Introducing:

elemental

Transforming environmental impact through intelligent design decisions across every project phase.

Liz Nicholson | **elemental**

What is elemental?

Dynamic Assessment Tool

Highlights pathways for environmental improvement across complex project variables

Evidence-Based Decisions

Quantifies impact across six critical areas of landscape development

Industry Transformation

Creates measurable change through data-driven design choices

Supported by industry leaders

Landscape Institute, BALI, RHS, SGLD, HTA and APL

Six keystones of elemental

Materials Management

Optimising resource selection and waste reduction strategies

Soils

Enhancing soil health and carbon sequestration potential

Water & Air

Improving water systems and air quality

Biodiversity

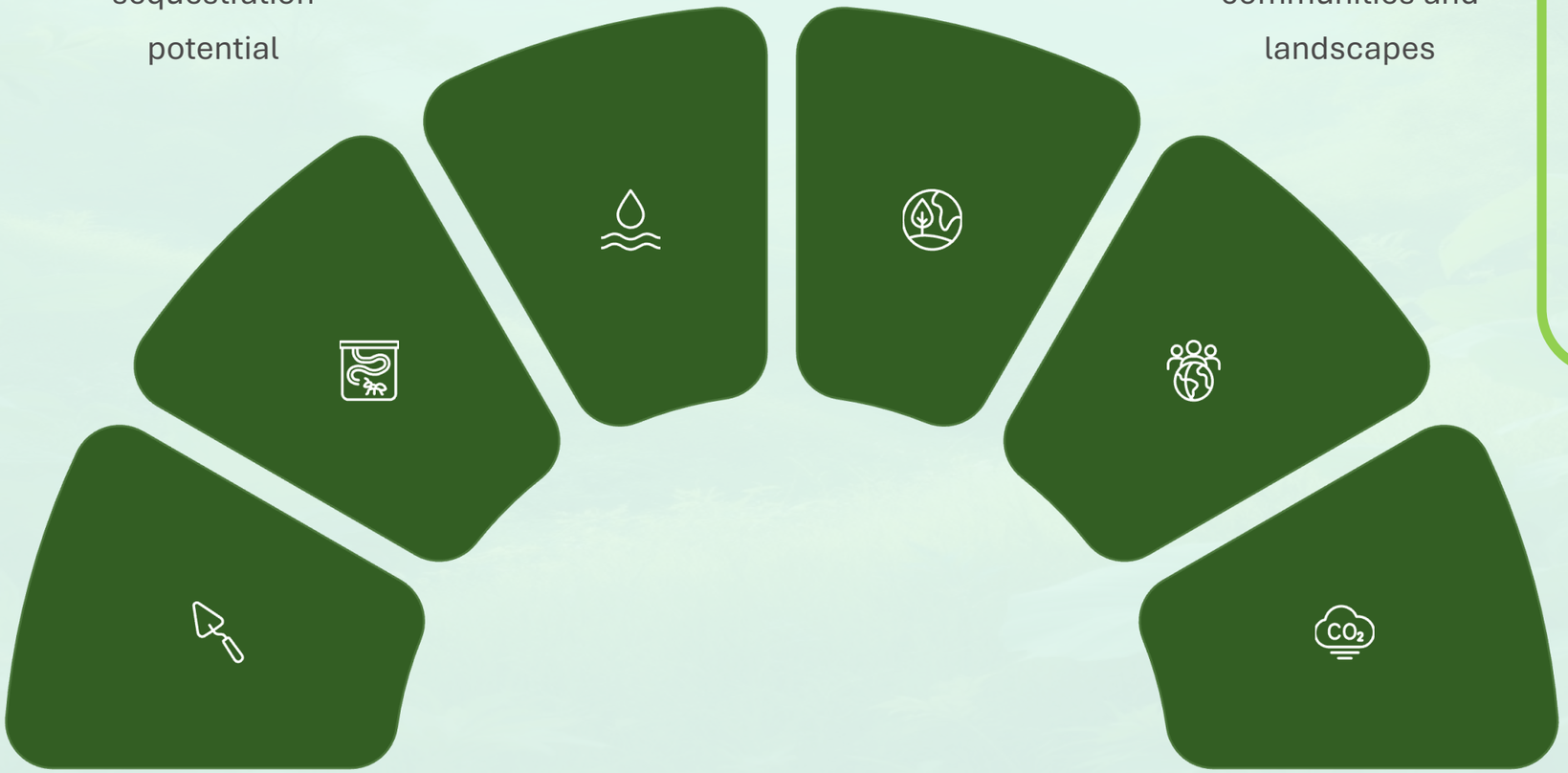
Protecting and enhancing ecosystems

People & Place

Connecting communities and landscapes

Carbon Emissions

Measuring and minimising project carbon footprint



How do these fit with the Carbon Overlay framework?

elemental and RIBA

RIBA Stage 0: Strategic Definition

At this foundation stage, initial project goals are set and feasibility is explored. Integrating **elemental** from the outset ensures sustainability is embedded into the core vision of every project.

Materials management	Soils	Water and Air	Biodiversity	People and Place	Emissions
Look at operational energy usage of any plant proposed e.g. pool heating	Determine if the project will have a Soil Management Plan in place	Define storm water management and site discharge. Explore in-site water harvesting for re-use	Preserve existing habitats Build biodiverse habitat enhancement into the brief	Consider green travel plan Consider access to green space	Consider longevity and end of life Consider local contractors and use of green energy

This framework helps guide initial decisions by mapping **elemental's** keystones to strategic considerations, fostering a proactive approach to environmental performance.

RIBA Stage 1: Preparation and Brief

During this foundational stage, **elemental** supports defining the project's environmental aspirations and data collection strategy.

Materials management	Soils	Water and Air	Biodiversity	People and Place	Emissions
Prioritising existing material and infrastructure	Soil Management Plan integrated into brief	Define water use requirements and outline a strategy for storage / permeable surfaces	Commission an Ecological Baseline survey	Consider how the space will be used by communities / people Plan for consultation if needed	Familiarise with elemental carbon dashboard

RIBA Stage 2: Concept Design

At this stage, **elemental** refines initial concepts by integrating detailed environmental considerations. It helps sculpt designs that are not only aesthetically pleasing but also inherently sustainable and regenerative.

Materials management	Soils	Water and Air	Biodiversity	People and Place	Emissions

Run project through **elemental** making early assumptions

This framework ensures that every design choice contributes positively to environmental performance, setting a robust foundation for the project's development.

RIBA Stage 3: Developed Design

At this detailed stage, **elemental** provides in-depth analysis of material choices, construction methods, and ecological impacts to refine the design and ensure environmental targets are met.

Materials management	Soils	Water and Air	Biodiversity	People and Place	Emissions
Consider risks to retained landscape	Coordinate with consultants to ensure minimal damage in the landscape	Consider sustainable drainage with biodiversity strategy where possible, to create better water places for nature			Use data from elemental to prioritise low carbon materials. Create a carbon target

RIBA Stage 4: Technical Design

At this crucial stage, **elemental** provides detailed support for technical design and specification, ensuring that all environmental considerations are fully integrated into the project documentation. It helps in selecting materials, systems, and construction methods that optimise environmental performance.

Materials management	Soils	Water and Air	Biodiversity	People and Place	Emissions

Use **elemental** to update and reassess project

elemental's robust data and analytical tools empower designers to make informed choices, delivering projects that are not only compliant but also exemplary in their environmental stewardship.

RIBA Stage 5: Construction

This stage marks the practical implementation and performance monitoring of the project. **elemental** transitions from design to assessment, enabling the verification of environmental outcomes against initial targets and providing data for ongoing maintenance and future optimisations.

Materials management	Soils	Water and Air	Biodiversity	People and Place	Emissions
Site visit to check material spec is being adhered to	Check Soil Management Plan is being adhered to	Check water sources are being protected	Check trees and habitats are being cared for	Check workers are working under CDM	Check contractors are working in an energy efficient manner and following specs e.g. soil

By providing a clear understanding of actual performance versus predicted impact, **elemental** ensures accountability and promotes continuous improvement in sustainable landscape management.

RIBA Stage 6: Handover

At this critical stage, **elemental** supports the seamless handover of sustainable landscapes, ensuring that the project's environmental goals are maintained and monitored post-completion. It provides frameworks for performance verification and client education.

Materials management	Soils	Water and Air	Biodiversity	People and Place	Emissions
Ensure aftercare instructions are delivered at handover		Ensure water features have a maintenance schedule	Ensure landscape management plan is in place	Ensure signage is in place to enable people to engage with the space	Actual vs Budgeted records could be compared to provide feedback

By capturing data on actual environmental performance, **elemental** facilitates post-occupancy evaluation, providing valuable insights for ongoing maintenance, future optimisations, and informing best practices for subsequent projects.

RIBA Stage 7: In Use

In the final RIBA stage, **elemental** supports the long-term performance and maintenance of the landscape. It provides tools for ongoing monitoring, ensuring that environmental benefits are sustained and lessons learned are fed back into future designs.

Materials management	Soils	Water and Air	Biodiversity	People and Place	Emissions

Consider using **elemental** for maintenance and management module

elemental ensures that the environmental integrity of the project endures, providing critical data for post-occupancy evaluation and contributing to a continuous cycle of improvement for sustainable landscape practices.

Proven Impact: Real Projects, Real Results

elemental Case Studies

RHS Show Gardens

Pathway Garden - Sustainability Headline Points
Lowest emission in the show at 8kg / m2 (max 80kg / m2)

All materials above and below ground are reclaimed / up cycled, including steel, timber, coppiced hazel, stone crushed concrete and gravel

Bench fabricated from wind fall tree and using gravity for stability rather than mechanical fixings

No concrete or cement anywhere in the garden and innovative engineering using free standing structures supported by base plates and ground pins

Prefabrication off site (minimal transportation)

Minimal waste from prefabrication (2 bin bags of waste and other waste sent for recycle / reuse elsewhere).

Mycelium towers use waste from last years Hampton Court show

All machinery on site powered by HVO

No power used during the show (no pumps etc)

Minimal excavation on site, designed to use cut and fill

Concrete swimming pool

CONCRETE POOL

TOTAL PROJECT AREA:
300 metres squared

SWIM AREA:
15m x 6m (90m²)

EXPECTED PROJECT COST: £300,000

DATE: 2025

Description

The concrete pool shown was built for a private domestic client. The largest carbon contributing landscaping material was the low carbon concrete, making up almost half of the total emissions created.

CARBON EMISSION FOR CONCRETE POOL:
76.19 kgCO²e/m²

POSITIVE IMPACT SCORE:
CONCRETE POOL: 179

	Type	Quantity	Desc	Emissions (t CO_2e)
●	Landscaping materials > Surfaces & paving > Surfaces & paving - incl sub base > Limestone (5cm depth) with sub base	120.00 m2	Limestone with sub base	1.40
●	Landscaping materials > Aggregates & stone > Limestone	5.50 t	Facing stone for lower retaining wall: 22m long	0.50
●	Landscaping materials > Aggregates & stone > Limestone	20.00 t	Facing stone for two upper retaining walls	1.80
●	Landscaping materials > Aggregates & stone > Limestone	1.00 t	Step risers	0.09
●	Landscaping materials > Cement & concrete > Concrete Blocks	0.00 t	Block work for two upper retaining walls	0.00
●	Landscaping materials > Cement & concrete > Concrete Blocks	5.00 t	Block wall - lower retaining wall	0.43
●	Landscaping materials > Aggregates & stone > Gravel	33.00 t	Retaining wall - back fill of gravel	0.14
●	Landscaping materials > Aggregates & stone > Gravel	80.00 t	Swimming pool - gravel at base	0.35
●	Deliveries and collections > Road - contracted > Lorry (3.5 – 33t) - Contracted	700.00 miles	Swimming pool - deliveries of materials	0.61
●	Fuel usage on site > Liquid fuels > Biodiesel - HVO	550.00 L	Swimming pool - excavation - fuel for diggers	1.66
●	Landscaping materials > Cement & concrete > Concrete (general)	100.00 t	Swimming pool - concrete walls and base	12.57
●	Landscaping materials > Metals > Steel rebar	1.00 t	Swimming pool - for reinforcing concrete walls	1.72
●	Landscaping materials > Bricks & tiles > Porcelino tiles	2.10 t	Swimming pool tiles	1.59
Total:				**22.86**

Natural swimming pool

NATURAL POOL

TOTAL PROJECT AREA:
200 metres squared

SWIM AREA:
15m x 6m (90m²)

EXPECTED PROJECT COST: £110,000

DATE: 2025

Description

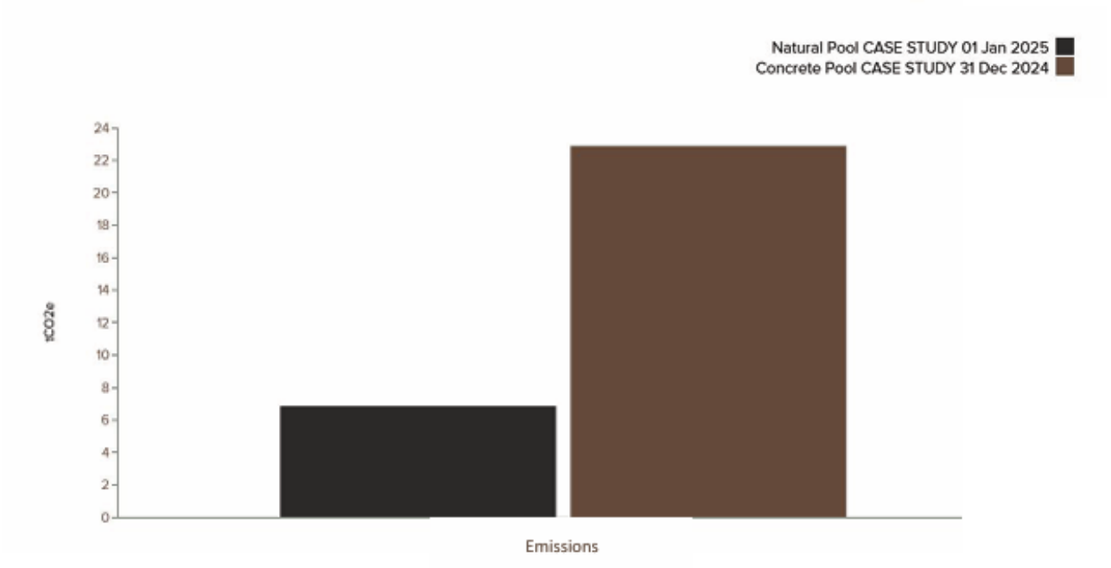
The natural pool shown was built for a private domestic client. The largest carbon contributing factor was the diesel fuel usage on site used to construct the pool, the largest landscaping material was the limestone used around the edges.

CARBON EMISSION FOR CONCRETE POOL:
34.19 kgCO²e/m²

POSITIVE IMPACT SCORE:
CONCRETE POOL: 223

	Type	Quantity	Desc	Emissions ($t CO_2e$)
●	Landscaping materials > Aggregates & stone > Gravel	140.00 t	Gravel for regeneration zone - Cotswold riverbed pebble, 30-55mm	0.61
●	Landscaping materials > Netting, ground cover & pond liners > Pond liner (EDPM/butyl)	264.00 kg	Butyl Liner	0.68
●	Landscaping materials > Wood > Hardwood	1,500.00 kg	Deck boards	0.46
●	Landscaping materials > Netting, ground cover & pond liners > Ground cover (e.g. mypex)	528.00 m2	Ground Cover	0.14
●	Landscaping materials > Aggregates & stone > Sand	10.00 t	Sharp sand at base of swim zone and regen zone	0.07
●	Landscaping materials > Aggregates & stone > Limestone	14.00 t	Boulders around edge of swim zone (excludes cost of transport from Tetbury, S. Gloucestershire)	1.26
●	Transport of workers > Medium car miles > Petrol (1.4-2.0l)	1,600.00 miles	2 workers travelling 20 miles a day (home to site) for 40 days	0.58
●	Fuel usage on site > Liquid fuels > Road diesel (Forecourt Diesel)	925.00 L	Swimming pool - excavation - fuel for diggers	3.04
Total:				**6.84**

Side-by-side comparison



CARBON EMISSION FOR CONCRETE POOL:
76.2 kgCO²e/m²

CARBON EMISSION FOR NATURAL POOL:
34.2 kgCO²e/m²

CARBON DIFFERENCE:
42 kgCO²e/m²

POSITIVE IMPACT SCORE:
CONCRETE POOL: 179
NATURAL POOL: 223

KPI DATA

REVENUE:
Kgs CO2 Per £ Revenue

NATURAL POOL:
0.06

CONCRETE POOL:
0.08

PROJECT AREA:
Kgs CO2 Per M²

NATURAL POOL:
34.19

CONCRETE POOL:
76.20

POSITIVE IMPACT SCORES

Score	Natural Pool CASE STUDY 01 Jan 2025	Concrete Pool CASE STUDY 31 Dec 2024
MATERIALS MANAGEMENT	39	25
SOILS	53	49
WATER & AIR	65	62
BIODIVERSITY	57	43
PEOPLE	9	0
Total	**223**	**179**

Housing scheme – Original

SITE: Oak View

LOCATION: Woodstock

LANDSCAPE DESIGN TEAM:

Nicholsons

SIZE: 4.4 hectares

DATE: 2025

Project Description

A sustainable, landscape-led development for 48 dwellings. The landscape strategy aims to provide a parkland setting for new homes that draws on the existing countryside character, to deliver a multi-functional and high quality network of open space which diversifies the lives of the new and existing communities while enhancing natural habitats.

CARBON EMISSION FOR ORIGINAL SCHEME:

TOTAL: 151 tCO^2e **AREA:** 3.44 $kgCO^2/m^2$

The key priorities for the project were:

- Sustainable transport links.
- Expansive, multi-functional open space that draws on existing historic precedents.
- Pedestrian priority - a car parking barn and courtyards encourage a more car free pedestrian focused neighbourhood.
- Green neighbourhood that incorporates ecology into the design.

	Type	Quantity	Desc	Emissions (t CO_2e)
	Landscaping materials > Bricks & tiles > Stone wall (by volume)	49.20 m3	Stone Walling	11.19
	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Concrete (5cm depth)	27.30 m2	Stone Walling Sub-base	0.41
	Landscaping materials > Surfacing & paving > Surfaces & paving - excl sub base > Concrete (5cm depth)	25.00 m2	Grasscrete (concrete only)	0.37
	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Stone (5cm depth)	3,538.00 m2	Paving	33.54
	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Gravel (5cm depth)	186.00 m2	Self Binding Gravel	0.09
	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Gravel (5cm depth)	36,804.00 m2	Hard Landscaping Sub-base (assuming average depth of 150mm)	17.96
	Landscaping materials > Aggregates & stone > Gravel - resin bound	88.00 t	Resin Bound Gravel	50.51
	Landscaping materials > Surfacing & paving > Surfaces & paving - excl sub base > Asphalt (5cm depth)	6501.00 m2	Tarmac	37.00
Total:				**151.07**

Housing scheme – Redesign

SITE: Oak View

LOCATION: Woodstock

LANDSCAPE DESIGN TEAM:

Nicholsons

SIZE: 4.4 hectares

DATE: 2025

Project Description

The scheme was reviewed by Nicholsons and redesigned to soften the landscape and remove any unnecessary hard landscaping to bring it more in line with the local area and reduce the carbon emissions produced by the development.

CARBON EMISSION FOR REDESIGNED SCHEME:

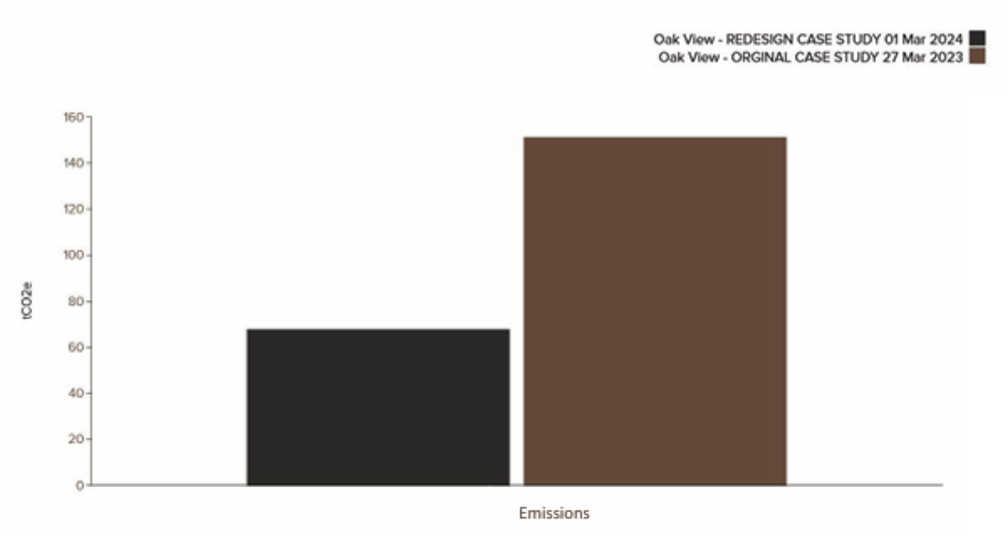
TOTAL: 67 tCO^2e **AREA:** 1.53 $kgCO^2/m^2$

The key priorities for the project were:

- Sustainable transport links.
- Expansive, multi-functional open space that draws on existing historic precedents.
- Pedestrian priority - a car parking barn and courtyards encourage a more car free pedestrian focused neighbourhood.
- Green neighbourhood that incorporates ecology into the design.

	Type	Quantity	Desc	Emissions ($t\ CO_2e$)
●	Landscaping materials > Bricks & tiles > Stone wall (by volume)	34.83 m3	Stone Walling	7.92
●	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Concrete (5cm depth)	19.35 m2	Stone Walling Sub-base	0.29
●	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Asphalt (5cm depth)	6,150.00 m2	Permeable Tarmac	35.00
●	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Stone (5cm depth)	938.00 m2	Paving	8.89
●	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Gravel (5cm depth)	2,563.00 m2	Self Binding Gravel	1.25
●	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Gravel (5cm depth)	29,301.00 m2	Hard Landscaping Sub-base (assuming average depth of 150mm)	14.30
●	Landscaping materials > Surfaces & paving > Surfaces & paving - excl sub base > Gravel (5cm depth)	89.00 m2	Loose Gravel	0.04
Total:				**67.69**

Side-by-side comparison



CARBON EMISSION FOR ORIGINAL SCHEME:
TOTAL: 151 tCO^2e **AREA:** 3.44 $kgCO^2/m^2$

CARBON EMISSION FOR REDESIGNED SCHEME:

TOTAL: 67 tCO^2e **AREA:** 1.53 $kgCO^2/m^2$

CARBON REDUCTION: 84 tCO^2e / 55.6%

POSITIVE IMPACT SCORE:
ORIGINAL SCHEME: 136
REDESIGN SCHEME: 259

KPI DATA

PROJECT AREA:
Kgs CO2 Per M^2

ORIGINAL SCHEME:
3.44

REDESIGN SCHEME
1.54

POSITIVE IMPACT SCORES

Score	Oak View - REDESIGN CASE STUDY 01 Mar 2024	Oak View - ORGINAL CASE STUDY 27 Mar 2023
MATERIALS MANAGEMENT	9	2
SOILS	53	16
WATER & AIR	60	25
BIODIVERSITY	71	53
PEOPLE	66	40
Total	**259**	**136**

elemental and your business

Call to action: Use elemental on every Project

Thank You

The future of landscape design is here.

Join the movement today.

Landscape Institute
People, place and nature

RHS

SOCIETY OF GARDEN + LANDSCAPE DESIGNERS

bali.org.uk British Association Landscape Industries

The Association of Professional Landscapers