

PROJECT DESCRIPTION

Since the beginning of time, humanity has sought ways to improve our quality of life. In an architectural sense, the spaces where we frequent the most; where we live and work, have evolved from a space of pure necessity to a place of luxury.

In the present day, innovations in structural strength, forms, and artistic expressions are being made around the world in an effort to push the envelope. Humanity has overcome the challenge of creating survivable spaces, and now looks towards creating thriving and sustainable spaces for the benefit of our planet and our future. There's only one problem - these strategies are currently the most effective and efficient in WARM climates. Where does that leave the rest of the world in areas further from the equator? This design thesis explores sustainable materials and building strategies in cold climates with the intent to educate, inform and inspire people to invest in our environment and design for the future - regardless of where they are in the world.

Designed as an interactive learning tool, the Sustainable Design Learning Center (SDLC) in Duluth Minnesota is a community based facility focused on providing education on how to build more intelligently for the future of our planet. The building not only utilizes, but showcases the various strategies being used around the world today. The SDLC is designed to change and grow as innovations are made - this allows the facility to serve as an evolving teaching tool for regional schools, and design professionals for years to come.

SUSTAINABLE BY DESIGN

ENERGY + POWER

- ELECTROCHROMIC GLASS maintains optimal indoor lighting conditions and allows users to change the opacity.
- ROOM OCCUPANCY SENSORS allows the building to maintain energy efficient lighting, heating and cooling.
- The use of **DAYLIGHTING** brings sunlight into spaces without the use of fixtures.

HEATING + COOLING

- PASSIVE COOLING is accomplished through the use of operable windows.
- In winter months, **BIOMASS SPACE HEATING** is utilized by burning locally sourced
- A **GREEN ROOF** helps reduce energy use by cooling roofs and providing shading, thermal mass and insulation.

RESOURCE MANAGEMENT

- REFORESTATION EFFORTS include forest maintenance and planting trees to replace those removed during construction.
- A RAINWATER COLLECTION system located on the roof provides non-potable water for irrigation and plumbing.
- WATER EFFICIENCY is achieved through low-flow plumbing fixtures.

MATERIAL SELECTION

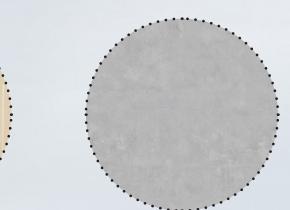
- LOCALLY SOURCED MATERIALS such as wood harvested and processed in Two Harbors, Minnesota reduces transportation costs.
- NO RED LIST MATERIALS OR CHEMICALS are used to improve the health of the building and its occupants.

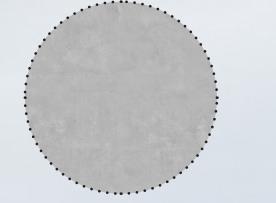




GREY BRICK









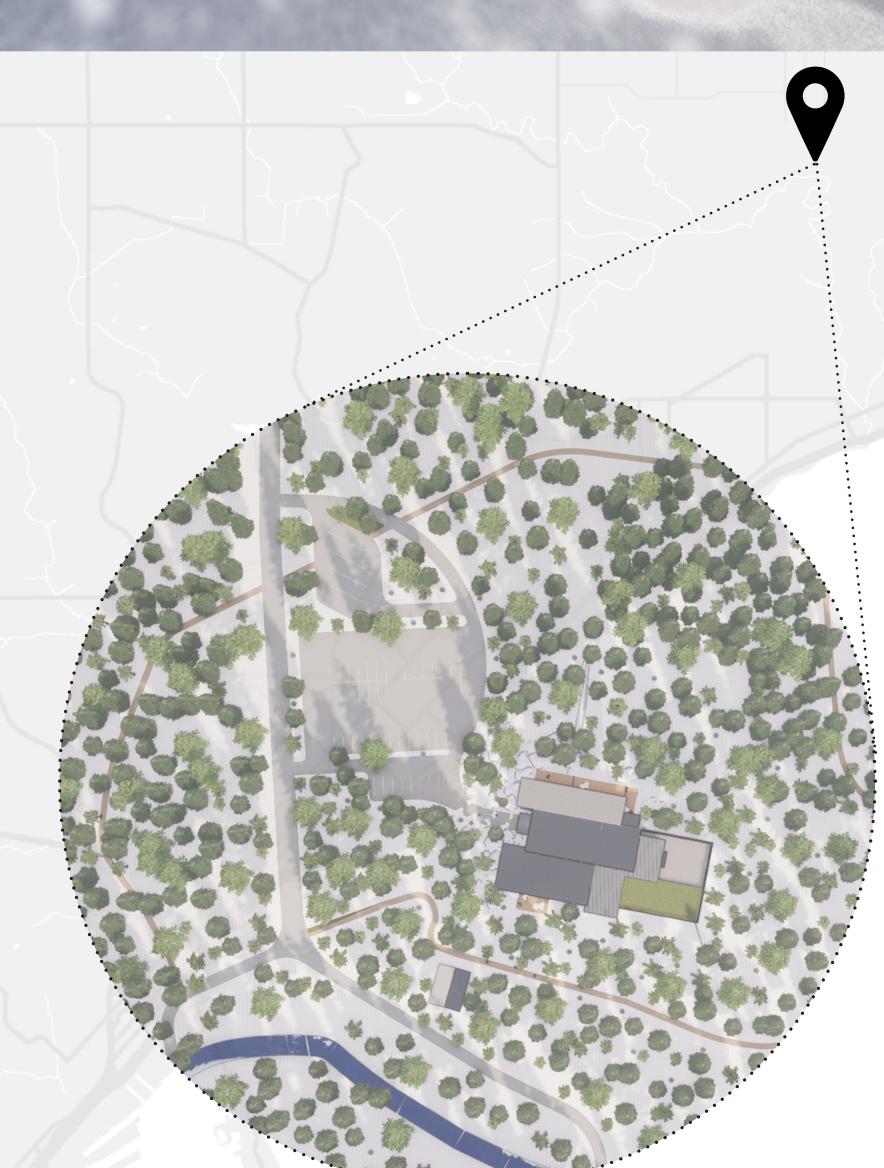


SITE SELECTION

Selected for its port access, thriving ecosystem, and regional connections, Duluth Minnesota serves as a prime location for a facility focused on sustainable construction. The region is an outdoor enthusiasts' paradise - densely wooded, countless rugged rock formations, and interweaved with streams.

The site itself is in the northern part of Duluth in Lester Park and is immersed in the dense forests of the North Shore providing an oasis from the rest of the city. The proposed site allows future development to be fully immersed in the forest, and connects to the world through a complex trail system for cross country skiing, hikers and bike enthusiasts, and locals can be found in the stream in the summers.

Duluth has many conservation efforts, and the region brings scientists and conservationists from all over the world. A facility highlighting sustainability and eco-friendly design would not be out of place in Duluth. Organizations such as the Hawk Ridge Nature Reserve and Bird Observatory are close by.





Incorporate strategies and materials that can showcase the capabilities of current green building technologies.

1) INTEGRATE INNOVATIVE SUSTAINABLE STRATEGIES:

2) EMPHASIZE THE IMPORTANCE OF THE ENVIRONMENT: Display the impacts of construction on our environment by the numbers, and show the

importance of conservation. 3) EDUCATE ON SUSTAINABILITY IN THE MIDWEST:

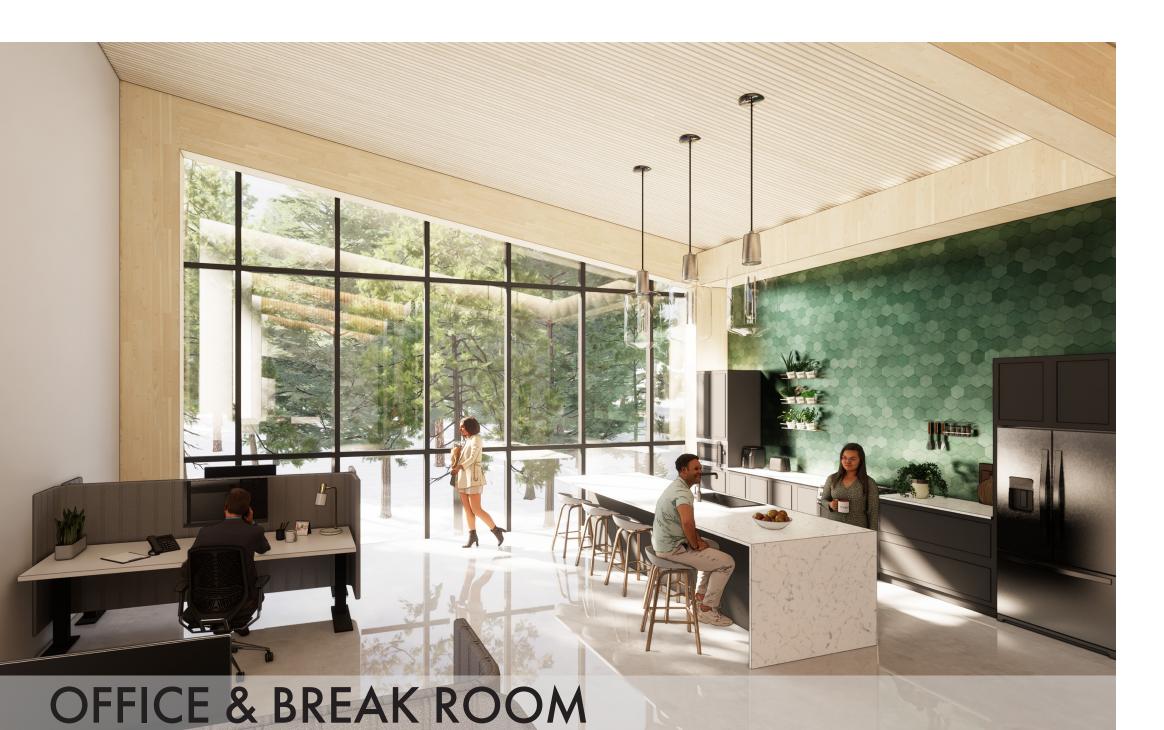
Provide educational spaces, signage, and programming to encourage future implementation within the community.

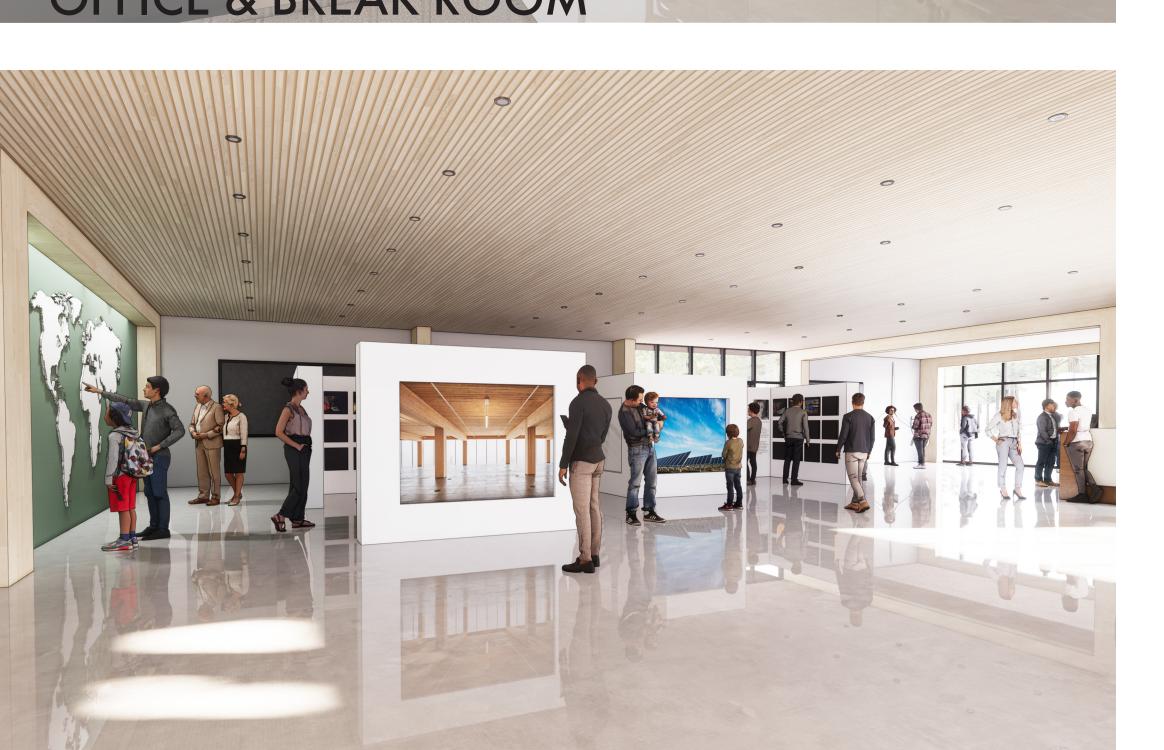
4) CREATE AN INCLUSIVE LEARNING ENVIRONMENT:

Implementing different learning styles and spaces allows for users of all abilities and disabilities to participate in sustainable design. These include auditory, visual aids, and hands-on learning opportunities





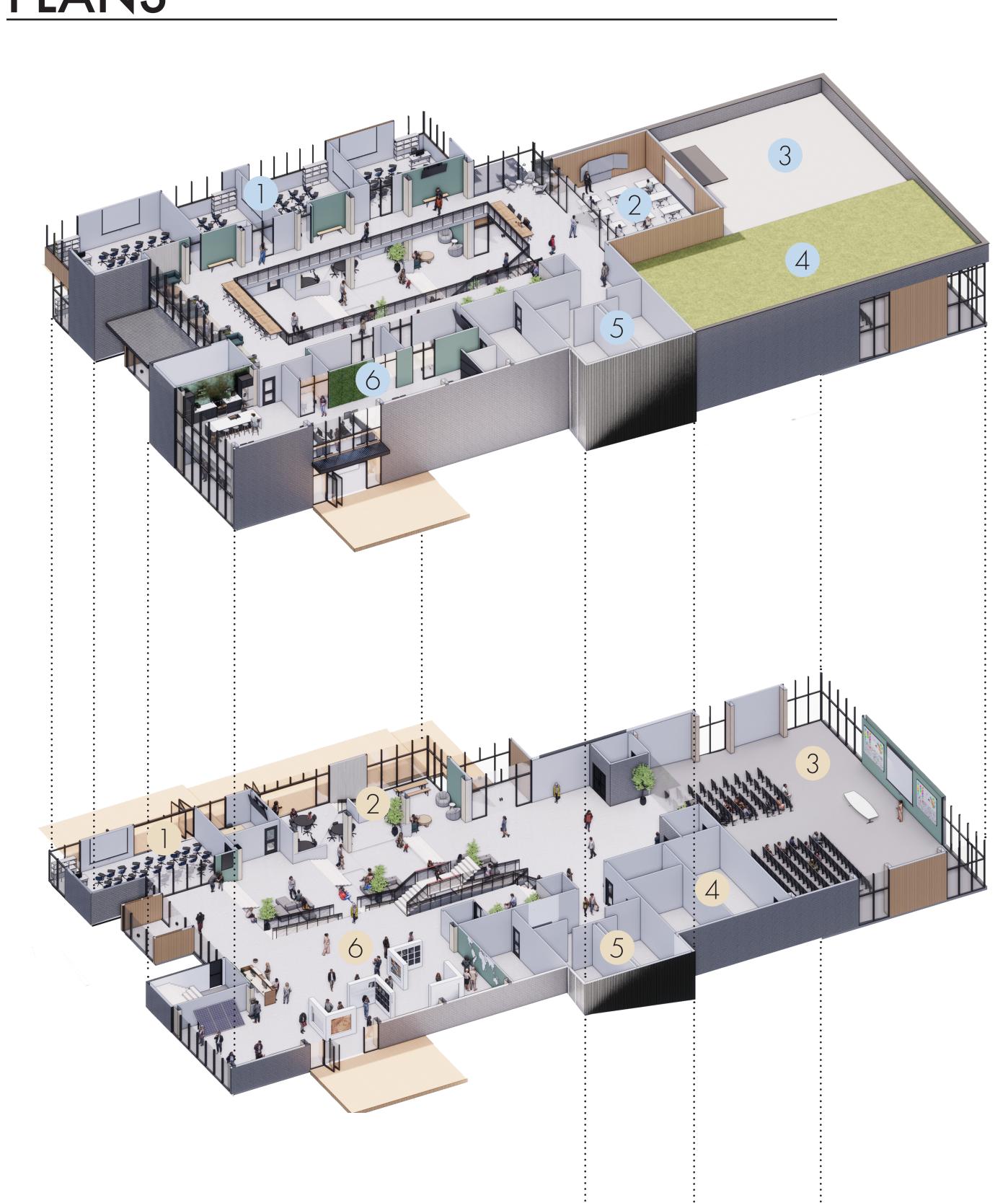




SUSTAINABLE DESIGN EXHIBITION







LEVEL 2: EDUCATION + ADMIN

1. Classrooms 2. Learning Lab 3. Rooftop Exhibition 4. Green Roof 5. Restrooms 6. Open Office

LEVEL 1: COLLABORATION

1. Large Classroom 2. Collaboration Center 3. Auditorium 4. Storage 5. Restrooms 6. Sustainable Design Exhibition

LOWER LEVEL: MECHANICAL

1. Mechanical Systems Teaching Lab 2. Backup Power + Battery Storage 3. Custodial Storage 4. Water Filtration 5. Mechanical + Storage 6. Rainwater Collection Cistern