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Providence Newberg Medical Centre, U.S.A.

Case Study 24

Aspects of Sustainability

This project highlights the following:

Social Aspects

Human Resources

Corporate Community Involvement

Business Ethics

Health and Safety

Environmental Aspects

Energy and Climate

Materials

Ecosystems

Local Impacts

Economic Aspects

Project Selection

Supply Chain

Value Added

The Providence Newberg Medical Centre in Oregon, U.S.A., pioneered the use of the Leadership in Energy and Environmental Design standards as a framework to integrate sustainability into the design and construction of a medical centre and contribute towards sustainable community healthcare.

Project Introduction

The Providence Newberg Medical Centre (PNMC) is located in Newberg, Oregon, U.S.A. and was constructed to replace the outdated Providence Newberg Hospital. The facility is one of the most technologically advanced medical centres in the U.S. and was opened in June 2006 to more adequately meet the medical needs of the growing Portland metropolitan area.

Providence Health Systems (PHS) awarded Skanska U.S.A. Building the role of general contractor in the design and construction phases of the US$49.3 million project. The 16,700 square meter facility is located on a 22 hectare site and consists of a medical centre, patient and community services building, medical office building and a healing garden. The medical centre is licensed for 40 inpatient beds and is equipped with specialist radiology, cardio, respiratory, emergency and MRI departments.

The PNMC design and construction team made the business case for sustainability design and construction features by shifting the focus from initial construction cost to overall building life-cycle expenditure. Sustainability features were integrated into the design through the Leadership in Energy and Environmental Design (LEED) rating system, which is a voluntary U.S. Green Building Council certification intended to encourage and guide the construction of more sustainable and energy efficient buildings.
From the outset, the project team, subcontractors and suppliers were selected in consideration of LEED and the certification criteria were individually addressed to ensure the requirements were met or exceeded. The PNMC became the first medical centre to be Gold LEED Certified in August 2006, and has been praised for its healthy interior environment, improved healing environment, quality of care and integration with the community.

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Contributing Toward Sustainable Development

The PNMC has contributed toward sustainable community healthcare by more adequately meeting community medical needs and using the LEED standards as a framework to integrate sustainability features into the design and construction. Sustainability was promoted in the design and construction phases by consulting with stakeholders, creating a healthy indoor environment, contributing to urban sustainability, stimulating local economic development, implementing energy and resource efficiency, and employing high environmental construction standards. Community and staff consultation was vital to assess local healthcare needs and incorporate sustainability features into the design. A healthy environment for patients, visitors and employees has been created through sustainability design features and the selection of high-quality materials. The project has contributed to urban sustainability by reusing an urban brownfield site and encouraging sustainable modes of transport. Local labour and materials were prioritised during construction to encourage local economic development. Energy and resource efficiency has been promoted through sustainability design features and was guided by the LEED standards. Environmental practices were employed during construction to minimise the environmental impacts of the project. As a consequence of the success of the PNMC, other PHS hospitals have undergone organisational changes to become more sustainable.

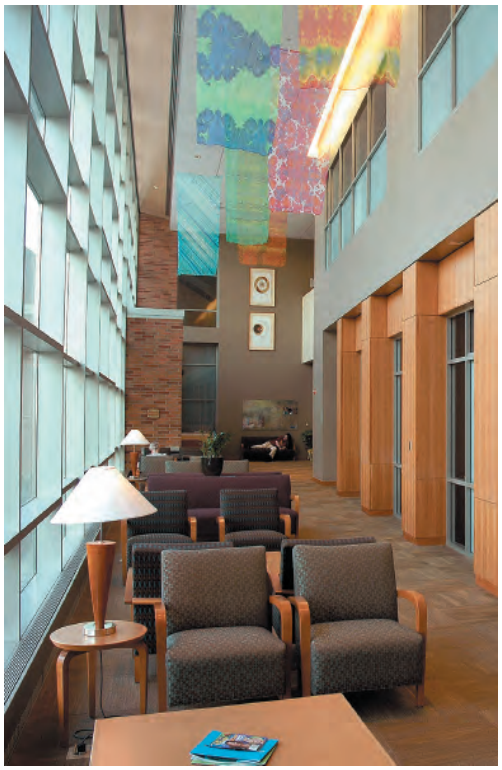
Social Aspects

Stakeholder consultation

Prior to the design stage, staff and neighbouring communities were consulted to take into account their interests and assess what was required of PHS to serve long-term stakeholder need. The design team actively collaborated with stakeholders in order to integrate the sustainability features into the design of the project.

Improved community healthcare provision

The PNMC is better equipped to meet the needs of the growing community than the old Providence Newberg Hospital, with more comprehensive medical facilities and services, and over 20 additional doctors. Medical services include expanded cardio and respiratory departments and the centre



is equipped with community education facilities. As a consequence of the improved healthcare provision, residents of Newberg and the surrounding area no longer have to travel 35km to Portland in order to receive specialist care.

Creation of a healing and productive work environment

A comfortable environment has been created, that enhances both patient healing and employee satisfaction, through the use of natural light, fresh air ventilation, environmental control systems, the use of low-Volatile Organic Compound (VOC) materials and scenic views. Courtyards maximise natural light within the building, which is used to illuminate every public space and patient room. The ventilation system uses outdoor air rather than recirculating indoor air, which enhances infection control efforts and creates a healthy environment for patients, visitors and employees. Environmental conditions, such as temperature, light and humidity are monitored and controlled for comfort. Only low-VOC paints, coatings, adhesives, sealants and carpets have been used within the facility to maximise air quality. The PNMC has also been designed to maximise scenic views of the surrounding natural landscapes and healing garden.

Stakeholder communication

Educational visits have been organised for local schools to highlight the building's sustainability features. PHS also created an informative display in the hospital to inform staff and the public about the sustainability features of the building and information has been posted on the company's website (www.providence.org/yamhill/new_medical_center/green.htm).

Community health education

The community services building is equipped with education facilities and a health resource library, which are open to the public. A variety of health, fitness and social improvement classes and educational forums including childbirth education, weight management programs, fitness classes and smoking cessation are offered to members of the public, and the community is able to reserve classrooms for their own use.

Urban redevelopment

A brownfield site was selected on the edge of Newberg city to protect the surrounding rural areas against urban sprawl, minimise transport impacts and contribute toward a more sustainable city.

Promoting sustainable transport

The PNMC is situated approximately 2km from the centre of Newberg and is served by the local bus system. Secure bicycle parking, shower facilities and lockers are provided to encourage staff to use sustainable transport and preferred parking is offered to employees who drive more efficient low-emission vehicles.

Construction worker safety

A safe environment was promoted for construction workers by staging regular emergency fire drills and ensuring that all site workers carried emergency contact information. Emergency drills included challenging mock rescues from the basement of the construction site with the Newberg Fire Department. Every site worker had stickers with emergency contact information on the inside of their hard hat in case of an accident. The most serious accident during construction was a broken hand, although the worker returned to work on light duty the following day.

Community donations

Greenhouses and retail buildings on the site prior to construction were relocated and donated to community groups.

Economic Aspects

Local employment

Local construction workers were prioritised and almost all were from the Portland metropolitan area. Approximately 350 construction workers were contracted during construction to work on the project. In 2006, the PNMC employed 310 employees, including 176 full-time and 134 part-time staff.

Regional suppliers and materials

"Regionally" produced construction materials were prioritised for the project, which were defined by the LEED criteria as being produced within 800km. 33% of construction materials were regionally manufactured and 58% of these materials were regionally extracted.

Designed for Energy Efficiency

PHS invested in energy-efficient design strategies and low-maintenance, long-life materials and equipment. To make the investment in more sustainable design features feasible, costs were calculated over a 10-year period to bring in finance from outside of the construction budget.

Energy consumption is controlled by a centralised building management system, which adjusts lighting and ventilation, depending on occupancy and indoor conditions. The building's location and specially treated windows are designed to optimize daylight for heating and cooling efficiency, and a high-efficiency Heating, Ventilating and Air Conditioning system recovers 70% of exhaust heat. High-efficiency boilers and coolers were also installed, which far exceeded the required efficiency requirements.

Environmental grants and benefits

Through securing environmental grants, incentives, and tax credits, the PNMC's total investment in sustainable design features was recovered within 14-months of operation. Oregon's Energy Trust approved a grant of US$199,858, through its Building Efficiency Program, and Portland General Electric approved a US$156,000 grant to fund the upgrade of the emergency power generators in return for access to surplus electricity production during peak energy demand. A US$15,000 grant from the Northwest Energy Efficiency Alliance also qualified the PNMC for a US$141,000 Business Energy Tax Credit through the Oregon Office of Energy.

Providence Newberg Health Foundation

The Foundation's "The Time is Now" Campaign raised US$5.2 million toward the construction of the PNMC. The Foundation also sells commemorative bricks in the healing garden to raise funds for the medical centre.

Financial assistance for medical care

The PNMC offers financial assistance, payment plan options and discounted medical care to low-income and uninsured patients.

Environmental Aspects

High environmental construction standards

During construction regular LEED progress meetings were held, only low-VOC materials were used, measures to ensure a high quality indoor environment were taken and high recycle targets were realised. The design and construction team met regularly throughout the project to monitor the progress of sustainability objectives and ensure individual LEED criteria were met or exceeded. Only low-VOC adhesives, sealants, paints, coatings, and carpets that exceeded Green Seal standards were used and cleaning staff have been trained to use environmentally friendly cleaning products and practices. During construction the indoor environment was protected by carefully preventing moisture damage before and after the installation of materials, and by maintaining a high indoor air quality by performing a preoccupancy flush-out of the ventilation systems. The construction teams realised targets to recycle 80% of construction waste and 29% of all building material used contained recycled content.

Environmental awareness training

All site construction workers received general environmental awareness training in compliance with Skanska U.S.A. Building's ISO 14001 program.

Energy Performance

PHS is active in monitoring and recording the energy performance of their projects. During the initial year of operation, it was determined that the project was not meeting the expected energy targets identified at design. In several instances, it was determined that the operations staff were not operating the building as designed, and that the hours of usage of the building were far in excess of design assumptions. Skanska has worked with the facilities staff to revise operating procedures, retrain personnel and change equipment found to be performing improperly. The result was an improvement in the energy performance, but the project has not reached the expected level of energy efficiency.

Public environment improvement

A 15 hectare healing garden with walking paths has been created for patients, staff and visitors to relax and recuperate, and is also open to the public.

Renewable energy supply

The PNMC is supplied by 100% renewable energy, which comprises of: 50% wind, 25% low-impact hydro and 25% geothermal energy. Through the use of renewable energy the facility avoids emitting an estimated 1.3 million kg of carbon dioxide per year.

Producing community electricity

PNMC has partnered with Portland General Electric, who upgraded and routinely service the facility's two 750 kilo-watt emergency generators in exchange for access to surplus energy during peak demand, which can provide energy for

approximately 3,000 homes. The emergency generators are diesel powered in order to be self-sufficient in the event of a power cut, but are as efficient as the latest technology allows.

Water efficiency

The facility has been designed with water-efficient features, which have ensured water usage is 33% lower than federal energy policy requirements and at least 40% less than conventional buildings. The building uses 'low-flow' plumbing fixtures, infrared sensors on the faucets, and a process water loop system, which reduce water usage by over 20%. The grounds of the medical centre, including the healing garden, were landscaped with drought-tolerant plants that have reduced irrigation needs by 50%.

Minimising pollution

Water and light pollution have been minimised through stormwater treatment and special external lighting. Stormwater pollution is managed in car parking areas by bio-swales, which filter out pollutants from vehicles before reaching the watershed. The exterior light fixtures on the building and in the parking areas are down-facing with cut-off lenses to reduce light pollution.

Reducing the heat island effect

The roof of the PNMC is coated with a white thermoplastic membrane that reduces the urban heat island effect.

Learning From Good Practice

The LEED criteria, the life cycle cost approach and the attainment of alternative finance were vital components of the project that facilitated sustainability considerations. LEED proved an essential framework to ensure the design and construction phases were as sustainable as possible. The focus on overall life cycle costs, rather than the short-term construction budget, was also vital in promoting sustainable design and construction, which is expected to reduce environmental impacts and operational costs throughout the life of the building. Alternative financing, through environmental grants and tax incentives, made initially more expensive sustainability features more feasible and further strengthened the case for sustainable design and construction considerations.