Green Hospitals: Sustainable Design and Its Impact

Abstract
A hospital is an organization where treatment, care, and attention are provided to those in need. Despite all hospitals having the same mission, some hospitals have an advantage in achieving this goal by incorporating nature within the architectural space. Hospital patients with views to nature, host more profound healing environments and had been regularly published with positive outcomes (Fleming, 1994). While caring for patients should be top priority, a hospital should also help play a bigger role in society for the environment by considering more green and sustainable design. For instance, at the Mercy Medical Center, a rooftop garden helps manage stormwater while creating a therapeutic space for the patients (Kimball, 2015). By analyzing the peak discharge and life cycle costs from stormwater measurements and the percentages of tree coverage, LEED certified Hospitals have increased more financial benefits and reduced peak discharge in the total of a 20 year life cycle. The average benefits of all 3 LEED certified Hospitals was $892,765 with a reduced peak discharge of 19%, while the average of all 3 non-LEED certified Hospitals was $497,856 with a reduced peak discharge of 17%. In the analysis, LEED certified Hospitals had an average of 32% tree coverage in the hospital area, while the non-LEED certified Hospitals had an average of 17%. These finding may provide critical evidence for healthcare facility design that impact a patient’s well-being and environmental sustainability.

Maps

List of Hospitals
LEED-Hospitals

Non - LEED Hospitals

Stormwater Calculator - 20 Year Life Cycle

Hydrologic Benefits

Financial Benefits

Tree Cover Percentage

Summary & Result

The Conventional system and the green intervention decreases the total 20 year life cycle costs and increases benefits by $404,479. This reduces peak discharge by 17%.

Holy Cross Hospital

Summary & Result

The Conventional system and the green intervention decreases the total 20 year life cycle costs and increases benefits by $51,412. This reduces peak discharge by 19%.

Johns Hopkins Suburban Hospital

Summary & Result

The Conventional system and the green intervention decreases the total 20 year life cycle costs and increases benefits by $193,302. This reduces peak discharge by 19%.

Holy Cross Hospital

Summary & Result

The Conventional system and the green intervention decreases the total 20 year life cycle costs and increases benefits by $219,847. This reduces peak discharge by 19%.

Adventist Healthcare Shady Grove Medical Center

Summary & Result

The Conventional system and the green intervention decreases the total 20 year life cycle costs and increases benefits by $60,322. This reduces peak discharge by 18%.

Johns Hopkins Suburban Hospital

Summary & Result

The Conventional system and the green intervention decreases the total 20 year life cycle costs and increases benefits by $147,512. This reduces peak discharge by 17%.

Holy Cross Hospital

Summary & Result

The Conventional system and the green intervention decreases the total 20 year life cycle costs and increases benefits by $93,942 with a reduced peak discharge of 16.3%. As for the average percentage of tree canopy, LEED hospitals had an average of 25%, while 3 LEED certified Hospitals was $168,207 with a reduced peak discharge of 18%, while the average of all 3 non-LEED certified Hospitals was $892,765 with a reduced peak discharge of 19%.

In this study, we will compare hospitals in Maryland with LEED certification and without LEED certification. We will compare environmental and economic outcomes of hospitals by measuring stormwater, and tree coverage through green intervention. By analyzing the peak discharge and life cycle costs from stormwater measurements and the percentages of tree coverage, LEED certified Hospitals have increased more financial benefits and reduced peak discharge in the total of a 20 year life cycle. The average benefits of all 3 LEED certified Hospitals was $892,765 with a reduced peak discharge of 19%, while the average of all 3 non-LEED certified Hospitals was $497,856 with a reduced peak discharge of 17%. In the analysis, LEED certified Hospitals had an average of 32% tree coverage in the hospital area, while the non-LEED certified Hospitals had an average of 17%. These finding may provide critical evidence for healthcare facility design that impact a patient’s well-being and environmental sustainability.

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