

X29, Collaborative Contracting for Nature and Climate Benefits:

How Option X29 Works in Practice



Speakers



Ian Heaphy

**Director, IN Construction Consulting and Member,
NEC Contract Board**

Ian has over 30 years of experience in the construction industry, including aviation, oil & gas, rail, water, highways and building. He has worked with clients in the UK, Europe, Middle East, Far East, North America and Australia including government bodies, private sector employers and contractors. Ian specialises in the development of innovative procurement strategies with particular expertise around partnering, alliancing and target cost contracts. Ian is a member of the NEC4 Contract Board has been directly involved in drafting and shaping the fourth generation of NEC contracts. In addition to his NEC and procurement work Ian also acts as adjudicator, dispute resolver and quantum Expert Witness.

Professor Anusha Shah

**CEO & Founder, Plan for Earth
Institution of Civil Engineers (ICE) President : 2023-24**

Professor Shah is a global leader in sustainable, climate resilient and nature-positive infrastructure, with over 26 years 'experience across the UK and internationally. As the ICE Past President, she made history as only the third woman and the first person of colour to hold the role in over 205 years. Anusha holds senior advisory, and non-executive roles championing climate adaptation, equity and regenerative development. A multiple award winner, she holds three honorary doctorates and two honorary professorships for services to climate and nature.

Professor Lewis Barlow

**Decarbonisation Head of Profession, WSP UK and ICE
Trustee for Carbon and Climate**

Lewis Barlow is Decarbonisation Head of Profession at WSP UK, a Visiting Professor at the University of Strathclyde and ICE Trustee for Carbon and Climate. He advises governments and major programmes on whole-life carbon, integrating decarbonisation and resilience, and is a leading contributor to PAS 2080 and industry best practice.

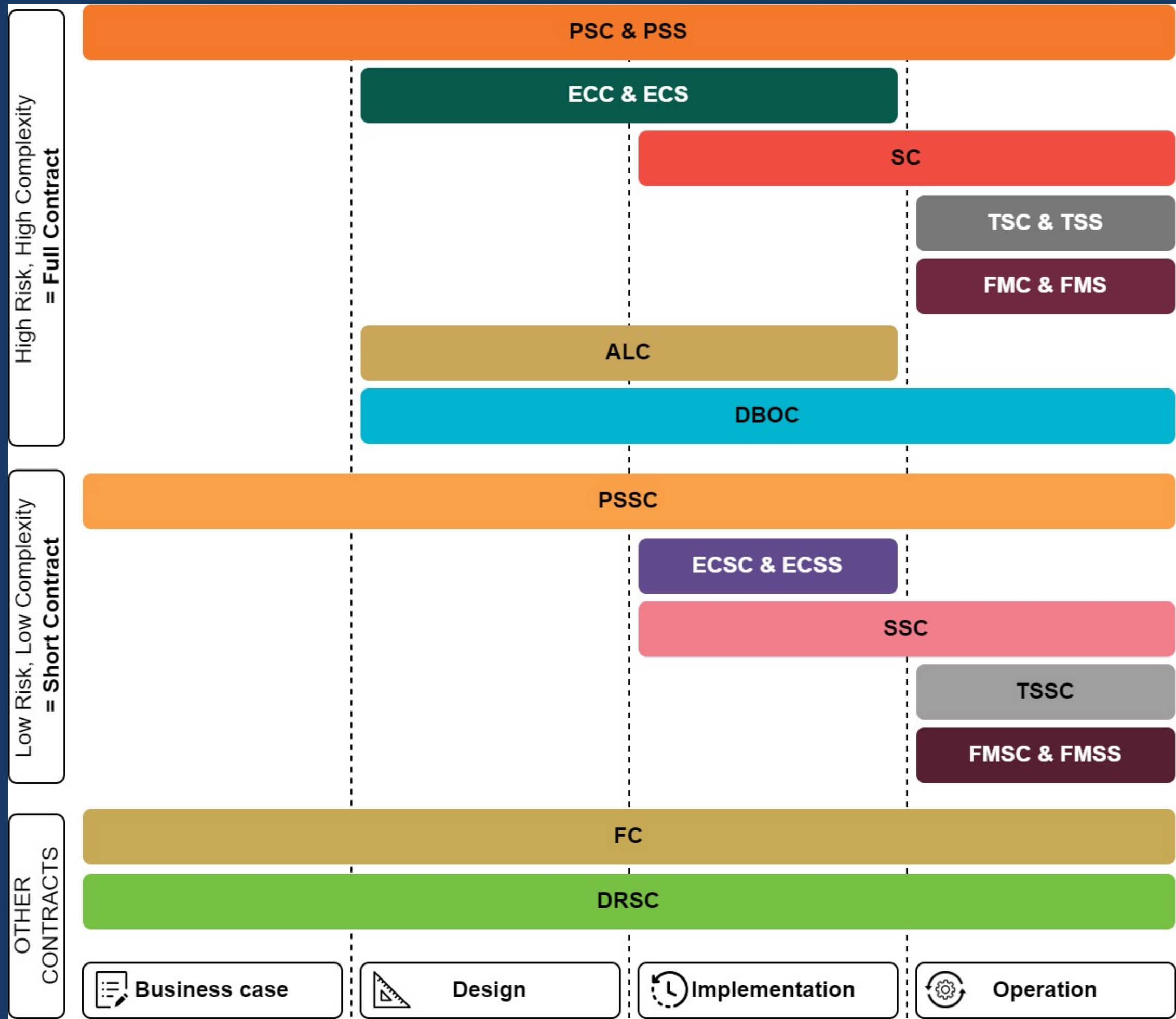
Dr Martina Girvan

Senior Technical Director – Ecology, Arcadis

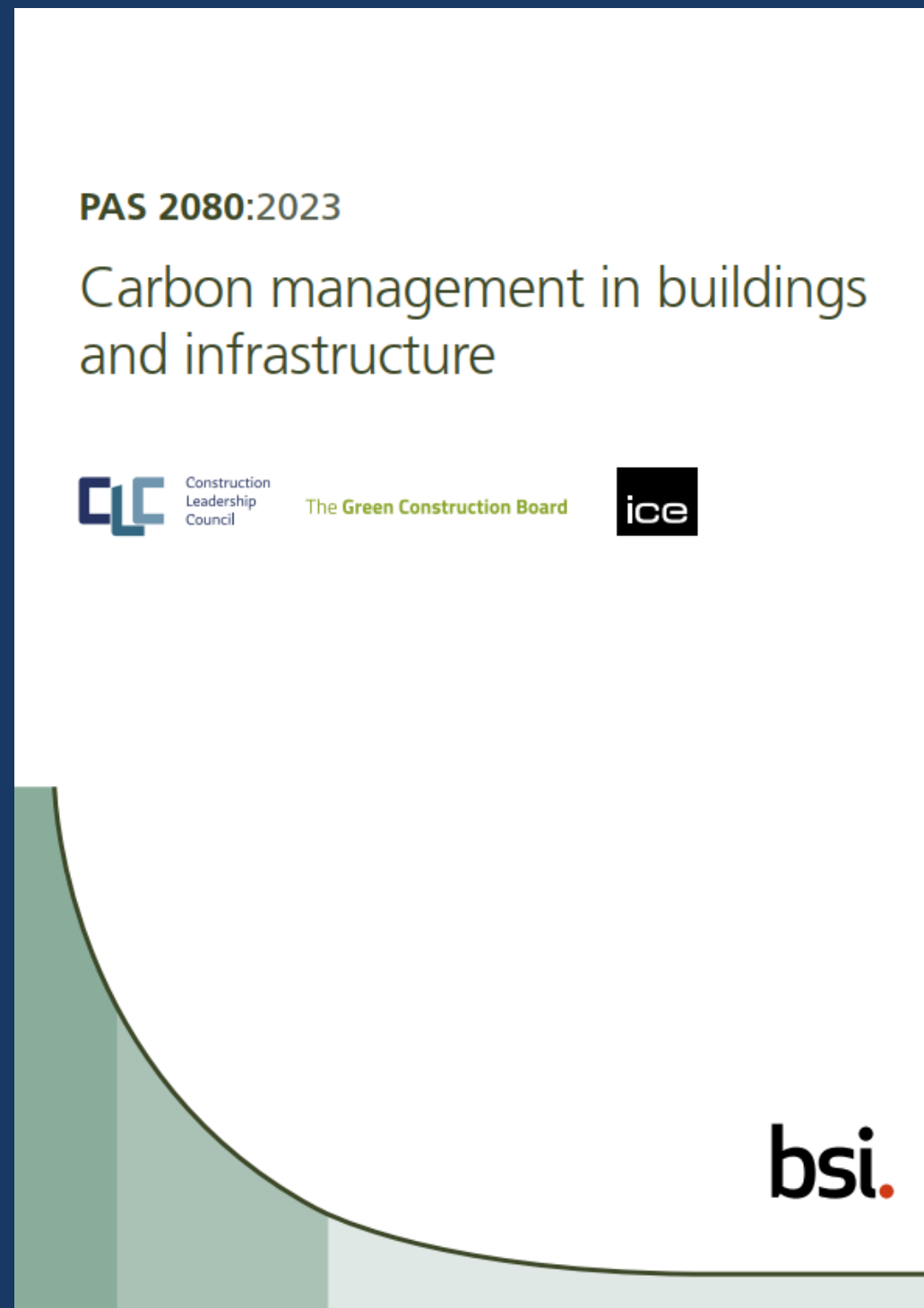
Martina is a Chartered Ecologist and Fellow of CIEEM, who has been practicing in the field of biodiversity, ecosystem services and natural capital accounting for 30 plus years. She is Head of Nature for Arcadis and the current Chair of the Green Construction Board's Biodiversity and Environmental Net Gain group. Her passion is in demonstrating the benefits of nature to promote quality engagement, design and access to green finance, bringing benefits for business, people and climate resilience.

Agenda

1. Introduction, background on NEC's Option X29 and feedback on original version **Ian Heaphy**
2. How this connects to the broader carbon management landscape **Lewis Barlow**
3. Evolution: How do we make nature work alongside carbon management? Prof **Anusha Shah**
4. Updated guidance: how the performance table works in practice **Martina Girvan**
5. Questions



Carbon Management Progress



- PAS 2080 is the standard for whole-life carbon management in the built environment
- Adoption has grown across procurement and planning at higher levels
- But a standard alone doesn't make anyone do anything

From Aspiration to Contractual Obligation

PAS 2080:2023

10 Procurement

COMMENTARY ON CLAUSE 10

The procurement process is critical to accelerate whole life carbon reductions in the value chain when delivering projects and/or programmes of work. This PAS recognizes that procurement is not solely the development of a contract; it's a mechanism that will incentivize the right behaviours. Organizations might want to consider the guidance of ISO 20400 and include carbon as part of a holistic approach to the integration of sustainability in all aspects of procurement activity.

10.1 Asset owner/manager requirements

10.1.1 Contracts

Asset owner/managers shall:

- a) assess how requirements in contracts for designers, constructors or product/material suppliers or within the delivery model could support the asset owner's/manager's alignment with the decarbonization principles (Clause 4) and the requirements in the carbon management process;
- b) prioritize whole life carbon as a performance drive, avoiding prescriptive specification;
- c) make requirements proportionate and relevant to each work stage;
- d) provide regular updates of the contract's performance against the agreed carbon reduction targets and other requirements to the contracted entity, and review and/or re-incentivize performance against these targets on par with performance against cost and programme;
- e) where appropriate, include data management/information exchange requirements in contracts to support monitoring and reporting (see Clause 9 and Clause 11);
- f) where appropriate, identify incentive mechanisms that reward whole life carbon performance;
- g) where appropriate, allow for challenges to asset standards that enable low-carbon performance;
- h) support appropriate risk allocation mechanisms that promote the inclusion of low whole life carbon solutions which might be novel and not proven in previous projects and/or programmes of work; and
- i) incentivize collaborative contractual arrangements across the value chain that maximize carbon reduction opportunities.

NOTE To support the inclusion of numerical carbon targets in contracts, the asset owner/manager might also need to specify a baseline performance level with reference to 8.2.2.

10.1.2 Sourcing

Asset owner/managers shall:

- a) periodically review the procurement categories that support the delivery of their projects and/or programme of works and identify those with a material carbon impact;
- b) develop proportionate criteria for inclusion in tenders that support the selection of suppliers who can efficiently enable delivery of low-carbon outcomes;
- c) review and update asset standards and specifications to promote the integration of low whole life carbon solutions; and
- d) provide timely and actionable feedback to suppliers on how they performed in tenders, including carbon-focused selection criteria.

NOTE The importance of carbon should be explicit and aligned with other procurement priorities, such as commercial outcomes, programme and risk. ISO 20400 also provides guidance on approaches to considering a range of sustainability aspects within a broader procurement framework.

- PAS 2080 describes what good carbon management looks like
- Without a contract, parties have no obligations
- PAS 2080 includes a dedicated section on procurement
- X29 puts carbon requirements where they belong: in the contract
- PAS 2080 + X29 = contractual carbon management

PAS 2080's Nature Requirements

- “Prioritize nature-based solutions for reduced whole life carbon emissions and potential for carbon removal, as well as the associated co-benefits”
 - “Prioritize nature-based solutions for reduced carbon and increased sequestration”
 - “It is important that the carbon implications of climate adaptation, biodiversity net gain and nature-based solutions are fully taken into account... Failing to evaluate them together might risk conflict and unintended consequences”
- PAS 2080 Clause 4: prioritise nature-based solutions
 - NbS reduce emissions and actively sequester carbon
 - Biodiversity net gain explicitly flagged in the foreword
 - But how do we make this work alongside carbon management?...

Carbon and Nature: Parallel Tracks, One Mechanism

		
ENGINEERING AND CONSTRUCTION CONTRACT		
Option X29 Nature and Climate		
Identified and defined terms	X29 X29.1	(1) The Nature and Climate Requirements are the requirements relating to nature and climate stated in the Scope. (2) The Nature and Climate Plan is the <i>nature and climate plan</i> or is the latest nature and climate plan accepted by the <i>Project Manager</i>. The latest nature and climate plan accepted by the <i>Project Manager</i> supersedes previous Nature and Climate Plans. (3) The Nature and Climate Partners are the people or organisations who contribute to the achievement of the Nature and Climate Requirements and are identified in the Nature and Climate Requirements. (4) The Performance Table states the targets the <i>Contractor</i> is to achieve in Providing the Works and sets out the adjustment to payment if a measured performance is higher, the same or lower than its target. The Performance Table is the <i>performance table</i> unless later changed in accordance with the contract.
Collaboration	X29.2	The <i>Contractor</i> collaborates with other Nature and Climate Partners as stated in the Nature and Climate Requirements.
Early warning	X29.3	The <i>Contractor</i> and the <i>Project Manager</i> give an early warning by notifying the other as soon as either becomes aware of any matter which could adversely affect the achievement of the Nature and Climate Requirements.
Nature and climate plan	X29.4	(1) If a nature and climate plan is not identified in the Contract Data, the <i>Contractor</i> submits a first nature and climate plan to the <i>Project Manager</i> for acceptance within the period stated in the Contract Data. (2) The Nature and Climate Plan shows how the <i>Contractor</i> plans to meet the Nature and Climate Requirements. (3) Within two weeks of the <i>Contractor</i> submitting a nature and climate plan for acceptance, the <i>Project Manager</i> notifies the <i>Contractor</i> of the acceptance of the nature and climate plan or the reasons for not accepting it. A reason for not accepting a nature and climate plan is that • it does not comply with the Nature and Climate Requirements or • it will not allow the <i>Contractor</i> to Provide the Works. (4) The <i>Contractor</i> submits a revised nature and climate plan to the <i>Project Manager</i> for acceptance • within the <i>period for reply</i> after the <i>Project Manager</i> has instructed it to and • when the <i>Contractor</i> chooses to.
Disclosure	X29.5	The Parties may use, disclose and publicise information relating to nature and climate as stated in and for the purposes stated in the Nature and Climate Requirements.
Acceleration and accepting Defects	X29.6	Quotations for acceleration and accepting Defects include any proposed changes to the Performance Table. If the quotation is accepted the <i>Project Manager</i> changes the Performance Table accordingly.

- **Carbon:** whole-life emissions reduced against a baseline
- **Nature:** biodiversity and natural capital enhanced against a baseline
- Baseline it, improve it, evidence it, report it
- The new X29 clearly sets out these stages with example metrics

How do we make nature work alongside carbon management?



When nature is depleted, infrastructure loses resilience



Tittesworth Reservoir in Staffordshire . Source: Stephen Craven / Geograph, CC BY-SA 2.0, 21 July 2026

When nature is depleted, infrastructure loses resilience

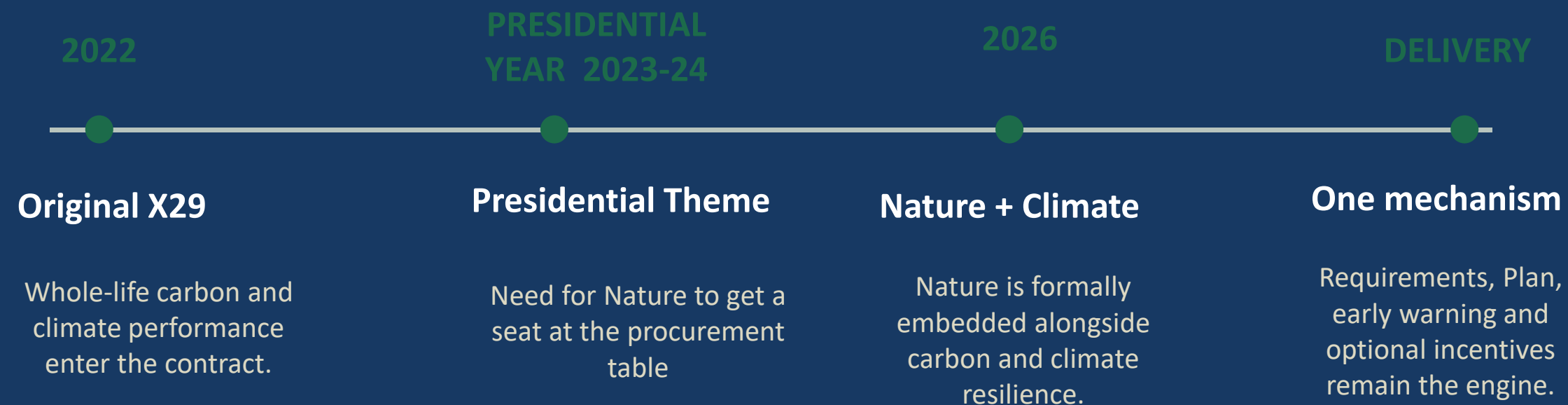


Llanaber railway, Wales. Source: Oosoom / Wikimedia Commons, CC BY-SA 3.0, 2014



The evolution

NEC4 OPTION X29 · NATURE AND CLIMATE



02

X29 has evolved from a carbon lever to an integrated outcomes framework

The Nature and Climate Plan is where ambition becomes managed delivery

01

Requirements

Define the outcomes, baselines, measures and partners in the Scope

02

Plan

Set out actions, roles, gateways, evidence, reporting and dependencies

03

**Deliver +
Evidence**

Use design decisions, supply-chain data and agreed measurement methods

04

**Early Warning +
Adapt**

Raise risks early, update the approach and propose better solutions

NATURE AND CLIMATE HIERARCHY

1

Nature-based solutions

Wetlands · peatland · woodland · habitat creation

2

Nature-positive infrastructure

Green roofs · SuDS · urban trees · rain gardens

3

Blended green–grey

Natural systems combined with engineered capacity

4

Engineered solutions

Used where levels 1–3 cannot fully meet the need

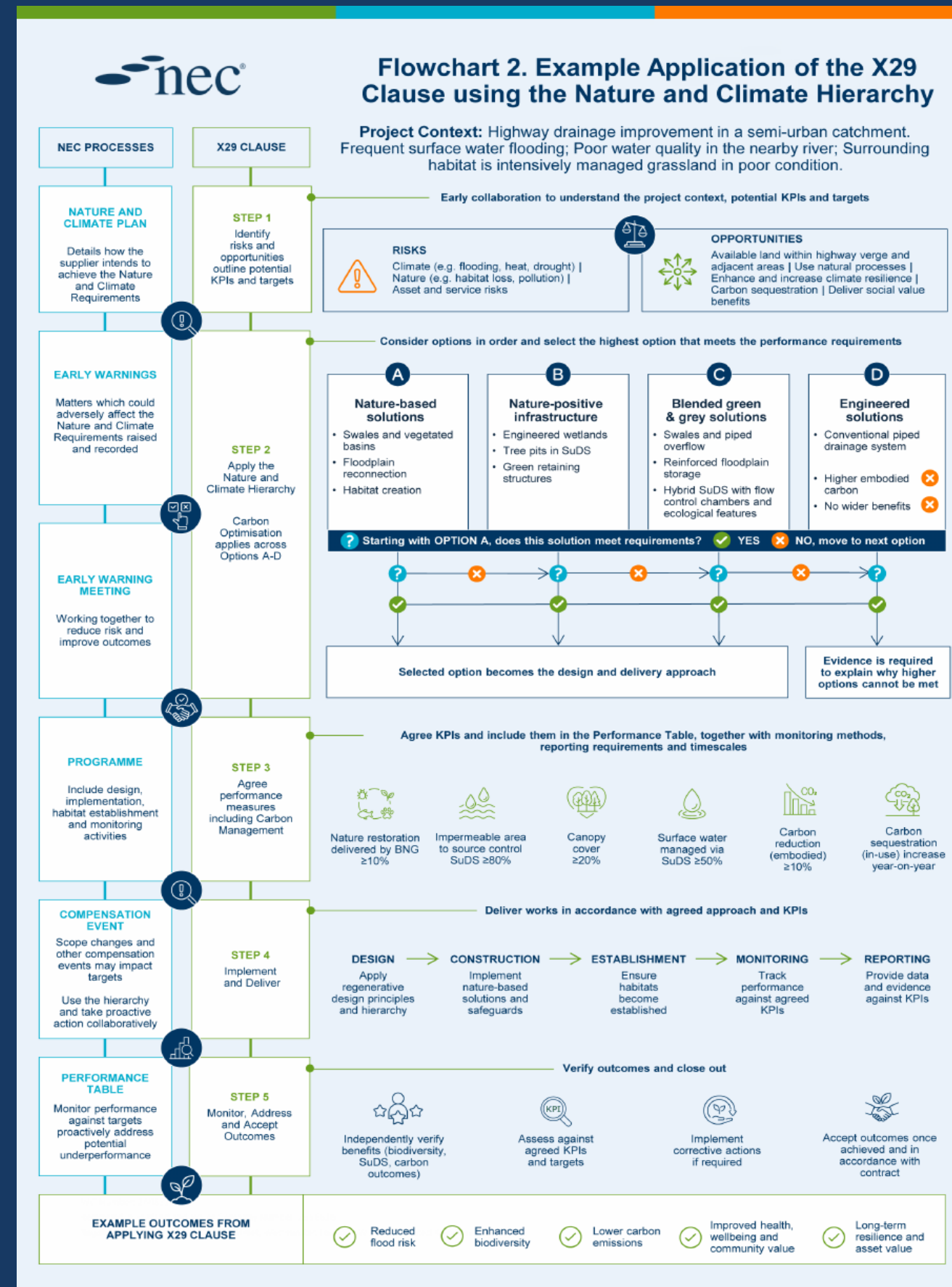
CARBON OPTIMISATION

applies at every
level

Evidence the choice
at agreed gateways

ENCOURAGING A REGENERATIVE MINDSET

Worked example: highway drainage improvement



Summary

- **The Evolution:** Formally updated in **June 2026**, Option X29 expands the original 2022 "Climate Change" clause into a combined "**Nature and Climate**" mandate.
- **The Core Purpose:** Moves environmental metrics out of vague planning conditions and embeds them directly into the contract as **legally binding, enforceable obligations as long as it's in the original scope**.
- **Unified Framework:** Combines traditional **Net-Zero/Carbon Reduction** metrics with active **Nature Recovery** targets inside a single commercial mechanism.
- **New Green Deliverables:** Expands project accountability to explicitly include **Biodiversity Net Gain (BNG)**, habitat connectivity, soil health, and canopy cover.
- **The "Nature Hierarchy":** Provides a structural preference for **nature-based and nature-positive solutions** before contractors can resort to heavy, grey-engineered alternatives, thus driving a regenerative model of works in the built environment.

When nature is restored, resilience returns



Source: Steve Sayers / National Trust Images, via The Guardian, 21 August 2026

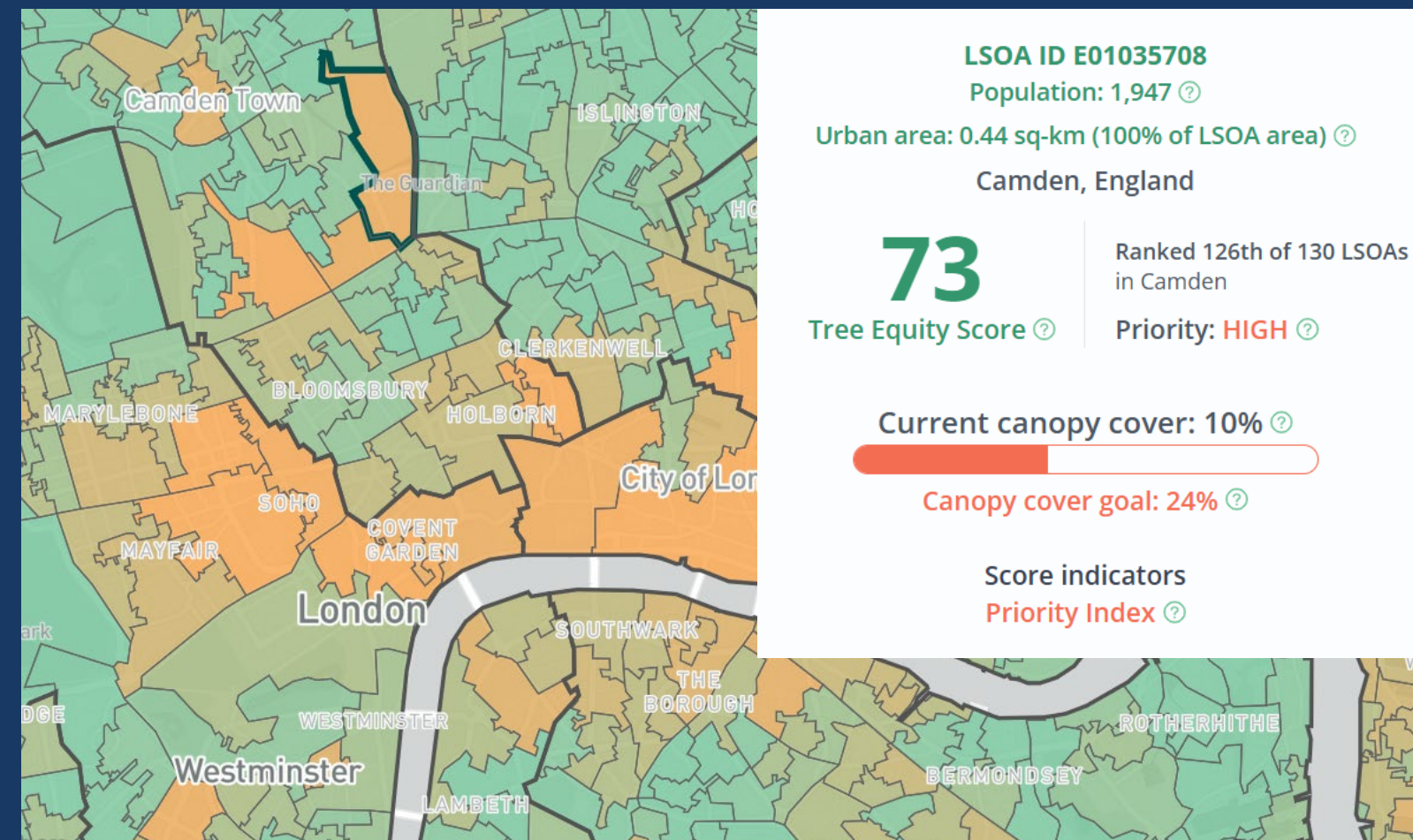
Performance Measures

Theme	Stage	Measure	Example target / threshold	Measurement method	Example enforcement approach (illustrative only)
BIODIVERSITY AND LANDSCAPE					
BNG	Design & Completion	Net biodiversity gain relative to agreed pre-construction baseline	Minimum 10% net gain (statutory UK minimum); project target to be agreed	Biodiversity units calculated using agreed metric (e.g. statutory biodiversity metric or equivalent)	Shortfall triggers corrective planting or enhancement at Contractor cost; gateway approval conditional on evidenced baseline
Habitat condition	Construction & Post-completion	Condition of created or enhanced habitats relative to agreed baseline	Target condition to be agreed with ecologist prior to construction	Condition assessment using UKHabs or equivalent methodology at agreed intervals	Failure to meet target triggers agreed corrective management plan; costs met by Contractor
Planting establishment	Post-completion	Establishment of agreed planting relative to design intent	Target establishment rate to be agreed (indicative: 90% establishment at 12 months)	Site survey at agreed intervals; percentage of planted units established	Failure triggers replacement planting at Contractor cost within agreed timescale
Habitat connectivity	Design & Completion	Delivery of agreed habitat connectivity measures	Connectivity measures specified in Nature and Climate Requirements	As-built survey against agreed design intent	Non-delivery reported to PM; corrective action agreed through early warning process
Invasive species management	Construction & Post-completion	Absence of agreed high-risk invasive species in works area	Zero high-risk outbreaks during construction and post-completion monitoring period	Site inspections at agreed intervals; third-party ecological survey at Completion	Outbreak triggers agreed management response; costs met by Contractor

- Can be used at any point in a project life cycle
- Should be focussed on suitable material measures
- Maintaining and/or improving upon existing opportunities
- Chose performance measures for which metrics are available
- Are feasible
- Informed by design and national and local goals

Canopy Cover

- Environment Act: 16.5% OF all land in England by 31 December 2050.
- Affluent neighbourhoods have over double the tree cover than less affluent neighbourhoods Tree Equity Score UK Map.
- Local goals are usually between 20 and 30% CC
- 3+30+300 Principle
 - 3 mature trees from every home
 - 30% canopy cover
 - 300m from nearest quality green space
- Information should be captured by arb and design
- Delivers cooling, better air quality, increased carbon removals, flood attenuation, biodiversity, amenity and recreational value



Soil Reuse

- Soil is a finite resource, in the UK, 10 times more soil is lost to landfill than to erosion
- Reuse and recycling of excavation waste could reduce the construction sector's CO₂ emissions by up to 5 million tonnes annually
- Soil type and quality is very local to the site and irreplaceable
- Local Soils Model Policy and Guide
- Soil Management Plans deliver to the mitigation hierarchy
- Unless contaminated, Zero Soil to Waste should be considered
- Lowers costs, reduces carbon emissions, waste and better BNG outcomes



Percentage SuDS

- England aims to have 75% of its surface water bodies reach good ecological status by 2027, though recent data shows only 14.3% currently meet this standard
- Reduce total nitrogen, phosphorus, and sediment pollution from agriculture into the water environment by at least 40% by 2038
- National standards for sustainable drainage systems (SuDS) - GOV.UK
- Intercept 80% of summer events (May to October) and 50% of winter events (November to April)
- Green roofs, permeable surfaces, infiltration trenches, filter drains and filter strips, swales, detention basins, purpose-built ponds and wetlands
- Reduces flooding, increases drought resilience, reduces wildfires, improves water quality and biodiversity



Carbon Sequestration and Storage



- % increase from baseline in above and below ground biomass
- Climate Change Committee projects that for our 2050 targets we will require removal of 58 million tonnes of 'engineered' and 36 million tonnes of 'nature-based' greenhouse gas per year Balanced Net Zero Pathway
- Following the PAS 2080 structure and links with BNG, infiltration, and Soil reuse
- Follows the Nature and Climate hierarchy
- Can use the BNG data to measure this
- Delivers wide range of climate resilience and ecosystem services already discussed

Key Takeaways

- Use local and national targets
- Use the data and metrics you have access to
- Use your specialists
- Integrate but also aspire, seek improvements
- Do not let perfect be the enemy of good if its just have a soil management plan or a nature and climate plan, do it
- Believe..... we can work together to make a difference
- We'll go down in history as the first society that wouldn't save itself because it wasn't cost-effective. Donella H. Meadows attrib.
- Nature is not a place to visit. It is home. Gary Snyder



Questions



Further Resources - training

ICE Training Environment and Sustainability courses

Includes:

- Carbon in infrastructure procurement
- Carbon management in infrastructure
- Introduction to sustainability procurement

<https://www.icetraining.org.uk/courses/environment-and-sustainability>

ice

Training



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