MAX FORDHAM

	Sustainability Criteria	Minimum Standard	Best Practice	Innovative	Pioneering	Notes
Building and Operational Targets	**Proposed Building Regulations**	2010 Part L Regulation	PFI Paymech Target	2013 Part L Regulation	2016 'Zero Carbon'	Zero Carbon' not yet fully defined
	1 CO_2 emission - design target	20 $kgCO_2/m^2/yr$	15 $kgCO_2/m^2/yr$	10 $kgCO_2/m^2/yr$	0 $kgCO_2/m^2/yr$	Typical design stage modelled target
	2 CO_2 emission - actual operational	41 $kgCO_2/m^2/yr$	27 $kgCO_2/m^2/yr$	19 $kgCO_2/m^2/yr$	0 $kgCO_2/m^2/yr$	Typical in-use metered loads
	2 DEC rating	D-C rating	B rating	A rating	A+ rating	Target DEC used rather than EPC - highly user dependent
	3 Energy consumption					Approximate values. Analysis based on secondary school metered loads. Defined by A) The design Strategy; which is the base installed load and controls strategy defined by the design team, and B) The operation; which is under user control
	Heating & hot water load	38 $kWh/m^2/yr$	26 $kWh/m^2/yr$	17 $kWh/m^2/yr$	11 $kWh/m^2/yr$	
	Electrical base load	49 $kWh/m^2/yr$	33 $kWh/m^2/yr$	26 $kWh/m^2/yr$	13 $kWh/m^2/yr$	
	IT and small power	31 $kWh/m^2/yr$	27 $kWh/m^2/yr$	23 $kWh/m^2/yr$	14 $kWh/m^2/yr$	
	Catering load	10 $kWh/m^2/yr$	8 $kWh/m^2/yr$	6 $kWh/m^2/yr$	2 $kWh/m^2/yr$	Pioneering level: off-site cooking or provision of cold food only
	5 On site energy generation	Up to 20% (to comply with local planning)	30%	50%-100%	Min 100% or agreed off-site generation. Minimum 85% CO_2 reduction by electricity generation to meet 'zero carbon'	Highly site specific
	6 U-values (W/m^2K)					Difficult to pass 2010 Building Regs using minimum regulation values: 20%-30% improvement in U-values and airtightness typical
	Wall	0.35 (Part L 2010)	0.2	0.15	0.1	
	Average Window	2.2 (Part L 2010)	1.4	1.1	0.8	
	Roof	0.25 (Part L 2010)	0.15	0.12	0.1	
	Ground Floor	0.25 (Part L 2010)	0.15	0.12	0.1	
	7 Airtightness at 50 Pa	10 $m^3/h.m^2$ (Part L 2010)	5 $m^3/h.m^2$	2 $m^3/h.m^2$	1 $m^3/h.m^2$	
User and operational interaction	**8 Controls, metering and monitoring**	Seasonal Commissioning. Produce DEC, report to senior management	Commissioning company retained to monitor over first year. Full post occupancy evaluation. Action plan in place to respond to annual DEC	Responsibilities for reading, reviewing, actioning changes defined Active involvement by pupils. Anonymised external reporting of results or BREEAM in use assessment. Departmental energy targets in place	Continual monitoring, fine-tuning and feeding back. Formal external review. Results published to industry. Energy use reward/penalty system	Post occupancy evaluations of buildings have systematically shown that actual performance KPI's for example in energy and water consumption, are significantly greater than design predictions, often a result of poor commissioning, training & management. www.softlandings.org
	9 User involvement	Facilities Staff trained at building handover. Building Log Book provided with O&M Manual	Facilities staff involved in commissioning. Non-technical user guide produced plus all staff inducted. Energy use fed back to staff and pupils	Soft landing framework followed (see note) Energy use shown in reception on interactive display screen and online. Interactive online user guide. Building use part of curriculum	Departmental energy use feeds into personal carbon trading (eg. WSP's PACT scheme)	
Design considerations and strategies	**10 Summer thermal targets for energy reduction**	24°C with a swing not more than +/-4°C. Above 28°C for no more 80 hours. External temperature to suit geographic location	As standard practice. Encourage adaptive clothing, consider summer and winter school uniforms. Design building fabric to UKCIP 2020.	24°C with a swing not more than +/-4°C and above 28°C for no more than 120 hours. Design fabric to UKCIP 2050	Building design tested to UKCIP 2080	
	11 Thermal mass, ventilation and cooling	Natural ventilation where possible, otherwise mechanical ventilation	BMS control and night cooling. Heat recovery on all areas with mechanical ventilation	Exposed thermal mass or mech vent with heat recovery. Assisted natural ventilation for peak summer-time	Use of pre-cooled air for peak summer-time and increased levels of thermal mass or phase change materials	
	12 Server room cooling systems and sources	Cool server rooms to no less than 24°C	Heat recovery on server room cooling in winter. Ground source heat pump coupled cooling	Ground source free cooling		Ground source free cooling = directly coupled ground water cooling
	13 Daylighting	Maximise use of daylight	Narrow plan floorplate or rooflights to provide daylight. 80% floor area >2% average daylight and uniformity 0.4	Building form heavily influenced by daylight design. Provision of daylight designed to CIBSE Lighting Guide 108 Daylighting and window design to, BS8206 Part 2 and the BRE Site Layout Guide10	Daylighting drives building form. At least 80% of the floor area has an average daylight factor of 5% with uniformity 0.4 in multi-storey or 0.7 in single story.	
	14 Artificial Lighting and Controls	PIR detectors in WCs etc. Low energy fittings throughout	Luminance and presence on/off control throughout building	As best practice with daylight compensating dimming	As innovative with new lighting technologies, eg LEDs	Design to SLL Lighting Guide LG7
	15 IT Strategy	Users encouraged to switch off PCs when not in use	Kill switch for non essential peripherals. Servers ramp down under part load. Consider laptops throughout	Thin client system – lower power terminals with centralised computing. Servers running virtualisation software	Off-site internet-based cloud-computing systems	cloud-computing = software and resources provided by Internet on demand, like the electricity grid
Acoustic targets	**16 Acoustic targets**	Design to BB93 schools acoustic targets	Music rooms: airborne sound insulation 5dB higher and impact sound insulation 5dB lower than in BB93. BB93 ancillary space guidance performance standards met.	BREEAM Rain noise requirements on ceilings achieved.	Ventilation openings react to external noise conditions - controlled by BMS to balance with other constraints	

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Construction Materials	1 Embodied carbon in fabric	Embodied carbon not assessed. Preference stated for locally sourced materials	Structure engineered to minimise material mass. Cement replacements used, e.g. GGBFS in concrete heavy materials. Materials specified to be from local sources and provenance rigorously checked during construction	Detailed life cycle analysis of embodied carbon in structure including assessment sourcing and transportation energy. Results used for material selection. Structure engineered to work at 90% capacity [Wise]	Structure made from entirely low embodied energy materials, with known and mainly local provenance. Building serviceability regulations challenged [Wise]. Carbon Profiling technique utilised and used to inform building design and material selection [Sturgis]	Highly building specific and metrics not sufficiently standardised to allow benchmarks to be used as meaningful targets. Wise, June 2010, Building.co.uk, "What if everything we did is wrong" 2010, Sturgis Associates, "Redefining Zero".
	2 Building and materials re-use	Preference for standard sizes of elements such as steel beams/columns or precast units	Future flexibility of building considered. High grade materials designed for recyclability. e.g. Using lime mortar. Different material layers made identifiable or visible	Flexibility of future use demonstrated by typical conversion example designs. Avoid composite materials. Consider fastenings for easy dismantling	Flexibility and future use drives design. Label & log or e-tag main elements	
	3 Recycled and reclaimed Content	15% recycled content likely as standard.	30% recycled content	45% recycled content	60% recycled content	Only applies to relevant materials
	4 Material Toxicity	Avoidance of high VOC content paints, sealants etc and all ozone depleting materials including insulation	PVC cabling exchanged for LSF. Non petro-chemical based insulation materials. All 'C' rated materials avoided	'B' and 'C' grade materials avoided. VOC-free paints and timber. Natural materials where possible. Eliminate PVC	Use only natural materials where products exist. 80% of materials 'A' or 'A+' rated	Ratings refer to BRE Green Guide
Climate Change Adaptation	5 Climate change adaptation	No considerations beyond those embodied in regulatory compliance	Potential impacts reviewed with client, strategic principles discussed and reported concerning key risks	Design is influenced by climate change adaptation implications	Design approach driven by climate change adaptation implications	See TSB report 'Design For Future Climate', 2010, & UKCIP for further guidance
Landscape & Biodiversity	6 Landscape and biodiversity	Local planning requirements met. Mitigate against negative biodiversity impacts where feasible	Consult an ecologist on biodiversity enhancement, giving preference to local species. Integrated landscape and water strategy with landscape management plan provided	Attach equal weighting to biodiversity as for water, M & E and people, in overarching Green Infrastructure strategy. Landscape works in harmony with design and climate including deciduous planting to reduce summer urban heat island and internal solar gain where appropriate	Biodiversity enhancement key driver in Green Infrastructure Strategy. Landscape significantly influences building design.	Biodiversity is the variety of species within an ecosystem, used as a measure of the health of biological systems.
Water	7 Mains water consumption	3 - 4.4 m^3/pupil/yr	1.5 - 3.0m^3/pupil/yr	0.5 - 1.5 m^3/pupil/yr	< 0.5 m^3/pupil/yr	
	8 Drainage systems	Carry out Flood Risk Assessment No increase in stormwater run-off.	Thorough site hydrological characterisation, design responds to environment, including SUDS where appropriate. Rainwater harvesting for WCs and irrigation.	Drainage system fully integrated into the environment. Consider reedbed treatment for irrigation.	Closed loop water system. Waste-to-Energy plant or alternatives to water base foul drainage	Highly site specific
Waste	9 Construction waste minimisation	Contractor to produce Site Waste Management Plan (SWMP) to identify waste streams and areas for segregation on site or post collection.	Establish waste streams during design, set key KPI's early on. Waste reviews on design team meeting agendas. Divert 75% by weight of non hazardous project waste from landfill.	Implement Modern Methods of Construction throughout design. Account for site conditions impacting waste. Materials logistics plan.	Achieve zero net waste for project.	see WRAP for guidance on SWMP's and waste minimisation strategies
	10 Operational waste recycling	Adequate space for storing recyclable waste.	Managed recycling processes involving space for separating and collecting recyclables. Encourage occupants to recycle.	Provide incentives for recycling. On site composting for biodegradable waste.	Waste stream feeds on or off-site anaerobic digestion for biogas production.	
Transport Issues	11 Transport	Some covered cycle storage.	Full cycling support provisions as part of travel plan. Utilise video conferencing. Access considered in site selection.	Fully site specific travel plan covering site infrastructure and awareness raising. Electric vehicle charging points. Utilise virtual video conferencing.	Accessibility drives site selection. Feed transport into personal carbon trading scheme.	Adequate provision of storage lockers for change of clothes, helmet etc, can require a significant amount of internal space
Management	12 Stakeholder involvement and design process	Use of industry Standards. Standard client briefing.	Early consultation with stakeholders with the declared intention that this may affect design proposals. Stakeholders fully understand standards and design	Open design process with published response to stakeholder proposals. Design strategy tested with stakeholders. New boundaries set	Feed back results into industry standards	
	13 Construction site management	Main contractor has CCS or alternative certification. Energy use in construction metered	Main contractor has 32 pts under CCS or an alternative certification. Main contractor operates EMS including monitoring and setting targets for energy use	Main contractor has CCS score 36 or more. Energy and water use targets are met and results published	A significant proportion of construction energy is generated on site with temporary renewables.	
	14 Sustainable procurement of consumables	Sourcing of office supplies and cleaning products considered	Sustainable procurement of office supplies and cleaning products and food and monitoring of consumption.	Mostly paperless organisation. All consumables sustainably procured. Some food grown on site	Some organic food grown on site, with the rest seasonal, local.	
Productivity & Health	15 Healthy environments	Building has no or only a slight negative impact on productivity. Meet regulation for internal comfort including air quality.	No impact on productivity. Connection to outside. Air quality monitored.	Slightly positive impact on productivity. Psychological and social impacts assessed during design.	Building has noticeable positive impact on productivity. Strive to create a 'sense of place'.	Productivity a highly subjective measurement. See http://www.cibse.org/pdfs/8aratcliffe.pdf for further guidance