**University of Washington**

**Molecular Engineering Building: A Naturally Ventilated Office**

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**design goals**

The Molecular Engineering Building projects to prioritize the human occupant over the building itself. By forecasting the needs of the user in terms of design and operational sustainability, the building can provide a number of benefits. The project aims to minimize energy consumption and environmental impact by using natural ventilation, passive design strategies, and advanced design tools. The building will also be designed to achieve LEED Gold certification.

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**climate**

The climate in Seattle, Washington, presents unique challenges for the design of the Molecular Engineering Building. The climate is characterized by mild winters and cool summers, with frequent rain and the potential for strong winds. The building will be designed to take advantage of these climate conditions to optimize energy performance and occupant comfort.

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**site response**

An intuitive approach to the site was taken to develop a design that would be responsive to its surroundings. The building will be sited to minimize impact on the existing campus infrastructure while maximizing opportunities for green space. The design will also take into account the needs of the occupants, including access to natural light and views.

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**project team**

- **Design:** ZGF Architects LLP
- **Mechanical, Electrical, Fire Protection Engineers:** KPFF Consulting Engineers, Inc.
- **Civil Engineering:** Solars Architecture + Engineering, Inc.
- **Structural Engineering:** Affiliated Engineers, Inc.
- **Cost Estimating:** Davis Langdon

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**facade**

The facade of the building is designed to create a visually appealing and functional exterior. It will be composed of a combination of glass and insulated panels, providing a high level of energy efficiency and occupant comfort. The facade will also be designed to take advantage of natural light and ventilation, reducing the need for artificial lighting and HVAC systems.

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**daylight**

The building will be designed to maximize the use of natural light, reducing the need for artificial lighting and associated energy consumption. The use of glass and insulated panels will allow for an abundance of natural light to enter the building, creating a comfortable and inviting environment for occupants.

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**airflow pathway**

Natural ventilation will be an integral part of the building's design, allowing for the introduction of fresh air and the expulsion of hot and humid air. This will help to maintain comfortable indoor temperatures and reduce the need for air conditioning. The airflow pathway will be designed to ensure effective heat and moisture removal, as well as to minimize the impact of outdoor pollutants.

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**stack assist**

In cases where natural ventilation is insufficient, stack-assisted ventilation will be utilized to ensure adequate indoor air quality. This will be achieved through the use of mechanical systems that provide a consistent flow of air to the building, ensuring that occupants are provided with fresh and comfortable indoor air.

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**systems integration**

The building's systems will be designed to work in harmony, providing a seamless and comfortable environment for occupants. This will be achieved through the use of advanced control systems that optimize energy performance and occupant comfort.

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**lab/office interface**

The design of the Molecular Engineering Building will ensure a comfortable and productive environment for both laboratory and office users. The design will incorporate features that accommodate the specific needs of each space, while also providing a cohesive and inviting overall design.

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**results**

The Molecular Engineering Building is expected to achieve LEED Gold certification, demonstrating the project's commitment to sustainability and energy efficiency. The building will be designed to minimize energy consumption and environmental impact, providing a model for future sustainable building design.

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**energy modeling**

Energy modeling was used to predict the energy performance of the Molecular Engineering Building. The model predicted that the building will require 30% less energy than a comparable building under the same conditions. This prediction was based on factors such as the building's location, orientation, and design features, as well as the use of renewable energy sources.

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**financial analysis**

The financial analysis of the Molecular Engineering Building showed that the upfront costs of implementing sustainable design features are offset by long-term savings in energy and maintenance costs. The analysis predicted that the building will save $600,000 per year in energy costs, resulting in a payback period of 7 years. This analysis was conducted using the Life Cycle Costing (LCC) method, which considers the entire life cycle of the building, including construction, operation, and maintenance.

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