Growing Up Rooftop Garden

Location:
131 Queen St Melbourne, Victoria
Completion Date:
July 2010
Cost:
$219,000
Area:
200 m² on an existing building

Description
The roof space is surrounded by a 1.2 m high balustrade above the 8th floor of the building. The rooftop garden total area is 200 m², with planter boxes occupying 48 m², and a central ‘hill’ area of 43.5 m².

A trafficable zone expands and contracts around a central landscaped hill to create a number of gathering spaces of various scales and orientations. Bound by edges of seating and planting, inhabitants are surrounded by greenery.

About half of the 131 Queen Street roof area is occupied by plant and machinery: this is screened and separated from the accessible roof garden area by a picket fence.

An additional 38 m² green roof space (not publicly accessible) was installed above the lift motor room. This is part of an Australian Research Council Linkage Project Grant carried out by The University of Melbourne’s Green Infrastructure Research Group, to investigate the performance of plants on green roofs in a variety of growing substrates.

Introduction
131 Queen Street is managed by Quayle’s Owners Corporation Managers. The building was constructed in 1896 and the tenants include a range of private and public organisations. It was intended that the rooftop garden be used for lunch and recreational breaks, meetings, workshops and classes, as well as special events.

Growing Up was built after the Committee for Melbourne ran a design competition for a green roof. The Committee identified three potential CBD rooftops and ran the competition to demonstrate how a “vibrant, innovative and contemporary urban green space” could be created on a rooftop. Safety, maintainability, and durability were key considerations for assessment of entries in the design competition.

Bent Architecture won the design competition with its “Head for the Hill” submission, based on the roof at 131 Queen Street.

The builder was Better Projects Australia and engineers were Clive Steele Partners. The University of Melbourne provided guidance on substrate and planting design.

The project budget was $200,000, with additional in-kind support provided by sponsors; for instance, VicUrban (the State Government’s former development agency, now Places Victoria) provided a project manager to oversee construction and ensure that partners’ objectives for the project were met.
Design and Components

The roof’s weight loading is for a dead load of 300 kg/m² and a live load 150 kg/m². Total carrying capacity is 100 people. The weight loading precluded the original design from being realised, which was a hill with a large volume of soil and a mature tree growing on it. Instead a sculpture tree was constructed and covered with Wisteria and a hill made from recycled, expanded polystyrene covered with a small volume of substrate and succulents.

Drainage outlets along perimeter walls lead to concealed downpipes. The roof deck is steel framed with precast concrete roof slabs and sand cement screed over to create fall from the roof to drainage outlets.

A new Polyseal Enviro 800 Pur Topcoat polyurethane waterproofing membrane was installed over the existing membrane. This carries a seven-year warranty. Elmich VersiCell® structural (weight-bearing) drainage modules were installed underneath pervious paving material. The open drainage layer allows free flow of water through to the waterproofed roof deck. No changes were made to the pre-existing drainage points. ZinCo Filter Sheet SF was used over the drainage modules.

The growing medium (saturated bulk density 750 kg/m³) was mixed by Debco to a recipe specified by The University of Melbourne’s Green Infrastructure Research Group. Growing medium is used at depths of 200 mm in shallow planter boxes, and 400 mm in deep planter boxes. The same growing medium is used on the ‘hill’ at a depth of 200 mm over most of its face, although the depth increases to 400 mm depth at the top and on the western face of the hill, to allow for the expanding root system of the Chinese Wisteria. The build up of the hill is created from recycled expanded polystyrene blocks, overlaid with an Elmich VersiWeb® 200 mm deep cellular confinement system to contain the growing substrate. The hill is covered with geotextile, and plant root masses were installed into slits cut into the fabric.

The substrate and plant selection was made with consideration of the Growing Up team’s desire to install a sustainable green roof that did not require irrigation. However, after project handover, the building owners installed a drip irrigation system for use particularly during harsh summer weather conditions. Captured rainwater is supplied to the productive garden and perimeter planters, but the hill zone is flourishing without irrigation.

Plants were supplied in a range of sizes, from tubestock, and 14 cm through to 30 cm containers from members of the Nursery and Garden Industry Victoria. The University of Melbourne’s Green Infrastructure Research Group grew most of the succulent plant species that were installed as tubestock. A total of 1,664 plants were installed.
## Maintenance

The garden is maintained once a month by a horticulturalist, and the building management team carries out some maintenance in between these scheduled visits.

Plant nutrition is provided as eight to nine-month low phosphorus controlled-release fertiliser, applied at half the recommended rate, as required.

## Cost

Costs of project components:

- **Timber and metal work** $135,850  
  (including planter boxes, seats, pergola, roof lift, access ladder, fencing and sculpture)
- **Building preparation works** $14,500  
  (including scaffold, handrail, crane)
- **General construction items** $35,608  
  (including roof access anchors, signage, light, power and plumbing and upgrades for Building Code of Australia compliance)
- **Roof garden construction items**  
  - Permeable paving $23,220  
  - Ronstan cables $2,000†  
  - Plants $5,000  
  - Rainwater tank & pump $2,500  
  - Elmich green roof system in-kind*  
  - Growing media in-kind‡  
  - Plants in-kind§  
  
  **Total** $218,678

† Further structural rod & cable systems for green walls and landscaping and cable systems for balustrades and railings were provided at cost price by Ronstan Tensile Architecture, a sponsor of Growing Up

*The green roof system and labour for installation was provided as in-kind support by sponsor Green Roof Technologies, this had an estimated value of $60,000

§ Provided as in-kind support by sponsor WeBlow

Provided by sponsors Proteaflora, Aloe-Aloe Horticulture, Merrywood Plants and Majestic Plants, this had an estimated value of $8,500

## Results and reflections

The rooftop has been popular and is used throughout the year as a social space by the building occupants. The rooftop can be booked for functions and is open annually to the public as part of The Committee for Melbourne’s ‘Melbourne Open House’.

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*Images in this case study courtesy Diana Snape Photography, for Bent Architecture.*