

6.0 The Highland Council Design Requirements

The Highland Council appreciates that there are various forms of legislation in place governing the design and installation of mechanical and electrical services, however, the council has created its own design conditions, requirements and policy documents detailing The Highland Council's specific requirements.

These are created to ensure that the council gets a degree of uniformity across all its buildings/properties which make the design, commissioning, servicing and maintenance of all mechanical and electrical systems simpler and more cost effective.

6.1 External Design Conditions

An external design temperature should allow for all but the most extreme conditions. Temperature variations throughout the Highlands over the last few winters have proved that current external design temperatures are less than adequate for the Highland climate, especially during extreme winter conditions the region is experiencing. A fundamental pre-requisite to system design is the selection of accurate local weather condition information.

Temperatures in the Highland Region show both seasonal and diurnal variation. January/February are the coldest months, with mean daily minimum temperatures varying from about 2°C on west-facing coasts and in the Western and Northern Isles, to less than -1°C over higher ground. Extreme minimum temperatures can occur in winter; examples include -27.2°C at Altnaharra. Conversely, occasionally to the lee of high ground temperatures can reach up to 15°C in winter.

The varying Highland climate sees mean annual temperatures over the region at low altitude varying from about 8.5°C close to the Moray Firth and about 7°C on Shetland, but over the higher ground temperatures are generally lower so that on Ben Nevis (1344 metres) the annual mean is just below 0°C. Elsewhere in the UK, mean annual temperatures reach over 11°C in Cornwall and the Channel Islands; this emphasises the need for accurate design conditions tailored to the highland climate.

In order to design M&E systems which perform effectively and efficiently during both the warm summer months and extreme cold winter months, which have been experienced in recent years, The Highland Council have created an [External Design Conditions](#) document which details the parameters in which all M&E systems must operate. These External Design Conditions break up the highland region into five zones; (1) Thurso, Wick, Landward Caithness, Sutherland & Edderton, Cromarty Firth and Tain & Easter Ross, (2) North, West & Central Sutherland and Wester Ross, Strathpeffer & Lochalsh, (3) Eilean a Cheo, Coal & Mallaig and Fort William, (4) Dingwall & Seaforth, Black Isle, Aird & Loch Ness, Inverness West, Inverness Central, Inverness Millburn and Inverness Ness-side and (5) Inverness South, Culloden & Ardeseir, Nairn and Badenoch & Strathspey, in order to provide accurate area specific design conditions to optimise the performance of the systems.

6.2 Highland Council Design Requirements

The Highland Council has developed a series of its own [Design Requirements](#) documents detailing the mechanical and electrical services it wishes to be installed within each building type.

These design requirements take into consideration the specific requirements of each building type along with the requirements of the Highland council as a building owner. The council's maintenance, electrical, mechanical and fire representatives have been consulted during the creation of these documents in order that all services are considered and included.

These documents form the basis of any M&E design and may therefore require systems to be designed over and above the guidelines/regulations discussed within section 5 of this specification.

6.3 Air Conditioning

Many buildings have air conditioning installed simply as it is seen as the quickest and/or easiest solution to cool a room or building. Mechanical ventilation and air conditioning are energy intensive processes and factors such as noise, pollution and excessive heat gains can prevent the use of a passive solution meaning

that designers need to consider the next best energy efficient means of providing ventilation. Energy consumption has risen significantly due to an often-unnecessary increase in the use of air conditioning in many buildings.

When a full air conditioning system is added to a design it can add up to 50 percent to the total running costs for the building and therefore, should be very carefully considered before being installed.

In order to combat this The Highland Council has issued an [Air Conditioning Policy](#), which clearly advises when & where it is acceptable to install an air conditioning system and when & where it's not. The aim of this policy is to minimise the use of air conditioning and subsequently the running and maintenance costs along with the energy consumption and carbon footprint of the council's building stock.

6.4 Sprinkler Systems

Systems in commercial and industrial premises (including offices, shops, hotels and places of public assembly) should be designed and installed in accordance with BS EN 12845 2004 – “Fixed fire fighting systems. Automatic sprinkler systems. Design, installation and maintenance” and BS 9251:2005 – “Sprinkler systems for residential and domestic occupancies. Code of practice.”

Sprinkler designers and installers will be certified by LPCB/BRE Certification Ltd or Bodycote Warrington

6.5 Energy Performance Certificates (EPC)

Scotland, as part of the United Kingdom along with all other EU member states has an obligation under the [Energy Performance of Buildings Directive \(EPBD\)](#) to promote improvement in the energy performance of new and existing buildings

An [Energy Performance Certificate \(EPC\)](#) is a document which states the energy efficiency of a building based on the standardised way that the building is used.

Energy Performance Certificates contain –

- Information on your home's energy use and carbon dioxide emissions
- A recommendation report with suggestions to reduce energy use and carbon dioxide emissions

There are 4 different types of EPC –

- Domestic New Build
- Existing Dwelling
- Commercial New Build
- Existing Commercial Building

The Highland Council has a legal responsibility to have a valid EPC for every building in its stock. A relevant draft EPC should therefore be included in the tender submission for all design projects; where the tender is for domestic housing an EPC should be submitted for each house type.

6.6 Simplified Building Energy Model (SBEM)

A Simplified Building Energy Model provides an analysis of a building's energy consumption; estimating the monthly energy use and carbon emissions. Allowing The Highland Council to assess and work towards reducing both the energy consumption and carbon footprint of its building stock. The Highland Council have an obligation to strive for an excellent outcome from SBEM calculations.

Every new commercial/industrial/retail building The Highland Council constructs after 7th April 2006 requires an SBEM calculation along with any new extensions to existing commercial buildings, where the total useful floor area is greater than 100m² and greater than 25% of the total useful floor area of the existing building.

An [SBEM](#) calculation including all supporting electronic files should be included (when relevant) within the tender submission for all design projects.

6.7 Option Appraisals

As options appraisal's become a more common tool in public management there is evidence that 'appraisal bias' is leading to pre-selected options and construction of particular outcomes by the selective use of evidence and narrow evaluation criteria. Yet, a rigorous and investigative approach can be very productive, directing attention to longer-term needs rather than short-term interests. It is therefore essential that any options appraisal carried out is comprehensive and rigorous.

When it comes to the M&E design within a council property a comprehensive and rigorous appraisal process is important to:

- Maximise the opportunities for design improvement and ensure the best use of technology
- Identify any adverse impacts and to design projects to eliminate adverse cost impact.
- Meet the council's requirements to identify the full range of costs and benefits and to obtain sustainable value for money.
- Adopt best practice procedures to meet policy and project requirements and standards.

The Highland Council expects an option's appraisal for fuel options and running costs to be carried out on every design project, ensuring the council gets the most cost effective and energy efficient design that will satisfy not only the council's requirements but also those of the tenant/employees who will occupy the building. In order to achieve this, the council has created a [Fuel Option & Running Costs Appraisal](#) spread sheet.

6.8 In-use Monitoring of Performance

Energy monitoring is an important feature in the running of buildings today. In order to determine whether the predicted performance figures, at design stage, are being achieved the Design Consultant will carry out [In-use Monitoring](#) throughout the 12month 'defects' period following handover. It is therefore important that any predicted running costs/figures for a design project are as accurate as possible.

Monitoring will be carried out using the BEMS system along with heat meters in larger properties or Testo Data Loggers (or equal and approved) in smaller properties.

Within the council's larger properties the BEMS system must be open protocol and capable of being accessed remotely; this allows the council's Energy & Sustainability Team to monitor the energy consumption of its larger properties from their office.

Heat meters installed within the larger plant rooms and biomass containers must be installed at a height and location which is easily accessible from ground floor level should the meters need to be manually read. Additionally, the heat meters and associated components should be clearly labelled to show which circuits they monitor.

6.9 Seasonal Commissioning

The practice of seasonal commissioning is an important aspect of the council's plan to *"Green our use of energy in buildings, setting targets for energy, carbon and cost reductions and undertaking an ambitious programme of energy saving measures in our top energy-consuming buildings."* As set out in the [Energy Management Performance Plan](#).

Seasonal commissioning involves –

- The testing of all building services under full load conditions i.e. heating equipment in the mid-winter, cooling/ventilation in the mid-summer and under part load conditions during Spring/Autumn.
- Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy.
- Interviews with building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of systems.
- Re-commissioning of systems (following any work needed to serve revised loads) and incorporating any revisions in operating procedures into the O & M manuals.

The Highland Council's [Seasonal Commissioning Policy](#) details this further.

All design projects will be subject to 12 months of seasonal commissioning following the completion of the project. This commissioning will be coordinated by the Design Consultant who will liaise with The Highland Council's Energy & Sustainability Team.