A small water works and associated water pipeline were constructed in the Brownhill Creek catchment in 1879 to supply water to the small but thriving village of Mitcham. By the 1930s, however, this water works scheme was no longer able to meet the increasing demands of a growing population and from the 1930s relics of the scheme lay forgotten in an isolated valley until they were located and identified during a recent heritage survey (Smith et al. 2004:1-8).

The brick-lined water well, dam wall, valve well and settling pond on Ellison’s Creek, a tributary of Brownhill Creek, were identified and documented in 2002 and 2003. For over seventy years the dam wall and the settling pond had been gradually buried under sediments eroded from the Eagle Quarry upstream and were concealed by dense thickets of blackberries (*Rubus fruticosus*). Most of the 3.2 km pipeline linking the water works on Ellison’s Creek to the Mitcham Tank at the end of Fullarton Road, Mitcham, was also located. The pipeline route passed through Ellison’s Creek and
Brownhill Creek, although the section along Brownhill Creek proved difficult to locate. Some sections of the pipeline had been removed or broken.

**HISTORICAL BACKGROUND**

When Colonel Light surveyed the site for Adelaide, the capital of South Australia, from 1836 onward, it was believed that sufficient water to support the colony for many years would be readily available. Water was obtained from the River Torrens, from wells and from rainwater tanks, and, as the population grew, water carriers carted water from the river, selling it to householders for 1s 6d to 3s per 50 gallons, depending on the distance carted.

By the late 1840s and 1850s these water sources could barely meet the demands of the rapidly growing population and colonists became all too aware of the need for a more reliable and pure water supply. In 1848 emigrants were being advised by *The Emigrants Friend or Authentic Guide to South Australia* (1848:9):

> ... there is another circumstance equally important to internal comfort and to health, as to which Adelaide is singularly deficient – that is the want of good water – the river is of course, salt, and all the water available for drinking and for domestic purposes, is obtained either by catching the rain water, or from deep wells, with which the city is furnished, and the making of which entails much expense upon the newly-allotted resident in most parts of the Colony.

A number of water schemes were proposed. As early as 1847 Brownhill Creek was considered as a possible source of water for Adelaide and the formation of a water company was proposed. *(Register, 13 November 1847).* However this plan appears to have been abandoned because of the cost. In 1848 George Green, a retired engineer, developed another plan for supplying Adelaide from Brownhill Creek:

> The reservoir at Brownhill Creek will be found just above the boundary of Mitcham, and will be 174 feet above the highest part of Adelaide. The conduit main will be 6 inches in the bore and will bring in 300,000 gallons of water daily to the closed cast iron receiver fixed in the centre of the reservoir. From the closed receiver the Company’s mains are charged for supplying the City, and the water escapes from the regulating valve at the top, which is loaded with a weight equal to 17 1/2 pounds per square inch, or the pressure capable of supplying the water in the Company’s pipes to a height of 40 feet above the highest part of the City. The water after passing through this regulating valve is made to supply a fountain, and then falls into the outer and open reservoir. And from this reservoir always containing 1,000 gallons pipes are taken for supplying water to carts so that all parts of the city where the company finds that mains cannot be laid at a...
profit will still have the advantages of a cheap and abundant supply of pure filtered water. The required outlay for the entire works as far as Victoria Square will not exceed as per estimate.

Register, 11 November 1848

In the meantime, other water supply sources were proving to be more reliable. A letter in the Observer, 14 December 1850, promoted a plan for a water scheme on First Creek in Waterfall Gully. The formation of a private water company was proposed but the project failed to raise sufficient capital and lapsed. To complicate this increasingly pressing issue, wealthy settlers with their own sources of water, or who could afford carting charges, opposed or delayed the development of water supply projects.

It was not until 1860 that a reservoir was eventually constructed to store water from the River Torrens and to provide the first reticulated water supply to Adelaide. The city was, however, experiencing variable seasons and the summers were frequently dry, long and very hot and so the government continued to struggle to meet the demands of the colonists for water. In 1872 a second River Torrens reservoir was constructed and the reticulation system was progressively extended to most suburbs.

Meanwhile, the village of Mitcham, six kilometres south east of Adelaide, was rapidly extending along Brownhill Creek, but the flow of that creek, which had also been expected to provide a permanent water supply, was diminishing. The village was at a higher elevation than Adelaide and could not be supplied with water by gravity flow from either of the new reservoirs.

In anticipation of the Brownhill Creek Water Works becoming a reality, the District Council of Mitcham constructed an access road to Section 1076 on Ellison’s Creek in order to promote the creation of a water scheme at that site. Notice of the council’s intention to construct the road was published in 1858 in the South Australian Government Gazette (9 December, 1858:935). It is likely that the road approached the creek from the Great Eastern Road to the north, as shown in the map of the area.

In 1877, residents of Mitcham lobbied the State Government for a permanent water supply and in 1878 Parliament agreed to construct a water supply system on the higher reaches of Brownhill Creek.

The site in Ellison’s Creek was sufficiently upstream to ensure that good quality water would be
available. Further downstream along Brownhill Creek, the water had been polluted by the operation of market gardens adjacent to the stream. Work began on the construction of the water storage and reticulation scheme in 1879, although the water works site on Section 1076 was not acquired by the Commissioners of Waterworks until 1880, when it was purchased from C.B. Hardy who had acquired it from John Grainger earlier the same year. A brick-lined water storage well, a stone-lined valve well, a dam wall and a settling pond were constructed on Ellison’s Creek. A 6 inch cast iron pipe, imported from Scotland, carried water along the Ellison’s Creek and Brownhill Creek valleys to the base of McElligott’s Quarry. Here the pipeline ran up the side of the valley and across what is now the end of Fullarton Road to the Mitcham Tank, which had a 270,000 gallon storage capacity. From here the water was piped to the Mitcham village and beyond (Norman 1953).

The water reticulation scheme was officially opened on 25 November 1879. The pipeline followed the route shown on the Section map of the region and the water flowed by gravity, the pressure in the system being a function of the respective heights above sea level of the well on Ellison’s Creek and the Mitcham Tank. The level in the Mitcham tank was 150 feet lower than the level in the well. However it was still sufficiently elevated to enable water to flow by gravity to Mitcham and, if sufficient water were available, on towards Adelaide. The system was officially
discontinued in 1930, although it is highly likely that it had not been in use for several years before that date.

ARCHAEOLOGICAL EVIDENCE

Heritage surveys were conducted along the route of the pipeline shown in Figure 2.4 during 2002 and 2003. The surveys followed a corridor along the riparian zone of Brownhill Creek and Ellison’s Creek. Sections 1094, 1092 and 1076 were of particular interest and a track (on private land) to the west of the marked road reserve, led into the narrow gully. The track between Sections 1122 and 1076 and the site of the water works appeared to be either on or close to the road reserve.

The surveys were, however, greatly impeded by the variety of introduced weed species along
some sections of the creeks. Although native species such as river red gums (*Eucalyptus camaldulensis*), swamp wattle (*Acacia retinodes var. retinodes*) and swamp club rush (*Isolepis inundata*) were identified along the creek flats, the upper story of the riparian zones was dominated by ash (*Fraxinus excelsior*), willow (*Salix sp.*) and poplar (*Populus nigra*) with numerous woody weed species in the understory. These included blackberry (*Rubus fruticosus*), boneseed, thistle, nightshade, African daisy, gorse and broom (Department for Environment and Heritage 2002; Patawalonga and Torrens Catchment Water Management Boards 1998).

A preliminary survey along Ellison’s Creek was undertaken by Andrew Tilley and Pam Smith in July 2002. Andrew Tilley lives in the next gully and had been consulted about the location of the water works, which he recalled seeing when he was a child. Unfortunately, heavy rain and dense undergrowth prevented further investigation, but it was found that the National Parks and Wildlife Service had recently commenced clearing dense thickets of reeds and blackberries in the valley for the Yurrebilla Trail (this route was later changed). That work greatly facilitated the eventual identification of the water works site. At this time also, Aidan Ash identified and recorded exposures of the pipeline along its route from Ellison’s Gully to the water fountain west of White’s Bridge using a GPS. These pipe exposures are indicated on the GIS map of the pipeline route.

Later the same year Doug Lane, Maggy Ragless, Pam Smith and volunteers from the Mitcham Heritage Research Centre walked through the area. A row of poplar (*Populus nigra*) and a flat area recently cleared of high reeds (illustrated) provided the best clues to the location of the dam wall and settling pond, but it was still not possible to confirm any features relating to the water works.

A field survey to locate the water works was mounted in May 2003 and included representatives from the Friends of Brownhill Creek, Mitcham Heritage Research Centre, SA Institution of Engineers Heritage Committee and the Department of Archaeology, Flinders University. With the aid of heavy gloves and cutting equipment we uncovered and recorded in detail the brick water storage well and the stone well containing remnants of pipes and valves. Core samples were collected from the reed beds immediately upstream from the poplar trees to confirm the nature of the sediment. Probes adjacent to the poplar trees confirmed that the trees were growing along the dam wall.

At this stage, the only section of the pipeline route not able to be identified was between the water fountain west of White’s Bridge and the Mitcham Tank at the end of Fullarton Road. A metal detector was later used to trace this section of the route.
These heritage surveys resulted in the identification of what we believe to be the entire Mitcham Water Works. Each feature is illustrated on the GIS map of Ellison’s Creek and Brownhill Creek and is described as follows.

**The water works on Ellison’s Creek**

The water works constructed on Ellison’s Creek in 1879 comprised a small dam wall, a settling pond, a circular well constructed from bricks and a square stone-lined well for valves. A cross-section drawing illustrates the relationship between each of the features (the stone valve well is not included) and the extent to which the site has been buried under sediments eroded from the Eagle Quarry upstream.

**The dam wall**

As described, the row of poplar trees (*Populus nigra*) had provided the clue to the location of the dam wall and this was confirmed by probing the earth bank immediately behind the poplar trees with a metal rod. The structure is completely buried by sediment, although the northern end of the stone wall was later identified and uncovered. It was not possible to excavate the wall, however Andrew Tilley had been told by his uncle that the dam on the adjacent Tilley property had been constructed using the same method and with a sluice gate in the centre to control the water flow. Tilley’s dam wall has a flood control ‘gate’ made from lengths of timber in the centre of a stone wall (see Smith *et al.* 2004:20). Using this model, the inlet pipe (illustrated in the cross-section drawing of the water works) would have carried water from behind the dam wall into the well. The location of the dam wall and its relationship to the brick well is indicated by the white flags in the illustration of the well.
The settling pond

The settling pond was located east of the dam wall and was an essential component of the water works. Sediment settled to the bottom of the dam and the clear water from the permanent springs upstream flowed through the pipe at the top of the dam into the brick well and then downstream to the plains. Unfortunately these water works were located downstream from the Eagle Quarry and all of the Ellison’s Creek catchment has been heavily polluted for many years by sediment eroding from the quarry (Smith et al. 2004:30-32). Today the settling pond is completely filled with sediment and is choked with reeds, as illustrated. A metal post believed to be approximately 1500 mm high was recorded close to the middle of the settling pond with only 440 mm exposed. This provided an indication of the depth of the sediments as a second identical post was recorded 14 m to the north-west immediately on the other side of the dam wall and parallel with the brick well. This had been only partially buried and 900 mm was exposed.

Core samples were collected at three locations and provided reliable depths for the sediment and showed that the sediment was evenly deposited within the valley. Core sample 1 was collected in the middle of the settling pond where it was found that the creek continued to flow under the sediment along the original creek bed.

The brick well

The brick well still holds water and is open at the top. The water inlet pipe is visible inside the well and is several metres below the top. A very insecure metal ladder into the well is located on the south-western side. The internal diameter of the well is 2880 mm. The brick well originally had a corrugated iron roof over the top and the bolts that secured the roof remain in situ. Rare original drawings of the well were located in the
Archives of the Engineering & Water Supply Department (now SA Water) by Doug Lane and are illustrated in *Figure 2.2*.

The brick well, as it appeared following the clearing of the blackberries is illustrated in *Figure 2.8*. There were eight bolts used to secure the roof around the perimeter of the brick-lined well.

A scatter of corrugated iron fragments from the original metal roof shown in the 1879 plan, above, were recorded adjacent to the site.

**The stone valve well**

A square well constructed of rough stone work on three sides and sharing the brick wall of the well on the fourth side, held the valves to control the water flow.

**Pipeline**

The length of the pipeline from the water works on Ellison’s Creek to the Mitcham Tank is approximately two miles and the fabric of the six-inch diameter cast iron pipe appears to be in reasonable condition. When first surveyed, a ditch with unidentified concrete footings adjacent to the Mitcham Tank contained lengths of the 1879 imported cast iron water pipe. When revisited in January 2005 it was found that the ditch, which had also contained rubbish, had been filled.

Five exposures of the pipeline were identified between White’s Bridge in Brownhill Creek and the water works on Ellison’s Creek and the pipeline is clearly visible under the Chapel footbridge.

These five exposures were all located along Ellison’s Creek and each exposure was recorded by GPS and photographed (Ash 2002). No exposures of the pipeline were recorded along Brownhill Creek between the Chapel footbridge and White’s Bridge or along the section of pipeline identified with a metal detector between the end of Fullarton Road and the water fountain. The concrete footings where it is thought that the pipe crossed Brownhill Creek adjacent to White’s Bridge, *Figure 2.3*, are still in place.
The water fountain
A series of drinking fountains was originally located along the pipeline, two of which were within the survey area and several more along the extension of the pipeline between Mitcham and Adelaide. The only fountain remaining along Brownhill Creek is located at the southeastern end of the caravan park before White’s Bridge. A second fountain is reported to have been provided adjacent to the Chapel footbridge.

The Mitcham Tank and valve well
The pipeline from Ellison’s Creek terminated at the Mitcham Tank at the end of Fullarton Road, above McElligott’s Quarry (now a Council Reserve). This tank, known also as the Mitcham High Level Reservoir Tank, was commissioned in 1879. The tank is constructed from bricks with a flat metal roof that now appears to be at ground level on two sides. A cross section drawing of the tank has been edited from the drawings for the Mitcham High Level Reservoir, Contract no. 12, Drawing no. 33. (Engineering and Water Supply Department 1879). The tank is 22 m in diameter and is distinguished by five air vents that appear to be on the surface, a trap-door entrance to the tank and the original 6 inch water pipe connection on the northern side.

A round brick valve well is immediately adjacent to the Mitcham Tank. It is 3800 mm wide (external width) and 2850 mm high, when measured from the deepest point above ground level, although the well probably extends further below the ground. The bricks are generally 70 mm wide indicating that the well may have been constructed after the Mitcham Water Works were operating. The 70 mm wide brick was the European standard and they were not manufactured in South Australia until the Hoffman Kiln was opened in 1879 to mass produce bricks for the tunnels along the Adelaide-Nairne railway. It was only during the 1880s that the European standard brick replaced the English standard brick. The valve well now has a flat metal plate on top but whether this is the original top is uncertain.

DISCUSSION
The Mitcham Water Works complex is a connected series of features that must be protected and interpreted as a whole. As a complete system it clearly meets the historical, social and scientific criteria developed by ICOMOS (2004) for the assessment of heritage significance.
The rediscovery and documentation of the Mitcham Water Works is important to the social and economic history of both Mitcham and colonial South Australia. It provides an opportunity to tell many stories. One must be the story of water and its critical role in the economic development of South Australia. Another is the social impact of the water supply on the people of Mitcham, and as an example of similar water supplies to other suburbs of Adelaide (for example, First Creek and Wattle Park).

This complex is also of archaeological significance. It represents a unique example of colonial engineering, water storage and reticulation technology. No similar complex of colonial water works has been identified in South Australia and the only other Australian pipeline identified by the authors as being of heritage significance is the much larger 560 km Goldfields Water Pipeline in Western Australia (National Trust of Western Australia 2001).

Frequently the most visible structures in the landscape are those regarded as being significant, whilst the smaller and less visible structures are overlooked. That is what occurred in this instance. The heritage value of the water works and its associated landscape has been focused on a single representative feature, the Mitcham Tank at the end of Fullarton Road, a site that is now on private land and inaccessible to the public. At the conclusion of the Hills Face Zone Cultural Heritage Project a recommendation was made that Mitcham Water Works and the cultural landscape with which it is associated should be listed on the State Heritage Register. The pipeline and associated structures also provide an opportunity to develop an interesting walking trail with signage at features along the route to complement those that already exist in the Brownhill Creek Valley.
NOTES

1 See Smith et al. 2004:1-8 for information about survey procedures, consultations and research.

REFERENCES

Ash, A. 2002 The Brownhill Creek Water Works pipeline. Undergraduate Cultural Heritage Management report, Department of Archaeology, Flinders University, South Australia.


Emigrant’s Friend or Authentic Guide to South Australia. 1848 J. Allen and D. Francis, London.


National Trust of Western Australia 2001. Newsletter. National Trust of Western Australia, Perth.


Observer, 14 December 1850.


Register, 13 November 1847; 11 November 1848.


South Australian Government Gazette, 9 December 1858.