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CityCronan, Sweden

Case Study 14

The CityCronan redevelopment project renovated a mixed-use property in Central Stockholm and was intended to be an environmental model by limiting the building's impacts throughout its service life.

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



Project Introduction

CityCronan is a mixed-use property in Central Stockholm that has undergone extensive redevelopment work. The original building was constructed in 1974 and was in urgent need of renovation. CityCronan is now a modern development comprising of offices, shops, restaurants and apartments.

Skanska Sweden carried out the US\$ 130 million project for Skanska Commercial Development Nordic (CDN) between 2000 and 2003. The project involved merging two buildings, constructing new facades, strengthening the entire structure with steel frames and improving the street environment around the CityCronan development. Sections of the CityCronan development were also vertically extended by 2 and 4 floors, on a design and build contract. The redeveloped property has a total floor area of 53,000 m², including 30,000 m² of

office space and 6,000 m² designated for retail outlets. 44 new apartments were created on the expanded upper floors, and an inner courtyard with a glazed roof has been constructed.

A Swedish construction industry magazine awarded the CityCronan project the Best Redevelopment prize in 2004 for the way in which the modernisation was carried out and for revitalising the surrounding neighbourhood. The project also won the Skanska Best Renovation and Upgrade project award in 2003. The CityCronan redevelopment was a model environmental project, which aimed to limit the building's impacts throughout its entire service life and to contribute toward the development of more resource efficient construction projects in the future. A lifecycle analysis was used to evaluate the building's components throughout their entire service life, from initial redevelopment, operation and future renovations to final demolition.

Contributing Toward Sustainable Development

CityCronan uses almost half the energy of the average CDN property in Stockholm, and has created healthy indoor environments for residents and tenant businesses. The mixed-use development revitalised an inner city neighbourhood and has promoted sustainable urban living by providing opportunities for living, working and shopping in central Stockholm. Stakeholders were involved and informed during the design and construction stages and the project is thought to have raised awareness of more sustainable buildings within the construction industry through media coverage of the project and by encouraging project partners to be more sustainable. The CityCronan project utilised employees, contractors and services from the Stockholm region, and all project partners followed thorough occupational health and safety measures. The CityCronan environmental programme focussed on minimising impacts during construction, waste management and recycling, environmentally responsible construction materials, and energy and water consumption during operation.

Social Aspects

Stakeholder communication

Skanska Sweden worked in close cooperation with the client Skanska CDN. The project was also highly focused on the needs of the tenants and both Skanska business units worked with tenants to fully meet their needs. CityCronan tenant retail outlets remained open throughout the construction phase and communication was vital so as to avoid excessive disruption to everyday activities.

Occupational health and safety

There were no reported accidents on the CityCronan project, which prioritised site safety for all project partners. All staff and contractors underwent safety training and were made aware of the site safety rules. Weekly safety briefings were posted on notice boards in the site offices and on-site briefings were held with a fire inspector throughout the project. Potentially hazardous demolition materials, such as asbestos, were identified before demolition and procedures were established that detailed how to deal with such materials.

Creation of healthy indoor environments

The CityCronan redevelopment has created healthy environments for living, working and

shopping by minimising indoor pollution, electromagnetic radiation and radon levels. The toxicity levels of all materials and substances, such as paints and carpets, were tested and approved prior to installation in order to minimise indoor pollution. Radon, which can cause health problems, was measured to be 70 bq/m³ compared to the Swedish standard of 200 per bq/m³. Electric fixtures with low magnetic radiation were selected to limit electromagnetic radiation to less than 4 V/m, and electrical junction boxes were situated away from frequently occupied areas in the offices.

Promoting sustainable urban living

CityCronan provides space for living, working, shopping and recreation in Central Stockholm. The development has good access to shops and amenities and is located 200m from the Hötorget Stockholm City metro station.

Raising awareness of more sustainable buildings and construction

The CityCronan project was designed to serve as a model for resource efficient construction projects within Skanska and the wider construction industry. The project pioneered the use of the life cycle analysis approach for energy and resource usage, which has become increasingly common among Skanska projects. Skanska also encouraged suppliers and contractors to think more sustainably by demanding high standards of construction materials and worker conduct. Approximately 20 guided site tours were held for construction associations, students, politicians and Skanska personnel from other projects to raise awareness of more sustainable construction techniques. The CityCronan project also received attention from construction industry media.

Economic Aspects

Construction employment

Approximately 280 construction workers were involved in the CityCronan project. Between 30 and 40 percent of the workers were from central Stockholm and many were from the surrounding region.

Regional construction materials and services

Most of the supplier and subcontractor companies used on the CityCronan project were Swedish, including production, delivery and mounting services and materials such as wood, windows and glass partitions. Furnishings were procured from the Stockholm area.

Efficiency savings for tenants

In 2004 CityCronan used almost half the energy of the average CDN property in Stockholm. Water efficient fixtures have been installed throughout CityCronan, including low-flow toilets and taps. CityCronan's energy and water efficiency measures constitute financial savings for tenant residents and businesses. Electricity, water and heating are also billed individually to encourage tenants to monitor their consumption and make further savings.

Urban redevelopment

Prior to the redevelopment, the CityCronan building had been criticised for being unimaginative and characterless, and the surrounding neighbourhood was associated with social problems. The building's facades have been modernised and improved street lighting and wider pathways have created a vibrant office and shopping quarter in central Stockholm. The redevelopment has brought more residents into the neighbourhood, which may benefit local businesses and services, and the mixed-use nature of the development has increased the level of pedestrian and retail activity throughout the day.

Environmental Aspects

Environmental programme

A comprehensive environmental programme was implemented to limit the environmental impacts throughout the entire life span of the CityCronan

building. The programme focussed on impacts during construction, waste management, construction material selection, and energy and water consumption during operation. There were over 80 environmental measures implemented during the project and regular environmental inspections were conducted to identify potential risks during the construction phase. The entire project team, including subcontractors, were engaged in environmental issues, which were discussed in both ordinary project meetings and separate environmental meetings.

Minimising environmental impacts during construction

Air pollution was minimised by using cleaner motor fuels, catalytic converters and electrical machinery where possible. Skanska informed the CityCronan retail outlets of potential noise disturbances and loud construction activities were scheduled to have minimal impact on their businesses.

Waste management

The CityCronan project had higher recycling targets than any previous Skanska Sweden project and over 75 percent of the construction waste was recycled. A waste management strategy was developed and a waste manager, solely responsible for waste recycling, was hired to oversee the sorting and recycling processes. A detailed inventory was made in the project planning stages to identify materials that could be recycled during the



redevelopment, including doors, glass partitions, windows, electrical lighting, furniture, wood, tiles, concrete, plasterboard and insulation fibre. Materials were ordered in large consignments to reduce the amount of packaging waste.

Non-toxic construction materials

Skanska and the project subcontractors checked all construction materials against Skanska Sweden's list of approved substances, which excludes banned substances and chemicals that are being phased out. Non-toxic materials were used, such as environmentally certified flooring and wall paints. Materials with minimal toxicity were only used when non-toxic alternatives were unavailable, and such materials were well documented in the CityCronan building plans. The use of PVC plastic was strictly limited, and lead-free PVC was used where alternatives could not be found. Halogen-free plastic electric cables were used throughout the building, which are non-toxic and do not contribute to indoor pollution. The majority of fixtures installed in the building are easily repairable and replaceable to minimise the extent to which entire systems would have to be replaced in the event of a fault.

Energy efficiency

CityCronan annually consumes approximately 80 kWh/m², which was 65 kWh/m² less than the average CDN Stockholm property when the development reopened, excluding tenant electricity usage. The energy efficient ventilation system uses large duct dimensions to maintain a low-airflow and the system follows a simple design to facilitate any future alterations to the system that may be required. A heat recovery unit recycles over 55 percent of the energy from outgoing air. The walls, roof and floors have been well insulated and CityCronan is equipped with energy efficient windows to minimise heat loss. The windows also reduce the need for cooling in the summer by reflecting 85 percent the sun's energy and exterior blinds are fitted over south-facing windows to avoid excessive solar heat gain. Large windows maximise natural light within the building and reduce the need for artificial lighting. The stair and hallways are fitted with low-energy lighting systems and occupancy sensors, and all communal washing machines and kitchen appliances are energy efficient.

Contributing toward Skanska CDN's environmental objectives

CityCronan was constructed in accordance with Skanska CDN's environmental policy, which considers the entire life cycle of the building.

The policy is aimed at improving the environmental status of every CDN property by reducing energy consumption and phasing out potentially hazardous substances.

Green roofing

Sections of the roof are covered with sedum vegetation, which absorbs rainwater, provides additional insulation, creates habitats for wildlife and reduces the urban heat island effect. The vegetation is drought resistant and reduces runoff during wet weather by absorbing water. The sedum roof provides additional insulation by retaining heat during cold weather and maintaining a relatively cool temperature during warm periods. Roof vegetation constitutes an urban habitat for insects and other wildlife and absorbs atmospheric pollution. CityCronan's green roofing contributes toward a reduced urban heat island effect in Central Stockholm by decreasing the extent of dark and paved surfaces.

Recycling facilities

The individual offices and apartments are equipped with recycling facilities. There is also a recycling station for residents on the ground floor to allow the sorting of household waste, plastics, paper, glass and metal.

Learning From Good Practice

CityCronan was a model project, which set new standards for more sustainable construction projects within two Skanska business units and the wider construction industry.

