Construction Services

Building standards for mechanical and electrical installations

M&E Design Standards

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Directorate:- Environment
Construction Services

Building standards for mechanical and electrical installations

M&E Design Standards

Contents

1.0 Introduction
1.1 Purpose of document
1.2 Standards generally
1.3 Deviation from standards

2.0 Carbon emissions, sustainability and energy
2.1 Cornwall Council and carbon emissions
2.2 Sustainability
   Cornwall Council’s definition of sustainable construction
   Sustainability in building construction projects
2.3 BREEAM (Building Research Establishment Environmental Assessment Method)
2.4 Environmental strategies
   Environmental strategy for building construction services
   Environmental strategy for mechanical and electrical services
2.5 Energy use
   Energy targets
   Energy management
   Energy metering
2.6 Renewable energy and low carbon technologies
   Heating delivery systems
   Fuel for heating and hot water
   Biomass
   Mains gas, bottled gas, oil or electricity
2.7 Maintenance of building services installations
3.0 **Design and documentation standards for Mechanical and Electrical installations**

3.1 General requirements

Definitions
Scope of the Mechanical and Electrical Works
Mechanical works
Electrical works
Documentation and design responsibilities for design and build
Design, document and management responsibility
Employer’s responsibility as follows
Mechanical and electrical installations
Mechanical installation only
Electrical installation only

3.2 Standards - statutory instruments, regulations, guidance
Compliance with design and installation standards
Compliance of standards for materials and products

3.3 Mechanical and Electrical Design Criteria generally

3.4 Cornwall Council Standard M&E Building Service Documents

3.5 Drawing standards and definitions

3.6 Design Reviews and Technical Submissions (work in progress)

3.7 Mechanical & Electrical Services Documents (work in progress)

3.8 Calculations (work in progress)

3.9 Operations and maintenance (work in progress)

3.10 Quality Standards and Controls (work in progress)

3.11 Thermal Insulation (work in progress)

3.12 Testing, Commissioning and Handover (work in progress)

3.13 Building Management & Control Systems generally (work in progress)
1.0 Introduction

1.1 Purpose of document

The purpose of this document is to provide information regarding Cornwall Council’s common standards, policies and requirements for building services to external Framework Consultants, Lead Consultants/Designers, Mechanical and Electrical (M&E) Services Design Engineers, Design and Build Contractors, M&E Contractors, M&E sub-Contractors, Specialists and Suppliers.

This document does not seek to replace industry-standard design guidance or practice. It is intended to provide designers with the Council’s specific standards and requirements, which are to be used as the basis of all building construction.

Although this document describes particular building standards it is to be read in conjunction with all other supporting building works project specific requirements and documentation.

External Framework Consultants, Lead Consultants/Designers, M&E Services Design Engineers, Design and Build Contractors, M&E Contractors, M&E sub-Contractors, Specialists and Suppliers will be expected to comply with the following requirements when preparing any schemes for building construction works for all new build, extensions, refurbishment, maintenance and decommissioning works.

1.2 Standards generally

Modern construction methods offer a wide range of materials and methods to create solutions for buildings. The majority are suitable and work well to provide an appropriate environment for the lifespan of the project and their efficacy can only be judged on a project-by-project basis at the design reviews or during the approval process. However, the following are fundamental issues which should be addressed to ensure that the preferred solution offers compliance to the Council’s expectations.

- All works will be expected to meet the requirements of the Construction (Design and Management) Regulations 2007, as well as applicable Health and Safety legislation to execute the works on site.
- The installation of a compatible building energy management system, allowing connection to core monitoring will be required. The provision of information technology systems shall comply with the existing policies of the Council.
- The choice of materials for building designs, construction, maintenance, refurbishment and decommissioning works, are to be selected with particular reference to their ease of use, frequency of maintenance, ease of upgrading or renewal and their ability to offer future flexibility and adaptability.
• Production of appropriate drawings and documentation, identifying and measuring the works to be undertaken are essential to ensure that the Council’s representatives can clearly identify and consider all materials, components and services involved in the project before the works are undertaken.

• All materials shall comply with the relevant British and European Standards (BS/BS EN) where applicable and for materials not of UK manufacture, the relevant certificates of compliance will be required. Maximum use is to be made of re-used, re-useable, recycled and recyclable materials or renewable materials from sustainably managed sources in order that any environmental impact is kept to a minimum, with low carbon footprint materials used where practical.

• Building construction techniques, material selections, services installations and finishes shall all represent the need to offer good value for money, and offer a solution that provides minimal environmental impact, good life expectancy and low maintenance.

1.3 Deviation from standards

Should designers and/or providers of building construction, maintenance, refurbishment and decommissioning works find it necessary to incorporate alternative standards or requirements to those stated within the following document or any other Council building construction standards then approval shall be sought in writing from the Councils’ Strategy Planning and Standards Manager.

Designers and/or providers of building construction works will be required to justify and demonstrate, with written documentation, that the alternative proposals will provide equivalent or better performance, result in the same or improved whole life costing and be of equal or better value.

2.0 Carbon Emissions, Sustainability and Energy

2.1 Cornwall Council and carbon emissions

Cornwall Council has developed a carbon management action plan, Carbon Management Plan 2010 - 2016. In which, Cornwall Council’s Chief Executive, has stated that ‘Carbon emissions and their impact on the global climate are of importance to both Cornwall Council and the people of Cornwall. In geographic terms we are uniquely placed to be adversely affected by climate change but at the same time we are also well placed to lead on carbon reduction technologies and zero emission energy production. Part of the Council’s vision is to be “a low carbon organisation, self-sufficient in energy and working hard to safeguard the environment and the distinctiveness and heritage of Cornwall.” We want to lead by example and encourage innovation in tackling the global issue of carbon reduction. Our Carbon Management Plan not only looks at the direct impact of the Council’s activities but also how we can work in other ways to support carbon reduction by businesses and the people of Cornwall.’
The first stage in this process has been to reduce the Council’s emissions through improved energy efficiency. The Council has previously set a 20% reduction target from the 2009/10 baseline from its own operations by 2015 as part of the ‘Green Cornwall Programme’.

The aspirational targets set by Cornwall Councils Carbon Management Plan launched in September 2010 are a carbon reduction of 30% by 2016 and carbon neutral by 2025. By generating more energy than we use we will achieve our aspiration of becoming carbon neutral.

Cornwall Council is committed to a more sustainable future, achieving significant reduction in energy consumption and CO₂ emissions. Therefore, the design of building services installations will be expected to incorporate best practice and all affordable and relevant technical applications to minimise the environmental impact and energy consumption of Cornwall Councils building and maintenance works.

2.2 Sustainability

The terms ‘sustainability’ and ‘sustainable development’ are increasingly becoming part of our everyday language, but it can be difficult to explain exactly what they mean.

Cornwall Council definition of sustainable construction

The Council has a policy on sustainable construction, Cornwall Council - Sustainable building construction Policy, in which it defines sustainable construction as, “the design, construction, maintenance, refurbishment and decommissioning of buildings and associated infrastructure that is fit for purpose, resource efficient and will not compromise the health of the environment or the health of building occupants, builders, the general public or future generations.”

Sustainability in building construction projects

Projects shall demonstrate and adopt an integrated approach to the design, planning and specification of materials and systems and to building location and orientation. Embodied within this approach will be the need to demonstrate the use of techniques that develop energy and resource efficient buildings, bringing significant environmental improvements to the building user and to the local and national energy consumption. Preference must be given to those materials from sustainable and renewable sources, or materials that offer low embodied energy during their production and distribution. This may well mean that materials are sourced locally from certified supply chains, or use local employment to create the material or product. The use of micro generation of energy must be evaluated in order to offset the projects energy demand profile.

Sustainability of the project over its lifetime must also be considered. The client base use of the scheme, long term affordability and maintenance profile, potential income generation and the benefits to the community over
a longer period must be consider as essential elements of establishing the sustainable profile of the project.

2.3 BREEAM (Building Research Establishment Environmental Assessment Method)

BREEAM attempts to measure the environmental suitability of a proposal, measuring both the physical outcomes as well as the management and processing of the project and the organisation sponsoring the project. A BREEAM rating will be then be established for the project (pass/good/very good/excellent).

BREEAM is the benchmark assessment process required by the Department for Education (DfE) on education projects and by the Council on all non-education projects.

The DfE require that qualifying projects meet the very good or excellent rating. The Council will expect a very good rating as a minimum on all qualifying projects, but on new projects, or those which offer the opportunity of a comprehensive replacement or renewal of a facility, (rather than extension and adaptation) an excellent rating will be assumed to be the benchmark requirement.

For education projects, the assessment will apply to all projects in the primary sector in excess of £500,000 and in excess of £2m in the secondary sector. In addition, the assessment will be considered on projects where the phasing of work will result in a combined or aggregated value in excess of these figures.

2.4 Environmental strategies

Environmental strategy for building services

The impact of buildings on the environment during both the construction phase and throughout their operating life and decommissioning is recognised as being of importance.

The Council is committed to designers developing sustainable and economic solutions for the design and development of building services and engineered solutions that minimise the environmental impact of building services while at the same time providing the Council with functional and viable buildings that meet their requirements for performance and operating costs.

Cornwall Council’s key features of its environmental building strategy are described as follows: -

- A preference for providing ‘thermal mass’ with high levels of insulation, air-tightness, avoidance of thermal bridging, with a well managed daylight and ventilation strategy, limited to minimum requirement and supported by heat recovery, for new building construction works
• A thermally efficient building fabric will reduce heat loss in winter, minimise heat gain in summer this will result in reduction of installed plant capacities and running costs.
• Energy recovery shall be considered for all mechanical ventilation systems, with the exception of specialist ventilation systems.
• Mechanical extract ventilation will be provided to WCs, showers and kitchenettes.

This strategy together with the building usage, orientation, form, shading and wind patterns on buildings will significantly influence the type and capacity of heating plant.

**Environmental strategy for mechanical and electrical services**

Day to day building services operations can impact directly and indirectly on the environment. Designers shall endeavour to protect the environment through best practice and good management integrating consideration and decisions to adopt a greener alternative wherever possible.

The design of the building services engineering scheme shall focus on producing a functional, flexible and energy efficient building through the integration of architecture and engineering of structure, services and the building environment.

The building services design shall also provide:

• Robust and resilient service engineering systems.
• Good comfort conditions for the occupants.
• Installations that require low maintenance.
• Systems which have straightforward operational procedures.
• Systems that will be energy efficient and minimise carbon emissions.
• Primary plant and equipment selected to minimise energy use and carbon emissions.

2.5 Energy use

**Energy targets**

The Council is committed to establishing low or zero carbon building solutions which minimise energy usage at all levels. Allied to this aim, all new school building solutions will be zero carbon by 2016 in line with government requirements.

When preparing any proposals for new build, extensions, refurbishment, maintenance and decommissioning building works the Council requires that they shall be designed to reduce energy consumption and minimise carbon emissions. Although the building regulations in force at the time of the work will be considered to be the minimum acceptable standard for building energy performance, it is the Councils preference to set energy consumption targets for particular types of buildings as follows:-
<table>
<thead>
<tr>
<th></th>
<th>Heating</th>
<th>Electrical</th>
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</thead>
<tbody>
<tr>
<td>Children’s Centres</td>
<td>70</td>
<td>20</td>
</tr>
<tr>
<td>Council Offices</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>Day Centre</td>
<td>200</td>
<td>30</td>
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<tr>
<td>Fire Stations</td>
<td>160</td>
<td>30</td>
</tr>
<tr>
<td>Leisure Centres</td>
<td>180</td>
<td>60</td>
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<tr>
<td>Libraries</td>
<td>95</td>
<td>35</td>
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<tr>
<td>Nursery Schools</td>
<td>70</td>
<td>20</td>
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<td>Primary Schools</td>
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<td>Secondary schools</td>
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<tr>
<td>Special schools</td>
<td>70</td>
<td>20</td>
</tr>
<tr>
<td>Workshop</td>
<td>85</td>
<td>15</td>
</tr>
</tbody>
</table>

The table above is not exhaustive, targets for other types of buildings including kitchens, farms, public toilets, visitor centres etc should be agreed with the Council M&E Strategy Officers.

Lead consultants/designers and engineers shall provide a design in conjunction and consultation with all other relevant project designers supporting building works, project specific requirements and documentation to comply with the above requirements.

**Energy management**

All heating and hot water services shall be controlled through an on site building energy management system (BEMS), which will allow remote monitoring of all its functions by the Council. Only one manufacturer of a BEMS will be permitted for the whole site.

**Energy metering**

The energy and water services to new build (including extensions) and refurbished buildings will be adequately metered to allow the building and any contained processes to be independently monitored and evaluated.

To ensure a proper strategic approach and the correct technical advice energy management installations must be referred to the Mechanical Services Strategy Officer at an early stage.

A notification period of six weeks is required by the Council’s Utility Supply Officer of any new supplies or modifications to existing supplies.
Gas and electricity meters are required to be compatible with Automatic Meter Reading (AMR) logging equipment and remotely monitored via the Council’s data collection service.

Gas, heat and electricity meters are required to be remotely monitored via the Council’s central BEMS.

Energy consumption is to be metered in accordance with CIBSE TM39:2009

Water metering in buildings is of equal importance, due to both costs and environmental factors. The Council’s standard for metering water consumption can be found in the ‘Water Efficiency in Buildings’ strategy.

The objectives of the TM39 metering and sub-metering methodology are to enable the design of metering strategies and systems to meet the purposes described above, in that they:

1. Gather accurate and useful energy consumption data (kWh) about actual energy use
2. Determine where the energy is used (site, building, tenancy, activity area, etc.)
3. Provide this information, in a user-friendly format, to whoever needs it, in order to:
   a. manage buildings and improve operational efficiency
   b. isolate ‘separables’ and other items not typically included in energy benchmarks
   c. take account of renewable energy systems by measuring their performance
4. Document the metering strategy in the Building Log Book (see CIBSE TM31)
5. Allocate costs when ‘third parties’ are involved

2.6 Renewable energy systems and low carbon technologies

Cornwall Council is committed to developing and promoting a Low or Zero Carbon (LZC) environment through its provision of facilities and delivery of services. The installation of renewable energy (RE) systems and the use of LZC technologies will have a significant impact on the initial capital cost of a project. Designers shall consider and evaluate the cost effectiveness of such systems and, in conjunction with the design team /assessors as appropriate, incorporate specific technologies into the project. These costs shall be assessed and included in project budgets at an early stage to ensure that appropriate funding is secured.

RE systems shall be considered as an essential element of a mix of supplies to projects. The ability for some RE sources to provide ‘income’ through Renewable Heat Incentives (RHI) and Feed-in Tariffs (FIT) significantly reduces the ‘pay-back period’. Taking these payments into account, and the carbon reduction potential, the designers shall evaluate, at feasibility stage, the provision of RE systems prioritised as follows:
• biomass energy supplies
• solar thermal
• photovoltaic power generation
• wind power generators
• ground source heat pumps (ideally with on-site electricity generation)
• air source heat pumps (ideally with on-site RE electricity generation)
• ‘Corporately sourced’ green energy tariffs (gas/electric)

Heating delivery systems

The choice of heating system must be the subject of a careful option appraisal for each individual project, whether in new build, extension, major refurbishment or maintenance works and be sized to meet the needs of the facility providing appropriate comfort conditions laid down for the spatial activities. Future increase in capacity should also be considered.

Existing system may well be inadequate, inappropriate or inefficient for the purpose of the facility. Opportunities shall be explored to increase the efficiency and effectiveness of the existing heating system, as well as reducing the energy demand and CO₂ emissions of the property. If boiler replacement is necessary, then wood pellet biomass systems will be the default solution.

Fuel supplies for heating and hot water

Biomass

Following extensive review and option appraisal, the Council has a preferred energy source of wood pellet biomass for heating and hot water.

Wood pellet shall be used as the default fuel supply for new boiler installations in new build scenarios (including large extensions which require significant increase in plant) and for boiler replacement schemes in existing buildings.

The provision of wood pellet fired biomass boilers is seen as a significant contribution to the reduction of CO₂ emissions from council buildings in the future, as well as being a potential source of local industrial and commercial benefit. Wood pellets offer the most consistent quality of biomass supply, as well as flexibility of delivery systems and variety of storage options.

Mains gas, bottled gas, oil or electricity

The use of mains gas, bottled gas, oil or electricity for heating and hot water purposes shall only be considered following extensive option appraisal (with the possible exception of localised electricity for hot water). Additional boiler plant may be considered necessary to support peak demand with a biomass installation, in which case mains gas should be the first option.
2.7 Maintenance of building service installations

Minimisation of future maintenance costs by the use of quality materials is expected, together with a clear understanding of the environmental implications of the material choices.

The Council operates a planned preventative maintenance programme and requires straightforward maintainable system that will stand the test of time. Site managers of the Councils buildings are not expected to have specialist knowledge of M&E services, consequently all controls of M&E installations are required to be user friendly.

3.0 Design and documentation standards for mechanical and electrical installations

3.1 General requirements

Cornwall Council has a significant property portfolio, which may require new, refurbishment, maintenance or demolition works to be carried out to meet a variety of requirements for various types of end users.

This section of the document describes the employer’s particular requirements for the general design and documentation standards for mechanical and electrical services installations for any building construction works.

M&E consultants/designers are advised that any standards set by the client team are intended to assist the design process only and the adequacy and suitability of any information indicated there upon must be confirmed by the consultants. The entirety of the designs shall be progressed to all comply with all applicable statutory requirements.

Any Contractors carrying out any electrical installation work on behalf of Council shall belong to one or more of the following bodies:

- ECA Electrical Contractors' Association
- NAPIT National Association of Professional Inspectors and Testers
- NICEIC

This document shall be read in conjunction with the standard prelims, room data sheets and other supporting documentation provided by the Council.

Definitions

The definitions for words, and phrases associated with the design, manufacture and site works for the mechanical and electrical installations shall be those of the IEE Regulations, CIBSE (Chartered Institution for Building Services Engineers) and BSRIA (Building Services Research and Information Association) Guides, British Standards, Codes of Practice, associated Statutory Acts and mandatory authorities.
Other non-technical definitions follow:

- Contract Administrator (CA):
- The Project Manager or his/her appointed representative
- Mechanical and electrical lead consultant / designer / engineer:
- The designer for the mechanical and/or electrical services or the appointed representative
- Contract Preliminaries: This refers to the main contract preliminaries

**Scope of the Mechanical and Electrical Works**

The M&E consultants/designers works shall include for the design and specification and supervision of the supply, installation, testing, commissioning, proving, demonstration and setting to work of all items of equipment and materials required, including maintenance during the warranty period to complete the mechanical and electrical services installations required, ready for handing over to the client in working order, in accordance with the agreed programme, along with provision of records and operating and maintenance manuals and all supporting handover documentation for the new and modified engineering building services.

The M&E services designs and installations shall be fully coordinated in both spatial and programme terms, with all other elements that comprise the building as a whole, including structural and architectural works.

The entirety of the works shall be progressed to all comply with all applicable statutory requirements. Should the lead consultants/designers discover any such discrepancy and/or contradiction between the employer’s requirements and statutory related requirements they shall provide evidence and bring it to the attention of the Council’s Mechanical and/or Electrical Services Strategy Officers.

**Mechanical works**

The extent of the mechanical works may include but not be limited to:

- Metered gas and mains water utilities connections.
- Renewable energy/low carbon installations
- Domestic water systems installations
- Building heating and cooling
- Building ventilation installations
- Above ground drainage and condensate systems
- Building energy management systems including AMR
- Preparation of operating & maintenance manuals
- Testing, commissioning, demonstration and setting to work

**Electrical works**

The extent of the electrical works may include but not be limited to:
• Incoming mains electricity
• High voltage switchboards, distribution and transformers
• Main low voltage switchboard
• Low voltage distribution
• Sub mains distribution
• Earthing system, including circuit protective conductors and supplementary bonding
• Lightning protection system
• Cable containment systems
• Small power
• Lighting & emergency lighting
• Voice and data system
• Disabled WC alarm system
• Disabled refuge alarm system
• Audio visual systems & containment
• Audio systems for the impaired of hearing
• Fire detection and alarm system
• Security systems (intruder alarm, CCTV and access control)
• Preparation of operating & maintenance manuals
• Testing and commissioning

Documentation and design responsibilities for design and build

Where the contract is design and build the Contractor will be responsible for the Mechanical and Electrical building services design in its entirety. Where the contract differs, the above list shall be reviewed and agreed with the contract administrator.

Design, document and management responsibility

The following list identifies elements of design work and documentation that the M&E lead consultant/designer/ will be responsible for completing as part of the mechanical and electrical services installation

This schedule is not deemed comprehensive; as there may be other elements of design work specifically mentioned or implied within the particular contract requirements and associated room data sheets.

Employer’s responsibility as follows

• Employers requirements drawings
• Employers requirements standard requirements
• Room data sheets

The M&E consultant/designers are advised that any historic drawings provided by the client team are intended to communicate the design intent and the adequacy and suitability of any sizes indicated thereupon must be confirmed by the detailed design.
Mechanical and electrical installations

- M&E input to lead consultant room data sheets where specified in contract documentation
- Equipment data sheets
- Building regulations approvals including ADL2A
- BREEAM
- Fully evaluate and submit a detailed report on any alternative equipment proposed
- Fully re-evaluate and submit a detailed report on all parts of the Mechanical and electrical services works installations and building design affected by any alternative equipment proposed
- CDM hazard identification and risk assessments
- Safety method statements
- General method statements
- Detailed schematics including all calculations and sizing information
- Detailed design drawings
- Coordination drawings
- Installation drawings
- Manufacturer’s drawings
- Builders work information
- Builders work details
- Record drawings
- Spatial coordination
- Design of supports and access ways
- Design of guide & expansion systems
- Design/selection of fire stopping
- Building log book
- Building user manual

Mechanical installation only

- All HVAC design calculations
- Domestic water services
- Automatic controls
- HVAC system noise attenuation and anti vibration systems

Electrical installation only

- All electrical design calculations
- Cable calculations
- Lighting level calculations
- Emergency lighting level calculations
- Fire alarm calculations
- Earthing calculations
- All test certification
- Earthing system
- Cable calculations
- Fire alarm system
- Disabled WC alarm system
- Refuge alarm system
3.2 Standards - statutory instruments, regulations, guidance

Generally

All M&E building construction designs and installation(s) shall comply with all the relevant statutory instruments, regulations, guidance and all relevant British, European and International standards. All equipment and their accessories together with the workmanship for the installation of the specified systems etc., shall be carried out to the highest quality and comply with all the detailed requirements.

Certificates of compliance with British standards, BSI certification schemes and/or quality assurance schemes shall be provided to Cornwall Council if requested.

The equipment and/or installation(s) shall conform to the relevant British Standards and Codes of relevant at the time of installation, unless indicated otherwise.

Where a published standard or guide is appropriate to the specified product or method/quality of workmanship but not listed, it shall be deemed to be included.

M&E designs and installations shall also comply with the current edition of Cornwall Council’s standard documents for mechanical and electrical Works, published on the Councils website.

It is the responsibility of the lead consultant/designer to ensure that all relevant standards, current at the time completion of the design, are complied with.

The lead consultant/designer is required to adhere to the Council's preferred manufacturers for all mechanical and electrical equipment.

The M&E services shall be designed with due regard for future maintenance. This shall be incorporated into the design through sizing plant with due thought for replacement and inspection, and by the application of standardised components wherever possible.

The M&E lead consultant/designer will be required to comply with Cornwall Council’s standing orders. Guidance will be provided by the Council as necessary.

All M&E design/installation works must be undertaken by competent qualified registered persons.
Compliance with design and installation standards

Standards shall be the latest revisions and amendments, which apply at the time of installation, unless stated otherwise. The work shall also be in accordance with all additional publications, revisions and amendments, which apply at the time of the installation.

Standards shall include the requirement in particular and where applicable, but not be limited to the following:

- Asbestos Licensing Regulations 1998
- The Building Regulations.
- Relevant British Standards and European whether applicable in part or whole
- Relevant CIBSE and BISRIA requirements.
- The Control of Asbestos at Work Regulations 2002
- Construction (Head protection) Regulations 1989
- Construction (Health, Safety and Welfare) Regulations 1996
- The Construction (Design and Management) Regulations 1994
- Control of Lead at Work Regulations 2002
- Control of Substances Hazardous to Health Regulations 2002
- DCSF/DfE/PfS design guides/building bulletins
- Display Screen Equipment Regulations 1992
- The Electricity at Work Act 1989.
- Electrical Equipment (Safety) Regulations 1994
- GS23 Electrical Safety in Schools
- Gas safety (installation and use) regulations
- Local Fire Officer/Risk Manager's recommendations
- Local authority bye-laws, regulations and notices.
- L8 Approved Code of Practice - Legionella
- Personal Protective Equipment at Work Regulations 1992
- Pollution Prevention and Control Act 1999
- Reporting of Injuries, Disease and Dangerous Occurrences Regulations 1995 (RIDDOR)
- Waste Management Licensing Regulations 1994
- Work Equipment Regulations 1998
- Workplace (Health Safety and Welfare) Regulations 1992

The list of publications is indicative and not exhaustive.
Compliance of standards for materials and products

Materials specified to conform to British, European and international standards shall be clearly and indelibly marked with the reference specified, or accompanied by documentation to support this.

Materials specified as manufactured by a BSI kitemark licensee or where materials/services specified to be by registered firms (under BSI assessment schemes), the manufacturer/firm must be a current participant in the relevant scheme.

Materials or systems specified as certified by the British Board of Agreement (BBA), the materials or systems supplied shall be the subject of a current BBA certificate.

Materials/services specified to be by registered/approved firms (under approved quality assurance schemes), the manufacturer/firm must be a current participant in the relevant scheme.

Materials and fittings for domestic hot water and cold water systems shall be as listed in the Water Regulations Advisory Scheme (WRAS’s) administered by the Water Research Centre (WRc) ‘Water fittings and materials directory’ or, where not listed, shall comply with the requirements of the statutory water undertaking.

Gas fired equipment and appliances shall be certified and approved by the Gas Appliances Directive (2009/142/EC).

3.3 Mechanical and Electrical Design Criteria generally

The following design criteria are Cornwall Councils standards for Mechanical and Electrical building services installations and also relates to the environmental impact of new construction, refurbishment, maintenance and demolition works, for all building construction projects

The Council has a strong commitment to carbon emissions and their impact on the global climate as typified by the Corporate Strategy Carbon Management Plan 2010 - 2016 with the intention to reduce its carbon footprint and the implementation of the strategies to reduce environmental impacts. Amongst a variety of actions to being taken by the Council are further improvements in the performance of its properties, which includes the implementation of the following design criteria and standards.

In designing to achieve our targets both for environmental impact and ability to perform well in future changing conditions, it is imperative that the Mechanical and Electrical design processes take account of potential future conditions over the operational life of the Councils buildings.

Our buildings need to be able to cope with periods of heavier rainfall, drought, stronger winds, higher and lower temperatures, and operate in such a way to minimise environmental impact and provide internal safety and security.
environments conducive to efficient working. Achieving these goals requires teamwork between Clients, M&E consultants/designers and end users at an early stage to identify and discuss the Councils objectives as well as a co-ordinated the designs process to address issues from the very beginning.

The Council aspires to achieve excellent standards and objectives, but also recognises that it may be difficult to achieve these sometimes with budget restriction. It is expected that all designers/consultants and project teams will attempt to achieve these aspirational targets and move progressively towards these aspirations as improvements in experience, design processes and solutions develop in the market place. It is essential that we work together to ensure that the engineering services provide convenience, comfort and economy for the end user.

M&E consultants/designers will be expected to:

- Apply the following design criteria
- Evaluate techniques and undertake assessments to comply with the criteria, to achieve the desired outcomes most efficiently and where necessary, look for opportunities to ‘trade’ or ‘offset’ solutions for various building techniques
- Advise of any financial implications of design choices, with the expectation that a holistic design evaluation with whole life appraisal is undertaken
- Maintain records of processes and design solutions, evaluating their effectiveness and communicating results and produce evidence of compliance when requested by the Council
- Advise the Council if targets / criteria cannot be met and why and agree further actions required
- Offer advice and recommendations for improvements where the latest revision in legislation, regulations, best practise and techniques would affect the Councils standard requirements
- Unless otherwise requested, produce or be directly responsible for producing design solutions in full, including all design calculations, working and record drawings, and operating maintenance manuals.
- Be directly responsible for ensuring that all required certification is produced and functional testing and commissioning is completed.

It should be noted that there are areas where the Councils design criteria standards may overlap the requirements of BREEAM and it should be noted that the Council has an objective that new designs are to achieve at least ‘very good’ BREEAM rating.

The following is a list of design issues addressed as Council standards with each relevant documents providing associated standards for compliance to be achieved.

- Acoustics
- Air conditioning
- Air permeability
- Asbestos
• Automatic controls
• Boilers and boiler rooms
• Carbon emissions and energy usage
• Commercial kitchens and catering
• Construction site waste management
• Day-lighting and lighting
• Dust extraction systems
• Electrical services
• Fire alarms
• Fire fighting sprinkler installations
• Heating and heaters
• Heating controls
• Hot and cold water systems (domestic)
• IT, data services and small power
• Lifts and lifting equipment
• Lighting and lighting controls
• Lightning protection
• Material selection
• Metering
• Mounting Heights of mechanical and electrical services
• Offices
• Public address and voice evacuation
• Pumps
• Relative humidity
• Renewable energy and low carbon technology
• School design
• Solar gains and shading to avoid air-conditioning
• Temperatures
• Utilities and existing services
• Ventilation and alternatives to air-conditioning
• Water
• Water saving appliances

3.4 Cornwall Council’s Standard M&E Building Services Documents

Consultants/designers will be required to comply with the Council’s current Standing orders, standards policies and guidance documents regarding M&E designs and installations on the Council’s website.

Cornwall Council’s standard document relating to M&E service installation as follows:-

• Asbestos
• Asbestos management process chart
• Asbestos management process chart (schools)
• Air tightness
• Briefing notes (‘B’ notes, various)
• Briefing documents (various subjects)
• Building controls
• The building log book
• Construction notes (‘ C’ notes, various)
Consultants/designers are required to adhere to the Council's preferred manufacturers for all mechanical and electrical equipment.

3.5 Drawing standards and definitions

Drawings are one of the principal methods by which design information is conveyed between members of a project team, contractors, manufacturers and client. The Council’s has produced a standard document relating to drawing standards and definitions “Drawing standards and definitions”, for M&E service installation.

3.6 Design Reviews and Technical Submissions

(work in progress as a standard document for this topic)

3.7 M & E Services Documents

(work in progress)

3.8 Calculations

(work in progress)

3.9 Operations and maintenance

(work in progress to produce a standard document for this topic)

3.10 Quality Standards and Controls

(work in progress)

3.11 Thermal Insulation

(work in progress to produce a standard document for this topic)
3.12 Testing, Commissioning and Handover

(work in progress to produce a standard document for this topic)

3.13 Building Management & Control Systems generally

(work in progress)


Prepared by:

**Strategic Planning and Standards**

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Property Services

3rd April 2013

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