

Stormwater and Sediment Field Day

Auckland Botanic Gardens 2008

Demonstration Swale

The swale constructed for the 2008 ARC Stormwater and Sediment field day has been installed to highlight the main features of this stormwater treatment practice. It is a retrofit-type situation, demonstrating the suitability of a swale as a stormwater conveyance system which also provides quality treatment. Key design features of the Botanic Garden's swale include:

- 600m² contributing catchment
- ~20m long
- 2.5% slope
- 150mm deep, 350mm bottom width, and 4:1 side slopes
- 0.003 m³/s water quality storm flow rate

What is a Swale?

Swales are vegetated channels designed to convey overland flow and remove contaminants from stormwater runoff.

A thick coverage of vegetation is important for the swale. It slows the flow of water, allowing sediments to settle, while also protecting against erosion.

As stormwater moves through the vegetation, contaminants are removed via a number of processes, including filtration, infiltration, absorption, and plant uptake. The slower the water moves through the swale, the better the contaminant removal.

Where to use a Swale

- Appropriately used in residential, industrial and commercial developments.
- Primarily used to treat runoff from roadways, car parks and other impervious areas.
- Typically located along property boundaries or adjacent to impervious areas, as part of the stormwater drainage system.
- Can replace curbs or gutters, adding an aesthetically pleasing element to a development.

Key Design Features of a Swale

- The placement of swales should relate to natural flow paths and contours of the land.
- Gentle slopes and flat surfaces will slow the flow of water promoting treatment and infiltration.
- The contributing catchment should be less than 4 hectares. Swales receiving flows from larger areas should incorporate a bypass system. The bypass will ensure that the swale is not overloaded with water, reducing its treatment efficiency.

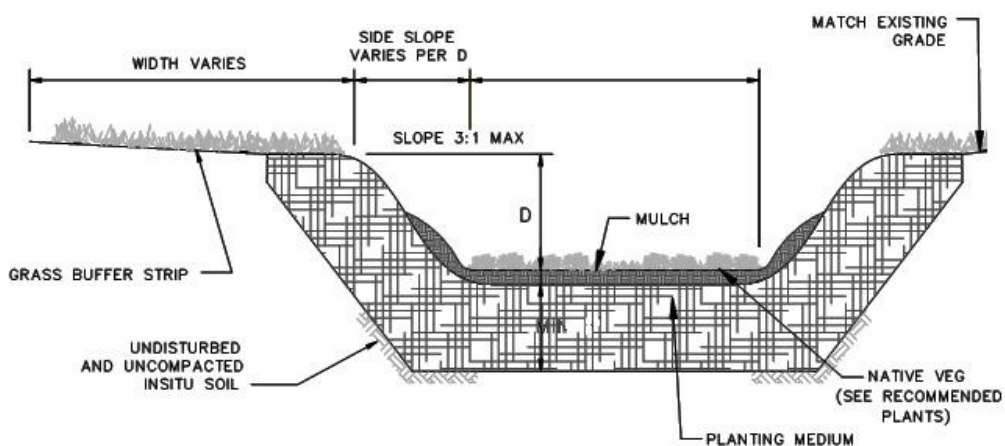
- Swales are generally greater than 30 metres in length and designed so that it takes at least 9 minutes for flow to pass along the swale (the minimum 'residence time').
- Check dams and level spreaders are used in swales that have a slope greater than 5%. Check dams reduce the flow of stormwater and increases residence time, while level spreaders ensure greater spread of flow across the area of the swale.
- The type of vegetation within a swale should be selected to ensure a dense cover; grass is the preferred choice as it is resilient to periods of saturation and provides a consistent spread.

Operation and Maintenance of a Swale

- The maintenance of vegetation is an important aspect to ensure the effective performance of swales and filter strips.
- Once planted, monitoring should occur to ensure a thick even spread of vegetation.
- Should be kept clear of weeds, debris, litter, and yard wastes.
- Eroded or bare areas should be replanted and repaired.
- Once established, regular mowing should be undertaken to maintain vegetation at a height of approximately 150mm.
- General on-going monitoring is required to control weeds and to remove accumulated sediment and debris.

Please note:

The swale has been installed as a retrofit treatment device and consequently has not been designed and constructed to maximise treatment efficiency and is not in strict compliance with TP10 guidelines.



Example swale cross-section