

Meadowbank Station Stormwater Treatment System

SUPPLEMENTARY INFORMATION

The case study for this project is found at www.parramattariver.com.au

This is additional technical information to supplement the case study.

The site is in a commercial and industrial catchment area of approximately 1.2 hectares.

Underneath the site is predominantly rock. Whilst this created a challenge for excavation, it also meant that the garden beds and tree pits did not need to be lined with plastic or artificial material because the rock forms an impermeable layer.

The garden beds and tree pits contain filter media and an aggregate layer at the base. Agricultural drainage pipes within the aggregate layer convey filtered water back to the stormwater network for discharge to the Parramatta River.

The size of the rain gardens was restricted by the location, which is heavily used by pedestrians and cars. MUSIC modeling was undertaken to determine the size of the rain gardens and to predict levels of nutrient and sediment removal.

The garden bed on the corner of Railway and Constitution Roads also treats rainfall runoff collected on the roof of the adjacent building. The downpipe from this building discharges into the easternmost corner of this garden bed and is lined with rocks in this area to prevent erosion of the soil media due to high flow velocities.

The tree pits are approximately 2m³ in size, which provides an ideal volume of filter media for biofiltration. The inlet to the tree pits and the garden bed on the corner of Railway and Constitution Roads is a rounded open kerb inlet. The tree pits are each covered with a steel grate that is flush with the level of the pavement.

The construction of this system also presented other significant challenges:

- During construction, rock was encountered 400mm below the surface, requiring saw cutting and rock hammering. This rock substrate had not been anticipated and the construction methodology and equipment had to be changed to correctly break and dispose of the rock. This added to the project costs.
- Some underground services got damaged and slowed down the excavation process. This demonstrated the need to manually excavate around underground services and to keep a radio service locator on site.
- There was a problem with contamination of one rain garden during paving works. A contaminated filter medium needed to be excavated and replaced.
- Some surface flows from the pedestrian areas were not draining into the railway station garden bed. Because of the rock underneath and limited space, the garden bed and overflow pit had been installed 150mm too high. After construction, a small weir was added along the pavement to capture surface flows downstream of the pedestrian area in a trench grate and pipe the water into the garden bed. The garden bed was also retrofitted with a correctly installed overflow pit, lined with rocks and replanted to prevent erosion.
- When directing the surface runoff, the presence of an elevator shaft several metres from the rain garden also had to be taken into consideration. Modeling had to be undertaken to prove that the garden bed and flow diversion mechanisms were not going to increase the extent of the 5 Year ARI (average rainfall intensity) which would have impacted on the nearby elevator shaft.

- During a site inspection in mid 2010, it was found that a vehicle had driven over and broken one of the steel grates covering a tree pit. These grates are designed to withstand heavy loads from vehicles, so this damage should not have occurred and the grate (approximately \$1,000 in cost) had to be replaced. Council will look into retrofitting the inlets to still allow water flow into the pits but prevent vehicles from driving up onto the tree pits.
- Similar to the experience at the Church Street South demonstration site, several months after completion of the system, some of the work at the site had to be removed to access underground services. In mid 2010 RailCorp had to undertake trenching works in the immediate vicinity of the railway station garden bed, which damaged part of the garden bed and some pavers that were laid as part of this project. This situation cannot be avoided and is typical in a highly urbanised area where many services are located underground.

Regular maintenance of the site includes:

- **Quarterly:** weeding.
- **As required:** removal of litter to prevent blockage of the system.
- **As required:** watering of the garden beds and street trees during dry periods, as they are not connected to an automatic irrigation system.

General inspections of the system will also take place to report any damage to system components.

Maintenance is minimal because the main components (vegetation and soil media) are designed to blend together over time.