Lower Brown Hill Creek upgrade project
What are the existing water quality challenges?

In its current state, Lower Brown Hill Creek is not a natural creek system.

Brown Hill Creek’s water quality within this study area is generally not improved by the passage of water through the creek system.

The creek primarily acts to transfer stormwater further downstream and ultimately to Gulf St Vincent. Pollutants in the stormwater such as litter, organic material and sediment are also moved downstream.

How can the upgrade improve water quality?

Some modifications to the creek channel can provide small improvements to water quality. Other improvements must be considered on a whole of catchment basis.

Some techniques for improvement of water quality that may be adopted include:

- Capture litter, debris and vegetated material prior to entering the creek
- Slow down water flow and allow more water to infiltrate into the soil and filter the water either through soil or wetlands or vegetation in the creek
Why does flooding occur?

The main reason that there is currently a flood risk associated with Lower Brown Hill Creek is that the creek is not big enough to carry the flows which will find their way to this section of creek during a major flood event.

Most of the concrete lined sections of Lower Brown Hill Creek were constructed in the mid 1930s, with further shaping of the earth lined sections of the creek during the 1950s post war rapid growth of the western suburbs.

Current flood maps show that a large number of properties in the West Torrens Council area will be flooded in a major flood.

How can the risk of flooding be minimised?

The Brown Hill Keswick Creek Stormwater Management Plan outlines a number of projects, which together will operate to greatly reduce the risk and frequency of flooding within the catchment. These projects include:

- Flood detention basins and wetlands to slow down the flow of water and reduce peak water flows downstream
- Flow diversions and bypasses to remove flows from currently overloaded sections of creek
- Channel, bridge and culvert upgrades to improve capacity of currently overloaded sections of creek

The Stormwater Management Plan also outlines ‘non-structural’ measures to be considered to assist with minimising flood impacts:

- Planning and Development Assessment Policy and Processes
- Flood Awareness and Preparedness Planning
- Flood Warning and Emergency Response Services
- Channel Maintenance and Clearing Practices

The Lower Brown Hill Creek Upgrade project is predominately a works project to improve the carrying capacity of the creek.

Future considerations for the managing of flood risk?

Climate change and more intense development are likely over time to result in increased runoff of water.

The State Government 30 Year Plan for Greater Adelaide clearly seeks to grow the city “upwards, not outwards” by focusing growth in new higher density developments which inevitably results in additional impervious areas and consequently increased stormwater runoff.

The Brown Hill Keswick Creek Stormwater Management Plan contains information about future planning controls and stormwater management measures that will reduce the impacts of these future issues.
What are the current water flows?

Current flows

Currently, the majority of Lower Brown Hill Creek can carry approximately 25 cubic meters per second.

Proposed future flows

To reduce flooding so that the channel overtops only every 100 years on average, this project aims to upgrade the system so that it has the capacity to carry approximately double the existing flows.

The upgraded capacity will also allow for excess stormwater from Keswick Creek to be diverted through proposed underground culverts into Lower Brown Hill Creek at Anzac Highway.

The upgraded system would have sufficient capacity to fill an Olympic sized swimming pool every 40 seconds.
Current maintenance issues

The current responsibility for maintenance of the creek is split between West Torrens Council, State Government and private property owners. There are many issues affecting maintenance, including:

- Limited access points for maintenance
- Severe erosion of sections of the creek
- Some of the creek is in private ownership which results in unclear arrangements, particularly if private owners are unaware of their responsibilities for maintenance
- Structures, trees and services being located within the creek corridor. Such intrusions create obstructions to the flow, cause debris to collect and may lead to bank erosion
- Stagnant water pools that create an odour and health issue
- Illegal dumping of rubbish into the creek
- Graffiti and vandalism

Possible future maintenance considerations

Some maintenance considerations are:

- Minimisation of maintenance requirements
- Provision of access for maintenance purposes
- Selection of vegetation species that suit the creek environment

Existing condition of Brown Hill Creek

Example of other creek environments that may have different landscape maintenance requirements
What currently exists?

Historically (pre-European settlement), the lower part of Brown Hill Creek was a floodplain without a defined channel. Over time the creek channel has been formed to enable development in the previous floodplain area.

Some parts of the creek have subsequently been lined with concrete to form steep-sided formal channels. More limited parts of the creek are similar to a natural environment, with vegetation and earth banks.

The creek currently provides limited habitat value.

The creek corridor supports some mature river red gum trees and populations of other native plant species. Many of the mature trees present along the creek would be considered ‘weed’ species, particularly in a waterway environment.

What are the possible improvements and challenges to achieving them?

The Lower Brown Hill Creek Upgrade Project presents an opportunity to improve the environmental and habitat values in some parts of the creek.

The possibility of incorporating aquatic vegetation, wetlands and natural channel profiles to promote flora and fauna will be investigated.

In many parts of the creek, it will be difficult to improve the natural environment because of the narrow corridor through which the creek runs.
Who has a local interest in the creek?

- Adjoining property owners and residents whose properties back on to the creek, especially those who are currently subject to flooding and who will receive benefit from works which reduce the risk of flooding
- People living in the surrounding suburbs
- People who visit the public areas adjacent to the creek

How is a design for the upgrade chosen?

The project team needs to balance different options by considering the costs of construction, maintenance issues, benefits to the community, environmental benefits, and the impacts on property owners and residents adjacent to the creek.

What are some of the potential benefits to the local community?

- Reduced risk of the size and frequency of flooding
- New bicycle and walking paths along parts of the creek
- Improved open spaces around the creek
- Increased environmental benefit
- Improved ways to cross over the creek
- Improved amenity

What are some of the potential impacts on the local community?

- Some properties (or parts of properties) may need to be acquired – this is very much dependent upon which upgrade options are chosen
- At this stage there are no decisions about which options are more suitable and consequently the extent of property acquisition is not presently known
- There may be noise, dust and local traffic changes during construction
What are the current recreation uses along the creek?

There is currently very limited recreation use or interaction along the creek. This is partly due to the rocky and uneven creek floor, steep and often unstable banks, and few public access points to the creek.

What are the possible future recreation opportunities?

With the upgrade, the creek environment may be developed to allow different types of recreation to occur. The types of recreation will be dependent upon the final design for the creek.

The potential opportunities will vary throughout the creek area. The final concept may propose different solutions in various sections of the creek and may include passive recreation opportunities (e.g. walking trails, seating) or active recreation opportunities (e.g. useable open space).

Examples of a creek environment and better designed spaces for active and passive recreation

Existing condition of Brown Hill Creek

Example of creek access points linking different recreation areas

Example of creek upgrade at Unley
Why are there different ideas?

- Different parts of the creek will need different solutions
- Each solution needs to have the required flow capacity to reduce flooding
- Each solution is likely to have positive and negative implications
- Some ideas will help to improve water quality and local amenity. Others will have high cost and require property acquisition
- A combination of ideas is likely
- At this stage, no ideas have been fully explored or decided

Examples of other creek environments and different ideas to be explored
some ideas to illustrate range and complexity of possible solutions...

**Issues and Opportunities**

Each option will need to meet the required flow capacity to reduce flooding.

- Cycle/pedestrian path linkage
- Property acquisition
- Public recreation
- Creek bank erosion and protection
- Existing trees
- Public accessibility
- Community linkages
- Passive surveillance
- Creek blockages
- Sediment build up
- Safety
- Public benefit
- Environmental / ecological benefit
- Water quality

- Construction costs
- Maintenance
- Water velocity
- Interaction with creek
- Landscaping and revegetation
- Habitat
- Amenity
- Biodiversity
- Signage and education
- Mosquitoes
- Snakes
- Bridges and crossings
- Vandalism

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Concrete channel with vertical sides

Box culvert and property easement

Earth channel

Gabion lined open channel

Low flow channel above a box culvert

Public access above a box culvert

Possible alternative - roadway culvert to complement minor creek upgrade
The Draft Lower Brown Hill Creek Concept Design is anticipated to be ready late in 2013 for your comment.

It will be available in the City of West Torrens offices and on Council’s website www.westtorrens.sa.gov.au

You can provide feedback on it during the associated consultation period. We will let you know how you can provide feedback nearer the time.

Meanwhile, if you would like to be kept updated about this project and be on our mailing list or have any comments, please let the staff here know, or contact Andrew King, Coordinator of Engineering Services at City of West Torrens on 8416 6333 or email aking@wtcc.sa.gov.au