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Greenway landscape design: River Torrens Linear Park, Adelaide, South Australia - a process rather than an end state

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Introduction

This paper addresses the ongoing landscape design of the River Torrens Linear Park, which is the first and largest greenway within the metropolitan area of Adelaide, South Australia. This greenway is a 30 km long recreation and conservation open space, linking the Mount Lofty Ranges with Gulf St Vincent, and envelopes the River Torrens throughout its length. The planning and design of the greenway has previously been reviewed in detail by the author (Mugavin, D., 2004). The initial planning, design and implementation stages were undertaken in 1982 and have been ongoing through to 2010. River corridor management including water quality, weed control and vegetation re-establishment, public access, and recreation are ongoing issues. This paper addresses the re-establishment of the Breakout Creek sector of the greenway.

Background: Breakout Creek Sector

In 1934 the South Australian State Government constructed a flood channel (referred to as Breakout Creek, Fig 1) on the River Torrens at Henley Beach South, to allow river flows through coastal dunes to the sea.

Figure 1, Breakout Creek Henley Beach South, Adelaide, SA.

Figure 2, The Reedbeds, River Torrens, painting by James Ashton. 1890.

Prior to the flood channel, the river had no direct outlet to the sea, with water gathering in wetlands, referred to as 'The Reedbeds', which extended north and south along the coastline and several kilometers inland (Kraehenbuehl, D., 1996, Fig 2). Flood flows found their way south to an estuary, the Patawalonga, and north to the Port Adelaide River.

Figure 3, Breakout Creek, a constructed channel, prior to commencement of in-stream wetland project.

The Creek had languished as a weed infested drain, with very limited environmental or recreational value. For example, the bed and banks were utilized for horse grazing by local equestrian recreation enthusiasts, with consequent adverse environmental impacts along with restrictions on public access. The almost complete absence of riverine vegetation has adversely affected its habitat value.

Stage 1 of the plan to reinstate the riverine wetlands commenced in 1998 and comprised a 500 metre stretch of the creek, upstream from Henley Beach Road, which has resolved into an environmental and community asset (Mugavin, D., 2004, p 236). Stage 1 was promoted as a demonstration project within a limited area, after a concerted campaign by equestrian enthusiasts against projected limitations on horse grazing. The value of the demonstration project prompted the adoption of Stage 2, re-instatement of in-stream wetlands downstream of Stage 1.

Figure 4, Breakout Creek Stage 1, view upstream. Design: Taylor Cullity Lethlean.

Figure 5, Breakout Creek Stage 1, Layered vegetation on bank. Taylor Cullity Lethlean.

In this paper, Breakout Creek Stage 1 and Stage 2 serve to illustrate the continuing process of realizing urban recreation opportunities, while reinstating biophysical processes in a riverine greenway.

In contemporary landscape phraseology, the River Torrens Linear Park is *infrastructural landscape*. This is defined as a greenway that hybridises urban fabric and community uses with local biophysical processes, where ecological functions are valued in themselves, as well as for the aesthetic, environmental and recreation 'services' provided.

This perspective is a direct and pointed one where single purpose river projects have been used in the past, for example, stream channelization. In the vain quest to provide flood protection, urban streams were realigned to remove natural meanders, riverine vegetation was eliminated and the bed and banks lined with concrete. Such an approach is neither optimal nor efficient, in that the stormwater quality and quantity issues are simply moved further downstream and recreation opportunities are lost.

Project Goals and objectives

The Breakout Creek projects afford an exceptional opportunity to create a wetland and recreation asset within a suburban environment. The project aims to establish a viable 'in-stream' wetland ecosystem within the riparian zone of Breakout Creek, one that can be accessed and enjoyed by the broader local community, including:

- an improvement in the biodiversity of the river and an opportunity to reinstate aquatic habitats for fauna including birds, frogs, fish and macro-invertebrates;
- increased public access to the site through the addition of viewing platforms and jetties, walking paths, picnic areas, boardwalks within the wetland and a low level bridge connecting the east and west banks of the reinstated riparian wetland;
- the planting of more than 60,000 indigenous plants over two years in a joint project with Greening Australia volunteers, utilizing local provenances;
- improved flood management of the River Torrens through unimpeded flows;
- improved water quality during low flow conditions.

The goals and objectives outlined here are key elements of a wider program for the Adelaide metropolitan area that focuses on urban water as a crucial and scarce resource. The program includes:

- Preparing storm-water management plans and storm-water harvesting projects;
- Flood risk assessment and implementation of flood mitigation works;
- Construction of demonstration sites and promotion of water sensitive urban design to developers, councils, government agencies and the community;
- Undertaking strategic projects to improve water quality and aquatic biodiversity in urban watercourses.

These programs are beyond the scope of this paper; further information is available at http://www.amlrnrm.sa.gov.au/Water_Management_Services.aspx

Since 2004, work has been undertaken under the sponsorship and direction of the Adelaide and Mount Lofty Ranges Natural Resources Management Board, funded by a targeted property tax. In the period 2007-2010, the Board is undertaking a $50 million program of projects throughout its region. It hosted 12 regional workshops

to elicit the views and goals of the community and collectively identify priorities for the funds. More than 600 local government and community members were involved.

Design and Construction Methods

Construction commenced in 2008 on Stage 2 of the Breakout Creek project. It encompasses watercourse reworking and in-stream wetlands, extending along a 700 meter reach and occupying over 10 hectares, between Henley Beach and Tapleys Hill Roads at Lockleys (Fig 6). Construction works included excavation of 60,000 cubic meters of silty sand to shape the wetlands as well as construction of two concrete weirs. Ultimately the reach will include picnic areas, boardwalks and jetties to provide access to the water for fishing and bird watching, and a low level bridge connecting the east and west banks of the wetland.

The longitudinal profile of the stream required retention weirs in two locations in order that water levels are maintained. The cross-section profile includes mudflats, mud banks, ephemeral wetlands, islands, a billabong, and rock and gravel beaches.

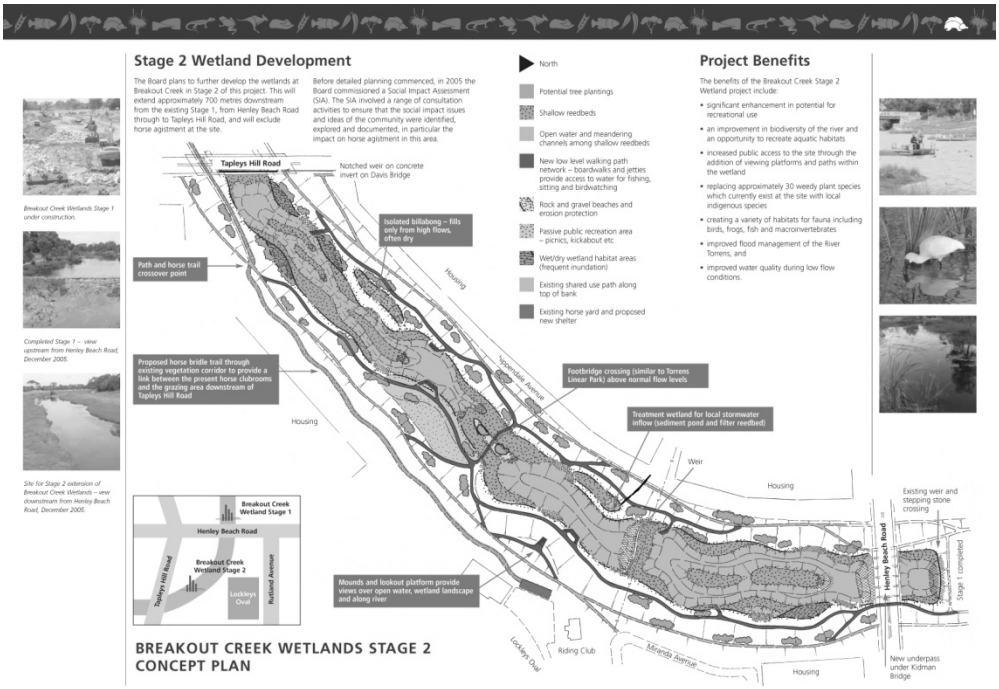

Figure 6, General Diagram and explanation for public information: Stage 2, Breakout Creek Wetlands and Watercourse. Source: Adelaide and Mount Lofty Ranges Natural Resources Management Board.

Figure 7, Breakout Creek Stage 2, downstream of Henley Beach Road.

Details observable in Figure 7 include:-

- Edge grades that vary to provide shallow reedbed areas of varying water depth;
- Open water areas within meandering channels, providing habitat for avifauna;
- Initial establishment of indigenous reeds including Schoenoplectus validus planted on margins of low flow channels to prevent Typha (Bulrush) from clogging the channels;
- Island areas at just above water level with reed vegetation including Bolboschoenus medianus planted on the crests and other high points;
- Rock lined gravel beaches for erosion protection;
- Wet/dry wetland habitat areas which are subject to frequent inundation in the wet season;
- Existing native trees previously planted and carefully protected during construction of Stage 2.

It may be noted that terrestrial tree, shrub and grass areas are being established at higher elevation.

Results

Prior to the instigation of the Breakout Creek project, the stream was a constructed channel, designed to drain the 'The Reedbeds' wetlands. It also facilitated urban development throughout most of the area formerly occupied by the wetlands. Levee banks were constructed on each side of Breakout Creek to protect adjoining suburban areas from flood inundation. Consequently, the pre-settlement environment has been lost precisely because of the construction of Breakout Creek. In undertaking the current project to re-establish wetlands, it cannot be claimed that the 'natural' environment is being restored. The total area of wetlands included in Stage 1 and Stage 2 is just 15 hectares, whereas pre-settlement the total area of wetlands was in the order of 30 sq km.

Nonetheless, the re-instatement of the wetlands to the extent possible has meant that the River Torrens Linear Park greenway has continuity through this sector. Prior to the project, not only was it of minimal recreational value, particularly because of incomplete pedestrian and cycle access, but also adverse environmental conditions were manifest and further deteriorating. The project has meant that those issues have been significantly redressed.

Conclusion

Essentially, design and implementation of the River Torrens Linear Park is a continuing process to achieve both urban recreation opportunities and viable biophysical processes, rather than an 'end state' compositional form. For example, vegetation establishment extends through seasonally appropriate stages rather than on a forced schedule. In this case, design is a key aspect of biophysical processes and vice-versa.

Secondly, the process of re-establishing riverine environments in this example has extended over almost 30 years. In many respects this reflects the varying level of financial resources and community support. It also reflects the efflux of time required to fully re-establish viable ecosystems.

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