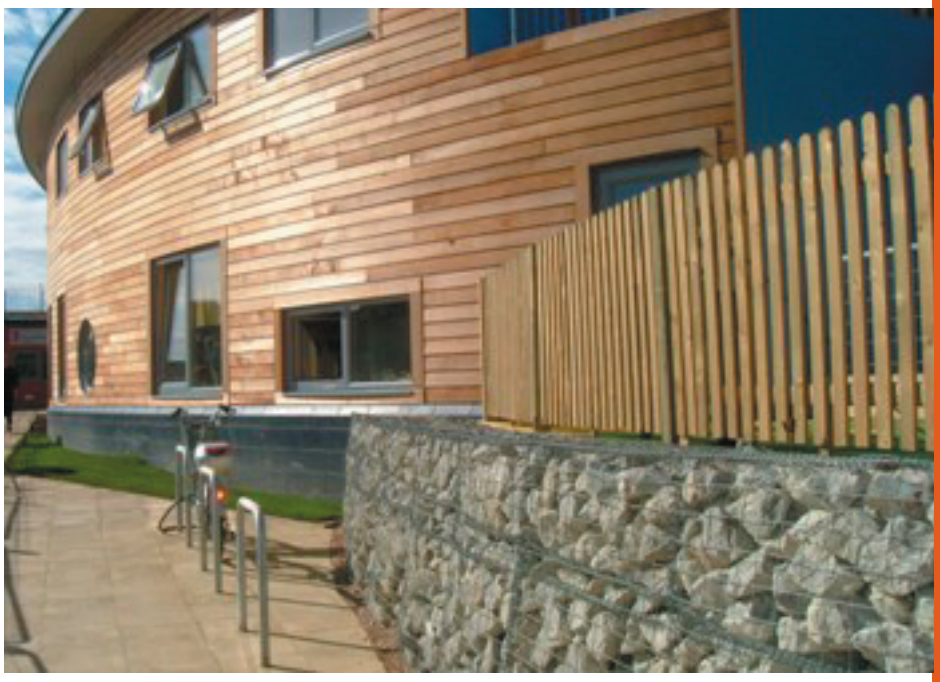
Corporate Sustainable Buildings Policy



Appendix 1
The Guidance Document

GUIDANCE - SECTION A

Appendix 1 The Guidance Document

Contents

Section A

Section B

Appendix 1 of the ESCC Sustainable Buildings Policy is split into two sections. Section A is principally aimed at ESCC appointed Designers, Consultants and Contractors. It indicates the design approaches which ESCC requires all building projects to consider throughout the design and construction stages.

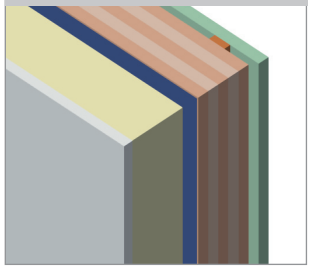
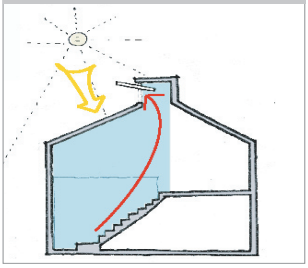
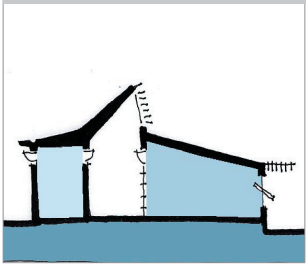
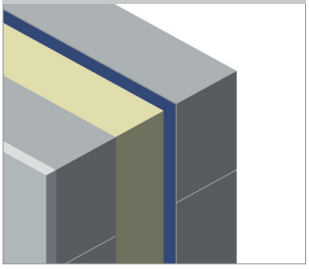
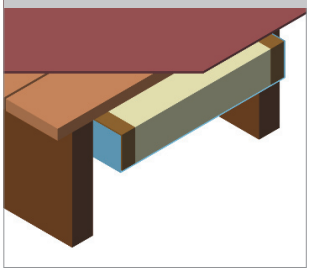
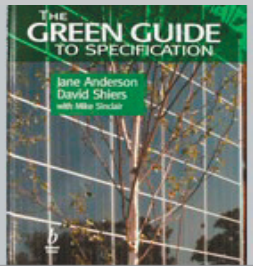
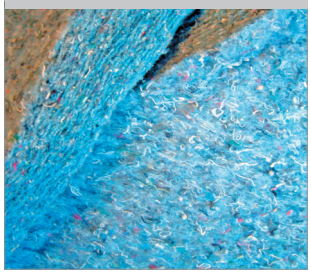
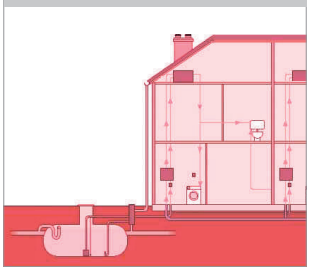
ESCC requires projects to document how they comply with or take into consideration these approaches throughout the project. This may be demonstrated in Stage D reports, planning statements, tender information and primarily through built examples.

Section B provides ESCC officers with a range of checklists to ensure proper monitoring and auditing of the various design options within a lifecycle approach.

GUIDANCE - SECTION A

Design Approachs

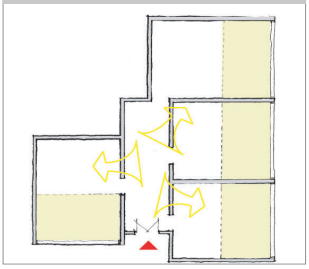
Adopt a context-sensitive “build it in” philosophy (passive design principles, infrastructure planning etc.) not a “one fits all” approach.
Adopt other techniques as appropriate (renewables, SUDS, rainwater harvesting etc.) following an overall approach that increases energy efficiency before looking at renewable and other “bolt-on” systems.

	1	2	3
adopt passive design principles	Thermal mass 	Ventilation 	Light 
identify infrastructure opportunities	CHP 	Waste 	Extended uses 
use materials with low embodied energy	Recycled material 	Concrete 	Timber and steel 
increase performance of building fabric	Green Guide 	Insulation 	Low VOCs 
minimise energy use and waste through environmental systems	Renewables 	Rainwater 	Metering/controls 

The checklist below shows the basic priority of issues that should be considered during the design approach of a specific building.

4

Orientation



1. Utilise thermal mass to moderate internal temperatures - expose concrete structures where used - specify cementitious board as an internal surface to lightweight structures
2. Maximise natural ventilation - avoid air conditioning, adopting a strategy to manually open windows - with maximum floor plate width of 13.5 m for cross ventilation.
3. Maximise natural light. Avoid internal rooms, use roof lights to penetrate deeper floor plans and integrate with natural ventilation stratagy.
4. Orientate buildings to maximise even north light and minimise excessive solar gain to habitable rooms, classrooms etc .
(orientate ancillary spaces, washrooms, corridors etc. to maximise solar gain and help manage temperatures with exposed thermal mass in these areas)

Transport

1. Identify opportunities to link facilities to communal heating and power supplies - this can massively reduce pay back periods for energy supply.
2. Use the Waste & Resources Action Programme (WRAP) Demolition Protocol to identify the opportunities for re-use of demolition materials in new designs and to maximise opportunities for reusing and recycling off-site.
3. Investigate the opportunities for community facilities to operate for a mulititude of uses to minimise construction of separate buildings and make best use of new buildings.
4. Consider site opportunities to increase access to local transport facilities. Install bike loops and shower facililties to encourage building users out of their cars. Design and integrate “Green Travel Plans” with all buildings.

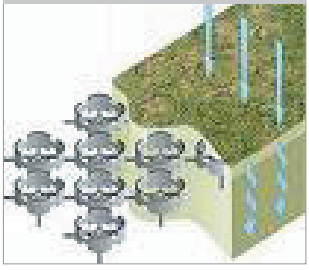
Local supply chain

1. Use the WRAP “Recycled Content Toolkit” to achieve a minimum of 10% recycled material content by value of buildings materials used AT NO ADDITIONAL COST TO CONTRACT.
2. Always specify 10% recycled concrete aggregate for concrete specifications and recycled blast furnace slag in external works applications AT NO ADDITIONAL COST TO CONTRACT.
3. Specify timber over steel where possible - consider glulam timber structures for larger spans. Where steel is unavoidable, specify standard section sizes and stamp with size and weight to enable reuse of material.
4. Use a local supply chain to minimise transport miles of materials and workers to construction sites and to help develop local economy.

Green roofs

1. Use the Green Guide to Specifcation to advise on all building specification.
All buildings should achieve as a minimum a “Good” standard under BREEAM for offices and schools and ECOHOMES for residential properties.
2. Increase insulation in line with BREEAM guidelines to greater requirements than those of Building Regulations
3. Use the Green Guide for Specifictaion to specify ‘A’ rated materials and materials with low VOCs and HFCs to all internal applications.
4. Where thermally massive structures are being used, consider green roofs to add insulation and reduce rainwater run-off to mains drainage.

SUDS



1. Reduce reliance on mains heat and power by adopting a renewable energy supply.
Link facilities together to maximise payback opportunities.
Avoid systems with low carbon emission reduction and long payback periods.
2. Consider the incorporation of rainwater harvesting systems. Consider pitch of roofs and location of storage tanks to maximise collection and minimise complexity of system.
3. Incorporate user friendly metering to enable tenants to monitor their energy usage.
Adopt a green tariff for all energy supplies. Incorporate Building Management Systems to allow building users and tenants simple, effective control of heating and power systems. Consider automatic window opening systems to gain maximum benefit from a sophisticated natural ventilation system.
4. Consider opportunities for site wide Sustainable Drainage Systems to minimise water run-off to mains drainage.

Cost Implications

The matrix below indicates an approximate relationship of cost neutral to cost positive design approaches. Generally the purpose of the arrow is to provide a visual reminder of the approach to follow and is indicative rather than prescriptive.
Where appropriate cost implications are available and specific figures are given in the notes they are taken from the BRE/Cyril Sweet publication 'Putting a Price on Sustainability' (2005), unless otherwise stated.

	1	2	3
adopt passive design principles	Thermal Mass 	Ventilation 	Light 
identify infrastructure opportunities	CHP 	Waste 	Extended Uses 
use materials with low embodied energy	Recycled Materials 	Concrete 	Timber and Steel 
increase performance of building fabric	Green Guide 	Insulation 	Low VOCs 
minimise energy use and waste through environmental systems	Renewables 	Rainwater 	Metering / Controls 

£ −

Cost negative

approach should provide a cost saving

£ +

Cost positive

approach has addtional cost implications

£ −/+

Cost positive or negative

specific project conditions will create a negative or positive cost implication

£ WHOLE LIFE COSTING

whole life cost approach required

Capex will be greater but whole life savings need to be considered

4

Orientation

1. The cost of using thermal mass will be free if a concrete structure or exposed concrete block walls are part of the specification. Avoid the use of suspended ceilings and the use of resources to cover unwanted exposed services. Integrated early design can resolve this conflict.
2. Manually opening windows add minimal cost and can implement a natural ventilation strategy if appropriate room sizes and design are integrated. Automatic opening systems cost money, as do air-conditioning systems which use more energy and create more CO_2. A BREEAM 'Very Good' rating for a naturally ventilated office costs between -0.4% saving and 2% . For an air-conditioned office, additional costs are between 0.1 and 5.7%.
3. More windows=more capital costs - fewer lights=lower running costs and less energy used.
4. Relates to issues above. Has to be weighed up against site layout costs and implications.

Transport

1. A site containing 350 individual residential units will require around £12000 per unit spent on solar hot water, photovoltaics, improved insulation etc to achieve the same carbon emissions reductions as one CHP plant at an additional cost of around £3500 per unit. The payback for the CHP approach is around 12 years (BRE Ely Bridge Report 2006).
2. The £65000 cost combines space set aside for recyclable waste and external bins - £1500 - and the cost of employing a procurement and waste champion to monitor site impacts, waste, energy and transport at £55,000 for the duration of the project.
3. Implications on additional capital costs weighed up against: fewer buildings ;shared infrastructure and reduced running costs.
4. Site location next to existing transport links FREE; £6100 = cost of 20 bike loops and providing travel information space in a public area of building (1 bike loop = £300).

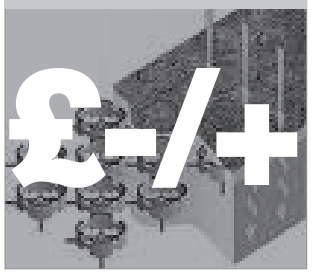
Local Supply Chain

1. Achieving a minimum 10 % use of recycled materials by value can be achieved by following the recommendations in the WRAP Quick Wins toolkit (WRAP 2007).
2. Always use 100% recycled aggregate in concrete specifications at NO ADDITIONAL COST.
3. Steel is often cheaper than Glulam - use higher percentages of recyled steel through quick wins toolkit; must weigh up against cost of decoration and future higher cost of energy pushing up steel prices combined with glulam prices continually falling.
4. A local supply chain can provide a cost saving and helps to promote local economic growth. Some cost implications are evident when appropriate skill base or product is not local. You could reconsider design specification to respond to local skills and products.

Green Roofs

1. Achieving a BREEAM V Good rating is calculated to add between 0.1% and 5.9% depending on building type and method of construction.
   Achieving a BREEAM Excellent rating is calculated to add between 0.6% and 7% depending on building type and method of construction.
2. Example to increase insulation on a 10000sqm Health Centre to acheive full BREEAM points = £7,954. see pound per sqm graphs on next page.
3. Insulation to be non HFC at NO ADDITIONAL COST - Low VOC products average 5% more expensive.
4. See /www.cityoflondon.gov.uk greenroofs guide.It gives an additional cost of £35 per sqm for an extensive roof, not including payback from the added insulation and energy reduction.

SUDS



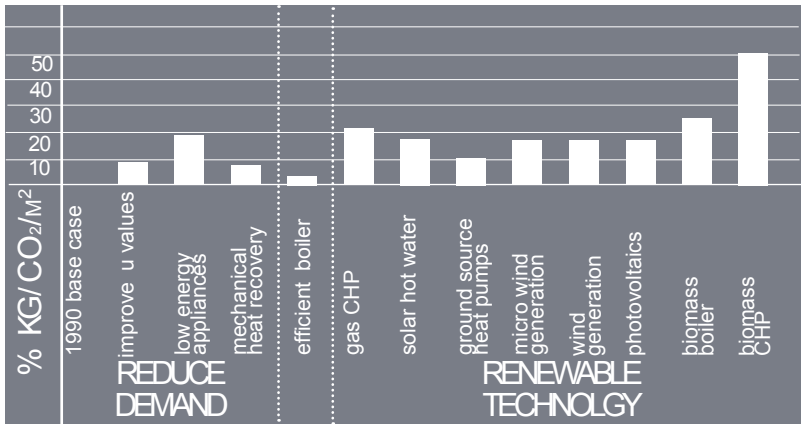
1. Cost of renewable systems, generic graphs for comparison and payback periods are shown on the next page. Avoid systems with low carbon emission reduction and long payback periods.
2. Example: install rainwater recycling on a 10000sqm Health Centre to achieve full BREEAM points = £22,176. This does not inculde cost of payback; see ESCC specific examples on next page.
3. Example: 500sqm two storey naturally ventilated office to acheive full BREEAM points - install sub meters for major plant and both floors £1,906, undertake seasonal commissioning £2,240, install mains water leak detection £462, install pulsed water meter £231, install daylight sensors to all luminaires £9,111.
4. Cost examples show a range between -2% and +2% between savings or additions ie. negligible difference when cost incorporates maintenance (see Atkins Girvan Report 2004).

GUIDANCE - SECTION A

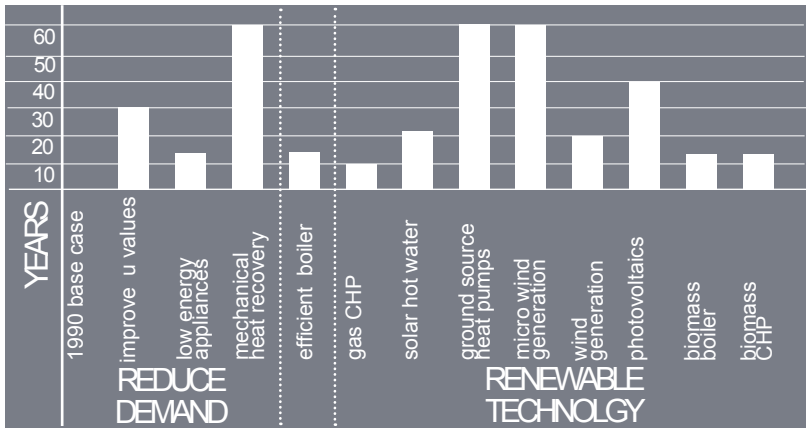
Reference Lifecycle Data for Energy and Cost Payback

Large Scale - The information in the graphs below contains the percentage of CO_2 reductions, the cost implications and 'years to pay back' of various design and energy approaches on a large generic mixed use development (20000-25000sqm) with average wind speed in the UK weather band for East Sussex.

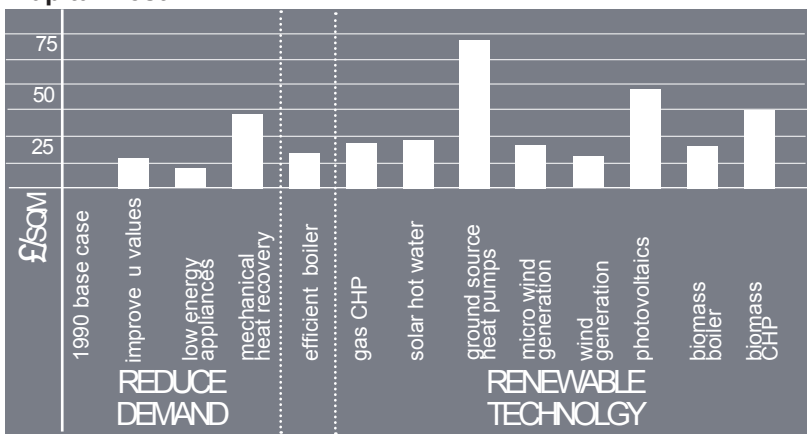
Percentage $C0_2$ reductions



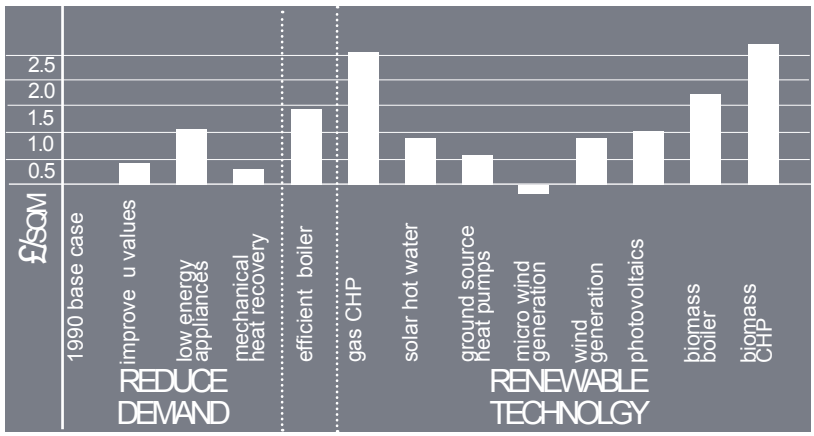
Years to payback



Capital Cost



Savings per Year



Notes

- The implications of any system are site and size specific.
- Combined heat and power is not cost effective at small scale.
- Micro wind can be cost effective at small scale and where there are greater than average wind speeds.
- Ground source heat pumps are more cost effective when integrated with the design of the building through foundation or landscape design and not treated as a "bolt-on" item as they were in this example.
- The information contained in the graphs relating to reducing demand will translate approximately through any size of project.

ESCC Officers' Toolkits and Checklists Section B

Generic building lifecycle approach

ESCC has identified as a first guiding principle a lifecycle approach to sustainable buildings. The Lifecycle Diagram on the next pages demonstrates the generic stages in a typical building lifecycle, namely:

- Prepare;
- Design;
- Construct;
- Use; and
- Re-use/Decommission.

Against each lifecycle stage, a number of questions have been identified that should be used as a checklist to ensure key measures have been considered at the relevant stage. The central core of the diagram summarises the ESCC processes that need to be engaged with at each stage of the lifecycle.

The four concentric rings summarise the Sustainable Design Standards (SDS) that ESCC have set for their four key priorities as follows:

Energy supply and use (including embodied energy) - dark grey;
Material specification – brown;
Transport – pale green/tan; and
Quality of internal environment – dark green.

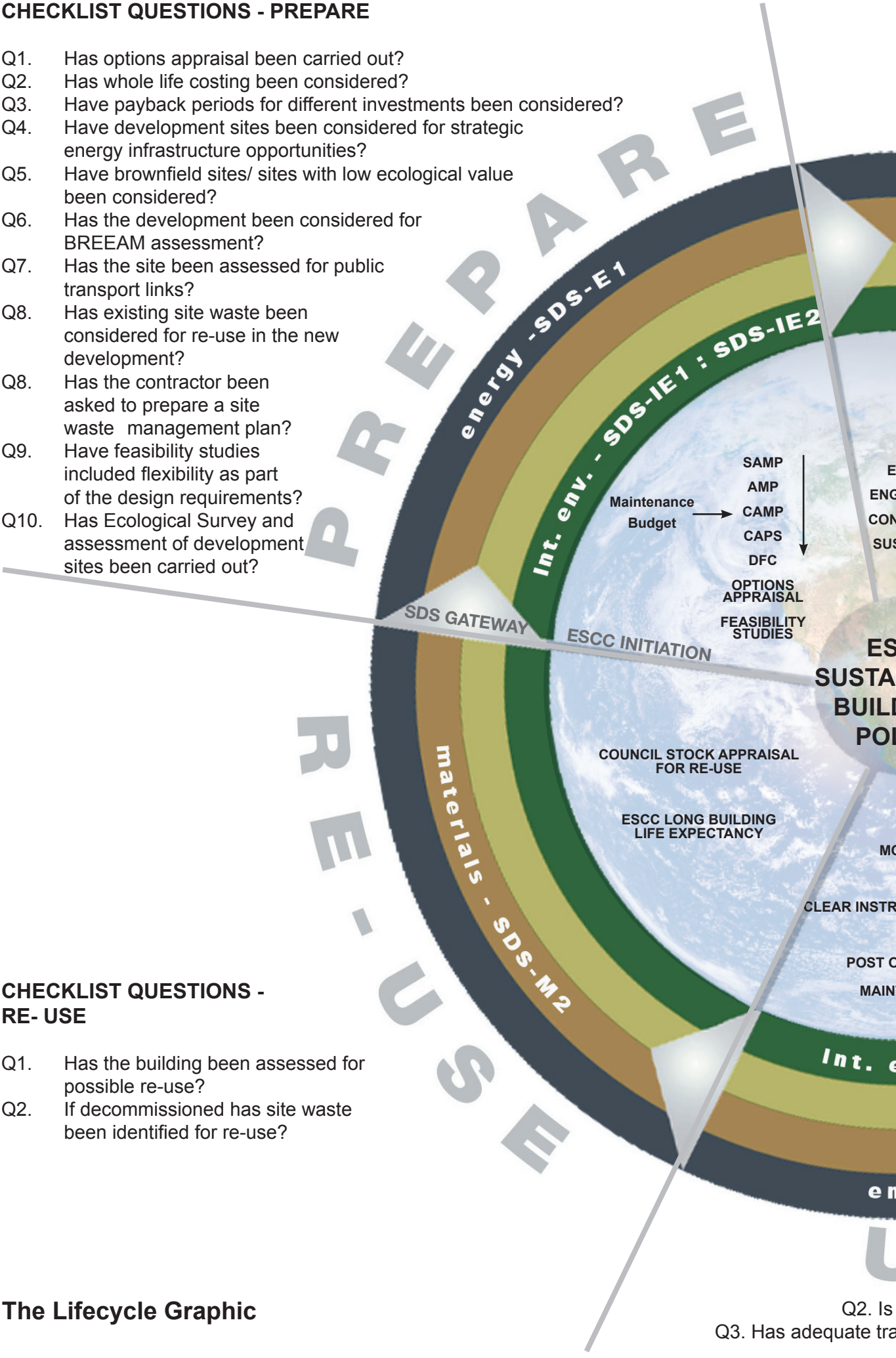
The reference numbers refer to SDSs which are defined and described in more detail in the SDS section of this document.

The spokes of the wheel illustrate the requirement to have a reporting mechanism in place for relevant SDSs at key lifecycle stages. This reporting mechanism is provided by the Lifecycle Checklist available to ESCC officers to ensure the appropriate requirements to achieve the current SDSs have been considered and integrated.

Further detail is added in table form through the Lifecycle Matrix and individual stages are provided with specific Officers' Lifecycle Checklists - see later in this section.

CHECKLIST QUESTIONS - PREPARE

Q1. Has options appraisal been carried out?
Q2. Has whole life costing been considered?
Q3. Have payback periods for different investments been considered?
Q4. Have development sites been considered for strategic energy infrastructure opportunities?
Q5. Have brownfield sites/ sites with low ecological value been considered?
Q6. Has the development been considered for BREEAM assessment?
Q7. Has the site been assessed for public transport links?
Q8. Has existing site waste been considered for re-use in the new development?
Q8. Has the contractor been asked to prepare a site waste management plan?
Q9. Have feasibility studies included flexibility as part of the design requirements?
Q10. Has Ecological Survey and assessment of development sites been carried out?



CHECKLIST QUESTIONS - RE- USE

Q1. Has the building been assessed for possible re-use?
Q2. If decommissioned has site waste been identified for re-use?

The Lifecycle Graphic

Q2. Is
Q3. Has adequate tra

CHECKLIST QUESTIONS - DESIGN

Q1.Has the design team responded to ESCC sustainable buildings policy?
Q2.Has a sustainability appraisal been requested as part of a planning submission design statement?
Q3.Have the Design Approaches suggested in ESCC sustainable buildings policy been considered?
Q4.Is the WRAP Quick Wins toolkit being used?
Q5. Have steps been taken to ensure long term enhancement of biodiversity?

CHECKLIST QUESTIONS - CONSTRUCT

Q1. Are consultants using the ESCC sustainable design brief?
Q2. Is WRAP Quick Wins toolkit being used?
Q3. Has contractor responded to request for site waste management plan?
Q4. Can a Procurement Champion be identified to monitor the involvement of a local supply chain?

CHECKLIST QUESTIONS - USE

Q1. Has the building been identified for post occupancy evaluation?
the energy consumption of the building being monitored through TEAM?
aining been given to users to enable them to monitor their own energy use?

GUIDANCE - SECTION B

GUIDANCE - SECTION B

Process Stage	PREPARE		DESIGN & PROCURE	
RIBA Stage(s)	A	B	C	D
Key Objective(s).	Prepare Vision & Brief. Develop Sustainability Strategy. Ensure Client & Stakeholder commitment. Define procurement route.	Define and review the options (high-level). Turn commitment into practical steps relating to both process and product. Define SDSs.	Assess the options, including outline building forms and costs (capital, revenue and lifecycle). Identify preferred option for Stage D development.	Integrate sustainability into preferred scheme design. Develop lifecycle cost plan. Sign off Stage D report. Submit for planning.
Practical steps to be considered	Hold workshop for key client & stakeholder representatives to develop common understanding of what sustainability means for this project or programme. Decide on aspirations (site visits can help) and translate into SDSs, e.g. Innovation, Best Practice or Good Practice aspirations require different approaches and imply different SDSs such as BREEAM Excellent, Very Good or Good as targets. Ensure procurement process for consultants and contractors matches the brief aspiration. Ensure operating and revenue budgets match the brief aspiration and include lifecycle costs & benefits.	Appoint team members at an early stage. Establish collaborative teamwork practices. Set targets, review process and audit points for key areas (NB refer to separate detailed list of aspects that may be relevant). Examples: - energy in use; - embodied energy; - user comfort; - air tightness; - %local materials; - %recycled materials; - %local labour; - habitat & species protected or enhanced; - design features to support ESD; - %site waste reduction; - lifecycle costs of key building elements; and - inclusive project & design process.	Make likely contribution to project SDSs a part of site selection criteria. Identify and utilise site's inherent advantages in outline design, plan and section forms e.g. - prevailing wind; - aspect; - biodiversity; - acoustic management; - natural light etc. Design services to be inherently efficient & controllable by building management staff. Design structure to be flexible, supporting changes in internal layout and future expansion. Apply high-level strategic lifecycle costing to key material and service decisions.	Review design proposals against project vision & SDSs. Key aspects include: - integrity of building fabric & material strategy; - efficiency of services & control systems to support operation e.g. utility sub-metering to support regular monitoring in use; - plans for commissioning & building handover; - outline content of building log book; - lifecycle costing sufficiently developed to allow material & energy strategies to be agreed; and - consultant & contractor input to e.g. education & inclusion objectives.
Defining & monitoring potential SDSs.	Relevant BREEAM rating (minimum requirements exist for some funding routes) e.g. 'Very Good' for BSF. Baseline survey of user comfort, productivity and attendance, educational outcomes (e.g. SATS performance) etc.	Relevant performance standards from e.g. Building Regulations and DfES Building Bulletins; define potential minimum standards e.g. on air flow, insulation values etc. Selected BREEAM target rating will include specific targets for many other aspects e.g. energy.	For each key sustainability aspect identified in the brief, ensure a SDS is in place with a qualitative or quantitative target that can be monitored and reviewed at key project stages from here on. Changes to the brief from this point on may require changes to SDSs as well.	A BREEAM assessment of the scheme as designed may be conducted at this stage. Any other SDSs should also be reviewed. It may be appropriate to consider how variations to SDSs will be managed e.g. via "bands" or "confidence limits".

		CONSTRUCT	USE	RE-USE / DE-COMMISSION
EF	GH	JKL	M (12 months) 12 months plus – no RIBA stage applicable	No RIBA stage applicable
Develop scheme and architectural details to support vision and sustainability strategy. Develop detailed life-cycle cost plan.	For traditional procurement, produce tender documentation & appoint contractor(s). For other routes, produce information & drawings required for construction.	Ensure construction practices follow design details to meet project vision and SDSs.	Ensure smooth project handover to client. Monitor and optimise building performance in use.	Develop & implement re-use and decommissioning strategy.
A comfortable internal environment that supports health & productivity is achieved by integrated consideration of heating, lighting, ventilation and acoustic management strategies. The consultant team should be charged with delivering this. Incentivising delivery of certain SDSs to support this may be appropriate. Suggested features that should be prioritised and retained for educational projects include: - appropriate ventilation; - optimising use of natural light; - minimum inherent energy demand; and - a “learning landscape” for schools.	The following steps may be relevant for any type of procurement but could happen at earlier stages for non-traditional routes: - ensure sustainability is integral to any advertisements or requests for expression of interest: - include key criteria in tender evaluation; and - hold early contractor/consortium briefing sessions to ensure you communicate your requirements before tender documents are drawn up & submitted.	Briefing in place for site visitors and sub-contractors so they understand sustainable site practices (combine with H&S briefing?). Ongoing review of construction practices to ensure they follow design details & agreed practices e.g. - air tightness - sourcing of materials - use of local labour - site waste minimisation - site pollution prevention - habitat & species protection etc. Commissioning tests witnessed & signed off. Log book developed as detailed design and construction has progressed.	Make consultant and contractor team clear on the service standard the client expects during the 12 month defect period. Ensure logbook is available on handover and is user-friendly, written with the user team in mind and, if possible, with their involvement. Use the log book as a “live” management tool to keep it up to date as a key reference source throughout the building’s lifetime. Ensure staff resources & training are in place early enough to manage handover of building systems & ongoing operation. The mix of energy efficient design & renewable technologies may require a change to job descriptions.	Anticipate options in Stages A to D e.g. simple materials are easier to re-use than composites, frame construction allows easy expansion, increasing insulation standards anticipates future legislation. Make this an integral part of the building logbook. Future asset managers will need to understand decisions made up to 30 to 60 years earlier to allow them to re-use & decommission sensitively. Consider labelling materials in-situ or via documentation to allow later re-use e.g. stamping specification details onto steel frame elements. Review market interest in materials well in advance of demolition to seize opportunities.
Keep project vision & SDSs clearly in mind during these stages. Their integrity can be easily lost during value engineering exercises. This is particularly important to deliver a comfortable teaching and learning environment.	Collaborative working is a vital component of delivering sustainable projects. Problems that arise have not always been encountered before on a regular basis and attitudes need to be flexible and constructive. Team performance should include this SDS.	There is much good advice available on environmental site management practice from e.g. Constructing Excellence, BSRIA, BRE, Environment Agency etc. This should be the responsibility of the Site Manager to monitor.	Implementing a school management system such as EMAS or ISO 14001 will provide a clear framework within which all SDSs can be monitored and reviewed on an ongoing basis. This could be established at the outset for existing buildings undergoing refurbishment.	Market conditions, understanding of potentially hazardous materials & options for re-use/recycling will change significantly over building lifetime. Options & SDSs should be flexible & kept under review. Embodied energy in manufacture & re-use will be key issues.

Checklist of key sustainability issues for Individual Projects by CABE stage and ESCC Project Management Toolkit

Stage: Prepare An idea → Project brief → Project Initiation Doc	**Date completed or Exception Report agreed**	**Signed**
1 Prepare Vision & Brief Define and review the options Has an Options Appraisal been carried out?		
2 Define Project SDSs Decide on project targets and aspirations and translate into SDSs in line with ESCC Policy e.g. Innovation, Best Practice or Good Practice aspirations require different approaches and imply different SDSs such as BREEAM Excellent, Very Good or Good as targets.		
3 Develop Sustainability Strategy 1 Has Whole Life Costing been assessed and payback periods considered?		
4 Develop Sustainability Strategy 2 Has the site been assessed for public transport links?		
5 Develop Sustainability Strategy 3 Has ecological survey and assessment of development sites been carried out and have brownfield sites with low ecological value been considered?		
6 Develop Sustainability Strategy 4 Has demolition waste been assessed for its use in the future project through the WRAP demolition protocol or a pre-demolition audit?		

Practical steps to consider at this stage

- Make likely contribution to project SDSs a part of site selection criteria.
- Ensure client & stakeholder commitment.
- Hold workshop for key client & stakeholder representatives to develop common understanding of what sustainability means for this project or programme.
- Ensure procurement process for consultants and contractors matches the brief aspiration.
- Ensure operating and revenue budgets match the brief aspiration and include lifecycle costs and benefits.
- Appoint team members at an early stage.
- Establish collaborative teamwork practices.
- Turn commitment into practical steps relating to both process and product.

Exception Reporting

Stage: Design & Procure Project Initiation Doc → Project Start → Manage & Monitor	**Date completed or Exception Report agreed**	**Signed**
1 Assess the options Have the site's inherent advantages been identified and utilised in developing an outline passive design approach, looking at the building plan and section?		
2 ESCC Sustainable Buildings Policy Ensure design team has identified a preferred option for scheme design which responds to the ESCC Sustainable Buildings Policy.		
3 ESCC Design Approaches Have the ESCC Design Approaches been integrated or considered as part of the scheme design?		
4 Develop lifecycle cost plan Apply high-level strategic lifecycle costing to key material and service decisions.		
5 Stage D report Request consultants to complete and submit a Stage D report (part of this document would also represent the sustainability statement to accompany the planning application).		
6 Planning Ensure that planning applications are submitted including a sustainability statement. Part L Target Carbon Emissions rate could be calculated and included in the Sustainability Statement.		
7 Develop Sustainability Strategy 5 Are consultants using the WRAP Quick wins toolkit to maximise the cost neutral advantages of increasing recycled content in material specification?		
8 Develop Sustainability Strategy 5 If BREEAM is not being sought, are consultants still aware of specific BREEAM design approaches to enable the best possible sustainable outcome to be developed within the project constraints?		

Practical steps to consider at this stage

- Design services to be inherently efficient and controllable by building management staff.
- Design structure to be flexible, supporting changes in internal layout and future expansion.
- Review design proposals against project vision and SDSs and suggested priorities that should be retained.
- The Stage D Report should include costing, Structural and Mechanical and Electrical Outliner Design and more importantly, state how the ESCC design approaches have been considered and integrated.

Exception Reporting

Stage: Construct Manage & Monitor → Project Closure	**Date completed or Exception Report agreed**	**Signed**
1 Audit ESCC SDSs against construction practices Ensure construction practices follow design details to meet project vision and SDSs.		
2 Waste 1 Is the WRAP quick Wins toolkit being used?		
3 Waste 2 Is demolition waste (identified in a pre-demolition audit or through the WRAP Demolition Protocol) being used in the construction process and is this being recorded?		
4 Construction and Biodiversity Have steps been taken to prevent long term adverse impacts on the local biodiversity?		
5 Procurement Champion Has a procurement champion been identified to monitor and improve the involvement of a local supply chain?		
6 Airtightness Have consultants and contractors undertaken a review of the construction details to specifically consider buildability to achieve airtightness.		
7 Buildings Users Guide Have the consultant and contractor produced a Building Users Guide to provide a straightforward summary of the O+M manuals and a lay person's guide to the use and operation of the systems within the building ie heating cooling, electrical systems, ventilation, audio visual etc.		

Practical steps to consider at this stage

- Briefing in place for site visitors and sub-contractors so they understand sustainable site practices (combine with H&S briefing?)
- Ongoing review of construction practices to ensure they follow design details and agreed practices, including:
  - air tightness
  - sourcing of materials
  - use of local labour
  - site waste minimisation
  - site pollution prevention
  - habitat & species protection etc.
- Commissioning tests witnessed & signed off.
- Log book developed as detailed design and construction has progressed.

Exception Reporting

Stage: Use Project Closure → Post Project review	**Date completed or Exception Report agreed**	**Signed**
1 Building Users Guide Ensure Building Users' Guide (available on handover to accompany O+M Manual) is user friendly, written with the user team in mind and, if possible, with their involvement. Ensure user trained by Consultant.		
2 Defects Period Ensure the consultant and contractor team have established a clear process with the client and understand the service standard the client expects during the 12 month defect period.		
3 Post Occupancy Evaluation Has the building been identified for Post Occupancy Evaluation?		
4 TEAM Is the energy consumption of the building being monitored through TEAM?		
5 Ongoing Monitoring Monitor and optimise building performance in use. Use the Buildings Users Guide as a "live" management tool. See below.		

Practical steps to consider at this stage

- Use the Buildings Users Guide as a "live" management tool to keep it up to date as a key reference source containing monitoring data and building performance, both statistical and anecdotal.
- Ensure staff resources and training are in place early enough to manage handover of building systems and ongoing operation. The mix of energy efficient design and renewable technologies may require a change to job descriptions.

Stage: Re-Use/Decommission Post Project review	Date completed or Exception Report agreed	Signed
1 Re-use and Decommissioning Develop & implement a re-use and decommissioning strategy		

Practical steps to consider at this stage

- Anticipate options in Stages A to D, e.g. simple materials are easier to re-use than composites, frame construction allows easy expansion, increasing insulation standards anticipates future legislation.
- Make this an integral part of the Building Users Guide. Future asset managers will need to understand decisions made up to 30 to 60 years earlier to allow them to re-use and decommission sensitively.
- Consider labelling materials in-situ or via documentation to allow later re-use, e.g. stamping specification details onto steel frame elements.
- Review market interest in materials well in advance of demolition to take advantage of opportunities.

Exception Reporting

No.	Exception Statement

Maintenance Checklist

Identify opportunities to reduce waste, re-use materials from other buildings and recycle the inevitable waste from replacing “worn out” building elements. Material specification and replacement of heat and power plant at the end of its design life present the greatest opportunities for implementing a significant reduction in energy use and therfore carbon emissions within maintenance contracts.

		Checklist Item	Not applicable to contract and consultant / contractor evidence given	Design Stage Inclusion	Construction Stage Inclusion
	1	Consider exposing thermal mass to aid cooling when maintaining or replacing suspended ceilings or internal linings.			
	2	Consider opportunities when replacing windows for adding opening lights to improve passive ventilation.			
	3	Consider automatic opening windows when renewing window systems to control ventilation and minimise heat loss, in turn minimising energy use .			
	4	Has the maintenance contactor been asked to provide a pre-demolition audit (or simple audit depending on size) to identify type and quantities of waste materials?			
	5	Have site specific opportunities for the re-use of demolition waste been considered and appropriate action taken?			
	6	Have demolition materials been advertised through BREMAP to identify new uses or has BREMAP been used to find the nearest possbile location for recycling or reprocessing?			
	7	Has the WRAP “Quickwins Toolkit” been used to achieve a minimum of 10% recycled content by value of buildings materials to maximise use of recycled material?			
	8	Has the Green Guide to Specification (ISBN 0-632-05961-3) been considered on all maintenance contracts and applied to all material specifications?(*see footnote 1)*			
	9	Can increased insulation be considered to improve the building fabric thermal performance? (*see footnote 2)*			

GUIDANCE - SECTION B

		Checklist Item	Not applicable to contract and consultant / contractor evidence given	Design Stage Inclusion	Construction Stage Inclusion
consider material choices	10	Has 100% recycled concrete aggregate been specified for concrete specifications or recycled blast furnace slag in external works maintenance applications? *(see footnote 2)*			
	11	Have finish materials with low Volatile Organic Compounds (VOCs) and low In Hydro Fluoro Carbons (HFCs) been specified? (*see footnote 2)*			
	12	Specify all replacement carpet tiles with recycled fibres and backing. Consider natural fibre carpets. Avoid using virgin PVC backed carpets. (*see footnote 2)*			
reduce water usage	13	Specify timber over steel and UPVC. Consider the embodied energy and future landfill implications for products that cannot be maintained, reused or recycled? *(see footnote 2)*			
	14	If drainage works or sanitary work underway, is there an opportunity to incorporate rainwater harvesting systems?			
through fit out	15	Have low flush toilets and taps been specified to replace existing standard fittings? (*see footnote 1)*			
reduce energy consumption through energy sources and electrical	16	Have standard electrical fittings and lighting been replaced with low energy equivalents?			
	17	Has consideration been given to low voltage circuits to plug in low voltage equipment: e.g. laptops, broadband, modem, CD, MD and telephone chargers? *(see footnote 1)*			
	18	Avoid the use of many transformers in order to lower voltage, as each one loses energy by generating heat (which is also undesirable in warm weather).			
	19	Avoid electric heating and other electric uses where other fuel sources are practical or possible alternatives.			
	20	Replace all expired heating and power systems with lower carbon emission alternatives. (*see footnote 3)*			

1. These items would be included within a BREEAM accredited approach.
2. These items would be included within a BREEAM accredited approach or when using the Green Guide to Specification.
3. ESCC's Biomass Fuel Strategy (2004) states that ESCC's first choice fuel for heating its buildings will be biomass, subject to the successful implementation of the trial site (Crowborough Beacon Community College) being confirmed.