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Further Education Sustainable Estates Guidance

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Contents

1.0 Introduction	6
2.0 Executive Summary	8
3.0 Shaping a Sustainable Estate	9
4.0 Designing for Climate Change	13
4.1 Climate Change Mitigation: Mitigating against Greenhouse Gas Emissions into the Atmosphere	14
4.2 Climate Change Adaptation: Responding to the risks of climate change	15
5.0 Design Principles	17
5.1 Context: Considering physical and social setting	19
5.2 Identity: Creating a sense of place	21
5.3 Natural Environment: Making the most of the site	24
5.4 Movement and site connectivity	26
5.5 Functionality: How the estate meets the needs of the college	28
5.6 Healthy and Safe Environments	30
5.7 Inclusion: Equity and access	32
5.8 Standardised Approach: Coordinated and capable of replication	34
5.9 Future Proofing: An agile estate	36
5.10 Whole life: Re-use, re-purposing, material robustness	38
6.0 The Feedback Loop	40
7.0 Conclusion	43
Image Credits	44
References	45

Table of figures

Figure 1: Hierarchy of FE Standards and Guidance	7
Figure 2: The Estate Strategy Cycle	11
Figure 3: Climate Change Framework	13
Figure 4: Sustainable Estate Design Principles	17
Figure 5: Andover College	18
Figure 6: Reaseheath College	20
Figure 7: Lancaster University	23
Figure 8: University of Northampton	25
Figure 9: Cardiff & Vale College	27
Figure 10: North Hertfordshire College	29
Figure 11: Conde Nast College.....	31
Figure 12: Alexandra Centre.....	33
Figure 13: GenZero schools	35
Figure 14: Barton Peveril College	37
Figure 15: Lincolnshire Institute of Technology.....	39
Figure 16: The Manchester College.....	42

Summary

This publication provides non-statutory guidance from the Department for Education (DfE) on delivering sustainable capital investment in further education. It has been produced to help institutions delivering further education in a variety of settings and economic regions across England. It sets out the DfE definitions and design principles for a sustainable estate and complements the range of DfE technical standards¹ that are available to the sector including the Further Education Output Specification that was published in November 2021.

The guidance sets out how we define a sustainable estate from a social, economic and financial perspective. This includes the drivers that should be considered in developing a sustainable estates strategy, the 10 key climate change mitigations and adaptations to be used in designing buildings and the 10 key design principles for a sustainable estate, including good practice examples.

Review date

This guidance will be reviewed before April 2024.

Who is this publication for?

This guidance is for FE institutions delivering further education including Further Education Colleges, Sixth Form Colleges and Institutes of Technology. This includes college leaders, estate managers, technical advisers, contractors, designers and others involved in planning, managing and delivering further education estates.

¹ Refer to the 'School and Further Education College Design and Construction' area on GOV.UK <https://www.gov.uk/government/collections/school-design-and-construction>

1.0 Introduction

The January 2021 white paper “Skills for Jobs: Lifelong Learning for Opportunity and Growth”² set out the Government’s aspirations to make opportunities for education and training available to everyone throughout their lives, including those with Special Educational Needs (SEN) and disabilities, providing the technical skills the nation needs. Investment in partnerships, teachers, facilities and estates, aims to make technical education a more popular and prestigious choice at the heart of local communities.

These aspirations sit in the context of the UK’s legal commitments to achieve net zero carbon and biodiversity net gain.

The further education (FE) sector has undergone major changes in the last decade. Innovations in digital technology have provided new avenues for learners to access the curriculum and develop 21st century skills. Business and development plans have evolved to attract learners, achieve market growth, and establish new partnerships with employers. Between 2010-2020, 90 colleges merged, supporting efforts to improve financial health and to address recommendations that came out of the National Area Review process³.

Advancements in education, whether to meet curricular, technological, environmental, or business demands, impact the requirements of the physical estate. In addition, change and restructuring offer an important opportunity to consider the efficiency and rationalisation of both buildings and grounds. The need for well-managed, efficient, college estates that are fit for purpose and able to facilitate delivery of a wide range of specialist vocational curricula to support the national skills agenda is now more important than ever. Improving the estate’s condition, sufficiency and suitability underpins the strategic moves made towards the longer term economic, environmental and social sustainability of FE institutions.

The guidance will support college leaders, estate managers, technical advisers, contractors, designers and others involved in planning, managing and delivering further education estates, to make best use of every pound spent and deliver the Government’s environmental commitments. It will support asset evaluation and estate strategies. It should assist colleges to optimise their sites - ensuring effective capital investment into college infrastructure and facilitating the long-term sustainability of the estate - to meet current and future educational and operational requirements. This guidance should ensure that strategic decisions are based on sound sustainable design principles and

² The Skills for Jobs: lifelong learning for opportunity and growth policy paper sets out reforms to post-16 technical education and training to support people to develop the skills needed to get good jobs and improve national productivity [Skills for jobs: lifelong learning for opportunity and growth - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/policies/skills-for-jobs-lifelong-learning-for-opportunity-and-growth)

³ The National Area Reviews were a restructuring of the post-16 education and training sector initiated by the Government undertaken between September 2015 and December 2016.

best practice, assessing value against social, economic and environmental measures alongside economic viability and risk.

Good practice examples are provided in this document to illustrate the key design principles and evidence the benefits of a sustainable estate approach.

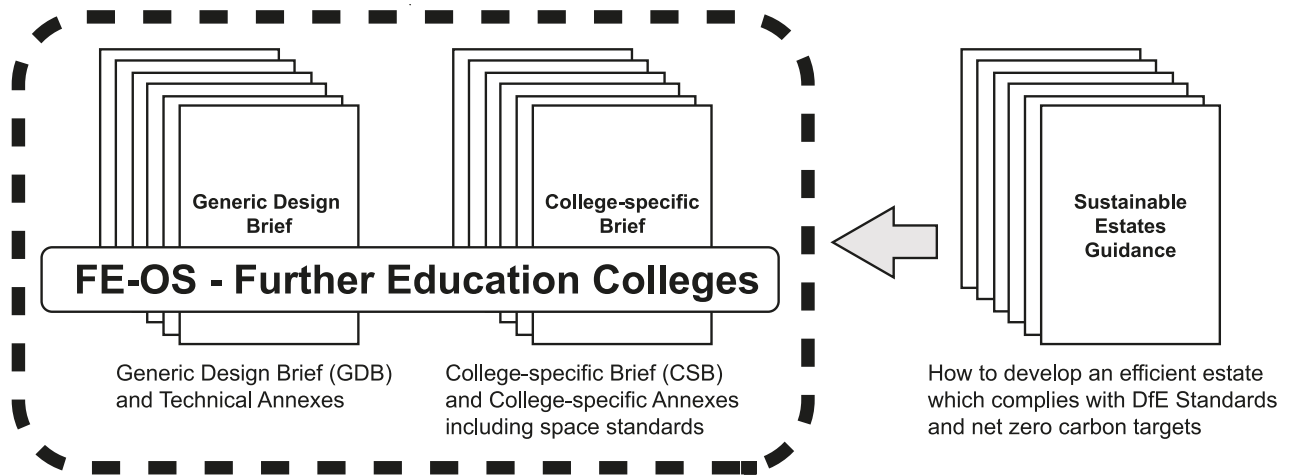


Figure 1: Hierarchy of FE Standards and Guidance

2.0 Executive Summary

The built environment has the power to shape our lives in profound ways. It is vital that further education estates are sustainable estates that meet the needs of the local community and employers and the strategic business plan; provide efficient and agile environments that support educational outcomes; and ensure longevity and resilience of the college's physical environment.

The key drivers for a sustainable estate are set out in the DfE Further Education Output Specification Technical Annex 2J: Sustainability⁴ - outlining the expectations for design, construction and operation of all further education buildings and grounds. These are:

- a) Put the long-term needs of the users (all students, staff and building users) at the centre of all decisions.
- b) Future proof against the risks of climate change as defined by UK adaptation policy⁵ i.e., higher temperatures and prolonged rainfall.
- c) Create a healthy and productive whole site setting, in response to UK's 25-year Environment Plan⁶ including biodiversity net gain.
- d) Prioritise the application of low energy, fossil fuel free buildings which respond to climate resilience and achieve net zero carbon in operation at handover.
- e) Calculate and report on Embodied Carbon in Construction, at key stages as defined by the standards within the Net Zero Carbon Buildings: A Framework Definition UK Green Building Council (UK GBC)⁷ Using EN15978.

These expectations and definitions are expanded in this guidance document to include the interrelated factors of environmental responsibility, social value, and economic viability. The DfE's recently developed framework for climate change mitigation and adaptation is provided and elaborated; and the design principles of sustainable estates are described, as they are measured and evaluated through the DfE Post Occupancy Evaluation process. These education sector principles all sit in the context of new universal government standards for planning and design.

⁴ DfE Design Guidance: FE Output Specification Technical Annex 2J: Sustainability on GOV.UK [Further Education Output Specification - 2J \(publishing.service.gov.uk\)](#)

⁵ Climate Change Committee: UK Adaptation Policy <https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-adaptation-policy/>

⁶ A Green Future: Our 25 Year Plan to Improve the Environment [25-year-environment-plan.pdf \(publishing.service.gov.uk\)](#)

⁷ UK GBC Net Zero Carbon Buildings: A Framework Definition [Net-Zero-Carbon-Buildings-A-framework-definition.pdf \(worldgbc.org\)](#)

3.0 Shaping a Sustainable Estate

Shaping a sustainable estate for further education needs a holistic approach that embraces the three interrelated elements of sustainability - environmental responsibility, social value, and economic viability.

Environmental Responsibility

Environmental sustainability refers to environmental and ecological protection, regeneration and renewal. An individual college can have an impact on the environment at a building, site, neighbourhood or even city or regional level and needs to consider the wider implications of Climate Change and the key objectives of achieving net zero carbon by 2050 and biodiversity net gain.

Social Value

Social sustainability refers to a user-centred approach to development, aligning to the needs of learners, employers and other key stakeholders, and supporting planned sector reforms as set out in the Skills for Jobs white paper. Equal and inclusive access to quality educational opportunities and learning environments is key to lifelong learning, social integration and the long-term wellbeing and resilience of individuals, communities and society. What constitutes social value depends on the best interests or needs of each organisation or community.

Economic Viability

Economic sustainability refers to long-term financial health of the college, supported by reduced capital and revenue costs. At an estate, buildings and grounds, level it can also refer to the economic impact of development - the long-term value provided to the college and local community. Investment in education facilities can improve local skills and business performance, increase footfall to support neighbourhood facilities, provide opportunities for improved transport and pedestrian links, and even transform the perception of an area and kickstart local redevelopment or regeneration.

A sustainable estate should be a key objective for any further education provider seeking to match their physical accommodation and facilities with their education and community needs and objectives. These needs and objectives are not static. A sustainable estate should be responsive to the continually evolving needs of the curriculum and learners, local skills and communities, and the college's own organisation. The DfE expects that a college's strategic business plan will include an up-to-date estate strategy⁸ and

⁸ Good practice guidance for FE colleges in developing estates strategies is currently available via the link below. The DfE is currently reviewing this [Guidance on college property strategies: circular 02/20 supplement A \(ioe.ac.uk\)](#)

associated masterplan that will provide a roadmap to a sustainable estate - potentially over several years and a number of phases, dependent on availability of funding.

At the foundation of the sustainable estate are the learners, the staff and the organisations who use, manage, and maintain the estates, and the communities and the partnerships that they serve. Together with the broader need for site rationalisation, efficiency, and educational reform, user-centred requirements should inform the ways that the buildings and estate are developed.

Every college estate has a distinct identity reflecting the community of users, alongside interrelated issues such as site character and location, specialism, community context, planning and transport, design, development history, digital and green infrastructure. The identity, ethos and culture of a college must be at the heart of a sustainable estate - reflecting its aspirations and ambitions.

A sustainable estate should encompass all sites, all buildings, and all grounds that make up an individual further education institution. The development of buildings and grounds should always be planned together. Designing the buildings before fully understanding the site, and what it has to offer, can lead to inefficiencies in the design process and compromises in layout, future use and maintenance.

Planning, designing, building, and operating the college estate is a cyclical process⁹ and few colleges will be starting from scratch. The sustainable estate of the future is likely to be a combination of refurbished, upgraded, repurposed and/or replacement accommodation. Some projects on the roadmap may be small and others may require significant capital investment and resources. Regardless, every individual project must be an investment in the college's vision and long-term objectives.

⁹ Refer to The Royal Institute of British Architects (RIBA) Plan of Work
<https://www.architecture.com/knowledge-and-resources/resources-landing-page/riba-plan-of-work>

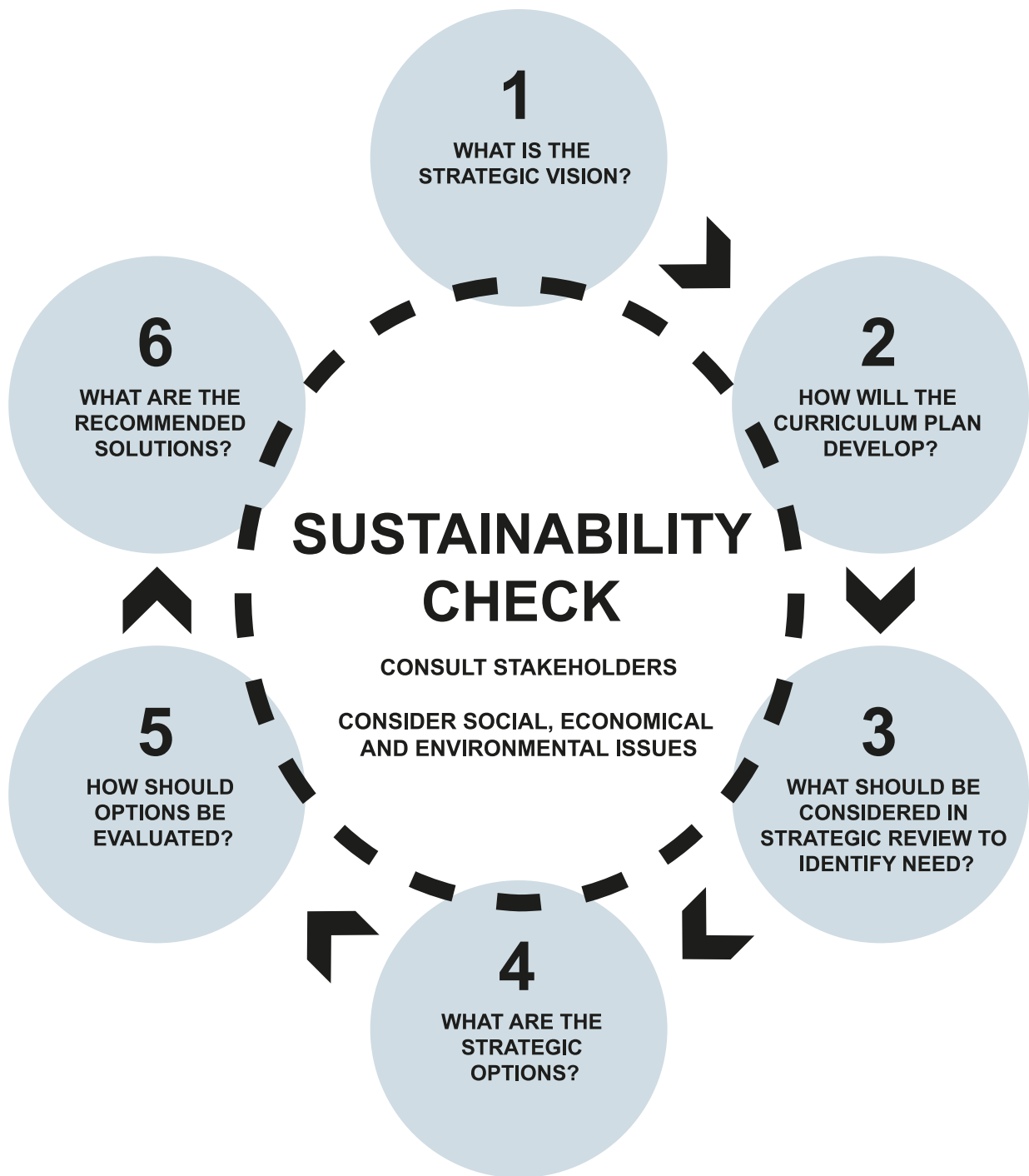


Figure 2: The Estate Strategy Cycle

Headlines	Subpoints
1. What is the strategic vision?	<ul style="list-style-type: none"> • A sustainable, efficient and fit for purpose estate • Informed by and aligning with the strategic business plan • Enables colleges to address local skills gaps and support employers - delivering the skills that the nation needs • Aligning to organisational culture
2. How will the curriculum plan develop?	<ul style="list-style-type: none"> • New teaching methods, distance/remote learning • Impact of new technologies • Employer and local skills gaps • Account for demographic trends • Planned new curriculum and specialisms
3. What should be considered in the strategic review to identify need?	<ul style="list-style-type: none"> • Condition and suitability • Climate Change and net zero carbon • Utilisation and space needs • Maintenance and running costs • Land title/Planning issues • Location issues • Efficiencies
4. What are the strategic options?	<ul style="list-style-type: none"> • What is the optimal solution? • Be realistic regarding available budget and constraints of the existing estate • Include options addressing opportunities for collaboration • Understand opportunities and constraints of all options
5. How should options be evaluated?	<ul style="list-style-type: none"> • Identify best value solution • Cost benefit analysis • Assessment against the Sustainable Estates Guidance • Consider how options address issues specific to college's requirements
6. What are the recommended solutions?	<ul style="list-style-type: none"> • Should evolve from the estates' strategy development process, deliver best value, be affordable and deliverable • Next Step: A detailed feasibility study on the preferred option(s) to demonstrate deliverability

4.0 Designing for Climate Change

To support project delivery, a DfE 'Climate Change Framework' has been developed. These principles identify how climate change mitigation and climate change adaptation can be applied to the design and operation of education institutions. These 10 points should be used to generate schemes and sustainable estates that are responsive to the impact of climate change and offer robust resilient design solutions for the future.

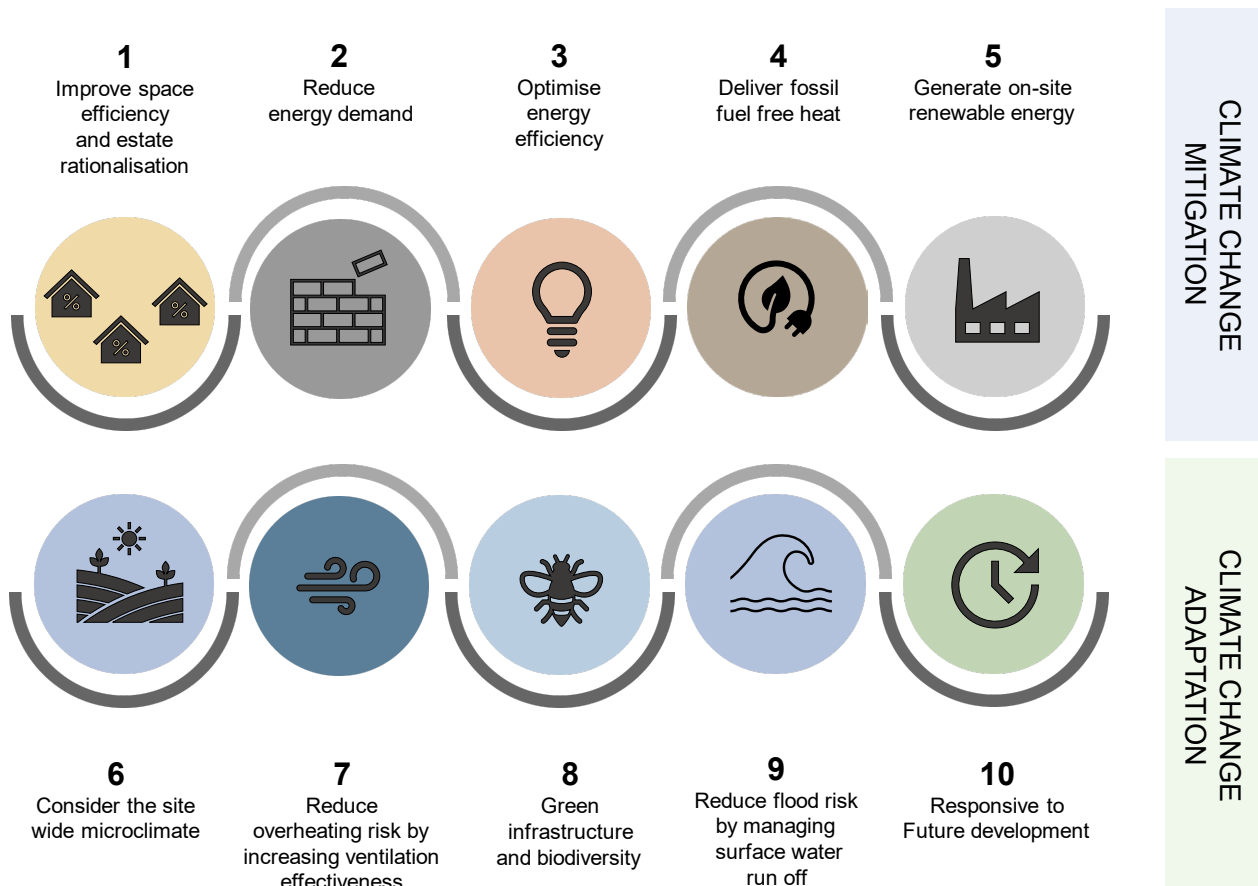


Figure 3: Climate Change Framework

Each of these points has potential economic, social (user), and environmental impacts and considerations that should be woven throughout a sustainable estate. These impacts, considerations and potential solutions are expanded here:

4.1 Climate Change Mitigation: Mitigating against Greenhouse Gas Emissions into the Atmosphere

Headlines	Subpoints (economic, social/user, environmental)
1. Improve space efficiency and estate rationalisation	<ul style="list-style-type: none"> • Use FE space and technical standards to deliver educational requirements • Develop sustainable estates strategy for future need based on evidence from use and user feedback • Use appropriate retrofit and refurbishment and new build solutions based on efficiency, economy and value • Build leaner, more agile space - build what is needed, improve utilisation where possible and future proof • Reduce embodied carbon through re-use and repurpose
2. Reduce energy demand	<ul style="list-style-type: none"> • Use building orientation and form to reduce demand • Challenge energy consumption • Use a passive fabric first approach • Consider volume rather than 2D plans to inform solutions e.g., cross ventilation and increased floor to ceiling heights • Embed standardisation to future proof the estate • Consider a meaningful reduction in embodied carbon and agree targets with team and contractor at outset
3. Optimise energy efficiency	<ul style="list-style-type: none"> • Employ energy efficient systems and select highly efficient plant, systems and equipment • Consider configuration of space and building services interfaces, distribution runs and plant locations • Train and engage stakeholders to monitor and maximise system performance in the long term. Employ seasonal commissioning • Modify user behaviour e.g., warm weather policies and student led initiatives • Include regulated and unregulated energy based on annual in-use profile to establish net use • Establish annual energy usage and benchmark on-site renewables to minimise carbon

	<ul style="list-style-type: none"> • Use of legacy FF&E
4. Deliver fossil fuel free heat	<ul style="list-style-type: none"> • Remove the need to burn fossil fuel on site • Use low and zero carbon technologies to deliver fossil fuel free heating e.g., gas boiler to be replaced by district heating or heat pumps • Create cross-site and off-site energy network with consideration of phased, future minded approach
5. Generate on-site renewable energy	<ul style="list-style-type: none"> • Establish anticipated energy use over an annual period by calculating regulated and unregulated energy • Use on-site generation to benchmark and balance generation against use e.g., provide PV on appropriate roof areas or provide alternative locations to achieve economies of scale • Make use of site and wider estate characteristics such as large roofs for PVs • Improve energy bills for users

4.2 Climate Change Adaptation: Responding to the risks of climate change

Headlines	Subpoints (economic, social/user, environmental)
6. Consider the site wide microclimate	<ul style="list-style-type: none"> • Consider site interaction with building environment performance e.g., adiabatic cooling, reduction in heat island effects and interface with green infrastructure and biodiversity • Leverage benefits of the site characteristics such as shading of facades by mature trees
7. Reduce overheating risk by increasing ventilation effectiveness	<ul style="list-style-type: none"> • Consider long-term climate change impacts on the building proposals, such as increased temperatures and flooding • Improve ventilation to respond to warmer climates e.g., cross ventilation • Increase floor to ceiling heights

	<ul style="list-style-type: none"> • Reduce local heat island effects through effective material selection e.g., reduced hard landscape and tarmac • Employ user friendly, intuitive controls • Simplify maintenance and improve economic efficiency in operation • Consider benefits such as user health and comfort • Use CIBSE guidance including TM calculations and weather files to 2080 to inform building proposals
8. Green infrastructure and biodiversity	<ul style="list-style-type: none"> • Increase biodiversity across the site • Consider greening of the estate and use of biophilia • Increase user benefits for health and wellbeing outside e.g., places to sit, socialise, learn and play outside • Employ passive and integrated shading in building fabric • Use low maintenance, robust and natural materials • Promote healthy travel and transport, into and around the site
9. Reduce flood risk by managing surface water run off	<ul style="list-style-type: none"> • Employ storm water management systems to ensure water discharge is effectively managed e.g., SuDS, swales, increased foliage and permeable landscaped surfaces • Use grey water to help reduce water usage e.g., flushing toilets
10. Responsive to Future development	<ul style="list-style-type: none"> • When planning for expansion and redevelopment or rationalisation, base solution on evidence e.g., learner growth and socio-economic change • Consider curricular changes and ways of learning and teaching e.g., the move towards a blended approach • Anticipate future systems and technology deployment e.g., car parking electric points • Use evidence from site in use and ongoing evaluations and feedback to continually review plans • Plan to adapt and change

5.0 Design Principles

The sections in this chapter reflect the design principles of sustainable estates that are measured and evaluated throughout the DfE Post Occupancy Evaluation process – from planning through design and construction and into use. These 10 design principles are interwoven with the 10 climate change principles.

Principle number	Design principle	Climate change principle
1	Context	Considering physical and social setting
2	Identity	Creating a sense of place
3	Natural Environment	Making the most of the site
4	Movement and site connectivity	Site connectivity and access
5	Functionality	How the estate meets the needs of the college
6	Healthy and Safe Environments	Safe and secure
7	Inclusion	Equity and access
8	Standardised Approach	Coordinated and capable of replication
9	Future Proofing	An agile estate
10	Whole life	Re-use, re-purposing, material robustness

Figure 4: Sustainable Estate Design Principles

Colleges are also bound by national guidance. The current National Planning Policy Framework¹⁰ (NPPF) provides a presumption in favour of sustainable development and making more effective use of sites - including development of under-utilised land and buildings. In addition, the National Design Guide¹¹ identifies universal characteristics for well-designed places. Both support a range of provisions that should be an integral part of a sustainable estate.

All these design principles are integrated, not independent, and apply from the wider overall education estate and site to individual internal and external spaces. The examples provided are not intended to pre-determine design solutions but to illustrate a range of principles in practice, to support briefing and design ideas.

¹⁰ National Planning Policy Framework 2021 <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

¹¹ National Design Guide (MHCLG 2021) <https://www.gov.uk/government/publications/national-design-guide>

Andover College and Andover Masterplan, Hampshire



Andover College identified as a key asset in the 2020 town masterplan - expansion and improvement of student facilities will bring vitality to the town and create space for housing and workspace¹²

Figure 5: Andover College

¹² Andover Town Centre Vision and Masterplan <https://www.thinkandovertowncentre.co.uk/>

5.1 Context: Considering physical and social setting

At its most basic level, site planning involves arranging structures on the land and shaping spaces between them. This planning is influenced by a whole range of contextual factors - historical, cultural, local and regional context; physical constraints, such as rights of way, street and road linkages; relationships to existing structures; and the natural qualities of the estate - orientation, microclimate, soils and geology, drainage, landscape and level changes; as well as considerations of the environmental, social and economic cost and value of development.

Further education campuses also vary to reflect the diversity of local aspirations and educational - student and employer - needs. Colleges can enhance, or reinforce, local community and identity, and other local provision, by strengthening connectivity to their physical and community context. This impacts the use and arrangement of every site across the estate, as well as the siting of buildings and functions on individual sites.

Context prompts:

Neighbourhood

- Are functions and buildings in the right place to meet the needs?
- Are sites laid out attractively and efficiently?
- How can the buildings and site functions best relate to their immediate and neighbourhood surroundings?
- Are there local cultural characteristics to be acknowledged?
- Is safety and security an issue?
- Does the physical context have a particular character?
- Any strategic views to be retained or enhanced?
- Are land uses constrained in any way?
- Have any other site-specific constraints been identified e.g., airport protection zones, Green Belt, metropolitan open land, transport nodes, local businesses or services?

Heritage

- Do Conservation Areas, Listing or other Heritage features suggest or best accommodate particular activities?

Policies

- Have local planning policies or guidance been considered?
- Statutory or specialist requirements e.g., DfE, Sport England?
- How are sector reforms, such as Skills for Jobs, supported?

Reaseheath College - National Centre of Excellence for Agri-Tech¹³

Reaseheath College is a land-based college based in Cheshire. It offers a range of further education, apprenticeships, higher education and part time courses. The rural campus environment added a new 20,000 sq. ft Agri-Tech facility in 2018 to provide improved technological education provision.

The workshop block and neighbouring teaching block are located at the entrance to the site to provide industry standard facilities for the college's agricultural industry partners to use for their own research, conference and industry events.

The small development has a consistency of character with the existing rural campus buildings but also creates a business-friendly front door to the college. The timber building envelope provides a unifying "cloak" to a range of volumes and types of practical and learning spaces.



Industry standard facilities in keeping with the scale and style of the rural setting and providing a heart and a front door to the campus for local businesses

Figure 6: Reaseheath College

¹³ Reaseheath College website <https://www.reaseheath.ac.uk/>

5.2 Identity: Creating a sense of place

Every college needs its own identity and sense of connection to its own site. This can be supported by ensuring that the approach to buildings and grounds is integrated, the relationship between the two is well considered, and the spaces in between buildings are as well considered as the buildings themselves. Perceptions of place are made up of layers of understanding. Character or sense of place might be drawn from a whole range of sources such as:

- Materials, building forms and features.
- Routes, edges or views.
- Connection of the site to its surrounding settlement - such as street frontage on a main route or relationship to a grid of streets.
- Local morphology e.g., historic routes, block pattern, building heights, massing.
- Particular ecological or geological characteristics.
- Celebrating or embracing particular local or historic activities or events.

Identity prompts:

Relationships

- Do internal function and external land use connect?
- Are there opportunities to frame views or enhance skyline?
- How might local perception or engagement need to be changed?

Character

- Does the site feel connected to the local street pattern?
- Is there a local aesthetic or vernacular that provides inspiration?
- Could the natural environment and ecology shape the identity?

Public realm

- Might public art, street furniture or signage connect the site(s)?
- Does lighting enhance features, and provide a sense of safety?
- Are boundaries, barriers and edges appropriate and attractive?

Buildings

- Does the existing layout and form (height, scale, massing) offer hints or opportunities for potential development?
- Is the access and approach clear and boundaries between public and private space defined? Are there opportunities for visual or physical permeability or a sense of enclosure?

Activity

- Is there optimum usage during the day and into the evening?
- Are there obvious routes, intersections and gathering spaces?

Lancaster University “Spine”

The project’s aim was to rejuvenate the principal pedestrian walkway on Lancaster University’s Bailrigg campus - the “spine”.

An existing “oppressive” and poor quality canopy was removed and the spaces redefined as a “necklace” thoroughfare. Building frontages and a series of characterful connecting spaces with diagonal relationships now knit the campus together. The historical nature of the site and surrounding context informed the proposals and identified potential opportunities for existing structures to be reused and enjoyed by new communities. The new arrangement provides “outdoor rooms” that engage the spine with the buildings and their interiors and enables external spaces to be used and enjoyed by all. Spaces along the spine have varying character while also providing coherent treatment, unified by a resilient, durable “carpet” of paving, soft landscaping, lighting, the new canopy and long vistas ensuring it is legible and aids wayfinding.¹⁴



A diverse series of spaces are connected and celebrated using hard and soft landscape, lighting and canopies creating a sense of place

Figure 7: Lancaster University

¹⁴ MICA Architects website <https://micaarchitects.com/projects/lancaster-university-spine>

5.3 Natural Environment: Making the most of the site

In line with the Climate Change Framework, utilising the site's natural qualities, including orientation, topography and microclimate, can help minimise any negative impact on the environment and reduce energy demand through considering:

- Building orientation - integrating shade and minimising solar gain.
- Water management - sustainable urban drainage for storm water management including blue/green roofs, rain gardens and swales.
- The potential of the ground for heating or cooling.
- Wind and air movement across the site or buildings.

In addition, environmental net gain, as outlined in the Government's 25-year environment plan¹⁵ can be supported through site-specific action such as:

- Landscape and biodiversity enhancements.
- Re-use and repair of brownfield land - decontamination or remediation.

Tree planting provides long-term sequestration of carbon and areas of shade that may benefit buildings - assisting in mitigating overheating in summer months, as well as users - improving the use of outside space for curricular and social activity. Low maintenance solutions support long-term retention of these important features.

Nature prompts

Physical

- How can topography help? Optimise orientation and microclimate.
- How will air quality be protected or improved?
- Consider geology, ground conditions, surface and groundwater.

Use

- How can the natural environment support the college's ambitions?
- Can unsightly utility structures be moved or screened?
- Can development protect or connect to sites of special scientific interest, nature reserves or other ecology or habitat areas?
- Are visual or physical connections created to green space or nature?

Ecology

- How can biodiversity and species be protected or enhanced?
- What are assets? Trees, water, habitat etc.
- Where are liabilities? Contaminated, despoiled, poorly drained land.

¹⁵ A Green Future: Our 25 Year Plan to Improve the Environment
<https://www.gov.uk/government/publications/25-year-environment-plan>

University of Northampton Waterside

Two university campuses totaling over 13,000 students relocated to the Waterside Enterprise Zone – a 58 acre site of a former power station adjacent to the town centre.

New and renovated buildings alongside the River Nene offer a learning and working environment that is a beacon of regeneration for the whole community - a community university that promotes blended learning. A clear spatial and landscape strategy utilises and enhances the natural assets surrounding the site.



The waterfront location provides an inspirational setting that attracts the local community, and offers an outlook and outdoor spaces that support health and wellbeing

Figure 8: University of Northampton

5.4 Movement and site connectivity

Movement into, within, and across sites should be well considered. Education providers can provide footfall and activity that supports a much wider range of local facilities and businesses. Colleges also have an opportunity to open up facilities to the public to support vocational curriculum such as hair and beauty or catering. Business incubation, and closer engagement with employers, may result in multiple access needs and types of boundaries. Access and connections to, within, and between the college site, or sites, should be mapped through a 'movement framework' that establishes:

- Connection to local centres through all forms of movement - prioritising walking, cycling and public transport.
- Potential for wider local benefits, for instance by provision of public facilities, extension of a bus route, or a more direct footpath to a neighbourhood centre.
- Access needs of any shared spaces.

A lifelong learning environment should consider the travel and movement needs of diverse users - including women, children, the elderly, and people with disabilities. How people move, particularly pedestrians, is not just a matter of the simplest and most obvious route, but will be influenced by, for example: variety and interest; safety; light and shade; commercial or street level activity; landscape or greenery; noise and pollution; surface type and quality; congestion.

Movement prompts

Circulation

- Analyse access and travel distances to and within the college estate.
- Identify movement modes - walking, cycling, scooters, vehicles etc.
- Where are interchanges, barriers, permeability and rights of way?

Legibility

- Are destinations and points of entry easy to identify?
- Which are the primary and secondary routes and spaces?

Traffic

- Are there noise, air pollution or safety issues - inside or outside the boundary of the estate? Is the user experience positive?
- Where do servicing, maintenance and emergency vehicles go?
- Is parking and drop off managed and suitable for disabled users?
- Is public transport accessible and use encouraged?

Cardiff and Vale College, City Centre Campus

As part of a 10 year development programme, this project brought together many of the college's activities onto a single campus in the heart of the city.

This large campus, just a few minutes' walk from Cardiff city centre and Cardiff Central train station, includes six different sites. Located in a challenging area of the city, it has had a positive impact on the perception and use of the area. The landmark building at the heart of the campus includes a public route through the centre. As well as education and training, facilities include a gym, spa, hair and beauty salons, shops, conference centre and a rooftop restaurant open to the public seven days a week. Public facilities are visible from the street and capture spectacular views towards Cardiff Bay.

The mature professional commercial settings provide an excellent range of 'real life' training environments that benefit learners and attract local employers.



External and internal routes past and through the building attract the community into the activities, engage businesses, and create a sense of passive surveillance that have a positive impact on the whole area

Figure 9: Cardiff & Vale College

5.5 Functionality: How the estate meets the needs of the college

Every college is different and needs a sustainable environment that meets its own needs. Functionality of the estate is measured through a number of factors:

- Effectiveness and use of all sites in the estate, individual site layout, and individual spaces - inside and out.
- The range and mix of internal and external spaces and area provision.
- Organisation of the spaces to support educational and operational needs.
- How the congregating spaces work i.e., arrival, building approaches, circulation routes, gathering and social spaces.
- How well the internal and external specialist facilities are working – particularly size, configuration, furniture and equipment.
- Robustness and suitability of finishes, fittings, and components across the whole buildings and grounds (enabling beneficial usage, sightlines and views).
- Environmental comfort including light, noise, air movement and quality etc.
- User-focused external areas with appropriate supervision, boundaries etc.
- Ability to support blended learning and other new learning delivery methods.

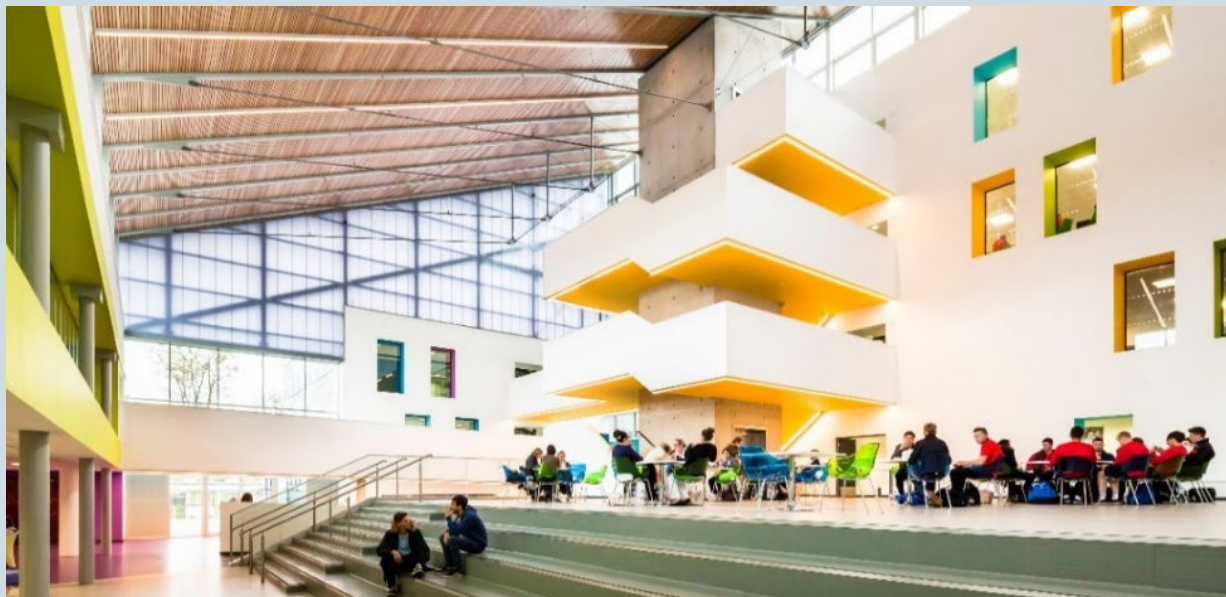
Functionality requires consideration of all users, or potential users, to accommodate future curriculum, including employer supported training, and to adapt to evolving teaching methods and platforms. Colleges have anticipatory public sector duties under the Equality Act. Partnerships or collaboration between providers may lead to shared use of some external spaces such as sports facilities or parking. Some parts of estates may be open for public or lettable use. Zoning areas, to allow some parts to be open and available while others are closed and secure, supports management, operation, maintenance, and long-term flexibility and sustainability of shared use.

Spaces - internal or external - that are considered poorly functioning may offer opportunities to make change and address wider issues or needs. Cost effective design solutions should be investigated to understand the potential of any under-utilised spaces.

North Hertfordshire College, Hitchin + Stevenage + Letchworth

A 10 year architectural estate strategy and masterplan was carried out across the college's three sites resulting in a combination of new build and refurbishment.

The Hitchin campus¹⁶ was revived through the refurbishment of three existing teaching blocks and creation of an internal "hub" space – formerly a poorly used external courtyard. The hub provides additional areas for learning and social interaction, and a point of orientation, linking existing buildings through rationalisation of circulation and improved accessibility. The roof bridging the courtyard sits on clerestory openable glazing bringing natural light and fresh air into the space and the rooms adjacent.



Roofing over a former external courtyard space provides an exciting heart to the campus, whilst improving horizontal and vertical circulation and supporting the surrounding blocks

Figure 10: North Hertfordshire College

¹⁶ Scott Brownrigg website <https://www.scottbrownrigg.com/company/news/north-hertfordshire-college-hitchin-centre-shortlisted-for-aj-retrofit-award/>

5.6 Healthy and Safe Environments

A safe and healthy estate setting is provided by a combination of factors:

- Feeling safe, secure and healthy e.g., welcoming site and building approaches, transparency and connection, connection and access between inside and outside, links to the natural environment, dining experience and access to fresh air and drinking water provision.
- Physical health and safety measures e.g., boundaries and gates, security measures and passive supervision, wayfinding and zones, barriers and edges, secured access to plant, hygiene and welfare provision, lighting, spaces and facilities that encourage movement and activity.
- Estate management e.g., fire and emergency provision, safeguarding, grounds maintenance and cleaning, site supervision and control at all hours.
- Safeguarding - considering the range of age groups and vulnerable users.

Safety and security should be considered in conjunction with the requirements that come with different types of use at different times of day or year, enrolled students, staff, and the wide range of potential visitors. Creating a feeling of a safe, secure, organised environment, as well as defining the specifics of boundaries, surveillance and access management, balanced with a welcoming, inclusive feel (see Section 5.7).

The location of any facilities that will be used by the public should be carefully considered, taking into account access, security, safeguarding, digital infrastructure, zoning of electrical and mechanical services and any parking provision.

Particular attention should be given to:

- Access control and arrival - to ensure visitors are welcomed into shared spaces, but cannot enter controlled spaces without permission.
- Security of the site - balancing appropriate site boundaries with permeability and a feeling of welcome - using a range of methods from surface changes, planting, fencing or the building line.
- Electronic measures, such as access systems and/or CCTV.
- Safety, health and wellbeing of anyone with special needs or disabilities.

Conde Nast College of Fashion and Design, London

The industry-focussed college¹⁷, offering degrees, online and short courses, is based in a refurbished Georgian townhouse complex in Soho. The environment needed to accommodate a multi-functional fashion and design school, practical and academic teaching and study spaces, and social spaces adaptable for both teaching and event hire.

The scheme needed to fit in with the Soho streetscape. It responds to the rhythm and materials of the historic Georgian terraces and provides a welcoming but secure entrance opening directly onto the pavement.

Despite the tight site, remodelling provided access to secure external areas on the ground floor, a roof terrace at first floor level where students can work, and a green roof.



Even a small outside space can provide really positive benefits from access to fresh air and sunlight as well as offering useful extra-curricular and social opportunities

Figure 11: Conde Nast College

¹⁷ Feilden Clegg Bradley Studios website <https://fcbstudios.com/work/view/Conde-Nast>

5.7 Inclusion: Equity and access

Access and inclusion must be integrated into the design of the grounds as well as buildings to support the inclusion of pupils with special educational needs (SEN) and disabilities into mainstream learning environments. Everyone should be able to access the whole curriculum and participate in the life of the education community. Everyone should also feel welcome and able to use the same routes, spaces and facilities as other users wherever possible. It is vital to also consider safe escape from the outset so that appropriate space or equipment can be built in.

Particular attention should be given in the grounds to:

- Potential physical or spatial barriers - in terms of arrival and approach, drop off and parking, level changes, travel distances and travel time, covered routes and seating.
- Legibility and easy orientation - an easily understood site layout and suitable use of colour, surface materials and textures, and good signage.
- Good quality acoustics and lighting - critical in teaching and learning spaces but also important in arrival and communal spaces.
- Easy access between indoors and outdoors and to the full range of outdoor facilities and learning opportunities.¹⁸

All teaching and learning spaces must support college users with SEN and/or disabilities and their assistants. Inclusion in the grounds is also supported by a range, and wide distribution, of easily accessible support spaces in the buildings across the estate such as:

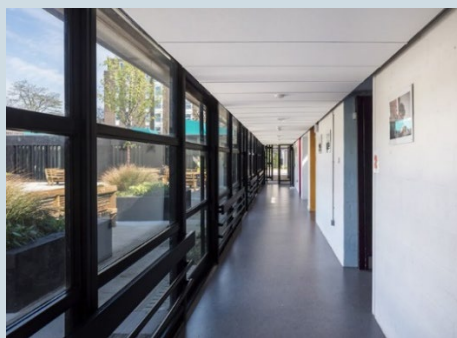
- Shared resource spaces - cafes, libraries, social space
- Staff workspace and resource bases
- Multi-purpose small group rooms, medical and therapy rooms
- Storage space for educational and mobility equipment
- Accessible toilets, changing places, and hygiene facilities for assisted use

¹⁸ Sport England Design Guidance www.sportengland.org

Alexandra Centre, Camden, London¹⁹

Part of Westminster Kingsway College, the centre provides learning support and short-stay accommodation for fifty 16-25 year olds with profound and multiple learning disabilities and autism, providing vocational learning to prepare students for semi-independent living. The college includes learning, recreation, training and support facilities. A grade II listed school was adapted and extended to meet a challenging range of needs in consultation with the original architect, the 20th Century Society and Historic England. A café at the entrance offers vocational training for students and an open door to the community whilst extensive glazing offers both natural light and safe separation for building users and guests.

Each student has an entirely personalised curriculum and the centre provides a range of therapies and health support. Designed in consultation with a wide and varied stakeholder group, the centre is seeking Passivhaus certification.



A fully inclusive education environment converted from a grade II listed school building in consultation with a wide range of stakeholders

Figure 12: Alexandra Centre

¹⁹ Haverstock Associates LLP website [Alexandra Centre - Haverstock](#)

5.8 Standardised Approach: Coordinated and capable of replication

Embracing Modern Methods of Construction (MMC) and promoting standardised and repeatable building elements encourages designs capable of replication on a number of scales from a whole or parts of an estate, to a kit of parts or individual components. Evidenced by research and pilot schemes, the DfE design guides and technical annexes have been developed to support standardised carbon-efficient future proofed design, space/area standards, and specifications. Modern Methods of Construction (MMC) can be employed to take advantage of delivering projects using a standardised approach and can offer further benefit in project procurement to minimise waste and improve quality and safety.

Opportunities for, and benefits of, standardisation could include:

- Improved quality standards of construction and standardised building form with known performance outputs.
- A well-considered, tested, and replicable design of components across the estate e.g., staircases, WC modules, kitchen areas, and a variety of room ‘clusters’ offering a standard based upon set room dimensions and fit out, doors, windows, modular/package M&E solutions etc.
- Consistency of look and feel across the estate.
- Consistent quality of finishes, fixtures, fittings and furniture.
- Improved airtightness and enhanced fabric first criteria.
- Energy reduction and on-site energy generation to support the climate change agenda and working toward achieving a net zero carbon position.
- Ease of operation, maintenance and replacement.

DfE GenZero²⁰

GenZero is a DfE led project to develop a new standard for secondary schools which delivers an ultra-low carbon outcome, designed as a digitally based construction system to support the best off-site manufacturing. Designs use a construction 'kit of parts', creating a 'platform' to build schools that meet the challenges of climate change.

The schools build will follow a systems-based design - a platform for buildings - manufactured in a factory setting. The spaces themselves are standardised and simple, with consistent construction materials. They are undefined by fixed furniture and fittings and allow for different curriculum models with little need for change, which reduces material waste and maximises flexibility.

Working with nature; the schools are designed for health, wellbeing and the environment. The landscape around the schools has been thoughtfully designed to provide protection against the elements with minimal disruption to the existing environment. Rain gardens are planted alongside buildings to make the most of run-off from heavy rainfall, and trees protect building facades as well as provide solar shading.

GenZero design objectives are proposed for a new build college pathfinder project.



GenZero schools are being developed by the DfE using 'platform' principles to deliver ultra-low carbon design solutions on a range of sites including a college pathfinder project

Figure 13: GenZero schools

²⁰ [GenZero - Designed with Nature](#)

5.9 Future Proofing: An agile estate

A sustainable estate needs to accommodate change. It must be flexible enough to respond to ongoing changes in education and operational use and user needs as well as climate change resilience. This applies estate wide - continually maintaining energy and resource efficiency; providing a range of internal and external spaces that can accommodate a variety of activities, and examining approaches to land use, transportation, traffic and parking.

Adaptability enables longer-term changes in response to fluctuations in student numbers, developments in the curriculum or course offers, and the implications of evolving ICT, as well as climate change. Standardisation of mechanical, electrical and digital infrastructure across a group of spaces can enable change of use without refurbishment. Providing a range of “high tech” spaces that can accommodate hairdressing or construction for example, “medium tech” spaces for classrooms and offices, and “low tech” spaces for ancillary use will enable re-purposing without remodelling.

The efficient use of buildings and estates can also support future proofing - making the most of what already exists and not building more than you need. This is particularly key in the context of a significant increased potential of remote and blended learning opportunities, which affects potential physical space and digital infrastructure requirements, as well as managing carbon targets.

An agile estate should enable day-to-day change of use, for example accommodating different curriculum subjects in a teaching space through movable furniture and portable ICT or supporting multi-purpose use of an outside space through provision of secure external storage. Integrated Technology and digital systems can also support agility and usage optimisation by:

- Monitoring and managing space usage through swipe card registration.
- Enabling courses to be taught and lessons recorded in multi-purpose rooms.
- Modelling the impact of timetabling change on people movement.

Barton Peveril Sixth Form College, Hampshire

Barton Peveril accommodates more than 3,000 full time students at its main campus.²¹ Since 2010 they have made a significant investment in teaching spaces, resulting in a 24% increase in student numbers.

The college wanted to match the standard of their social, study and dining spaces with the teaching spaces through renovation and expansion of the existing Student Centre. An existing fitness suite was converted into a vibrant café and social space creating an exciting and durable solution that improves efficiency and capacity and chimes with a modern student work ethic as well as increasing lettable opportunities across the campus.

Walking and cycling to site are encouraged by thoughtful and cost-effective interventions in the landscape that create a relaxed informal backdrop providing places for relaxation and events that support health and wellbeing.



A combination of refurbishment and extensions have successfully accommodated changes in the college's needs over time and are supported by a flexible landscape that provides a range of spaces

Figure 14: Barton Peveril College

²¹ Stride Treglown website <https://stridetreglown.com/projects/barton-peveril-college/>

5.10 Whole life: Re-use, re-purposing, material robustness

Retrofit or refurbishment solutions can deliver great efficiencies and value for money and are also the best starting point for embodied carbon reduction. The condition of existing buildings and grounds; their suitability to accommodate existing and planned learner numbers and meet the current and anticipated future curriculum needs; and the potential for refurbishment and retention; should be properly appraised first - before investigating any new build solutions. The college's condition data will identify the priority areas or systems that require improvement. As part of the development of the initial scope/feasibility, the retrofit and refurbishment hierarchy should consider value for money and identify resilient solutions that consider both the wider climate change issues and a net zero carbon outcome.

Embodied carbon is the total carbon generated to produce a built asset and includes emissions caused by extraction, manufacture and processing, transportation and assembly of every product and element in an asset. The value of embodied carbon should be determined at every stage of a project, and lower embodied carbon components or materials considered at each of these stages, to support an overall reduction in carbon. This approach starts from retention and repurposing of existing structures or elements, through to simply 'swapping out' materials with high value embodied carbon for those with a lower value. Addressing embodied carbon offers a one-time opportunity to make a significant saving in a shorter period of time, whereas operational carbon savings unfold over a longer period of time.²²

Employing a "passive first" approach will contribute to a simpler maintenance regime and minimise estate energy use. For example, the need for active powered security or safety measures could be minimised through designing in extended use, passive surveillance, or boundary treatments. Improving the finishes, fixtures and fittings of the external landscape, through suitable material and product selection, can significantly impact the experience of the overall environment for the users of the estate. This material and product selection should be partnered with robust, durable detailing through the design and construction of any new or refurbished estate elements or features.

²² UK GBC Optimising designs to minimise embodied carbon [Carbon.AKT - UKGBC - UK Green Building Council](#)

Lincolnshire Institute of Technology, Scunthorpe Campus

A collaborative project between the University of Lincoln and North Lindsey College²³ that involved the repurposing and restoration of the grade II civic centre to provide a new Institute of Technology specialising in engineering and digital technologies.²⁴

A dedicated campus in the town is intended to make education opportunities more accessible to the local community, raising aspirations, promoting social mobility and engaging employers.²⁵



The converted civic centre in Scunthorpe

Figure 15: Lincolnshire Institute of Technology

²³ North Lindsey College website <https://northlindsey.ac.uk/>

²⁴ Lincolnshire Institute of Technology news [Civic Centre in Scunthorpe to be transformed into new university campus - Grimsby Live \(grimsbytelegraph.co.uk\)](https://www.grimsbytelegraph.co.uk/news/2018/09/11/civic-centre-in-scunthorpe-to-be-transformed-into-new-university-campus/)

²⁵ Lincolnshire Institute of Technology website <https://www.lincoln.ac.uk/home/instituteoftechnology/>

6.0 The Feedback Loop

As well as testing and validating performance at project completion, particularly for acoustics, heating, ventilation and daylight, DfE Capital are committed to supporting Post Occupancy Evaluation - learning from, and gathering evidence from, education buildings and grounds in use. DfE standards used for evaluation fall into these three categories:

- 1) A healthy and resilient environment
- 2) At the right size
- 3) Safe, secure and long lasting

Clear findings of what works well, or not as well, across the education estate helps to focus the sector on the challenges of the future. The evidence gathered enables the right decisions to be taken on meeting and improving standards, re-focussing priorities, and targeting effective spend. Standards describe the desired outcomes, so it is vital to ensure that the standards are appropriate, through gathering evidence of performance in use at all scales - "from daylight to door handles".

Measuring outcomes and feedback

The metrics defined within the existing and evolving technical standards and explained in this document in Sections 4.0 and 5.0 provide a framework for evaluating a sustainable estate for use by both the DfE and colleges themselves, to inform future projects and drive continuous improvement.

Evaluation of all projects should be commenced after at least 12 months of use, and be ongoing years into use, to enable the original design criteria to be compared against the building and/or grounds in operation, to verify whether the anticipated outcomes were achieved and fine-tune them where possible. Scrutinising energy use, for example, will establish whether sites have been operating to their optimum performance for the evolving user needs and identify the requirements for any corrective action to improve longer-term performance. Findings should be shared to support the college leaders and estates teams to continually improve operation and plan for future projects.

Operational energy - regulated and unregulated

Net zero carbon requires a significant reduction of operational energy use across the estate considering building fabric, air permeability, engineering systems, management in operation etc. There is a need to address all energy used within the building in operation - recorded through the day-to-day operation (heating, lighting, power etc. i.e., regulated energy) and through calculation of predicted energy use through the variable use of the building (out of hours use, events, weekend opening, community use etc i.e., unregulated energy).

Data should be gathered to determine the total actual and anticipated energy use for the estate in operation. Proposals should significantly improve energy efficiencies, through installing higher energy efficient plant, equipment and systems. On-site generation through renewable technologies, such as photovoltaic arrays, may provide opportunities to balance/offset the energy used over the annualised period, and also promote and achieve a carbon neutral position in operation.

Of course, overall floor space has a significant impact on the carbon footprint, energy usage and running costs of any building so rationalising floor space in line with educational requirements will also assist.

The Manchester College, Wythenshawe Campus²⁶

A new campus of interrelated buildings set along a central boulevard. The Construction Skills facility and Visitor Centre demonstrates low carbon technologies and offers courses leading to trade qualifications.

Building Performance

Buildings utilise a fabric first approach with high thermal insulation standards along with strategies to harness natural energy sources.

The Construction Skills facility has a ground source heat pump whilst the saw-tooth roof to the Scaffolding Workshop is oriented to ensure good levels of north light; photovoltaic (PV) cells on the south facing areas harness the sun's energy and convert it to electricity. The double façade to the Sixth Form Centre provides two lines of thermal protection and utilises natural cross ventilation. A simple and robust palette of self-finished materials reduces maintenance requirements.



The new college campus creates a civic street frontage and protects external social spaces from road noise

Figure 16: The Manchester College

²⁶ Walker Simpson Architects website <http://www.walkersimpson.com/wythenshawe-campus>

7.0 Conclusion

At the foundation of the sustainable estate are the learners, the staff and the organisations who use, manage and maintain the estates, and the communities and the partnerships that they serve.

This Sustainable Estates Guidance should support colleges to make opportunities for education and training available to everyone throughout their lives, supporting colleges to deliver the ambition of the ‘Skills for Jobs’ white paper. These aspirations have to be delivered in the context of the UK’s legal commitments to achieve net zero carbon and biodiversity net gain and new universal government standards for planning and design. Evaluating the constraints and opportunities of an existing estate should always be a starting point. Taking a resilient circular economy approach must include the consideration of lifecycle, replacement and a reduction in both cost and carbon over the life of the building and grounds.²⁷

Every further education college is different but all need a physical estate that is fit for purpose and able to facilitate delivery of a wide range of specialist curricula to support the national skills agenda both now and into the future. Using the standards and guidance set out in this document for developing the college’s strategic plan should not only meet the expectations of the DfE but also provide an environment that reflects the college’s identity, ethos and culture and supports long term economic, environmental and social sustainability. Every investment in education buildings and grounds needs to be considered in the context of the strategy for the overall college estate, as well as the qualities of the individual asset, to determine the best value solution.

A sustainable estate must address the impact of climate change through well-considered design, holistic thinking and joined up long term planning.

²⁷ DfE Good Estate Management for Schools (GEMS) guidance <https://www.gov.uk/guidance/good-estate-management-for-schools>

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Figure 16: Walker Simpson Architects

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