

Sustainable Solutions for Energy Efficiency and Acoustics

Study Building:

Name: James Lee Soreson Language and Communication Center (SLCC)
Location: Washington, DC (NE)
Owner: Gallaudet University
Architect: SmithGroup
Engineers: SmithGroup (MEP, Structural)
Floor Area: 87,000SF
Cost: \$24,054,000
LEED Rating: Certified



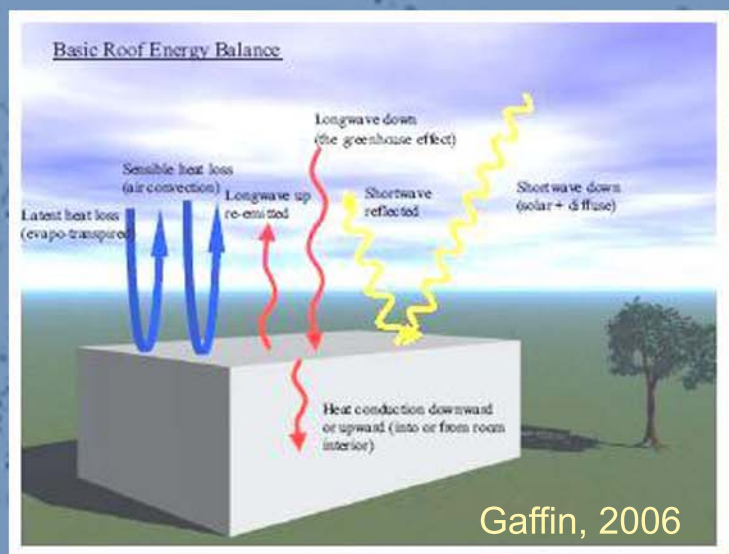
Rendering of the main entrance to the SLCC (SmithGroup).

vis·u·cen·tric (vĭzh'ōō-sĕn'trĭk) adj.:

1. The design of a distinctive structure that clearly and unmistakably says "this is a space for deaf people."
2. A design for the deaf "way of being" based on visual communication.

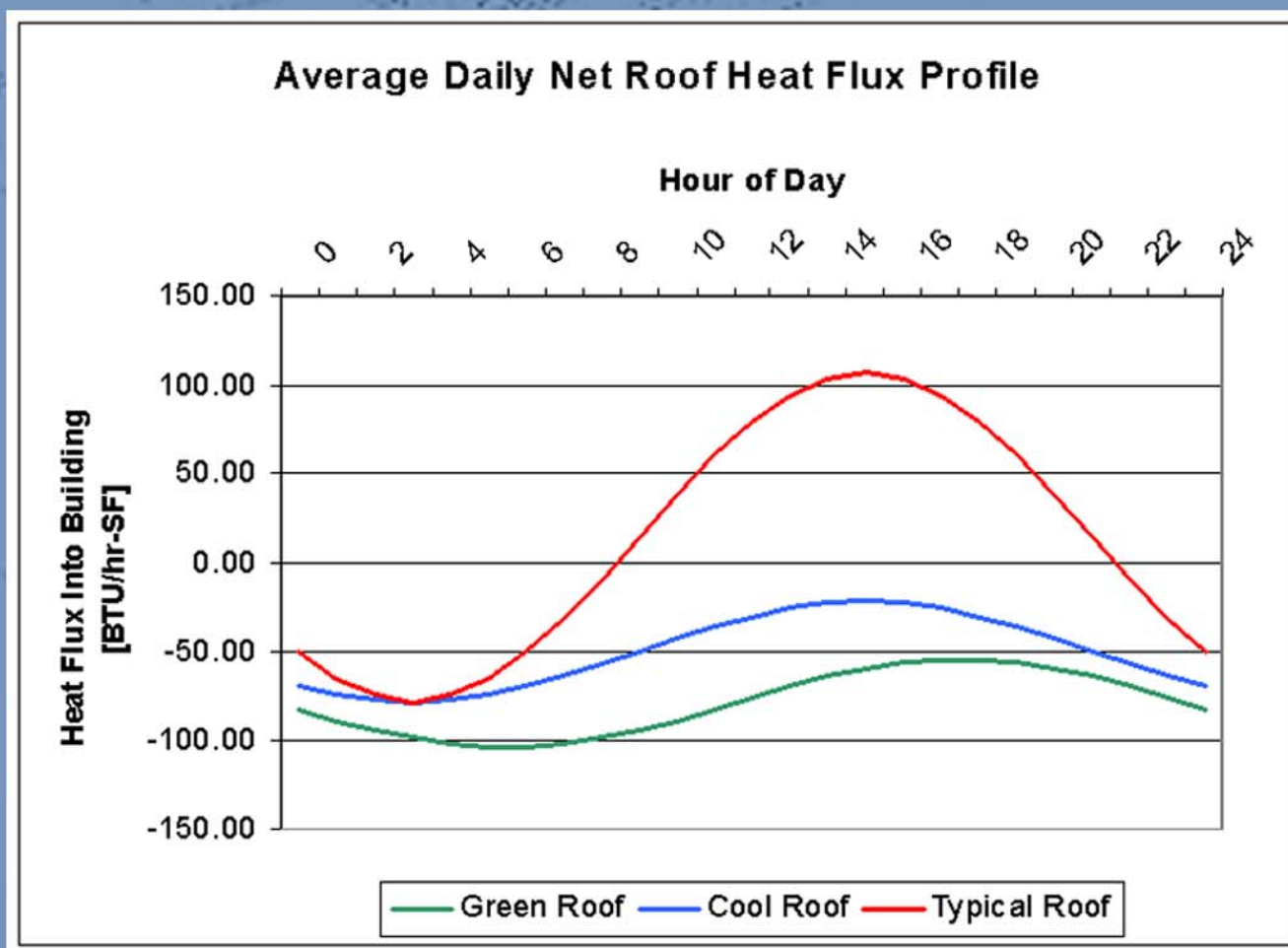
Green Roof:

HVAC Energy Savings: 256.5 MMBTU/yr



The green roof energy savings were based on an energy balance of all modes of heat flux and average ambient monthly conditions.

The energy profile shows the sinusoidal nature of heat gain through the different roof types over 24 hours.

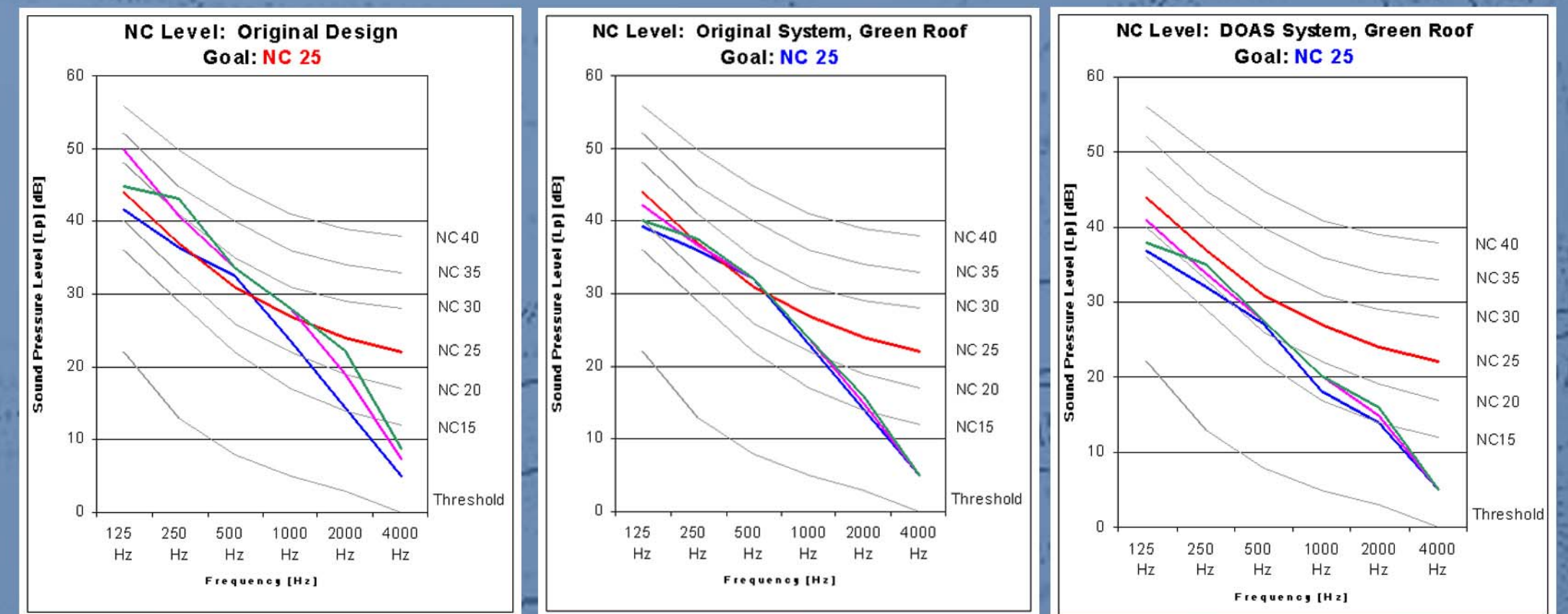


Acoustic Analysis:

The SLCC contains several Audiology Labs, Therapy Rooms, and a Hearing Aid Fitting Center. These spaces require **NC-25** or quieter conditions.

Green Roof: Mass dampens lower frequency noise, allows mechanical noise to govern.

DOAS System: Less air movement and elimination of VAV boxes also reduces noise in occupied spaces.

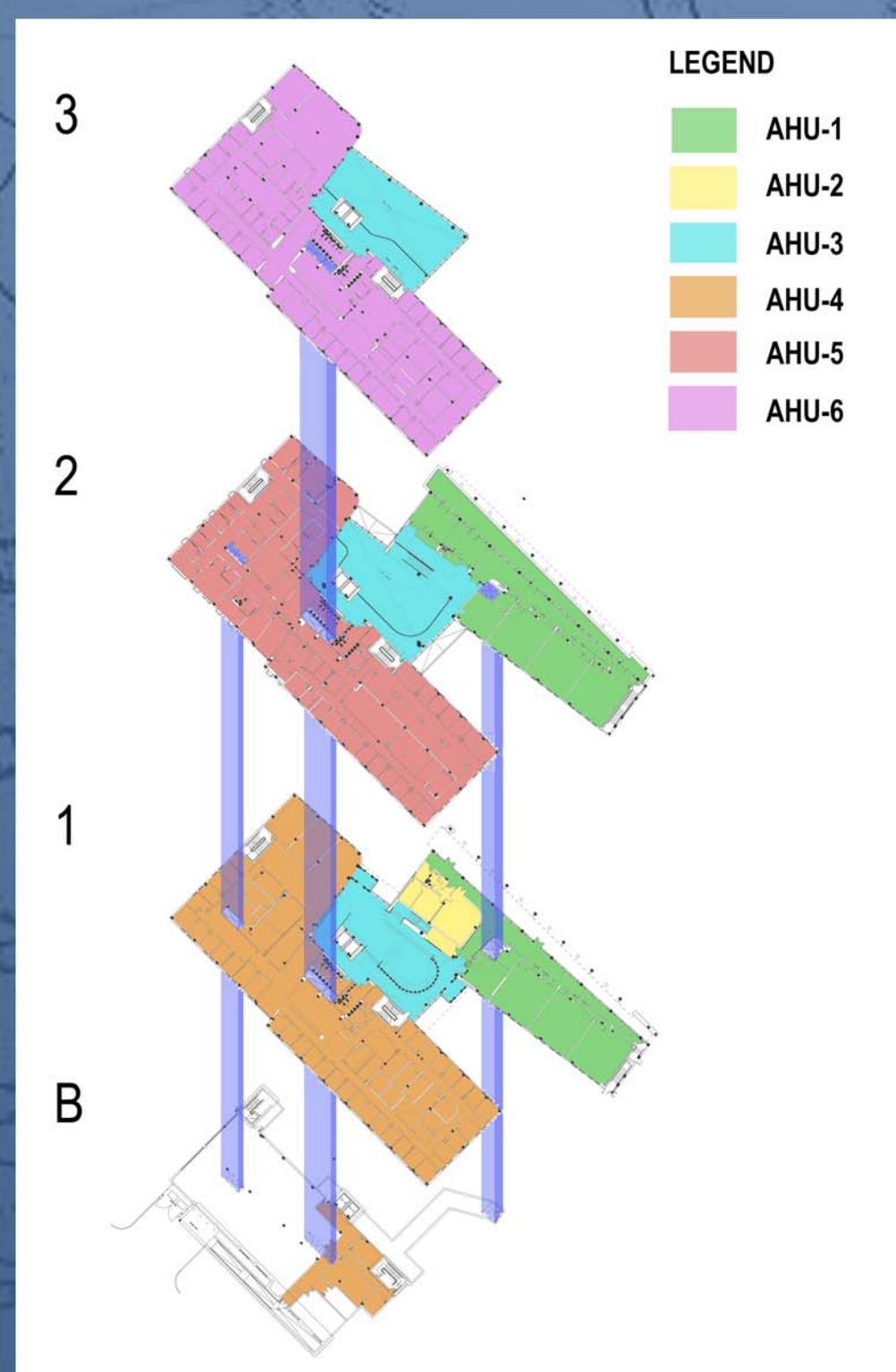


The proposed DOAS System and Green Roof provide optimal conditions in a typical classroom for three cases of outdoor noise: average conditions (blue), car traffic (purple), and large truck driving by (green).

Stormwater runoff: 400,000 gallons held back from Anacostia River annually.

Minimizes Urban Heat Island Effect

Acoustic Insulation: Dampens traffic noise of downtown Washington, DC.



Mechanical system zones are based on occupancy schedule and special loads.

Mechanical System

Original Design

Variable Air Volume with Terminal Reheat
 Six (6) Trane M-Series AHUs
 Remote CHW (43F) and HPS (100psig) PRV to LPS (15psig) to HHW (180F)
 Air-side Economizer with Enthalpy Ctrl.
 21,630 CFM
 72,875 CFM
 2,167 MMBH
 \$153,000

Type

Equipment

Plants

Energy Saving Strategies

Outdoor Air Supply

Total Supply Air

Annual Cooling Energy Use

Annual Operating Cost

Proposed Design

Dedicated Outdoor Air System (DOAS)
 Merge AHUs 4,6 for total of five (5) AHUs
 Remote CHW (43F) and HPS (100psig) PRV to LPS (15psig) to HHW (180F)
 Plate ERV Enthalpy Exchanger
 17,835 CFM
 17,835 CFM
 1,746 MMBH
 \$128,600