;
3. wet trades, such as brickwork, screeding, concreting and plastering;
4. groundworks, including grouting and drilling;
5. dust suppression, including road and wheel washing;
6. hydro-demolition;
7. cleaning of tools and plant equipment, lorry washing; and
8. commissioning and testing of building plant and services.

Activities where it is thought the majority of water wastage occurs include:

1. general dust suppression, suppression on site roads and wheel washes;
2. hydro-demolition with high pressure water;
3. lorry wash out;
4. wash out of ready mixed concrete wagons;
5. site and general cleaning;
6. specialist and high pressure cleaning; and
7. commissioning plant and services.

Water metering for the construction stage is essential to manage water prudently. The following should be considered:

1. The main water meter supplying the site is accessible for reading the meter.
2. Sub-meters are installed on:
    a. Each water zone
    b. Water discharge points which have the potential for uncontrolled flow because of human behaviour, e.g. leaving a tap running
    c. Water discharge points considered to have the highest estimated daily volumetric use within each zone
    d. Rainwater recycling technology
    e. Grey water recycling technologies.
3. Water consumption is recorded weekly for the items mentioned and an assessment made of erroneous consumption, e.g. high or low water demands to identify leaks or maintenance requirements.
4. A monthly site inspection is carried out to identify:
    a. Inefficiencies in water devices and water discharge points including leaks and overflows
    b. Actions needed because of the inspection including relevant operation, maintenance or replacement information
    c. Out-of-hours assessment of base load water consumption.
5. Total and net water consumption is recorded at the end of the project or yearly and compared with the target. The end of project figures are reported.

At the procurement stage, requirements can be set to minimise water use during construction from mains and abstracted sources. For example, requirements could include the re-use of water from settlement lagoons as a non-potable water supply for damping down during dusty periods.

Evidence

Assessment criteria	Evidence guidance
7.8.1 Embodied water - consideration (fixed)	Evidence would include information gathered on the embodied water of the construction products and materials required for the project, either from product or material suppliers. It would also include documentary evidence that decisions on material or product choice have been made on the basis of embodied water. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
7.8.2 Embodied water - implementation (fixed)	
7.8.3 Capturing run-off for beneficial use	Evidence should show what measures (such as the ones mentioned in the guidance above) have been incorporated into the design. This could be in the form of drawings, specifications or other design output documents, with construction records or photographs to demonstrate their construction.
7.8.4 Water consumption in operation - consideration during design	Evidence of the design consideration could include assessment of predicted water use, review of availability of water resources or a copy of consultation with the relevant water authority regarding water supply and resource availability. At design stage, evidence is required of investigations into water conservation measures. This could be in various documented forms (such as notes of brainstorming sessions, and notes, specifications or drawings showing measures incorporated into the design). Evidence could alternatively include the calculation and reporting of the metric-based guidance.
7.8.5 Water consumption in operation - reduction measures included in the design	
7.8.6 Water consumption in operation - reduction measures incorporated in the works	
7.8.7 Water consumption during construction - client requirements (fixed)	Evidence could be a copy of documentation (such as the Project Environment Policy) showing that the Client has formally adopted policies and targets and copies of reports (such as Environmental or Corporate Responsibility report) demonstrating the measurement of performance against targets. The Client would also need to provide copies of the procurement documentation and contracts showing these requirements have been cascaded throughout its supply chain. A proactive approach to reducing water usage in construction should begin at the procurement stage and it is the responsibility of the Client and Designer to ensure that requirements are set for water use in the construction process. Additionally, total and net water consumption recorded at the end of the project or yearly and compared with the targets should be supplied as proof of implementation.
7.8.8 Water consumption during construction - policies, plans, and targets (fixed)	
7.8.9 Water consumption during construction - implementation of plans and policies (fixed)	

8 Transport

Summary

This category encourages the effective management of transport impacts from all modes of transport both during construction and as operational impacts. Transport impacts considered within this assessment include the movement of construction materials and waste, construction workforce transport, as well as disruption to other users of the transport network during the life of the asset. An emphasis is placed on designing out transport impacts wherever possible and consulting with local communities to create opportunities for an integrated transport system.

Category summary table

Assessment issues	Credits available
8.1 Transport networks	228
8.2 Construction logistics	172
	400

8.1 Transport networks

Aim

To enhance local transport networks and promote active travel for community benefit.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
8.1.1 Relationship to the transport network	Scope out for projects having no permanent effect on the level of service provided by existing transport networks.
8.1.2 Transport effects of the completed project	Scope out for projects that: generate no additional traffic impact (for example flood defences or pipelines) or are wholly or essentially refurbishments.
8.1.3 Access for pedestrians and cyclists	This applies to any site that was publicly accessible prior to development. It can be scoped out where the site is of necessity a secure site where public access is inappropriate.
8.1.4 Need for additional transport infrastructure	This should be scoped out for projects that are on or creating new elements of transport infrastructure. It can also be scoped out for civil engineering projects that generate no additional impacts from traffic. Examples include flood defences, pipelines, and new water or sewage treatment works where, after construction, traffic may well be reduced as fewer staff may work on the new plant. Minor access works can be scoped out.
8.1.5 Enhanced operational transport outcomes	The decision to scope out will depend on the nature, scale, location and context of the project.
8.1.6 Community consultation on the design objectives	
8.1.7 Resilience of the transport network	Scope out where the project has little or no impact upon the transport network.
8.1.8 Adaptability of the transport network	
8.1.9 Performance for non-motorised users	Scope out where the project has little or no impact upon all modes of transport.

Credit summary

Assessment criteria	Strategy	Design	Construction
8.1.1 Relationship to the transport network	27 (up to)		
8.1.2 Transport effects of the completed project		37	
8.1.3 Access for pedestrians and cyclists		25	
8.1.4 Need for additional transport infrastructure	37		
8.1.5 Enhanced operational transport outcomes		15	
8.1.6 Community consultation on the design objectives		30	
8.1.7 Resilience of the transport network	11	11	
8.1.8 Adaptability of the transport network	10	10	
8.1.9 Performance for non-motorised users		15 (up to)	

Assessment criteria

8.1.1 Relationship to the transport network

Str	Des	Con
27 (up to)		

8.1.1.1 In the case of a transport project, the project provides improved levels of service and extends to all modes in a way that delivers improved integration.

	Mode with improved level of service	Credits (each)
(i)	Car or van	3 for each mode
(ii)	HGV	
(iii)	Bus	
(iv)	Bicycle	
(v)	Walking	
(vi)	Equestrian	
(vii)	Rail	
(viii)	Aviation	
(ix)	Water	

8.1.1.2 In the case of a non-transport project, the site has been selected because the project (a) requires no or minimal new transport infrastructure and/or (b) mainly makes use of public transport systems.

8.1.2 Transport effects of the completed project

Str	Des	Con
	37	

8.1.2.1 The project team has considered and incorporated measures that reduce relevant, transport-related impacts of the completed project on the local community.

8.1.3 Access for pedestrians and cyclists

Str	Des	Con
	25	

8.1.3.1 There has been consultation on, or consideration given to, the ability of pedestrians and cyclists to pass through the site on dedicated paths and to establishing links with existing and proposed routes to local services.

8.1.4 Need for additional transport infrastructure

Str	Des	Con
37		

8.1.4.1 The project does not require provision of, or increase the need for, additional transport infrastructure.

8.1.5 Enhanced operational transport outcomes

Str	Des	Con
	15	

8.1.5.1 There is evidence from the design process that Designers have worked beyond the standards specified in the design codes to deliver enhanced operational transport outcomes.

8.1.6 Community consultation on the design objectives

Str	Des	Con
	30	

8.1.6.1 There is evidence from the design process that the community affected by the project has been involved in specifying the design objectives.

8.1.7 Resilience of the transport network

Str	Des	Con
11	11	

8.1.7.1 The resilience and recovery of the transport network has been considered during the design process.

8.1.8 Adaptability of the transport network

Str	Des	Con
10	10	

8.1.8.1 The design delivers a transport network with improved ability to accommodate future change.

8.1.9 Performance for non-motorised users

Str	Des	Con
	15 (up to)	

8.1.9.1 The project team has provided measures that improve the level of performance for non-motorised users either within or outside the project site.

	Outcome	Credits (each)
(i)	Measures taken to mitigate adverse impacts such that the net effect is no change.	3
(ii)	Measures taken that provide enhancements for able-bodied people.	4
(iii)	Measures taken include enhancements for vulnerable members of the community.	8

Guidance

Relationship to the transport network (8.1.1)

A sustainable project places few demands on the construction of new transport infrastructure and existing services. Where additional demands exist or are justified, then it is important that they be matched by increased transport capacity that enables no significant loss in the level of service available to existing users.

Transport effects of the completed project (8.1.2)

Road schemes may score if they reduce the overall volume of traffic by, for example, developing bus or cycle lanes. In addition, redesigning a junction may make that part of the road network more-efficient, thus reducing congestion and thus emissions. Such projects are now considered to be an important part of the better management of the road network so, if this can be demonstrated, then credits should be awarded.

The issues that could be relevant include:

- Severance
- Ease of use (signs and communications)
- Safety
- Congestion
- Parking spaces
- Inconvenience

Access for pedestrians and cyclists (8.1.3)

When introducing a new built feature into the landscape, issues regarding public access and security need to be addressed during the planning and design stages. If a scheme results in the closing-off to the public of previously accessible areas, there has to be a trade-off between the loss of accessible land and the provision of public access. This could be the provision of new access routes, such as bridleways, cycle paths or walkways, or the enhancement of existing routes or amenity features. Consideration of the balance can also result in preventing public access on health and safety grounds and to avoid nuisance.

Please note that this applies to any site that was publicly accessible prior to development for formal or informal amenity use, for example, for walking, dog walking or as informal play area. Such areas, even where not formally protected, can have an important amenity value for the local community and some compensation for the loss of that amenity should be made where possible. Any such compensation scheme should also include maintenance arrangements to ensure its long-term success.

For road projects, 'public space' should refer to space provided for community benefit rather than road users.

Need for additional transport infrastructure (8.1.4)

The requirement is not necessarily about demand on the transport network but the ability of the transport network to absorb any demand the project places on the network. A project with significant demands that can be absorbed by existing transport infrastructure can score, whereas a more-modest project that requires additional transport infrastructure will not.

Enhanced operational transport outcomes (8.1.5)

Suitable evidence would be where departures from standards have been sought from the regulatory authorities, or where a novel technique or approach has been adopted that does not feature as standard industry practice.

Community consultation on the design objectives (8.1.6)

Community engagement in the project specification may be demonstrable from the identification of projects within local plans or consultation with the community on the design objectives to be applied before the design process commences. Hence, consultation events would need to be held at the project inception rather than at the optioneering or project consent stage.

Resilience of the transport network (8.1.7)

Resilience and recovery of the transport network is to be considered in terms of the ability of the asset to return to normal levels of service following severe weather, terrorism and unusual events.

Adaptability of the transport network (8.1.8)

This seeks to recognise that enhancements to the transport network may incorporate some level of futureproofing. It also recognises that a project may deliver benefits for other planned projects such as through financial contributions or additional capacity.

Futureproofing is to be considered in terms of the project's design life, adaptability, allowance for future provision and aiding delivery of future projects.

Performance for non-motorised users (8.1.9)

With an increasingly elderly population who will be less mobile, measures that ease their transport needs are to be recognised. Vulnerable members of the community not only include groups such as the elderly and people with mobility difficulties but could also include children and women, particularly if road safety or safety at night is a consideration.

Evidence

Assessment criteria	Evidence guidance
8.1.1 Relationship to the transport network	Evidence could be found in an Environmental Statement (ES) or Transport Impact Assessment (TIA).
8.1.2 Transport effects of the completed project	Evidence could be found in an ES, TIA, drawings and plans.
8.1.3 Access for pedestrians and cyclists	Evidence could include consultation meetings with councils or other local groups, or evidence from drawings or other design documents that show consideration of open space and/or public access.
8.1.4 Need for additional transport infrastructure	Evidence is likely to be in the report of a TIA or similar.
8.1.5 Enhanced operational transport outcomes	Evidence is likely to be in the form of minutes of meetings or other reports documenting consideration of alternative approaches or community engagement.
8.1.6 Community consultation on the design objectives	
8.1.7 Resilience of the transport network	Evidence would be expected in the ES or TIA Report.
8.1.8 Adaptability of the transport network	Evidence is likely to be included in the ES or TIA Report.
8.1.9 Performance for non-motorised users	Evidence is likely to be in the form of plans, drawings and photographs to demonstrate delivery. Consideration of the needs of such members of society during adverse weather and at night should be part of the evidence provided.

8.2 Construction logistics

Aim

To reduce carbon emissions and avoid negative effects on local health, safety and travel arising from transport movements and diversions arising as a result of preparation and construction works.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
8.2.2 Transport effects of construction activities	Scope out only for self-contained sites that do not require access to public highways nor disrupt the rights of way network.
8.2.5 Minimising disruption from construction traffic	The decision to scope out will depend on the nature, scale, location and context of the project.
8.2.6 Success in minimising construction traffic impacts	Scope out for projects with little in the way of construction traffic.
8.2.8 Movement of construction materials - implementation	This may be scoped out if the analysis used to answer 8.2.7 shows that no such alternatives are either available or would be appropriate on the project.

Credit summary

Assessment criteria	Strategy	Design	Construction
8.2.1 Planning construction traffic movements (fixed)		15	
8.2.2 Transport effects of construction activities		19 (up to)	
8.2.3 Reducing risks for vulnerable road users (fixed)			20 (up to)
8.2.4 Responsible fleet operations (fixed)			22
8.2.5 Minimising disruption from construction traffic		8	25
8.2.6 Success in minimising construction traffic impacts			18 (up to)
8.2.7 Movement of construction materials (fixed)		6	
8.2.8 Movement of construction materials - implementation			9
8.2.9 Workforce travel planning (fixed)	5	5	5
8.2.10 Workforce travel planning – implementation (fixed)	5	5	5

Assessment criteria

8.2.1 Planning construction traffic movements (fixed)

Str	Des	Con
	15	

8.2.1.1 Construction traffic movements have been reviewed or considered by the project team prior to the construction stage commencing.

8.2.2 Transport effects of construction activities

Str	Des	Con
	19 (up to)	

8.2.2.1 The project team has incorporated measures that deliver improved performance on the following effects of construction activities on the local community.

	Outcome	Credits (each)
(i)	Ease of use of signs and other communications	4
(ii)	Reduction of available parking spaces	4
(iii)	Reduced congestion	5
(iv)	Reducing severance	6

8.2.3 Reducing risks for vulnerable road users (fixed)

Str	Des	Con
		20 (up to)

8.2.3.1 The project team have incorporated measures that improve safety for vulnerable road users.

	Outcome	Credits (each)
(i)	Site entrances have been managed to minimise the risks to vulnerable road users arising from vehicles approaching and leaving the project site.	4 for each
(ii)	The site is accessible for delivery vehicles fitted with safety features (e.g. side under run protection).	
(iii)	Access routes to the site, including for heavy vehicles, have been managed to minimise risks to vulnerable road users.	
(iv)	All fleet operator(s) have undertaken regular driver training and awareness to promote safety within the site and off site.	
(v)	The fleet operator(s) have captured and investigated any road incidents and near misses and reported them back to the principal contractor for analysis.	

8.2.4 Responsible fleet operations (fixed)

Str	Des	Con
		22

8.2.4.1 All fleet operators travelling to or from the construction site have used a compliant organisational, local, or national considerate fleet operations scheme and their performance against the scheme has been confirmed by independent assessment and certification or verification.

8.2.4.2 The fleet operators have achieved the relevant level of performance for the compliant scheme.

8.2.5 Minimising disruption from construction traffic

Str	Des	Con
	8	25

8.2.5.1 Measures have been included in the project specification and construction management that minimise disruption caused by construction traffic, whether on the public network, from construction vehicles on site, or on both.

	Outcome	Credits	Assessment stage
(a_1)	Measures included in the project design	5	Design
(a_2)	Measures delivered during the construction stage	25	Construction

8.2.6 Success in minimising construction traffic impacts

Str	Des	Con
		18 (up to)

8.2.6.1 There is evidence available at the end of the construction stage to demonstrate that measures to minimise the impacts of construction traffic have been monitored and been successful.

	Outcome	Credits
(a)	Monitored	7
(b)	Monitored and successful	18

8.2.7 Movement of construction materials (fixed)

Str	Des	Con
	6	

8.2.7.1 The project team has considered possible use of other, more sustainable transport routes (other than road), such as rail and/or water, for the movement of construction materials and/or waste.

8.2.8 Movement of construction materials - implementation

Str	Des	Con
		9

8.2.8.1 The outcome of the assessment in 8.2.7 has implemented some or all of the measures.

8.2.9 Workforce travel planning (fixed)

Str	Des	Con
5	5	5

8.2.9.1 There is a travel plan in place for each of the organisations responsible for delivering the project that is aimed at an appropriate balance of effectiveness for the travellers, and at minimising adverse environmental and social impacts associated with the travel involved.

a. Client organisation
b. Design teams
c. Lead construction Contractor

8.2.10 Workforce travel planning – implementation (fixed)

Str	Des	Con
5	5	5

8.2.10.1 For each travel plan identified in 8.2.9, the plans have been successfully implemented for each of the project team organisations.

a. Client organisation
b. Design teams
c. Lead construction Contractor

Guidance

Planning construction traffic movements (8.2.1)

The consequences of construction traffic upon all modes of transport, including on cycling and walking as well as vulnerable members of society, must be part of the consideration to score. Evidence could be baseline study data (a stand-alone report or produced as part of an EIA) but, where appropriate, could also be minutes of meetings where the issue has been actively considered.

Transport effects of construction activities (8.2.2)

This can be achieved, for example, by assessing the transport impacts of materials delivery and construction staff travel, considering options for site access and transport routes. Consideration of alternative means of transport for materials (other than by road) is considered in 8.2.7.

Reducing risks for vulnerable road users (8.2.3)

In the UK, the Construction Logistics and Community Safety (CLOCS) Standard may be used by clients and principal contractors to help manage and reduce risks to vulnerable road users from construction vehicles. For more information about the CLOCS Standard visit www.clocs.org.uk.

In the UK, fleet operators may use the Fleet Operators Recognition Scheme (FORS) to demonstrate how they are managing their operations to reduce work related road risks. For more information about FORS visit www.fors-online.org.uk.

Responsible fleet operations (8.2.4)

Compliant considerate fleet operations schemes are listed in the table below, along with the minimum required level of performance. If you would like another scheme to be evaluated for recognition, please contact BRE Global with 'Infrastructure: Responsible fleet operation - New scheme evaluation' in the subject header (BREEAMInfrastructure@bregroup.com).

Location	Scheme name	Minimum level
UK	Fleet Operators Recognition scheme (FORS)	FORS Silver

Minimising disruption from construction traffic (8.2.5)

This focuses upon the movement of construction materials and waste rather than the movement of the construction teams, which is considered in 8.2.9 and 8.2.10. In addition, it is important to recognise that noise and dust nuisance may be caused by internal haul roads as well as by the effects of construction traffic upon the transport network.

Measures by the Client or Contractor could include a contractual ability to impose sanctions on the company causing an infringement or hard enforcement measures, such as local liaison and/or cameras. Further measures at construction stage could include direction signage, and route planning to avoid particular roads.

Success in minimising construction traffic impacts (8.2.6)

This is focused on successful implementation of the measures outlined in 8.2.5.

Metric guidance

Monitoring and measurement of success in minimising construction traffic impacts could be done through recording and auditing of construction transportation movements, to and from site. Possible calculations and reporting methods include:

Total number of commercial vehicle movements onto site per £100k construction value, using a formula such as:

$$\frac{Total\ number\ of\ commercial\ vehicle\ movements\ recorded}{Total\ project\ construction\ value\ £} \times 100,000$$

Total distance (km) due to commercial movements to site per £100k construction value, using a formula such as:

$$\frac{Total\ recorded\ distance\ travelled\ due\ to\ commercial\ vehicle\ movements}{Total\ project\ construction\ value\ £} \times 100,000$$

Total distance travelled (km) per tonne of construction material, using a formula such as:

$$\frac{Total\ recorded\ distance\ travelled\ due\ to\ commercial\ vehicle\ movements}{Total\ weight\ of\ material\ consumed\ in\ permanent\ works}$$

Percentage of carbon emissions due to construction vehicle movements, using the formula:

$$\frac{Calculated\ tCO2e\ due\ to\ construction\ vehicle\ movements}{Total\ embodied\ tCO2e} \times 100$$

Movement of construction materials (8.2.7, 8.2.8)

The project team needs to demonstrate that appropriate alternatives have been considered, even if they are apparently extreme. For example, the use of helicopters to transport materials and or equipment to a remote, sensitive site to avoid building of a temporary haul road may be acceptable but needs to be fully justified.

In considering this criterion, the movement of materials not just to and from the construction site should be considered, but also the effect that the supply chain may have on the movement of major elements of the project components.

Workforce travel planning (8.2.9, 8.2.10)

Even if movements by the Client organisation or design team are modest compared to those at the construction stage, these travel plans are felt to be helpful in not only reducing adverse impacts but in setting a tone for the project team.

Distance and carbon emissions are both significant, so distance and form of travel are relevant, and, hence, executive travel by air would be considered a potentially a very significant movement.

Appropriate measures may include, for example, access to public transport links, provision of a minibus, provision of temporary accommodation, encouraging car-pooling or prescribing specific routes for journeys (including access arrangements, compounds, parking and public transport).

Metric guidance

Workforce travel may be managed and controlled by implementing systems to monitor and record travel movements during the works.

A workforce transport survey or travel diaries may be used to record:

- The different transportation modes used.
- Frequency of and distance of movements to and from site.

Minimising and monitoring of workforce transport movements may be reported through calculation of:

The total number of workforce vehicle or transportation movements (individual round trips) to site per £100k construction value, using a formula such as:

$$\frac{\textit{Total number of workforce transportation movements recorded}}{\textit{Total project construction value } £} \times 100,000$$

The total distance (km) due to workforce movements to and from site (total distance of each individual round trip) per £100k construction value, using a formula such as:

$$\frac{\textit{Total recorded distance travelled due to workforce vehicle movements}}{\textit{Total project construction value } £} \times 100,000$$

Average distance travelled per person to and from site, using a formula such as:

$$\frac{\textit{Total recorded workforce distances travelled to and from site}}{\textit{Total number of recorded workforce movements}}$$

Percentage use of local public transport modes, using the formula:

$$\frac{\textit{Total number of recorded local public transportation mode uses}}{\textit{Total number of workforce transportation movements}} \times 100$$

Evidence

Assessment criteria	Evidence guidance
8.2.1 Planning construction traffic movements (fixed)	Evidence is likely to be found in a Transport Impact Assessment (TIA), Environmental Statement (ES), Construction Logistics Plan (CLP), or contract documentation.
8.2.2 Transport effects of construction activities	Evidence is likely to be in the form of drawings, plans or photographs that demonstrates the incorporation of measures that reduce the effects upon local communities.
8.2.3 Reducing risks for vulnerable road users (fixed)	Evidence could include site inspection reports, relevant sections of a Construction Management Plan (CMP), training records, or near miss reporting and analysis.
8.2.4 Responsible fleet operations (fixed)	Evidence is likely to include contractual requirements and records or reports from monitoring during construction.
8.2.5 Minimising disruption from construction traffic	Evidence is likely to be drawn from the commitments made in the ES, the evidence supporting the planning application, the specifications or terms and conditions that the tendering Contractors are operating under, or the transport sections of a Construction Environmental Management Plan (CEMP) or similar document.
8.2.6 Success in minimising construction traffic impacts	It is accepted that proving success in these situations is difficult because there is no control project running alongside the one with the measures in place, and because of the challenge of proving that an issue has been minimised. However, a combination of demonstrating the measures were aimed at minimising impacts and that they have been achieved (for example using video clips and photographs) is what is being sought here. In addition, a signed statement by the Project Director to confirm the absence of complaints may also be appropriate. Evidence of monitoring and measuring transportation movements may be from security or gate records, material order/receipts or waste transfer notes etc in order to record number/frequency of vehicle movements and the average distance of round trip to site. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
8.2.7 Movement of construction materials (fixed)	Evidence will need to be shown in the Client's requirements or in design and/or site records to demonstrate consideration of alternative transport methods.
8.2.8 Movement of construction materials - implementation	

Assessment criteria	Evidence guidance
8.2.9 Workforce travel planning (fixed)	Evidence is required that demonstrates that the need for travel plans has been considered rather than evidence of the number of movements by particular transport modes. For implementation, evidence could be reports on numbers of workforce travelling to work by car as opposed to public transport, car counts compared to total number of workforce employed on site or similar. Evidence could alternatively include the calculation and reporting of the metric-based guidance.
8.2.10 Workforce travel planning – implementation (fixed)	

Additional information

CLOCS – Construction Logistics and Community Safety Standard

The Construction Logistics and Community Safety (CLOCS) Standard is a UK construction industry standard for reducing work related road risk. It promotes good practice beyond legal compliance by defining primary requirements for key stakeholders associated with a construction project. For more information about the CLOCS Standard visit www.clocs.org.uk.

FORS – Fleet Operators Recognition Scheme

The Fleet Operators Recognition Scheme (FORS) is a voluntary accreditation scheme for fleet operators, which aims to raise standards of safety, efficiency, and environmental protection within fleet operations in the UK. FORS membership and accreditation allows fleet operators to demonstrate their performance against three levels in the FORS Standard: Bronze, Silver, and Gold. For more information about FORS visit www.fors-online.org.uk.

Innovation

Summary

The Innovation category provides opportunities for exemplary performance and innovation to be recognised that are not included within, or go beyond, the requirements of the standard assessment criteria. This includes exemplary performance credits where the exemplary performance criteria in an issue have been met. It also includes innovative products and processes for which an innovation credit can be claimed, where they have been approved by BRE Global.

The cost-saving benefits of innovation are fostered and facilitated by helping encourage, drive and publicise accelerated uptake of innovative measures.

Innovation

Aim

To support innovation within the construction industry through the recognition of sustainability-related benefits which are not rewarded by standard BREEAM Infrastructure issues.

Assessment scope

Only criteria listed in the table below can be scoped out of assessments. All other criteria are fixed.

Assessment criteria	Scoping guidance
-	-

Credit summary

Assessment criteria	Strategy	Design	Construction
Exemplary level of performance in existing issues	500 (up to)		
Approved Innovations			

Assessment criteria

Exemplary level of performance in existing issues

The project has demonstrated exemplary performance by meeting the exemplary performance criteria in one or more of the following assessment issues:

a. 7.2 Reducing whole life carbon emissions

Approved Innovations

Innovation credits can be awarded for each innovation application approved by BRE Global, where the project has complied with the criteria defined within the approved innovation application form.

Guidance

Approved Innovations

Innovation applications can be submitted to BRE Global by a qualified BREEAM Infrastructure Assessor using the Approved Innovation Application Form (BF1033).

Evidence

Assessment criteria	Evidence guidance
Exemplary level of performance in existing issues	See guidance in BREEAM Infrastructure assessment issues.
Approved Innovations	A copy of the Approved Innovation Application Form (BF1033) and a copy of the Innovation Application Report that confirms the application has been approved. Relevant documentary evidence that demonstrates the project has achieved or installed the approved innovation as detailed in the innovation application form and report.

Definitions

Approved innovations

Any new technology, design, construction, operation, maintenance or demolition method, or process that can be shown to improve the sustainability performance of a built environment asset and is of demonstrable benefit to the wider industry in a manner that is not covered elsewhere in BREEAM Infrastructure. In addition, the innovation has been approved by BRE Global in accordance with its published innovation credit procedures.

Glossary

BAP
Biodiversity Action Plan

BIM
Building Information Modelling

BSI
British Standards Institution

CABERNET
Concerted Action on Brownfield and Economic Regeneration Network

CEMP
Construction Environmental Management Plan

CIWEM
Chartered Institution of Water and Environmental Management

CMP
Construction Managment Plan

CSR
Corporate Social Responsibility

EIA
Environmental Impact Assessment

EMS
Environmental Management System

ES
Environmental Statement

EU
European Union

HAZOP
Hazard and Operability Studies

HER
Historic Environment Record

HIA
Health Impact Assessment

ICE
Institution of Civil Engineers

IEMA
Institute of Environmental Management and Assessment

IES
The Institution of Environmental Sciences

ISO 14001
International Standard for Environmental Management Systems

IT
Information Technology

IUCN
International Union for Conservation of Nature

LCA
Life-Cycle Assessment

LI
Landscape Institute

LMS
Landscape Management Strategy

LWP
Landscape Works Plan

PEMP
Project Environmental Management Plan

RMP
Resource Managment Plan

SEMP
Site Environmental Management Plan

SMART
Specific, Measureable, Attainable, Realistic, Timely

SuDS
Sustainable Drainage Systems

SWMP
Site Waste Management Plan

TIA
Transport Impact Assessment

UK GBC
UK Green Building Council

VOC
Volatile Organic Compound

WFD
Water Framework Directive

WRAP
Waste & Resources Action Programme