DuPage County Jeanine Nicarico Children's Advocacy And Neutral Exchange Center

Wheaton, IL

Green Building Features - Over view

The green building features of this facility include carefully planned indigenous landscaping, a high-performance building envelope, passive design elements like daylighting and passive solar responsiveness, high efficiency mechanical equipment, and on-site renewable energy.

The landscape design slows water runoff from the building and grounds, directing it to deep rooted native prairie and indigenous plant areas. This natural process filters various types of pollutants from all forms of surface water due to storm events and runoff. The landscape slows the movement of surface water, diverting much of it from storm sewer infrastructure reducing flow into nearby Winfield Creek.

The building foundation, walls, and roof are insulated at approximately twice the minimum energy code. A white roof helps keep the roof cool in the summer by reflecting, as opposed to absorbing, solar energy. All building joints are carefully designed at all locations where building systems meet, such as windows and doors, minimizing leakage and infiltration, thereby minimizing energy losses.

The building is oriented with a majority of the glass facing south and north; shading devices on the south side are used to minimize the amount of solar energy entering the building directly during the warmer months. The east and west glass is minimized and screened to prevent overheating and glare. These strategies significantly minimize the level of air conditioning necessary to maintain user comfort.

High efficiency mechanical heating and cooling equipment is smaller than comparable buildings because of these collective green design strategies. A large portion of the energy consumed by the high efficiency mechanical equipment is off-set by the energy produced by the roof mounted photovoltaic system.

63 kbtu/sf/year

Typical Energy Usage Intensity in a conventional office building

53 kbtu/sf/year

Predicted Energy Usage Intensity with conservation strategies and high efficiency mechanical equipment

14 kbtu/sf/year

Actual Energy Usage Intensity including on-site electricity generation through photovoltaics

Optimal Daylighting and Natural Ventilation

Optimal Daylighting Design Techniques:

1. Clerestory windows are evenly placed along the upper volume of the space to allow daylight to pour in on the north and south faces of the building.

2. The ceiling is used as a reflecting surface for the perimeter daylighting at the clerestory, and used as a reflecting surface for the artificial upward directional lighting on the perimeter wall.

3. Artificial lighting is installed in close proximity to exterior windows to minimize the appearance of lighting fixtures and help the lighting seem more natural.

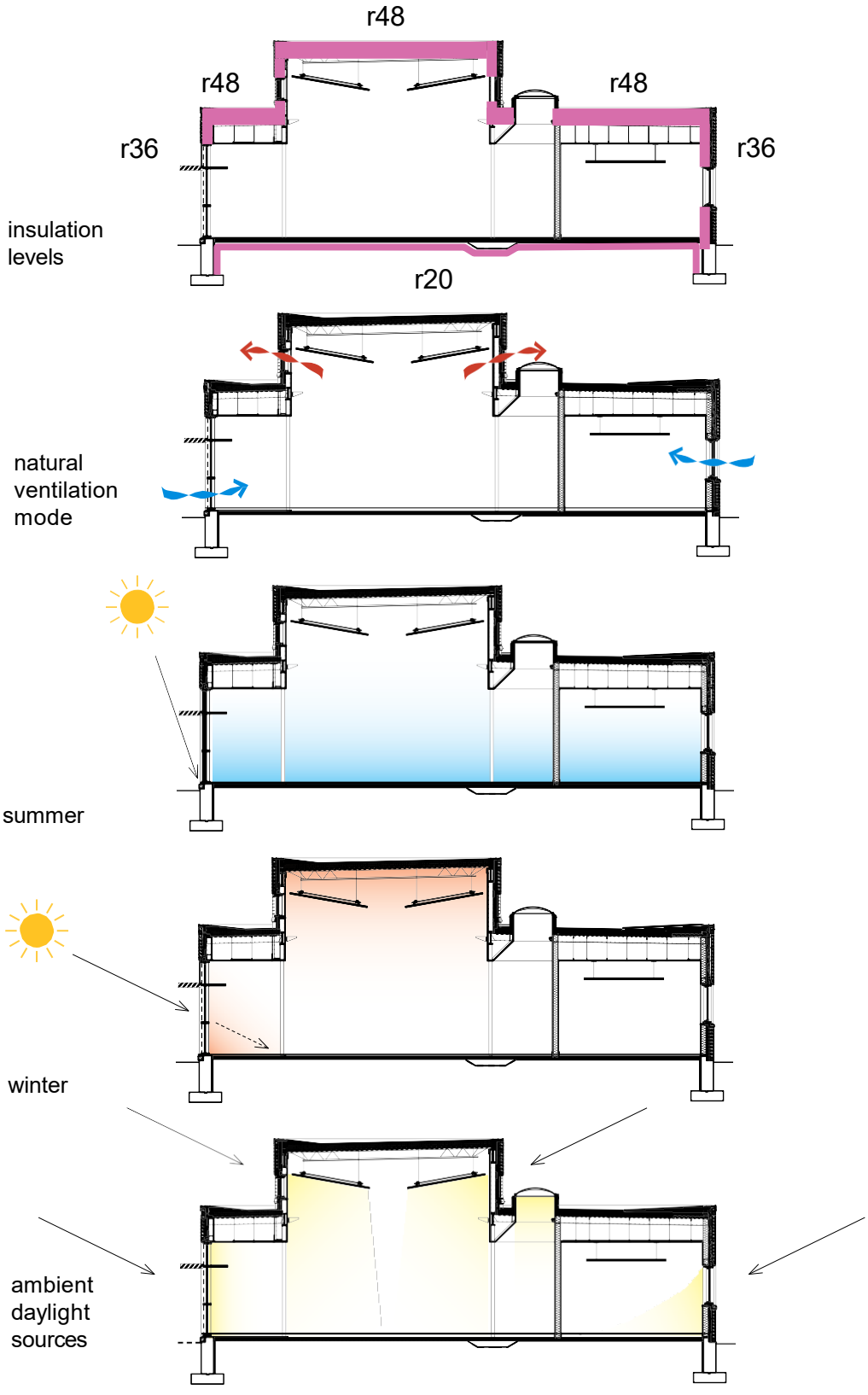
Natural Ventilation Design Techniques:

4. Lower-level windows are operable to allow cool air from the native landscape to enter along the floor surface.

5. The clerestory windows are operated by the building automated mechanical system when outdoor air temperatures and humidity are optimal. These high windows create a cross-ventilation of the main spaces when combined with open lower-level windows.

6. Carefully designed open space planning allows for crossing breezes to increase the volume of outdoor air.

Resilient Construction and Solar Responsiveness



Resilient Construction Design Techniques:

1. Steel and masonry exterior structure and cladding

2. Super-insulation doubles the minimum code requirement.

3. Window to wall ratio is kept below 1:3 to ensure majority of walls are super-insulated.

4. Windows are high performance double glazed, low-e, with high visibility and low energy loss.

5. Windows are designed to open automatically when outdoor temperatures and humidity levels are optimum.

Solar Responsive Design Techniques:

1. Windows are designed to minimize summer sun penetration, while maximizing winter sun penetration.

2. Windows on the south walls are optimally sized to allow generous amounts of sun to warm the stone tile floors to supplement heating and reduce energy costs.

3. Windows throughout the entire building are optimally placed and arranged to maximize daylight harvesting.

Renewable Energy and Green Power Purchase

The roof of the facility has a film-based photovoltaic system. The design stratgy was to produce enough electricty on site to offset the use of lighting and plug loads in the facility.

The photovoltaics produce 15MWh of electricity annually. This is roughly equivalent to the pollution caused by 11 tons of carbon dioxide. This is the equivalent of 11,000 pounds of burned coal or 24 barrels of oil consumed; or the equivalent of the carbon sequestered by 265 tree seedlings grown for 10 years or 8.5 acres of U.S. forest in one year.

The facility also purchased a 35% of the off-site electricity that it uses from green power e-certificates. This program helps fund the development and operation of wind farms and other renewable energy systems in the region.

Design Team: Serena Sturm Architects, Ltd., dbHMS Engineering, WRD Environmental, Knight E/A, and John Burns Construction.

For more information on this facility and other DuPage County green building initiatives please go to: https://www.dupagecounty.gov/sustainablecampus