

# Sustainable Water Challenge 2005 - Project Entry Report

**Council:** Ku-ring-gai Council

**Project Title:** Minnamurra Avenue Water Sensitive Road project

**Project category:** Retrofit

## Project Summary

This project has provided a sustainable, water sensitive outcome for a road in Minnamurra Avenue, Pymble. In planning for the upgrading of the road, Council undertook to ensure that the drainage and ancillary works were sympathetic with the adjoining riparian area and Blackbutt Creek.

## Project Objectives

- 1) Provide a demonstration of sustainable/water sensitive road design and construction
- 2) Within the confines of the site, demonstrate a range of WSUD road principles and components
- 3) Enhance the aquatic and riparian environment of Blackbutt Creek before this flow enters Lane Cove National Park through:
  - Peak flow and pollutant reduction as a result of the works listed above
  - Weed clearing, mulching and revegetation; and
  - In-stream stabilisation structures such as bed control sills to prevent erosion.
- 4) Satisfy the community's expectation of protecting and improving the natural environment
- 5) Provide a demonstration site to the community, Councillors and Council staff of how asset (road) maintenance should be linked with the achievement of environmental objectives in Ku-ring-gai
- 6) Provide a model for community consultation which can be used for similar projects in the future
- 7) Provide a project which will consolidate and expand the role of a new bush regeneration group in Ku-ring-gai
- 8) Increase the knowledge of staff involved in the project to include WSUD principles into traditional road construction

## Project outcomes - mention monitoring

### Environmental

- 1) Enhanced aquatic and riparian ecosystems in Blackbutt Creek achieved as a result of
  - Reduced peak flows - lessens the effects of in-stream erosion
  - Reduced stormwater pollutants and nutrients – reduced nutrient/pollution loading of ecosystem
  - Stabilised stream profile - less in-stream erosion of bed and banks
  - Stabilised stormwater inlet arrangements - less erosion of banks and bed
- 2) Improved bushland biodiversity achieved through removal of weeds and planting of locally endemic vegetation.
- 3) Monitoring Programs
  - Monitoring of the works by both Council and STORM\_CONSULTING (whose office is very close to the works) will include the functioning and stability of the works.
  - A site assessment on the bush regeneration potential will be conducted by Council as the first step in developing a bush regeneration program around the site.
  - Macroinvertebrate sampling has been undertaken over the past several years to provide an integrated index of water quality. The sampling location is at the bottom of Blackbutt Creek (below Minnamurra Avenue) and is part of Council's macroinvertebrate sampling program for Lane Cove catchment. This program will continue into the next year and help to provide comparable data of before and after the project has been constructed.

### Technical

The WSUD approach was Council's vision. Council has recently completed extensive community surveys throughout Ku-ring-gai with results showing that the community valued bushland and riparian enhancement

projects highly. In response to this, the project was chosen specifically for its demonstration purposes in that the link between the works and the adjacent receiving environment is direct and obvious.

The works are multi-objective in nature meaning that the approach to the road maintenance could be considered in light of objectives other than simple pavement re-surfacing.

Once the approach was discussed and agreed upon within Council, WSUD consultants STORM CONSULTING were appointed to develop concepts to achieve Council's vision, and also to supervise the conduct of the works to ensure the design intent was achieved during the construction phase.

The Water Sensitive road design components are listed and described below, and shown in the accompanying design plans and Powerpoint presentation.

One-way crossfall pavement	Reduces the need for pits and pipes and sheets flow to infiltration devices
Grassed swales	Filtering runoff from the road pavement before it enters stormwater pits. Reducing peak flows by encouraging infiltration.
Infiltration trenches	To accept flow from small car park areas without the need for kerbs, pits and pipes. Reduces peak flows and retains stormwater pollutants.
Modified (broken and flat) kerbs to allow drainage to swales and basins	To convey pavement runoff into Grassed Swales and Storm Garden
Stable rock-lined outlets	Preventing erosion of stream bed and banks
Storm Garden infiltration basin	Placed at a stormwater outlet and to collect road runoff, this is a bio-infiltration basin to reduce peak flows and to retain stormwater pollutants
Riffles and bed controls	To prevent in-stream bed and bank erosion and provide aquatic habitat diversity

#### Social/Community

- 1) Community input to and acceptance of the approach taken with the constructed works - the WSUD approach meant that there needed to be consultation about how the works would look, and the extra construction time required compared to a traditional road re-surfacing project.
- 2) Improved views and general aesthetics of the road. Blackbutt Creek was choked with weeds and views into it were blocked for years. The works have opened up the creek corridor such that it is visible and a constant reminder of the focus of the works. The new road alignment with its associated swales and parking areas also provides a much-improved landscaped look to the road and neighbourhood.
- 3) The works provide a focus for the newly formed bush regeneration group in the area to maintain the works in a weed-free manner. One planting day was held on a weekend in late June attended by about 40 neighbours, Council staff and Councillors. Another of these days is planned in August.

#### Transferable

This project provided opportunities for significant learning and this aspect of the project was foreseen and managed well by Council. Council used the opportunity to create repeatable models for use internally, and by other Councils. Model approaches have been created in the following areas:

- 1) A blending of disciplines within Council - this project went across different departments of Council including Technical Services, Open Space and Planning & Environment. Design and construction coordination meetings were conducted to ensure that the project vision and objectives were achieved throughout the design process and during the construction phase.
- 2) Interaction with the community to achieve acceptance of the approach to works, amendment of design, cooperation during works period, participation in planting days, and ongoing management of the plantings by a bushcare group that Council will support.
- 3) The project provides excellent examples of alternative road drainage techniques and has been the subject of capacity building inspections by other Councils. A group of North Shore Councils inspected the works during constructions in a guided tour conducted by Council and its consultant. The project is likely to be inspected by many more Councils if it is successful in the Sustainable Water Challenge.
- 4) It provides information on the clever use of consultants to provide a cost-effective balance of technical input at critical stages. Problems on site such as identifying the potential for stream

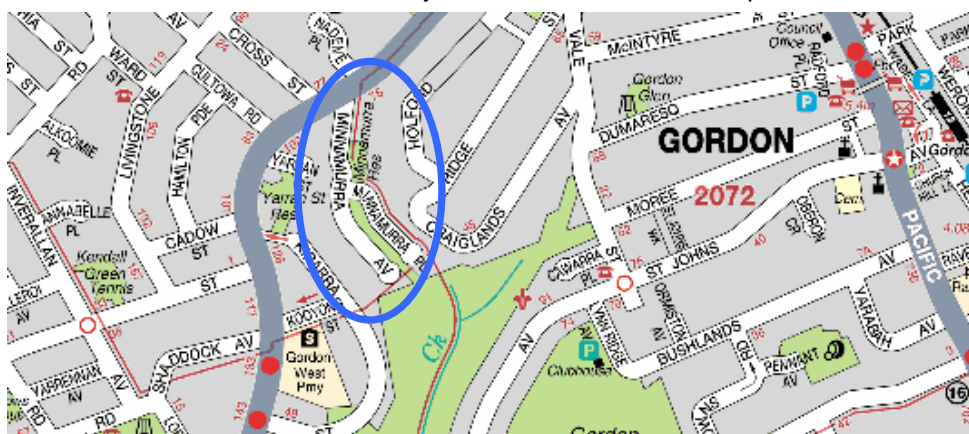
erosion after undertaking weed removal works were solved as the project progressed resulting in a consistently high quality of works across all aspects of the project.

### Difficulties encountered

Problem encountered	Resolution
Rain during construction had potential to create erosion of bare and newly constructed components resulting in in-stream sedimentation	Awareness of weather forecasts and adoption of special erosion and sediment control measures were implemented where needed
Operators (contractors) unskilled in this type of work	Council superintendent of works on site full time to advise and direct contractors
Minor departures from design intent as interpreted by Council's Superintendent	Use of consultant to provide ongoing advice during construction
Not all weed removal was possible due to privacy concerns raised by some residents	Selective removal of most weed species during works with the remainder to be removed as part of the bush regeneration program in the future

### Pictures, plans and maps

The works are located in Minnamurra Avenue, Pymble, as shown on the map that follows.



### Team and Team leader details

Council team leader	Peter Davies	9424 0745
Council officer	Michael Brookes - Superintendent's Representative	9424 0955
Consultants - design and construction advice	STORM_CONSULTING, Mal Brown, Jay Jonasson	9498 2362