Further information Skanska AB www.skanska.com

Contact Noel Morrin, SVP Sustainability & Green Construction noel.morrin@skanska.se

Case Study 72

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

Dashwood House, UK

Dashwood House is an office building in central London that was redeveloped and modernized, between 2007 and 2008, into a BREEAM (BRE Environmental Assessment Method) 'Excellent' building by incorporating energy efficiency features, solar water heating and rainwater harvesting.



Project Introduction

Dashwood House is an office building located near Old Broad Street in central London. Originally constructed in 1973, the building was in urgent need of renovation to create more functional and modern office spaces. The building's concrete facade was also in need of a face-lift, along with the adjacent public paved and planted areas.

Skanska redeveloped and expanded Dashwood House as part of a US\$ 75 million contract for the property company Land Securities. The project involved demolishing the existing 13th floor, and creating 4 new floors and an additional plant room floor. The vertical height of Dashwood House was increased from 61 m to 88 m. The building framework was retained but the external concrete cladding was replaced by a new glazed façade and the interior of the building was stripped out and modernized. The surrounding public paved and planted areas were also enhanced. The redeveloped Dashwood House now covers an area of 21,000 m² in total, including 13,940 m² of prime office space on 17 floors and two ground floor retail units covering an area of 700 m².

The redeveloped Dashwood House achieved the BREEAM for Offices rating of 'Excellent', which was the highest possible rating at the time of construction. BREEAM is a voluntary green building measurement that was established by the Building Research Establishment in the UK. Today a building is either rated as Pass, Good, Very Good, Excellent or Outstanding according to the number of BREEAM assessment credits that are awarded.

Contributing Toward Sustainable Development

Dashwood House was redeveloped into a more resource efficient office building that uses solar heating, rainwater harvesting and has relatively low

greenhouse gas emissions. The building provides modern and healthy office environments, and is now more functional and flexible to promote a long useful lifespan. During construction, Skanska worked with stakeholders to reduce public disturbance and supported the local economy by utilizing local labor and trade contractors. Skanska strived to minimize environmental impacts during construction and implemented a comprehensive waste management program. Environmentally responsible construction materials were incorporated into the redevelopment and the project enhanced urban biodiversity.

Social Aspects

Reducing public disturbance

Skanska signed up to the Considerate Constructors Scheme, which aims to minimize local social and environmental impacts during construction. Skanska consulted with neighbors, and regular meetings and newsletters were organized to keep stakeholders informed. The works were planned as sympathetically as possible, for example, noisy activities were restricted to 2 hours on 2 hours off intervals to reduce public disturbance.

Occupational health and safety

There were no major accidents on site. Although there were a number of minor injuries during the project.

Healthy office environment

The energy efficient features incorporated into the building during the redevelopment were designed in close cooperation with the architectural and service engineering aspects of the project to ensure that the indoor environment was not adversely affected. The new glass façade allows natural light to penetrate the building and blinds were installed to reduce solar glare. Lighting was designed in accordance with CIBSE (the Chartered Institution of Building Services Engineers) LG3 to promote occupant wellbeing and health, and high frequency lighting was installed in all office areas to avoid the flickering effect of low frequency luminaries that can cause occupant discomfort. Heating and lighting controls allow occupants to control and optimize their local environment. Fan coil heating units, for example, are located every 3 meters along the internal and external perimeter of the building and lighting control devices do not serve more than 4 workstations or an office area of more than 28 m².



Functional and flexible building

Dashwood House was modernized to enhance the functionality and flexibility of the office space offered to tenants and to promote a long useful lifespan for the building. The office space has been fitted with state-of-the-art electronic and computer routing systems to provide tenants with modern IT and communications. The systems have also been installed in a manner that will facilitate system upgrades with new technology. An easy to use Digital Addressable Lighting Interface (DALI) was installed, which manages every light fixture in the building and is capable of accommodating any additional features and configurations required by future tenants.

The redevelopment created a column-free openplanned office space on each floor, which enables the efficient layout and organization of workstations and partitions. The offices were completed according to Category A standards, which includes a basic office fit out and provided tenants with the opportunity to customize their own space. All the office levels have the potential to be subdivided into two separate tenancies, each with their own washroom facilities and emergency exits. Acoustic breaks are installed to subdivide tenancies when necessary. The new steel framed floor structure is relatively adaptable for accommodating services and risers, compared with the old structure. Extractor ducts were also included on each floor to allow tenants to create a kitchenette if required.



Urban development

The project was designed to enhance the immediately adjacent public areas through landscaping and softening the existing environment around the ground floor. Surrounding areas were landscaped with grass and trees, large planters were positioned outside the front entrance and public seating areas were created. The existing vehicle service ramp to the building was covered by a new timber pergola and plantings with stainless steel trelliswork to soften its visual impact. Similarly, the existing vent structure on the eastern side of the building was obscured with timber and trelliswork. Dashwood House's new façade was designed to blend in with the surrounding urban environment that includes St Botolph's Church to the east of the site, which is a historically listed building. Intermittent vertical color elements reflect the colors of the surrounding local urban fabric, particularly the adjacent listed Turkish pavilion to the south.

Promoting more sustainable transport

Dashwood House has the maximum PTAL (Public Transport Accessibility Level) rating of 6 due to its excellent access to public transport infrastructure in central London. The building is approximately 50 m from Liverpool Street Station, which provides access to four London Underground lines and rail links to the east, and around 300 buses per hour pass close to the site during peak hours. The redeveloped site has no vehicle parking (only one disabled parking space on the ground floor), but bicycle and motorbike parking was created during the redevelopment. Bicycle storage for 57 bicycles, and shower and changing facilities are provided on the lower ground floor. The redevelopment also opened up pedestrian routes around the building and a pedestrian friendly open space was created in front of the building to enhance access. The retail areas face on to the public pedestrian area and Bishopsgate Courtyard gardens. Dashwood House consequently has relatively low transport-related CO2 emissions of approximately 360 kg/person/year, which was below the BREEAM lowest rating of 750 kg/person/year.

Economic Aspects

Local construction employment

180 construction workers per month on average worked on the site during the 21-month project. At the peak of construction, 263 workers per month were on site and around 65 percent of the workforce was from the London area. Most of the main trade contractors were also London-based.

Efficiency savings for tenants

The redevelopment transformed Dashwood House into a resource efficient office building that makes energy and water savings for tenants. An intelligent electricity monitoring, metering and billing system was installed to accurately bill tenants and to promote individual energy savings. Each tenancy



has the possibility to have three connections into the central metering and billing system, which enables tenants to monitor individual departments within their organization.

Environmental Aspects

Minimizing environmental impacts during construction

Energy consumption, water consumption, carbon emissions and transport to and from the site were monitored and reported on as part of the Considerate Constructors scheme throughout the redevelopment. Skanska also adopted good practice policies concerning air and water pollution to minimize and avoid environmental impacts.

Promoting urban biodiversity

Dashwood House is situated on a site in central London that has a low ecological value. However, the redevelopment sought to minimize impacts on existing urban ecosystems and to actually enhance local biodiversity. For example, Skanska avoided disturbing birds by scheduling potentially disruptive construction activities around the breeding season between March and July. The ecological value of the site was enhanced by creating planted areas around the building and by installing bird nesting boxes in appropriate locations around the site.

Waste management

Skanska monitored and minimized construction waste by sorting and recycling appropriate waste materials off site. 6,281 tons of waste was recycled in total, which was 85 percent of the total construction waste. The original Dashwood House building was recycled and incorporated into the redevelopment, and 13 stories and around 80 percent of the volume of the existing building was retained.

Environmentally responsible construction materials

The project incorporated materials that have a lower environmental impact and where possible were sourced from sustainable and recyclable sources. All timber, timber for formwork and other temporary site timber, such as site hoardings, were procured from certified sustainably managed sources, including the FSC (Forest Stewardship Council) and PEFC (Programme for the Endorsement of Forest Certification).

Energy efficiency

The redeveloped Dashwood House annually consumes around 2,086,000 kWh of electricity and 1,416,000 kWh of gas, which equates to 115 KWh/m² and 78 KWh/m² respectively. The redeveloped Dashwood House has a level B building energy rating and the building's fabric and the heating, ventilation, cooling and lighting systems have been designed to reduce energy consumption. The façade is clad in a double glazed high performance system on all sides and external solar shades help to avoid excessive solar heat gain. The walls, roof and glazed façades have u-values of 0.35 W/m²K, 0.2 W/m²K and 1.8 W/m²K respectively and the air tightness of the building is 3.16 m³/hr/m² (at 50 pa). A Building Energy Management System (BEMS) was installed to monitor and manage the building's energy consumption. The software-based system consists of a network of intelligent controllers distributed throughout the building. The BEMS controls the high efficiency boilers and chillers to ensure their optimal operation. Fresh air is supplied mechanically and heat is recovered from the stale outgoing air with an efficiency of 64 percent. Energy efficient lighting has been installed and the DALI lighting control system has daylight and occupation sensors that make energy savings. The building's logbook includes guidance for occupants about how to achieve ideal comfort whilst optimizing energy consumption.



Water solar heating

A roof-mounted solar hot water system, with 50 m² of panels, pre-heats the domestic hot water storage to 50 degrees C. The system annually generates approximately 20 MWh of hot water, and reduces the building's gas consumption by around 30 percent.

Greenhouse gas emissions

Dashwood House incorporates features that reduce the CO₂ and NOx emissions associated with its operational energy consumption. The building produces around 49 kgCO₂/m² per year, compared with conventional air-conditioned office buildings in the UK that consume between 70 and 130 kgCO₂/m² per year. High efficiency gas boilers have been installed to reduce the emissions of NOx to 48 mg/kWh, compared with the highest class 5 standard that requires emissions of less than 70 mg/kWh.

Water efficiency

Dashwood House has a range of water saving features and is designed to consume 2.6 m³/person/year - 60 percent less than what is considered 'good practice' for a UK office building. Water efficient fixtures include low-flow taps, fixtures with automatic shut off, efficient toilets and IR proximity sensor urinals. The water meters are connected to the BMS to monitor consumption and a water leak detection system has been installed. A rainwater harvesting system was installed to provide non-potable water for toilet flushing and landscape irrigation. The system has a rainwater collection area of 960 m² and diverts water into an underground storage tank with a capacity of 27,000 liters. The rainwater is filtered to remove any suspended solids, before being passed through an ultraviolet unit to sterilize the water to a non-potable standard. The storage tank is topped up with mains water during periods of dry weather or heavy washroom usage.

Reduced light pollution

All exterior lighting has been designed in accordance with the Institute of Lighting Engineers' guidelines to minimize light pollution. A timer has also been fitted to switch off external lighting between 23:00 and 07:00.

Learning From Good Practice

An estimated 70 percent of the existing buildings in London in 2010 will still be in use by 2050. The redevelopment of existing buildings into energy efficient properties is consequently of vital importance for meeting the UK's carbon reduction targets of 80 percent by 2050, and offers a huge potential market for Skanska.