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Riverfront Park Redevelopment, USA

Case Study 141 The Riverfront Park Redevelopment project created a new public park and amphitheatre on a brownfield site in downtown Nashville. The project achieved LEED Gold certification.

Aspects of Sustainability

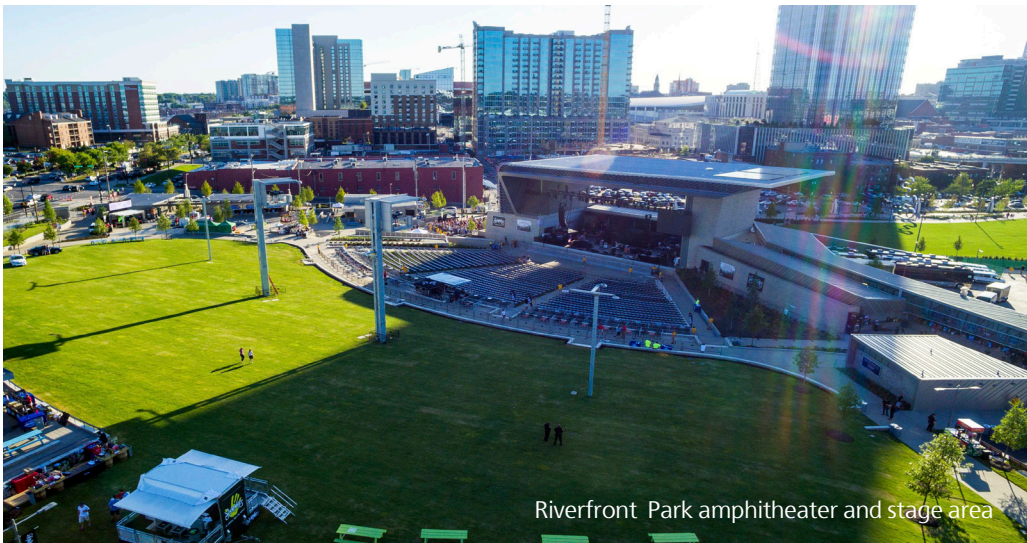
This project highlights the following:

Green Aspects

- Energy
- Carbon
- Materials
- Water
- Local Impacts

Social Aspects

- Human Resources
- Corporate Community Investment
- Business Ethics
- Health and Safety



Riverfront Park amphitheater and stage area



“This site is the last great vestige of open space in downtown Nashville, and I can’t think of a better use for such a beautiful green space than a world-class park, coupled with a spectacular performance venue to showcase all that Music City has to offer.”
- Karl Dean, Mayor of Nashville

Project Sustainability Highlights

Economic

- Greatly exceeded the project's Diversity Participation Goal of 20% project expenditure made to minority-owned, female-owned and small businesses
- Reduced utility bills throughout the project lifespan

Green

- 22% less Energy than LEED baseline
- 88% of construction waste diverted from landfill
- 30% less potable water than LEED baseline

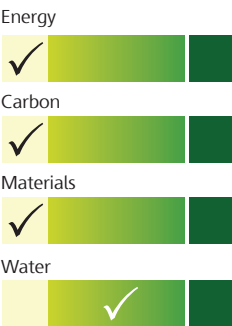
Social

- Zero lost time accidents

Project Introduction

The Riverfront Park Redevelopment project has created a unique event venue and park space that is open year-round to the public in downtown Nashville. The 4.5-hectare site previously accommodated a waste incineration plant that was demolished in 2004. This first phase of the Riverfront Park redevelopment is part of a larger US\$ 35 million master plan that will transform over 7 hectares of land on both banks of the Cumberland River into downtown park space.

Skanska carried out the first phase of the Riverfront Park redevelopment for the Nashville Metro Council. The project includes a 6,000 m² event lawn known as ‘the Green’, a bowl-shaped outdoor amphitheater with a 30 m wide stage and a two-story amphitheater building. The amphitheater can accommodate up to 6,800 people in total with a mixture of semi-fixed and temporary seating, and is designed to host a variety of music and community events.



The amphitheater facilities include an artist wing, operator offices, dining and event space, restrooms, first aid and sound control for events. The park also includes almost 2 km of multi-use greenway trails, Nashville's first urban dog park, ornamental gardens, outdoor workspaces, and sport and exercise facilities, including two basketball half-courts. The park has been extensively landscaped and offers public Wi-Fi in select areas. Construction on the first phase began in 2014 and was completed in the summer 2015.

The Park was originally designed to achieve LEED Silver certification, but Skanska secured enough LEED points during construction to achieve Gold. LEED is a voluntary U.S. Green Building Council (USGBC) certification process intended to encourage and guide the construction of green buildings.

Contributing Toward Sustainable Development

The Riverfront Park Redevelopment project transformed a large brownfield site in downtown Nashville into a unique event venue and park space. Furthermore, the park uses around 22 percent less energy than the LEED energy baseline and approximately 6 percent of its energy needs are met by on-site renewable geothermal and solar energy generation systems. The park is designed to use around 30 percent less potable water than the LEED baseline and a rainwater harvesting system has been installed. Riverfront Park has also been designed to promote biodiversity, reduce the risk of flooding in downtown Nashville and encourage more sustainable modes of transport by creating an important link in Nashville's walking and cycling greenway network. During construction, the project had ambitious waste management objectives and succeeded in diverting 88 percent of construction waste from landfill. Local environmental risks were mitigated during

construction, particularly concerning site erosion and water pollution. There were no lost time accidents on site and the team had a very strong safety culture. The project benefitted the local economy and Skanska managed a program to hire minority-owned, women-owned and small businesses as subcontractors and vendors.

Green Aspects

Energy

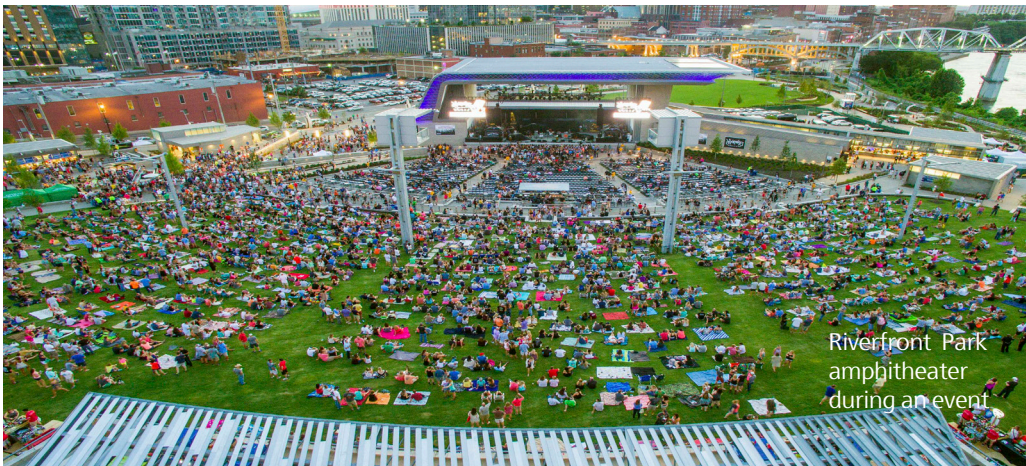
Energy efficiency

The park uses around 22 percent less energy than the LEED energy baseline for the site. Energy efficient LED fixtures have been installed in the park along with an advanced control system, which allows the lighting level throughout the park to be adjusted on command to optimize energy use.

The amphitheatre building is equipped with an efficient Variable Refrigerant Volume (VRV) highly efficient commercial HVAC (Heating Ventilation and Air Conditioning) system. The system moves heat and cooling around the building as needed by providing either heating or cooling via a network of ceiling-hung indoor units. Carbon dioxide sensors have been installed within each densely occupied space to optimize HVAC energy use.

Renewable energy

Around 6 percent of the park's total energy needs are met by renewable energy generated on-site with a geothermal heating and cooling system. The system includes 62 boreholes that are around 90 m in depth, and is able to provide approximately 420 kW of heating and cooling. The park also has an outdoor public solar mobile device charging station that is equipped with three 20 W solar panels and can charge a range of personal devices such as phones, tablets and mp3 players. A 168 W-hour battery allows the station to charge devices during the night or on cloudy days.



Materials

Waste management during construction

The project had ambitious waste management objectives and diverted 88 percent of construction waste from landfill. The team held a pre-construction meeting with the waste contractor to identify the major sources of construction waste that would be produced by the project and how waste sent to landfill could be minimized.

Comingled recycling is supported in Nashville and site waste was dumped into containers that were sorted off site by a waste management company. The waste was then reported back to Skanska in detailed monthly reports. The Waste Management Plan was communicated to all subcontractors during the project orientation and the plan was regularly reviewed during subcontractor coordination meetings. Over 1,800 tons of construction waste was diverted from landfill in total. The team worked with the fencing subcontractor to renovate a portion of the existing site fencing and found a local company that could reuse the redundant fencing, which avoided the creation of almost 5 tons of waste material.

Environmentally responsible materials

Low emitting adhesives, sealants, paints, flooring systems and wood products have been used in the amphitheater building.

Operational waste management

The amphitheater building is equipped with three interior recycling stations and two exterior recycling dumpsters in the loading dock. The ticketing and food preparation areas also have large recycling stations. Recycling facilities are designed to receive paper, cardboard, glass, metal and plastics.

Water

Water efficiency

The park is designed to use around 30 percent less potable water than the LEED baseline for the site. The amphitheater building is equipped with water efficient and low-flow bathroom fixtures. A rainwater harvesting system ensures that no potable water is used for irrigation. Local and native plants and grasses have also been used in the landscaped areas to reduce the demand for irrigation.

Stormwater management

The site has a rainwater harvesting system that collects rainwater from the amphitheatre building and the surrounding hardscape into a 1,500 m³ underground rainwater cistern under the artist wing. The system supplies water to the nighttime irrigation system, and is topped up with groundwater via pumps during periods of low rainfall but when irrigation is required. The park also has a 190 m² rain garden to allow excess stormwater to infiltrate the ground and reduce stormwater runoff.

Other Green Aspects

Reducing local environmental impacts during construction

The project is adjacent to the Cumberland River, and measures were taken to minimize soil erosion and the possible sedimentation of waterway. Biweekly soil erosion inspections were carried out at least 72 hours apart and rainfall was monitored on a daily basis. Soil erosion and sedimentation were part of worker training, and corrective action was required following maintenance checks and observed deviations from approved practice. Erosion control measures included drain inlet protection and silt fence socks around the perimeter of the site, which allow water to flow through while trapping silt.



Other measures included a wheel wash at the construction entrance/exit, temporary sediment basins and dust control measures.

Risks associated with oil spills were mitigated by using designated refueling stations situated away from drains and watercourses, not storing bulk fuel on site, and regular equipment inspections and maintenance. Spill cleanup kits were located in the Skanska project office, and all subcontractors with equipment onsite were required to have their own spill kits.

A Master Chemical Inventory List specific to the project was kept and updated regularly. Paint brushes were washed in a designated area and rinse water contained and disposed of properly.

The team also worked to reduce the energy they used on site during construction. For example, energy efficient project lighting was used throughout the site and programmable thermostats were installed in the Skanska office along with a power down function, which allowed lighting, office equipment and heating to be switched off at night and over the weekend when possible.

Green roofing

The amphitheatre building has 325 m² of sedum green roofing in total over the back stage area and the ticketing booth. Green roofing provides additional thermal insulation and extends the roof's lifespan by protecting it from weathering and UV light. In addition, roof vegetation can filter airborne pollution and reduce stormwater runoff.

Promoting biodiversity

225 trees have been planted in the park, including 36 different species to promote biodiversity and a varied habitat for urban wildlife. The park is in the process of achieving the status as an arboretum, which requires an exhibit of at least 30 different tree species according to the Tennessee arboretum standard.

Flood mitigation

The park is at the risk of flooding from the adjacent Cumberland River. Phase 1 of the Riverfront Park Redevelopment has an integrated flood mitigation wall that is designed to protect parts of downtown Nashville against 500-year flood events. The wall consists of a below-grade seepage cut-off wall that is 2.5 to 10.5 m in depth and has been constructed along the full length of the park. The flood mitigation wall is designed to significantly slow down the underground movement of water in the event of a flood in downtown Nashville. Less than 1 m of the wall is above ground and forms a decorative garden and seat wall capped in limestone.



Public solar charging station

Social Aspects

Community communication

The Nashville Metro Council held over 250 meetings with local community groups during the planning of the project. The park was consequently designed to create an enjoyable space in downtown Nashville for people of all ages and interests.

Occupational health and safety

There were no lost time accidents on the project. The team had a very strong Injury Free Environment® (IFE®) culture. IFE is a cultural aspect of Skanska's safety program, which promotes a work environment intolerant of injuries and incidents and goes beyond standard safety practice in the USA.

Various IFE orientations and training sessions were held for Skanska and subcontractor workers, as well as IFE Supervisor Skills training. One employee was recognized each month for safety excellence and the team had a project board where everyone posted photographs of their families, which served as a reminder of the importance of returning home safely. Other health and safety initiatives included 'stretch and flex' sessions every morning to warm up before work followed by coordination team meetings and pre-task planning, which included safety considerations, before commencing particular tasks.

Healthy indoor environments

The amphitheatre building is designed to promote health indoor environments for occupants. Low-VOC substances have been used in the building that promote good air quality and carbon dioxide sensors ensure densely occupied spaces are adequately ventilated. The building has extensive glazing to allow natural light to penetrate the building, and spaces can be easily adjusted to suit occupant preferences.

Contributing toward sustainable development

The site in downtown Nashville was previously a waste incineration plant that failed to meet air pollution regulations, before being derelict for 10 years. In contrast, the Riverfront Park provides an extensive public green space and allows various recreational activities in downtown Nashville, from fitness equipment and the first urban dog park in Nashville to outdoor workspaces with public Wi-Fi connectivity.

Promoting more sustainable modes of transport

The park has good pedestrian connectivity that facilitates walking from downtown Nashville and to East Nashville over the John Seigenthaler Pedestrian Bridge. Furthermore, the park is an important part of Nashville's greenway network, which connects two existing greenways through downtown – the Rolling Mill Hill greenway to the south and the MetroCenter Levee greenway to the north. The project has consequently created a continuous walking and cycling greenway trail over 9 km in length.

Bicycle racks are provided to encourage cycling and the park is 300 m from a light rail station. The site provides no vehicle parking.

Economic Impacts

Local economic benefits

Over 1,500 people worked on the construction site, and the majority of the workforce was from the Nashville area. Around 75 percent of the project's subcontractors by value were based locally.

Diversified Business Enterprise (DBE) program

Skanska ran a successful DBE program, which hired minority-owned, women-owned and small businesses as subcontractors and vendors for a significant proportion of the project expenditure. The project had the minimum DBE requirement of 20 percent, which was greatly exceeded. The team worked closely with the local authorities to identify DBE firms early in the project, and Skanska organized outreach events to meet and encourage DBE companies to support the Riverfront Park project. DBE firms included the steel and electrical companies.

Learning From Good Practice

Skanska's approach to minimize the detrimental environmental impacts of the project and enhance the socio-economic benefits by exceeding project requirements contributed toward the project's success.

