



SCAPE SCOTLAND CONSTRUCTION

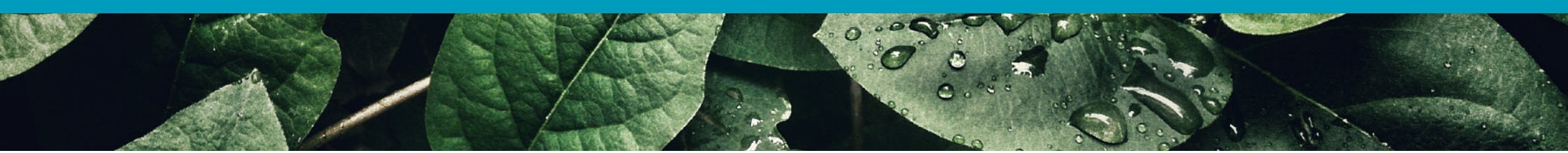


Life Cycle Delivery

A guide to delivering the Government's
Net Zero Public Sector Building
Standard through the SCAPE Scotland
Life Cycle model

Construction delivery partners





Introduction

Scotland's world-leading climate change legislation sets a target date of 2045 for net zero emissions of all greenhouse gases. At SCAPE Scotland we support this with our policy to deliver climate action for the Scottish public sector through positive procurement solutions. Working collaboratively with our construction partners and advisors, we have developed this guide to support the promotion and development of a net zero public sector estate across Scotland.

Both SCAPE Scotland and our construction partners have recognised the importance of a common language and a consistent approach in the successful management of greenhouse gas emissions in the construction sector. As a member of the UK Green Building Council, we have adopted the UKGBC framework definition¹ which underpins both our framework procurement and the Net Zero Public Sector Building Standard developed by the Scottish Future's Trust.

Recognising the changing landscape and the criticality of urgent climate action SCAPE Scotland has designed and procured our latest generation of construction frameworks in September 2021, with a clear aim of:

1. Providing rapid access for Scottish public sector clients to market leading contractors who have experience, capacity and capability to implement best practice and innovative solutions to deliver net zero buildings.

2. Instilling a collaborative ethos in every construction project: enabling clients to benefit from industry insight, and to bring our construction partners together in strategic improvement projects to share collective outcomes.
3. Providing clients with a procurement approach which supports net zero outcomes across the whole project life cycle, from inception to completion and during occupation.

These objectives align with the commitments set out in our Group Environmental Policy, believing that **every construction project can be part of our response to the climate emergency.**

SCAPE Scotland, in collaboration with our construction partners, are delighted to provide this organisational guide which demonstrates how the requirements of the Net Zero Public Sector Building Standard (NZPSBS) can be delivered using our unique SCAPE Life Cycle Contract option. Making the strategy, design, delivery and crucially verification of net zero buildings inherent in project delivery for public sector organisations.

We aim to provide a clear, stage by stage guide of how to procure, deliver, monitor and verify buildings accredited to the Net Zero Public Building Standard using the SCAPE Scotland construction framework and our SCAPE Life Cycle option. Demonstrating how the NZPSB Standard and Life Cycle contract requirements align across project stages and key milestones, and how this supports each stage of the accreditation process.



Mark Robinson
SCAPE
Group Chief Executive

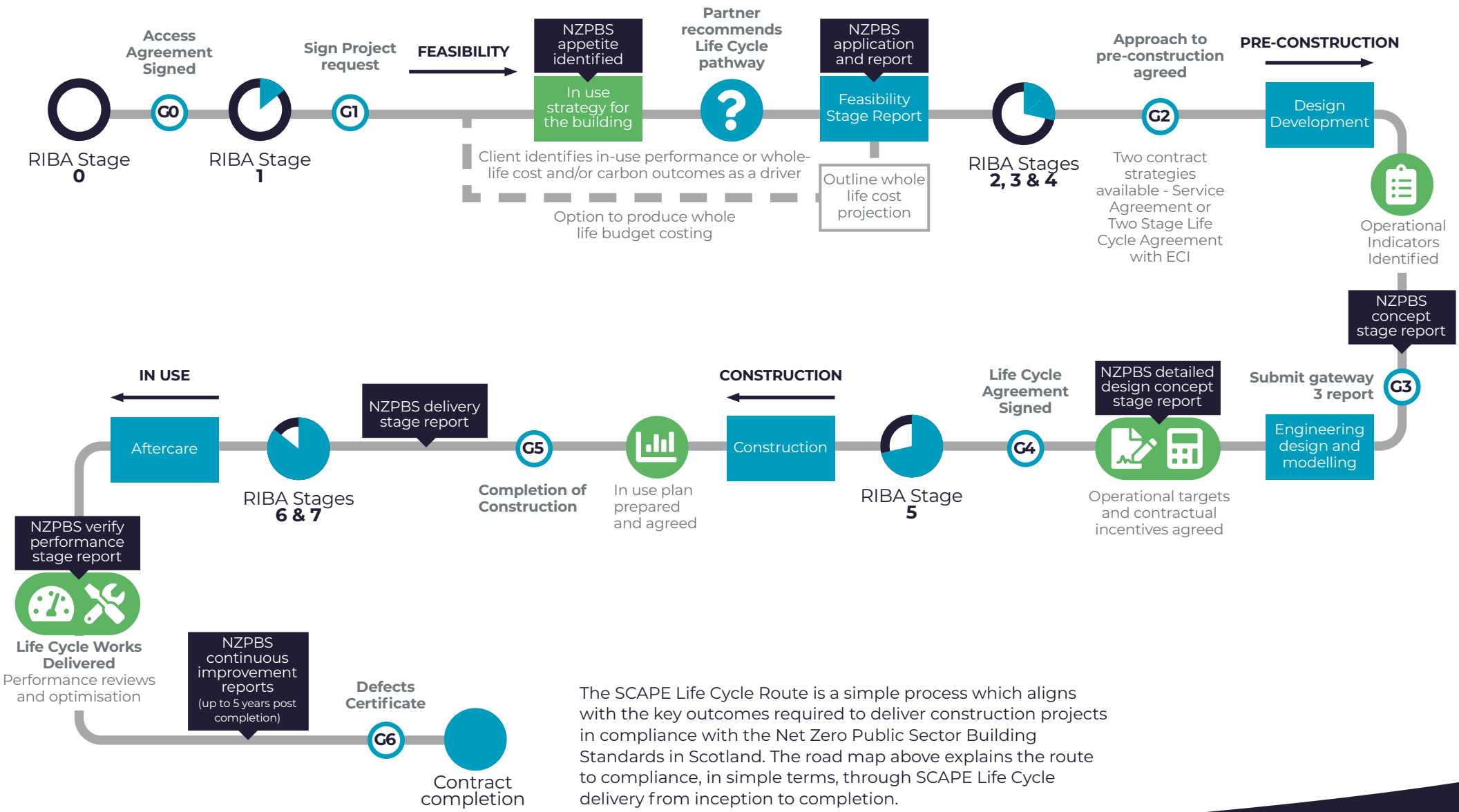
¹[Net Zero Carbon Buildings: A Framework Definition](#)

SCAPE Life Cycle Route

NZPBS Implementation Overview

Key

- NZPBS Milestones
- SCAPE Delivery Milestones



The Standard Overview

'In Use' stage verification influences design & construction

The Scottish Government's Net Zero Public Sector Buildings Standard (referred to throughout this document as 'the Standard') sends a clear message to all stakeholders in the development, delivery and use of buildings in Scotland. The public sector requires the best available carbon performance for its new build and major refurbishment projects. The Standard provides a realistic but ambitious starting point for the Public Sector.

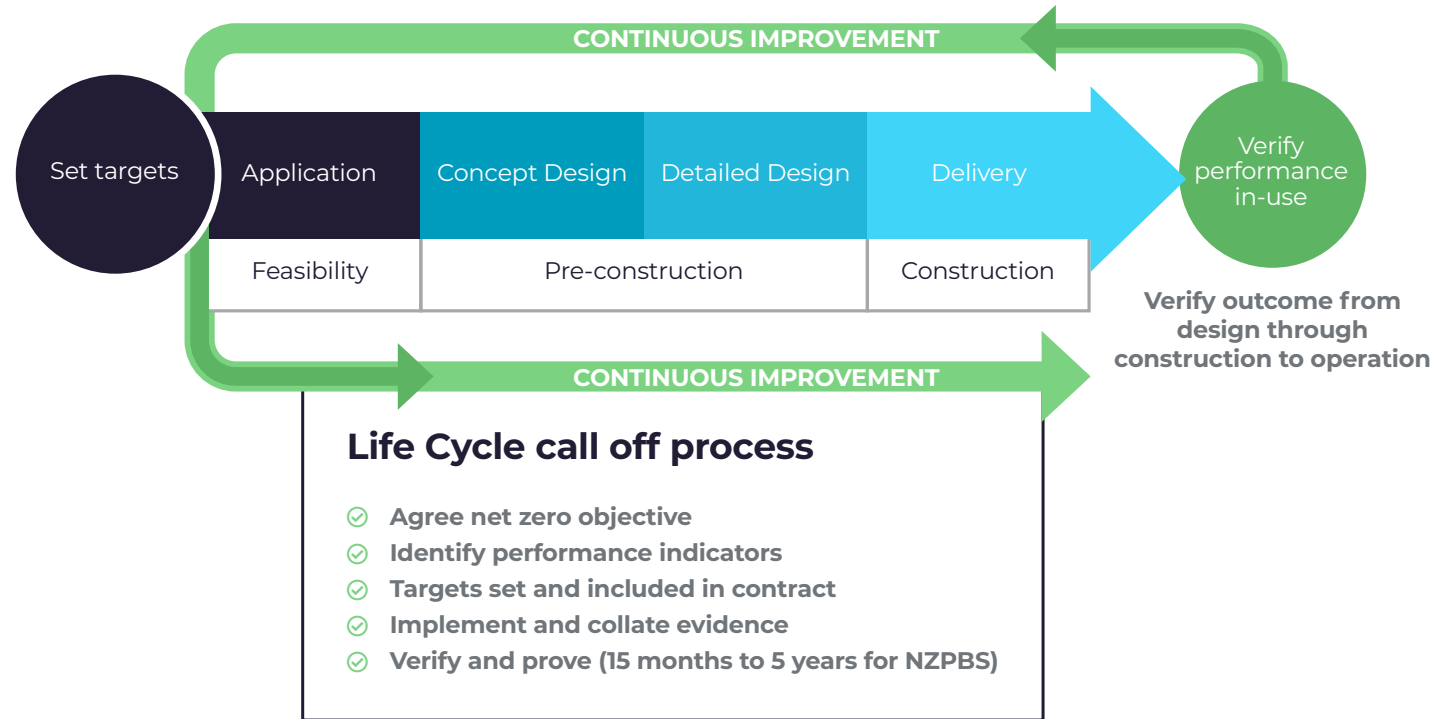
A key characteristic and strength of the Standard process is the way in which success is defined at inception and then measured in-use. The different aspects of good environmental performance are framed as six objectives. The Standard drives participants to set ambitious targets across the objectives early in the process and then to measure and ultimately verify these ambitions in-use. This principle, and its emphasis on measurable outcomes, is a powerful way to focus the minds of designers, clients and other stakeholders. It ensures that the right steps are taken through feasibility, pre-construction and construction to ensure targets are achieved. Prompting scrutiny and challenge at key stages and fostering good practice and innovation in design.

So, the Standard places great emphasis on the beginning and later the in-use

outcomes for each project. It also clearly sets out the intervening steps necessary to work towards these outcomes through its process of verifying progress at each stage of the Standard.

The Standard document suite provides detail of the requirements at each stage, along with specific guidance, templates and tools, helping participants to manage risks and build steadily toward the right outcomes in-use.

This guide sets out the stages, actions required and outcomes of the Standard and how the SCAPE Life Cycle approach aligns to support the achievement of the Standard accreditation. The suite of documents that make up the Standard can be obtained from the Scottish Futures Trust [here](#).



Feasibility Application stage

At the outset an application stage project registration form is completed, committing the participant to the targets and approach of the Standard. It is submitted to the Scottish Government to kick-off the project. It is critical that a strong business case, justified by a place-based review precedes the project. Assessing this Objective 1 response is the first third party verification requirement. The key priorities at the application stage are to:

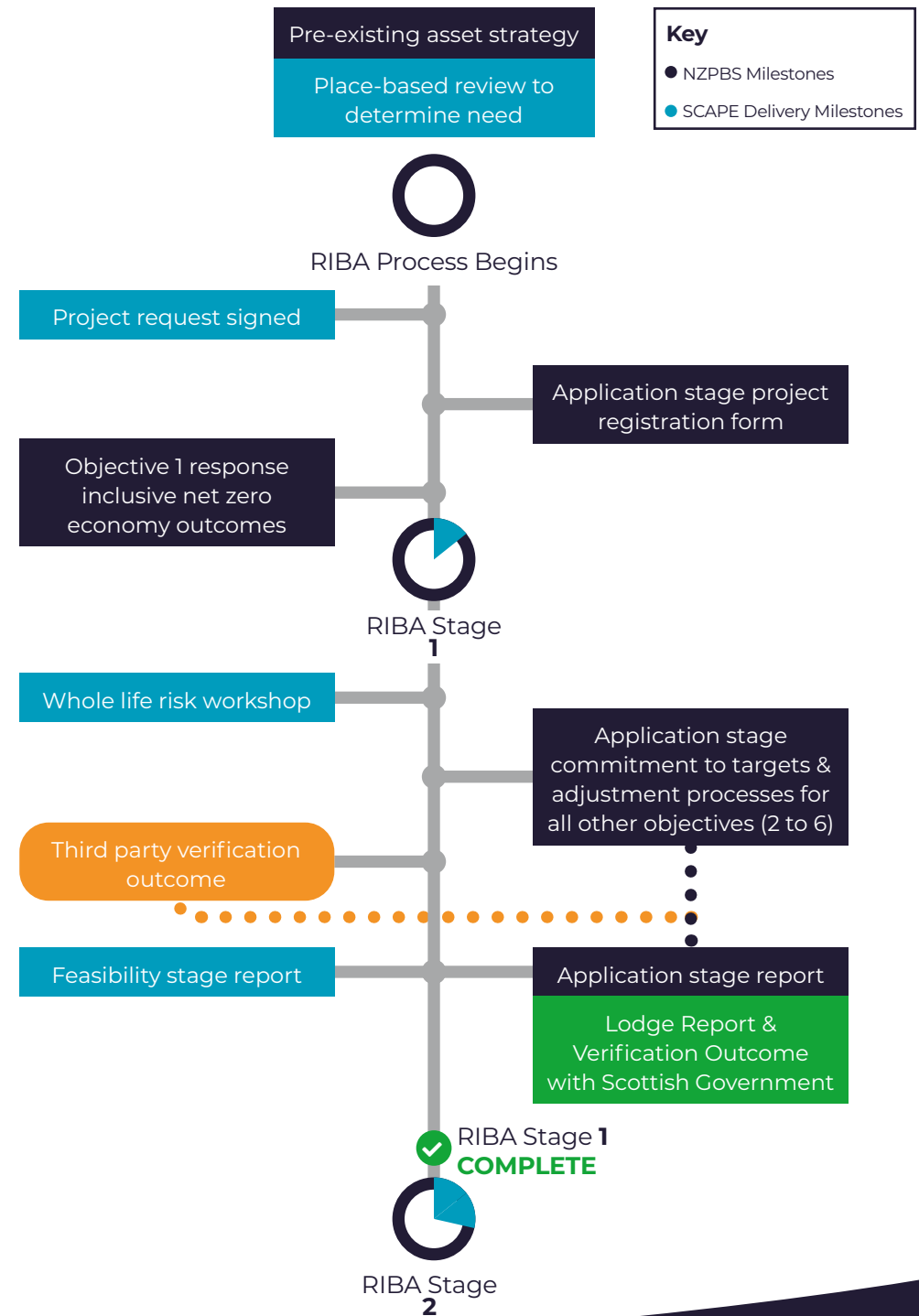
- Complete the application stage project registration form
- Achieve a successful third party verification outcome of the objective 1 response

Every SCAPE Scotland project is initiated with a simple project request form, developed in collaboration by the client and the construction partner. During the feasibility stage, which is provided at no cost to clients, the SCAPE Life Cycle route provides a structured path to achieving compliance with the Standard's early outcomes up to and including submission of the application stage report. As part of the SCAPE Life Cycle route, the following key objectives will also be undertaken during the feasibility stage:

- Define clarity/scope of works & design responsibility
- Appoint design team
- Confirm sustainability requirements
- Confirm whole life requirements
- Engage with stakeholders
- Outline programme and constraints

- Hold/attend whole life risk workshop & develop risk register
- Produce draft social value action plan & sustainability requirements

Upon completion of RIBA Stage 1, the boundaries for embodied carbon and operational carbon shall be defined. This will include identifying and agreeing the approved calculation tool for assessment of embodied carbon, along with assessment and selection of renewable energy opportunities, predicting future climate adaptation requirements, and approving lifespan, circularity and adaptability strategy.



Pre-construction Concept Design

During RIBA Stage 2, the participant develops their design ideas; determines the likelihood for adjustments to the Standard's targets and reports on key requirements, such as their approach to zero emission heating. This stage also represents the beginning of the modelling and life cycle assessment activities which will inform design decision making and progress towards targets.

During the concept design stage, the SCAPE Life Cycle route provides a structured path to achieving compliance with the Standard outcomes for completing and lodging the Concept Design stage report with the Scottish Government. The following key activities will also be undertaken as part of the SCAPE Life Cycle process during the concept design stage:

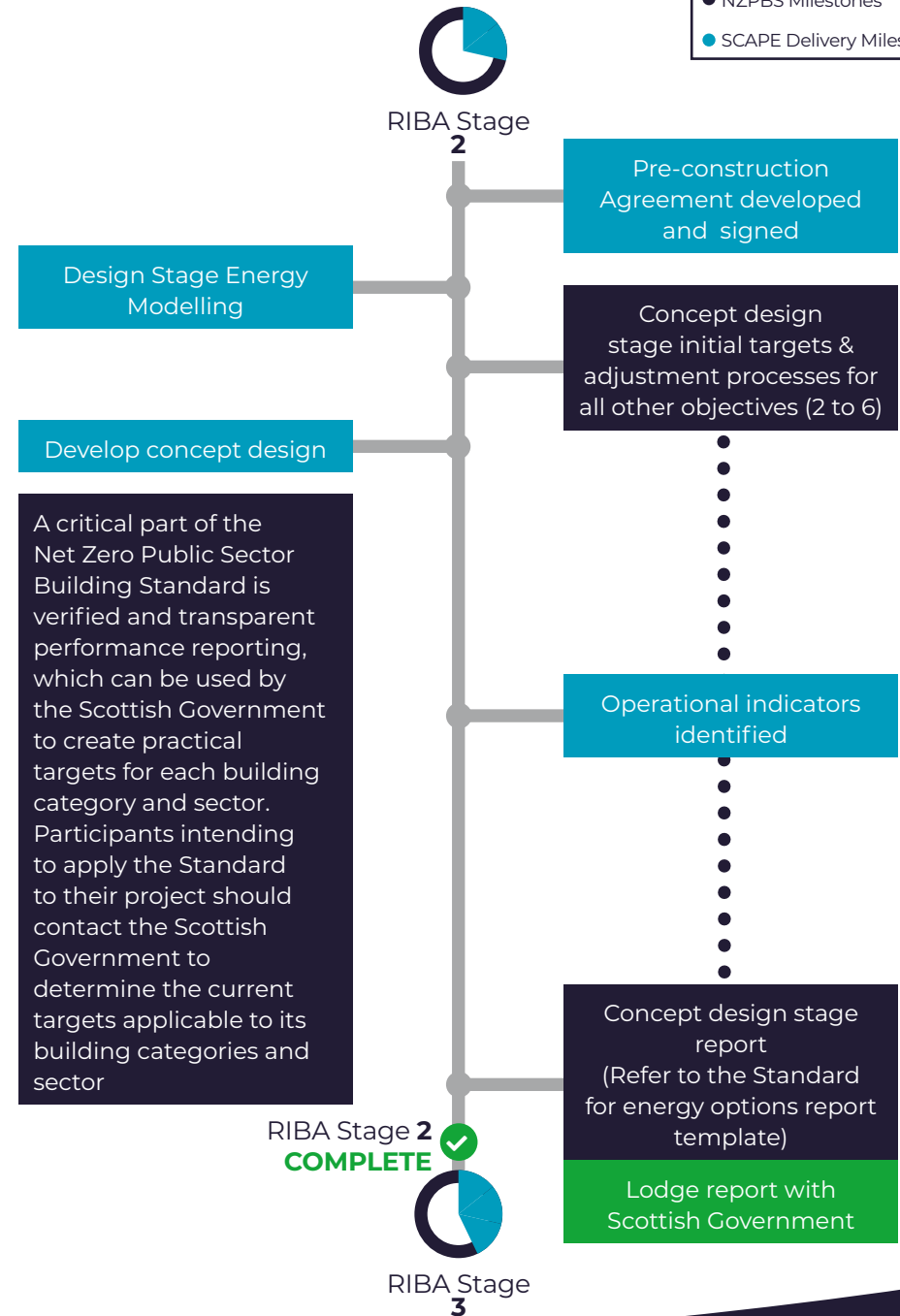
- Assign Energy Consultancy and Life Cycle Assessor (LCA) role
- Develop the concept design in accordance with critical design parameter recommendations, to include the following:
 - Building orientation, form factor and façade glazing ratio
 - Likely occupancy patterns and operating strategy, with input from key stakeholders
 - Initial environmental matrix
 - Technical systems integration
 - Develop overall metering strategy
 - FM requirements
 - Optioneering to ensure the most efficient and suitable design is chosen to reduce energy use and waste
 - Using planning policy and guidance such as the London Energy Transformation Initiative (LETI) Future of Heat Decision Tree when making decisions on heating and hot water systems

- Develop a preliminary operational energy model aligned to Energy Use Intensity targets
- Development of maintenance and operational strategy including energy use optimisation, renewable energy and any hard facilities management activities
- Review digital twin requirements to identify benefits such as risk mitigation, digitally enhanced processes etc.
- Implement the most significant carbon/energy reduction measures in design including demand response and energy storage opportunities
- Highlight the roles and opportunities for overcoming performance gaps
- Commercial aspects, Service Agreement, Life Cycle Costing and Benchmarking
- Shared information and data library

Upon completion of the concept design stage, the opportunities for low carbon design are maximised. Carbon reduction options for building elements are developed to provide more detailed analysis around the key building systems, and the design development will arrive at an improved understanding of whole life carbon, leading to a developed circular economy strategy upon RIBA Stage 2 completion.

Key

- NZPBS Milestones
- SCAPE Delivery Milestones



Pre-construction

Detailed Design

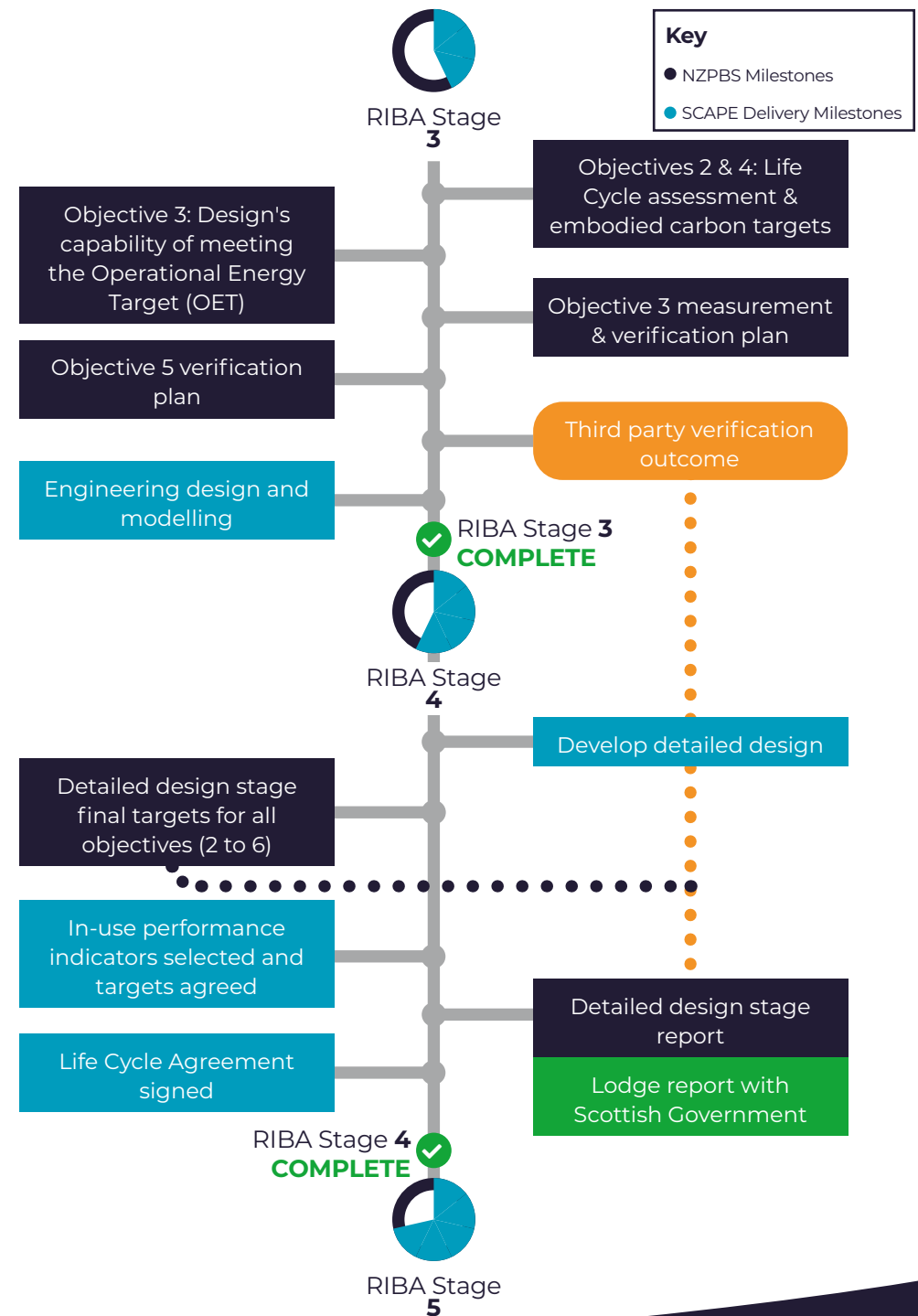
As participants work through RIBA Stages 3 and 4, they will gain greater confidence that the project is on course to achieve the targets set out early in the project. This stage represents the culmination of much of the modelling and Life Cycle assessment, and is when the greatest reliance on third party verification occurs.

During the detailed design stage, the SCAPE Life Cycle route provides the platform for collaborative design development and risk management, ensuring the developed design delivers to the requirements of the project brief and the Standard objectives. Third party verification is used at this stage, to verify the detailed design stage targets and outcomes, prior to submitting the detailed design stage report to the Scottish Government. The following key activities will also be undertaken as part of the SCAPE Life Cycle process during the detailed design stage:

- Digital twin strategy implemented
- Building design and modelling complete
- Design based whole life carbon assessment and validation complete
- 100% market tested cost plan complete
- Open book validation of prices to secure competitiveness of all elements
- Client, contractor and design team work together to finalise and agree proposals
- Construction quality plan developed and agreed

At the end of the detailed design stage, all targets and objectives set for achieving the requirements of the Standard will have been realised and incorporated within the design.

- Supply chain and community benefits strategy jointly developed
- Early supply chain engagement, to validate material selections and performance
- Engagement with statutory authorities
- Collaborative design development workshops to provide a one-team approach to whole life carbon design
- Operation and maintenance strategy confirmed



Construction Delivery Stage

Participant-led checks during the construction phase are key to evidencing that the design intent is met by the as-fitted works. Any significant changes to the design must be accounted for by adjusting the Life Cycle Assessment, dynamic simulation model, measurement & verification plan or any other affected items. Where these processes show that the installation won't meet the Standard's targets, remediation works must be carried out to bring the project back into alignment with the Standard's Requirements.

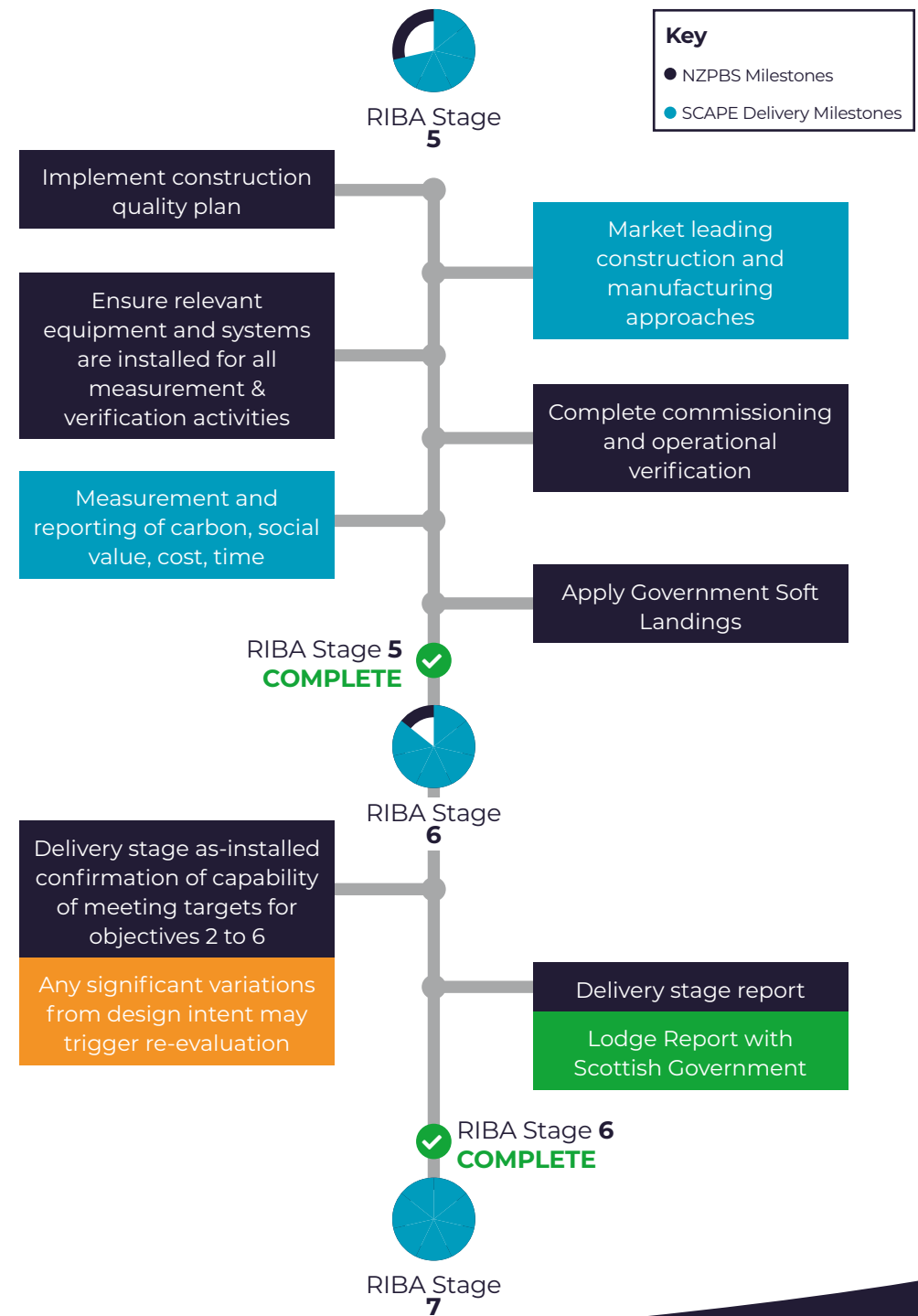
During the delivery stage of projects, the SCAPE Life Cycle agreement ensures that the quality of installation meets the requirements of the design intent through structured reporting, inspection and testing processes. Evidence collated throughout these processes confirm that projects are on track to meet all the Standard targets, and these are then used to compile to the delivery stage report for submission to Scottish Government.

The following key activities shall be undertaken as part of the SCAPE Life Cycle process during the delivery stage:

- Ensure plant, transport, site accommodation, waste management and temporary materials requirements align to construction carbon calculator tool
- Review and update construction carbon calculator tool
- Confirm offsetting amount based on tool and action offsetting method

- Assess and ensure all opportunities identified in the design planning phases have been implemented
- Connect to mains renewable electricity for the duration of the on-site works
- Issue sustainability targets and requirements to supply chain for compliance
- Create weekly sustainability progress meeting with key supply chain stakeholders and project team
- Engagement with supply chain on material quantities and appropriate storage
- Ensure appropriate level of inspections and testing is carried out (air tightness, thermal bridging etc.)

At RIBA Stage 6, SCAPE Life Cycle will deliver accurate as-built digital information models and full suite of operation and maintenance manuals consistent with international standards in the adoption of Building Information Modelling (BIM) to support Life Cycle asset management.



In-use Verify Performance

Once the project is handed over, performance data should be gathered across the six objectives to evidence that the targets and other requirements are being met. This can take place from 12 months after handover. Participant-led checks will suffice – but if performance fails to meet threshold, third party verification must be brought in to assist with reasonable adjustments or checking the success of remediation works. Projects should aim to meet all targets within five years of handover to be certified by the Scottish Government as meeting the requirements of the Standard.

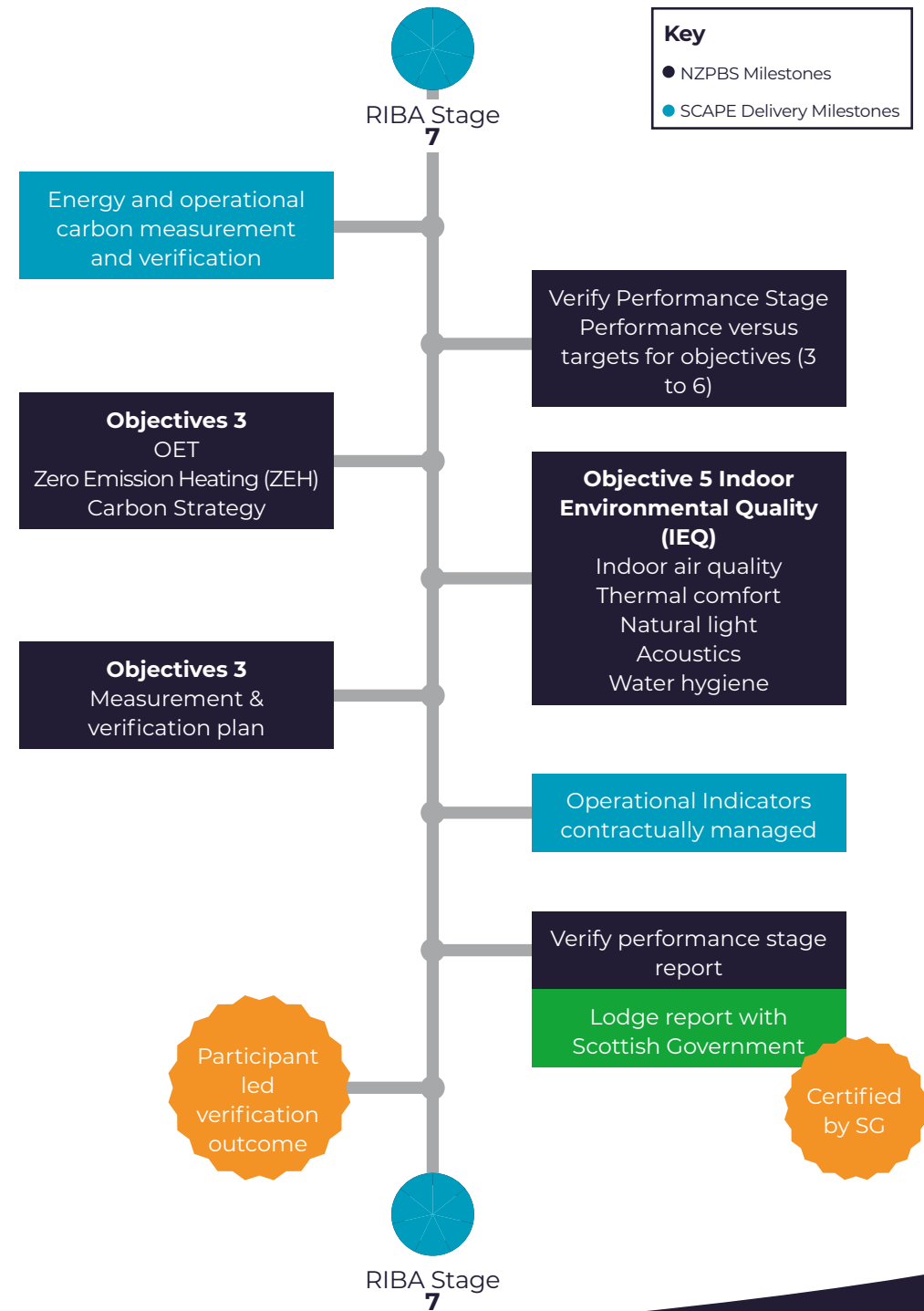
The SCAPE Life Cycle route enables continuous improvements to be made post completion for up to five years. During this period, the building performance is measured and verified against the Standard outcomes, and the final stage report is issued and certified by the Scottish Government. The following key activities are undertaken as part of the SCAPE Life Cycle process during the performance verification stage:

- During the first year of occupation both the building and the targets shall be tuned to actual building usage patterns
- Ensure hourly energy consumption trends match operating hours
- Ensure the metering system is operating correctly and validated against utility meters
- Identify and track key efficiency metrics
- Line up energy efficiency assessments with post occupancy evaluation assessments to ensure occupant satisfaction with environmental conditions

- Monitor, record and publish total energy and heating energy consumption data
- Digital twin benefits - flags up any issues in real time to allow early intervention and rectification if required
- Analyse maintenance strategy and seasonal commissioning results
- Shared information and data library with lessons learned

The SCAPE Life Cycle process also provides training and guidance to the client and building users on embodied carbon activities, to ensure that the building will continue to operate within the verified parameters. This will include:

- Recommended strategy to be followed throughout the building life cycle
- Providing end users with relevant information to maintain compliance with the embodied carbon reduction strategy
- Providing shared information and data library with lessons learned.



The Standard's Continuous Improvement Requirements

Performance data should continue to be submitted to the Scottish Government across the six objectives during the continuous improvement stage to evidence that the Standard's requirements are being met.

Reporting on continuous improvement in energy, carbon and environmental performance over the in-use stage of the building allows participants to demonstrate they are working towards the scope and date of their project-specific net zero deadline.

This is particularly important for reporting against the project's carbon strategy. For example, a project that has an all-electric heat source and a net zero deadline of 2030 will be able to report upon the decreasing carbon-intensity of its heat source as the electricity grid decarbonises.

However, to achieve net zero operational energy by 2030, the participant would need to take additional measures to account for the residual emissions of the grid. This could include generating or otherwise sourcing electricity from alternative net zero supplies and carbon offsetting, consistent with the requirements of the standard.

Continuous improvement aspects should therefore continue throughout the life of the building as an ongoing participant led activity, to ensure that the building continues to perform and meet

the energy, carbon and environmental performance targets set for the project.

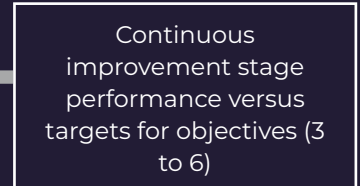
To ensure this is undertaken effectively, realistic operational budgets should be assigned to the project to allow the participant to continue to undertake any necessary maintenance and replacement activities required throughout the design life of the building.

The SCAPE Life Cycle process will advise participants upon project inception of the funding routes available for projects, and will guide participants through the requirements and application process.

This will include initiatives such as the Learning Estate Investment Programme (LEIP) delivered through the Scottish Futures Trust, details of which can be found [here](#).



RIBA Stage 7



RIBA Stage 7

Summary

SCAPE Scotland and our construction partners are committed to supporting Scotland's target date of 2045 for net zero emissions of all greenhouse gases. The development of this guide is a result of a collaborative relationship and shared desire to assist public bodies in meeting their net zero commitments on new build and major refurbishment projects.

The demonstrated alignment of the Life Cycle contract to the project stages and key milestones of the Net Zero Public Sector Building Standard supports achievement of each stage of the accreditation process. With a common net zero definition adopted across the suite of supporting documentation available, a platform for successful procurement, delivery, monitoring and verification of buildings accredited to the Net Zero Public Building Standard can be provided.

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SCAPE Scotland are champions of the
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