



Energy and Environmental Factors Report

A review on the energy impact and environmental factors around constructing the landmark lecture hall.

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On behalf of

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Introduction

This report discusses any environmental factors considered on the construction of the Landmark Lecture Halls, SA1. Energy and efficiency of the building is important for both the client and Empire construction and the aim is to compare and evaluate chosen methods of construction and materials to ensure the environmental impact of the completed building complies with current guidelines.

Below is a list of building regulations in place during the construction plan of the Landmark Lecture Hall for energy and environmental factors.

UK Building Regulations

- ~ Ventilation: Approved Document F
- ~ Sanitation, hot water safety and water efficiency: Approved Document G
- ~ Drainage and waste disposal: Approved Document H
- ~ Conservation of fuel and power: Approved Document L
- ~ Infrastructure for charging electric vehicles: Approved Document S

Additional Regulations (Non-dwellings in Wales)

- ~ The Building (Amendment) (Wales) (No. 2) Regulations 2022 – SI 2022 No. 993 (W. 210)
- ~ Welsh Government Circular (WGC 005/2022)
- ~ Flood and Water Management Act 2010: Schedule 3

(GOV, 2021)

In addition to current guidelines, future acts and changes to buildings regulations that might affect the construction of the project will be discussed. Resources, materials and construction methods of the project have all be considered against current regulations.

As requested by the clients brief, considerations for the project include sustainable materials, environmental landscaping and sustainable transport solutions such as rechargeable vehicle points have been assessed in this report.

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Compliance

In order to comply with all relevant Building Regulations this document will cover the current steps taken by both UWTSD and Empire Construction in addition to any further recommendations and requirements. Each section of this report will cover the minimum standards of compliance and any additional factors to consider during the design and construction phase.

Approved Document F

Approved Document F: Ventilation specifies on the guidance in place to regulate the ventilation of a structure in order to avoid issues with condensation build up once the building has been handed over. Volume 2 of Approved Document F covers non-dwelling buildings. Excessive condensation can lead to serious damage to a structure therefore the below considerations have been put forward in order to comply.

- 1.Design and install mechanical ventilation systems that meet the minimum requirements specified in the document. This includes ensuring that ventilation systems are properly sized, have appropriate airflow rates, and are installed in accordance with manufacturer guidelines.
- 2.Ensure that natural ventilation is provided in all habitable rooms, including study rooms, open areas, and lecture rooms. This can be achieved by natural forms of ventilation depending on the room use.
- 3.Control the sources of indoor pollution, such as cooking fumes to prevent them from accumulating in the indoor environment. Extraction systems, such as cooker hoods and extractor fans will be used to ensure that sources of pollution are properly ventilated.
4. Ventilation systems are to be properly maintained and operated to ensure they continue to function effectively over time. This includes regular cleaning of filters and ductwork, monitoring ventilation rates, and responding promptly to any faults or issues that arise.
- 5.Consult a Mechanical Engineer to ensure all minimum standards are met to comply.

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Approved Document G

The purpose of Approved Document G is to regulate the design, installation and use of sanitation, hot water and water efficiency of a building. Safety is important throughout this standard; the below considerations are suggested in order to comply.

1. Ensuring that there is adequate drainage, ventilation, and water supply, and that fixtures and fittings are of the appropriate standard.
2. Hot water systems are designed and installed to prevent potential risk of scalding to users. This can be achieved by installing thermostatic mixing valves (TMVs) or other devices that regulate the temperature of water.
3. Incorporating water efficiency measures into the design and installation of plumbing systems, such as by using low-flow fixtures and fittings, water-efficient appliances, and rainwater harvesting systems. These are to be assessed and discussed with the client based on brief.
4. Ensure that all plumbing systems are installed and maintained to prevent the risk of contamination or pollution of the water supply.
5. Consult with a plumbing specialist to ensure that the plumbing system design and installation comply with the requirements of the regulations and best practices in the field.

Approved Document H

Drainage and Waste Disposal is crucial in the design and build of the structure. Appropriately managing waste on site and on handover for user must comply with Approved Document H as a minimum standard. The below steps ensure full compliance for the project.

1. Ensuring that there is adequate capacity for the expected flow of wastewater, and that the gradient of the pipework is appropriate to ensure proper drainage.
2. All waste disposal systems, including toilets, sinks, and other fixtures, are connected to the drainage system in accordance with the requirements of the regulations. This includes ensuring that waste pipes are properly sized and connected, and that all fixtures and fittings are of the appropriate standard.
3. All components of the system are properly sealed and connected, and that backflow prevention devices are installed where necessary.

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4. Ensuring that all rainwater drainage systems, including gutters, downpipes, and soakaways, are designed and installed to meet the minimum requirements specified in the document. This includes ensuring that there is adequate capacity for the expected flow of rainwater, and that the system is designed to prevent flooding and water damage. Further guidance on this can be found under SuDs.

Approved Document L

The conservation of fuel and power are important factors when constructing. Compliance with Approved Document L is crucial to completing a sustainable and efficient structure. The consideration below have been put in place for this project.

1. Ensure that all walls, both internal and external, are designed and constructed to meet the minimum requirements specified in the document. This includes ensuring that the materials used are appropriate for the intended use, that the structure is stable and secure, and that any openings or penetrations are properly sealed and protected.
2. Fire-resistant materials are used where necessary, that fire-stopping measures are installed to prevent the spread of fire, and that fire doors and escape routes are properly designed and installed.
3. Ensuring that escape routes are properly designed and installed, that exit routes are clearly marked and free from obstruction, and that emergency lighting and alarms are provided where necessary.
4. All work is properly supervised and inspected, and that any defects or issues are identified and addressed immediately.
5. Use of BIM and enabling software such as Integrated Environmental Solutions (IES) can assist in locating and mitigating energy wastage from design stage. This software can directly compare the project to Part L of the Building Regulations and result in a pass or fail.

Approved Document S

Although Approved Document is not fully enforced in Wales, it lays good guidance and best practice for the implementation of facilities for electric vehicles. It is possible to receive funding and grants from the Government when installing VE charging points. Criteria for these grants can be found at The Workplace Charging Scheme (WCS).

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1. In order to upkeep with the potential demand of the project, Fast charging points will be installed in the car park. Fast charging points provide 7-22kW which is sufficient for business use.
2. Appropriate checks will be carried out to ensure the local grid has sufficient capabilities to supply the charge points.
3. All charging points will be maintained on an annual basis. This can monitor usage and assist in ensuring their life cycle worth on the project.
4. 1 in 5 bays will be a charge point for EV in order to comply with the Department for Transport and Office of Zero Emission Vehicle policy.

Sustainable Drainage Systems

The best way to implement Sustainable Drainage Systems (SuDS) into a commercial building will depend on a variety of factors, including the size and location of the building, the local climate and soil conditions, and the specific requirements of the local authorities. Based on the client brief and chosen design concept the below consideration has been implemented into the project.

1. Conduct a site assessment on the soil types, topography, and drainage patterns of the surrounding area. This will allow compile further data in order to proceed with specific SuDS systems.
2. Consider maintenance needs: It's important to consider the maintenance needs of different SuDS features. Some features, such as green roofs, may require regular maintenance to ensure they continue to function properly.
3. Obtain necessary approvals: Before implementing SuDS, it's important to obtain any necessary approvals from the local authorities.
4. Incorporate SuDS into the building design: SuDS features should be incorporated into the building design from the outset. This includes incorporating permeable pavement into the landscaped areas of the project.

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5. Monitor and maintain SuDS: Once SuDS features have been implemented, it's important to monitor their performance and maintain them as needed. Often with regular inspections, cleaning, and maintenance.

The Future Generations Act 2015

In order to create a more sustainable and efficient future, the Welsh Government introduced The Future Generations Act in 2015. The act outlines well-being goals to achieve this goal, all of which align with the construction industry. The goals are:

1. Properous Wales
2. Resiliant Wales
3. Healthier Wales
4. Equal Wales
5. Cohesive Communities
6. Vibrant Culture and Thriving Welsh Language
7. Globally Responsible Wales

Our objective to comply with this act is as follows.

The overall design will fully reflect the local community, with landscaping to create a more cohesive area.

Appropriate measures will take place to ensure the project provides high-quality ventilation and waste disposal with efficient fresh air supplies throughout.

The project will produce low embodied carbon and all carbon will be offset by sustainable resources.

The landscape will include varieties of biodiversity throughout.

Transparency with the public across the project.

Energy Usage

There are many ways to keep a commercial building as energy efficient as possible. Here are strategies used by Empire Construction for the Landmark Lecture Halls, SA1.

1. Conducting an energy audit: An energy audit can help identify areas where energy is being wasted and provide recommendations for improvement.

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2. Lighting: energy-efficient LED lighting can significantly reduce energy consumption.
3. Insulation: Poor insulation can lead to significant energy loss. High graded insulation in walls, roofs, and windows can help reduce heating and cooling costs.
4. Installing smart controls: Smart controls, such as occupancy sensors and programmable thermostats, can help reduce energy usage by automatically adjusting lighting and temperature settings.
5. HVAC systems: Upgrading HVAC systems to more energy-efficient models can also help reduce energy consumption.
6. Use renewable energy: Installing solar panels or other renewable energy systems can help offset energy consumption from the grid.
7. Encourage employee engagement: Encouraging employees to adopt energy-efficient behaviours, such as turning off lights and electronics when not in use, can help reduce energy consumption.
8. Monitor energy use: Regularly monitoring energy use can help identify areas where energy is being wasted and provide opportunities for improvement.

By adopting these strategies, you can help keep the building as energy efficient as possible, reducing energy costs and environmental impact. A sustainability engineer is recommended throughout the design phase to ensure compliance is sufficient in addition to extra factors requested by the client.

By producing drawings and annotations throughout the design stage, the information from this report can be used to demonstrate compliance with the current Building Regulations prior to construction start.

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