

The IU Data Center: Sustainable Features

The Indiana University Data Center is a unique facility, meeting the demands of a high-performance data center as well as the needs of a large university. Regarding environmental sustainability, construction of the IU Data Center has targeted various features to optimize the facility's efficiency and overall sustainability. Some of the sustainable features of the data center project and the continuing Technology Precinct master plan include:

- A working landscape, or greenway, to assist with storm water management, protect ecological balance, and encourage biodiversity.
- Increased built density. As older, single story buildings that currently occupy the site approach the end of their usable life, they will be replaced with multi-story research and office buildings. The data center is centrally located in support of these new facilities. Building with smaller but multi-story footprints—as opposed to large, single story footprints—preserves undisturbed land.
- The data center resides mostly within the footprint of a previously demolished building. Building on already disturbed land preserves the surrounding undisturbed environment and, in this case, contributes to almost no net gain of impervious surface.
- The master plan will encourage pedestrian circulation and provide access to mass transit.
- The data center is right-sized to accommodate current need but allows for future growth. Responsible land management suggests building on only as much land as is needed. However, university needs often change as pursuit of grants and other funding develop, making it important to allow for phased additions.
- A data center is essentially a secured home for machines and computers and often does not allow for windows. Less than 4% of the IU Data Center is regularly occupied by humans. Little or no access to views or natural light are achievable, so other measures must be pursued in interior spaces:
 - o flexibility of space. The IU Data Center utilizes flexible space where applicable, so that more than one function may occur in the same footprint. The lobby can be reconfigured into a conference or event space through the use of operable partitions.
 - o materials derived from recycled content or rapidly renewed resources, such as the bamboo wall cladding in the lobby.
 - o limited material quantity and waste in general by exposing structure as finished surface.
 - o maintain high air quality with low VOC paints and stains

- While cost initially precluded a green roof, the data center is designed so that a future green roof can be added without removing or replacing the roof membrane.
- A concrete structure and shell were required to meet the project goal of high wind and tornado resistance. The production of concrete does contribute to CO₂ emissions, a fact that in general needs to be addressed by the building and design industry, but there are some characteristics of concrete that support sustainability:
 - o longevity/durability of materials and subsequent greater efficacy of resources used.
 - o increased heat storage (Thermal Mass), reducing the need for additional heating and cooling.
 - o resource availability: the limestone used in cement, for example, is one of the most abundant materials on the planet.
 - o recycled content (pre-consumer) can be specified, such as waste product from other industries, fly ash, slag cement, silica fume.
 - o reinforcement (rebar) is typically recycled steel.
 - o regional production: concrete is often locally produced, reducing CO₂ emissions associated with transportation over great distances. In this case, the plant for the cast-in-place is in Bloomington, and the plant for the precast is in Paxton, Illinois (less than 200 miles away).
 - o minimal waste is incurred because it is produced in only the quantities needed for each project.
- The project incorporates a ten- to twelve-foot-high planted berm around most of the building. Sustainable impact of the berm includes:
 - o improved insulation, reducing heat gain on exterior walls.
 - o buffering from high winds and flying debris.
 - o the berm is planted with native grasses and drought-resistant plants, so that a potable water irrigation system is not needed.
- Recycled site waste: limestone boulders discovered during excavation are re-used on site, along the berm and at a planned rain garden near the main entrance, so that they do not have to be hauled off-site.
- Regarding the efficiency of the equipment, some very basic principles were engaged, such as reusing waste heat in support of occupied space, locating Power Distribution Units as close as possible to RPP's, and incorporating some VFD's on Mechanical Equipment.