

productive architecture

Project Portfolio 2010



**Kiss +
Cathcart,
Architects**

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smithsonian tropical research institute research station

The Smithsonian Institution's new research campus in Panama is located on a sensitive coastal site next to a mangrove swamp. Kiss + Cathcart was asked to prepare a design for the main laboratory/classroom building that minimizes its environmental impact while providing an exemplary scientific facility.

The building's different programs—laboratories, classrooms, conference rooms, and support spaces—occupy a string of volumes on a raised platform shaded by an overhanging pitched roof. These volumes can be individually air conditioned, but the linear plan also allows for natural ventilation and daylighting. The building is raised on concrete piers to provide flood protection and ventilation.

The roof is covered with photovoltaic panels, interspersed with clear glass, allowing light through the semi-transparent ceilings to daylight the interior spaces. The angled roof geometry directs rainwater to collection tanks at a central point.

This project comes close to the ideal of “zero-impact”, despite heavy energy loads from almost constant air-conditioning. The building produces the majority of its own energy, and harvests all of its water from the rain.



The Client:

The Smithsonian Tropical Research Institute

The Team:

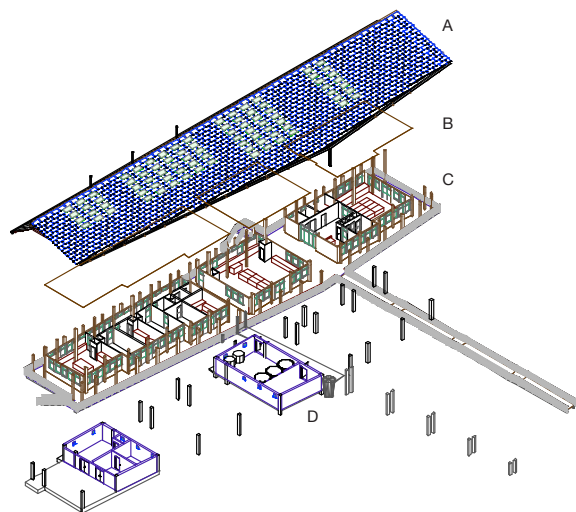
Kiss + Cathcart, Architects
Ove Arup + Partners

Project Details and Awards:

\$1,800,000
10,000 sf
Completed 2003

Federal Energy and Water Management Award 2005

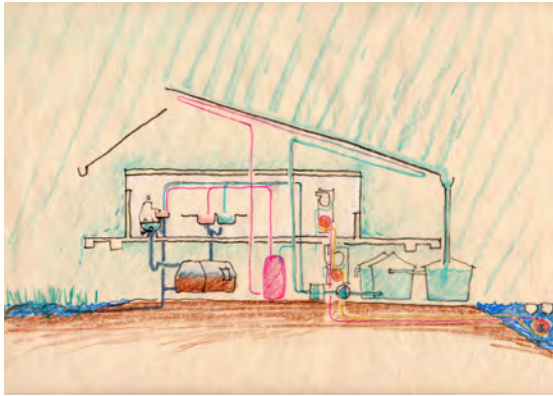




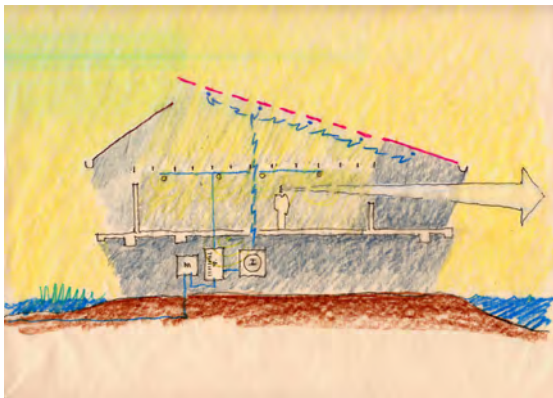
- A. PV array roof/rainwater collection
- B. Translucent roof
- C. Laboratories and classrooms
- D. Rainwater storage



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water and waste schematic diagrams



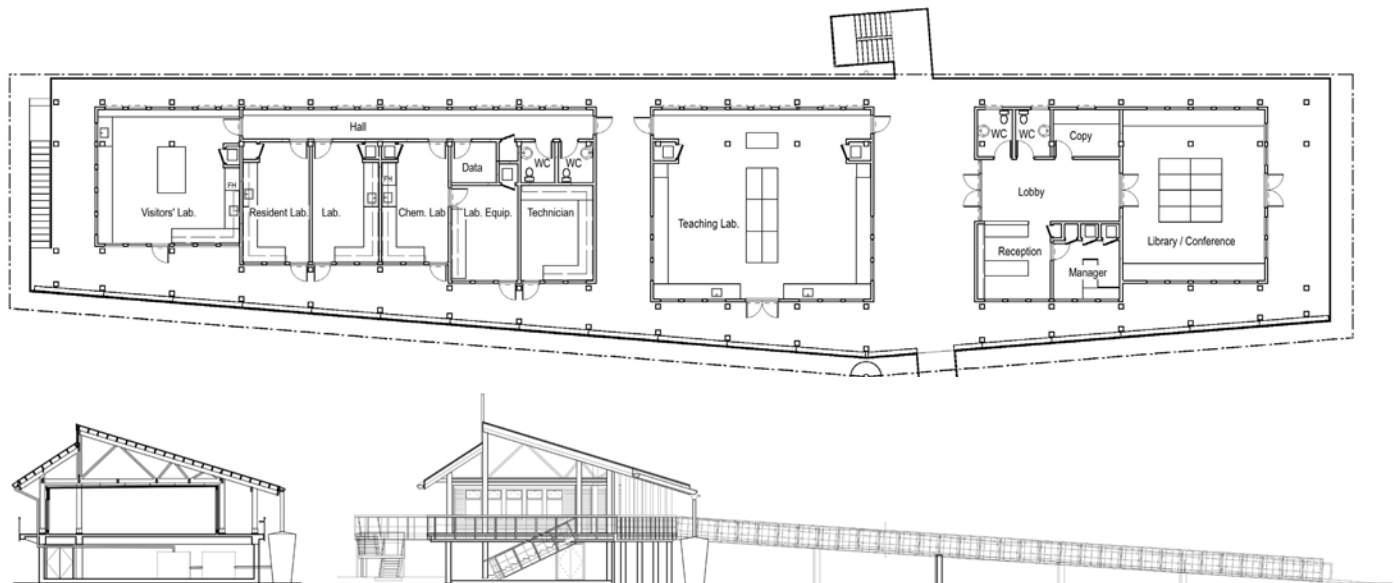
light and electricity schematic diagrams

Site

The site had previously been a sawmill. The pond area, which had been filled with saw mill waste, was restored to provide a habitat for local species. In a later phase the pond will be a constructed wetland to provide the final stages of black water treatment. Six crocodiles now reside there.

Energy

The form of the building was guided by passive solar concerns. The conditioned spaces are lifted up above the ground, keeping them above insects and floods, and encouraging natural ventilation. The double roof shades interior volumes, reducing solar heat gain. The building integrated PV roof faces south and has a shallow pitch, an optimal position for maximum electricity generation at this tropical latitude. The PV upper roof, which has an average transparency of less than 5%, becomes more transparent where needed by the insertion of clear glass panels. The lower roof, which is the roof of the conditioned spaces, is an insulated translucent material. The system is designed to allow enough daylight to pass through both layers to provide 100% of the lighting during daylight hours. The building features a dual stage heat pump system with individual units for each space to allow flexibility and efficiency in usage. A separate makeup system provides cooled and dehumidified air to



Transverse Section

West Elevation

