

Case Study 3



Detention Swale at Goldenfields Reserve

WATER SENSITIVE URBAN DESIGN SYSTEM

- Ornamental detention swale

LOCATION

- The Golden Way, Golden Grove

AVERAGE ANNUAL RAINFALL

- 450 mm (Parafield, 100-year average)

YEAR ESTABLISHED

- July 2007

RESPONSIBLE AUTHORITY

- City of Tea Tree Gully

Case study prepared by the City of Tea Tree Gully, Parks Assets Department, February 2010



Source: City of Tea Tree Gully

Background

This is one of several case studies providing examples of bioretention and swale systems that have been incorporated into landscaping in public spaces.

Project objectives

The project aims to:

- filter run-off from the extensive netball courts in the Goldenfields Reserve
- improve safety and enhance community access along the streetscape
- improve public access from the netball courts to the Golden Grove Police Station entrance and Goldenfields Reserve
- demonstrate water sensitive urban design concepts to the community
- ensure enhanced water quality for planned downstream wetland storage by detaining peak flows and moderating water flow
- harvest site water to improve the health and vigour of natural and self-sustaining plantings.

Project description

The project involved the construction and landscaping of a high-flow detention swale and filter system for the downstream treatment of netball court run-off in the Goldenfields Reserve.

Landscaping around the nearby police station was the catalyst for enhancing the area and resulted in the original open swale being filled for new car parking.

The project required careful planting and swale lining to ensure stability during high-flow events.

The swale fills to capacity at least two to three times a year during high rainfall events and fills to half capacity during most average rainfall events.

Lessons learned

Timing—A dry winter in 2007 allowed the work to be completed during a three-week period without damage by flooding.

Materials—Jute mat was used under the rock layer, which prevents natural generation of aquatic species in the base of the swale.

Public use—The area around the site has proven popular, with people stopping for viewing and resting, which was not expected when the site was originally designed.

Weed control—Suckering of nearby street trees could become a long-term management issue for this site and the surrounding areas. Selecting plants to grow in the existing site subsoils has helped minimise weed issues.

Safety—The open view between the police station and the swale allows for good surveillance and improved community safety.

Vegetation—Overall, the plants on the site are growing well, with only the *Isolepis nodosa* and *Lomandra 'Katrinus'* showing signs of water and heat stress.

Soil specifications

To reduce weed growth, an imported sandy loam was used for topsoil in the upper parts of the swale, with existing clay soil deeply ripped for lower planting areas.

Large rocks were backfilled with the sandy loam to aid establishment of shrubs; this proved to be very useful in achieving early ornamental success in the lower clay areas.

Vegetated embankments: 100 mm sandy loam

Rock backfilling: 200 mm sandy loam

Lining: jute mat

Sump/invert: existing site sub-base (no over excavation); 100-200 mm diameter coarse rock and 0.5 m² quarry rock spoils.

Maintenance suggestions

- Regularly assess the site for suckering of nearby street trees and remove the shoots before they develop (the rootstock can be a fast-growing weed and have thorns, which are not appropriate for public spaces).
- Allow natural regrowth over time in open areas once weed species are eradicated and remove pioneering plants as more robust, long-lived species mature.

Species used in swale (see landscape design plan)

Scientific name	Common name	Observations in February 2010
<i>Dianella revoluta</i>	Little Rev	Planted winter 2007 <ul style="list-style-type: none">• Plants are growing very well as general landscaping on the lower sides of the swale away from the permanently wet areas and behind swale defining rocks.
<i>Dianella revoluta</i>	Baby Bliss	Planted winter 2007 <ul style="list-style-type: none">• Plants are growing very well as general landscaping away from the wet areas of the swale.
<i>Hardenbergia violacea</i>	Purple Coral Pea	Planted winter 2007 <ul style="list-style-type: none">• Plants are establishing well.
<i>Eucalyptus fasciculosa</i>	Pink Gum	Planted winter 2007 <ul style="list-style-type: none">• Plants are establishing well
<i>Lomandra longifolia</i>	Katrinus	Planted winter 2007 <ul style="list-style-type: none">• Plants are located away from the wet areas of the swale; some are showing signs of water stress.
<i>Lomandra longifolia</i>	Tanika	Planted winter 2007 <ul style="list-style-type: none">• Plants are growing well on the edges of the swale.
<i>Eucalyptus maculata</i>	Spotted Gum	Planted winter 2007 <ul style="list-style-type: none">• Plants are establishing well.

Species used on sump/invert (see landscape design plan)

Scientific name	Common name	Observations in February 2010
<i>Isolepis nodosa</i>	Knobby Club-rush	Planted winter 2007 <ul style="list-style-type: none">Located on the edge of the swale, these plants are showing some signs of water stress.Pruning back the plants may enable them to increase nutrient uptake and maintain their dark green, reed-like foliage.Natural succession occurring in the jute mat.
<i>Acacia melanoxylon</i>	Blackwood	Planted winter 2007 <ul style="list-style-type: none">Plants are growing well on the mid to upper sides of the swale.
<i>Juncus pallidus</i>	Pale Rush	Planted winter 2007 <ul style="list-style-type: none">Plants are growing well on the edge of the swale with natural succession occurring in the jute mat.More planting of this species would be useful to keep debris away from the sump and reduce downstream movement.

Planting-related lessons learned

Overall—A good design process and the visual quality of the final product is critical in a highly urbanised area.

Plant densities—Plant densities in lower areas of the swale could have been higher to aid early establishment. The base of the swale was kept plant-free to aid weed control.

Tree spacing—Additional upper storey trees could have been planted on the upper swale sides to aid long-term weed control. This was not done, however, as surveillance from the police station was a priority and retaining views of the station from the swale was an important urban design principle.

Selection of species—More *Juncus pallidus* could have been used around the sump/invert at the base of the swale to reduce litter entering the sump. Two dry seasons have affected the growth of the *Isolepis nodosa*, which may require more regular flood events.



Source: City of Tea Tree Gully

Completed swale and rock lining (looking towards sump)



Source: City of Tea Tree Gully

View from the street towards the Golden Grove Police Station after planting



Completed landscaping



A sucker (weed with thorns) from an adjacent street tree



Isoplepis nodosa, showing signs of water stress, on the edge of the swale



Source: Department of Planning and Local Government

Lomandra 'Katrinus' in general landscaping showing signs of a lack of water and heat stress



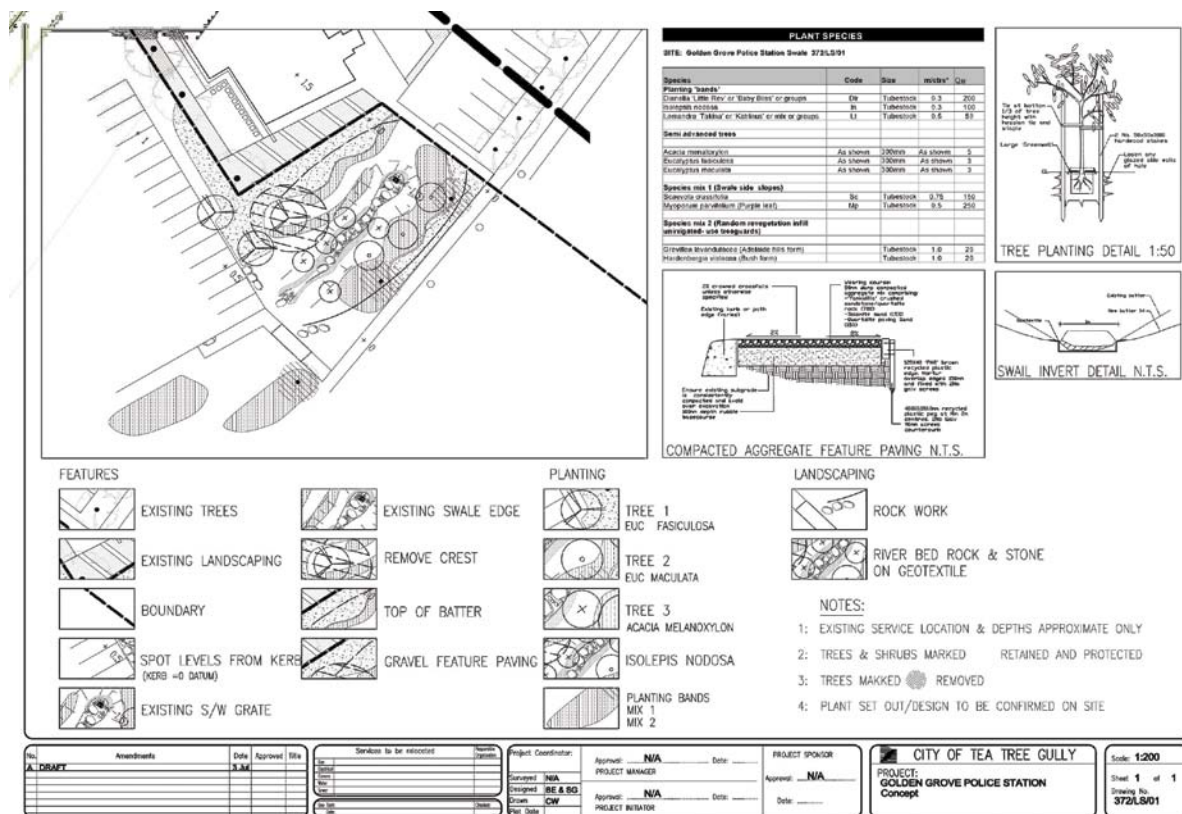
Source: Department of Planning and Local Government

Condition of the detention swale in February 2010



Source: City of Tea Tree Gully

Sump outlet showing well established plantings of Isolepis nodosa





Source: City of Tea Tree Gully

The state of the site after two growing seasons; Plants growing well on the site, with only Isolepis nodosa and Lomandra 'Katrinus' showing signs of water and heat stress

The project described in this case study was undertaken with the support of



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