

## CASE STUDY

### Mindarie Regional Council-Tamala Park Landfill Leachate Recovery

#### Background

The Mindarie Regional Council is WA's largest waste management authority, managing the disposal of approximately 350,000 tonnes of waste generated each year by people living in its seven government localities.

To date, some 6 million tonnes of waste have been received since operations began in February 1991 and based on current waste quantities being received, the landfilling operations should continue until 2025.

#### Project Description

In 2003 plans to develop stage 2 of the landfill site commenced. The tender for the new stage included a pumping system to lift leachate from collection sumps and recirculate the leachate back on the waste.

The tender document specified the following requirements:

- Initial supply of 2 x air operated pumps.
- Dynamic head capacity of 45m
- Minimum duty of 1.2 l/s
- 24 hour operation capacity

The Airwell Group was initially engaged by civil engineering contractors to fabricate, supply, install and commission a leachate pumping system.

The client, Mindarie Regional Council, was quite specific in its requirement for a system that could handle corrosive fluid better than an electric submersible and regulate and adjust itself to varying bore yield, meaning that when there was little or no leachate to pump, the pump would adjust its flow rate or stop operating automatically without damaging itself, and restart again when there was leachate to pump.

Like many landfill sites, the volume and viscosity of leachate produced varies during the year with higher flow rates in winter and lower rates in summer. This was a perfect example of where the unique features of the Airwell pump had direct application.

**The Airwell Solution:** The project called for the installation of 2 pumps with a total of 8 pumps to be installed progressively over a period of time. To achieve the required flow rate, Airwell custom-built an 8" (220mm) diameter by 1.6m long pump to fit down the large existing bore casings (250mm ID HDPE) and operate at an angle of 1:1.5.

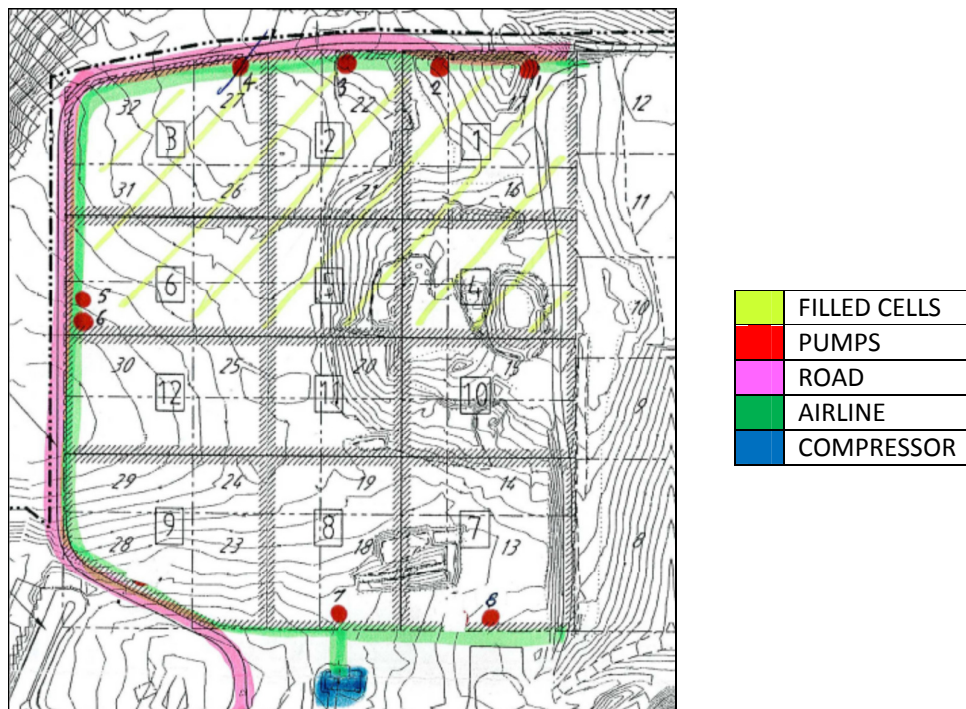
The pumps were to be activated and controlled by a solar powered control unit with back up batteries and be self-contained for 24 hour control of operation and capable of fluid level detection.



Custom made 8" by 1.6m Airwell pump for Tamala Park

Also stipulated was 316SS cable fitted to the pump bore to allow removal of the pump for maintenance purposes and all pipework and fittings were to be suitable for use in an abrasive and corrosive environment.

The initial installation required a compressed air delivery system to provide air to four pumps through a distribution system consisting of 63 OD PN16 PE100 polyethylene manifold approximately 1000m total in length and four off takes in 32 OD PN16 PE100. The air delivery requirement was 27m<sup>3</sup>/hr at 650 kpa minimum outlet pressure at each point.



Map of Tamala Park Landfill including pump locations

Tamala Park landfill now has 8 x Airwell leachate recovery pumps installed at the site with 4 pumps located at the Northern boundary near cells 1, 2 and 3 and two more pumps located close together on the Eastern boundary in cell 6. The other two pumps are located on the Southern boundary in cells 7 and 8 directly opposite the workshop that houses the air compressor. The compressor was recently upgraded to handle the extra pumps with capacity to provide additional compressed air for more pumps and for other workshop pneumatic activities.

The eight pumps installed range in size from the original 8" dia by 1.6 m long down to 4" dia by 2m long. During the life of the project several of the bore casings collapsed due to intense compacting activity and needed to be re-sleeved. Some of the 8" pumps were removed and replaced with 6" and 4" dia pumps with the original 8" pumps being re-used in newer bores.

All pumps on the Tamala Park site have cycle counters fitted to the controller units to measure the amount of leachate being recovered from each pump. This allows the owners of the site to better understand the changes and processes that landfill sites undergo over time in the recovery and treatment of leachate. This information also provides easy access to information for reporting of leachate recovery activity for regulatory purposes.

## Client Testimonial:

**“I have been the Mindarie Regional Council Operations Manager since 2002, our Airwell pumps were first installed as a part of the cell construction of Phase I Stage II in 2003 and commenced operation later that year. More Airwell pumps were added as development of the Stage II landfill advanced; over this period of time the Airwell pumps have pumped leachate for approximately 13,000 hours without any downtime. The simplicity of design of these pumps means that we have the ability to change the setup of the pumps individually to suit varying leachate conditions ourselves not having the cost of call out and service fees. The Airwell pumps are a set and forget operation, reliable, safe in a methane environment and requiring minimal servicing. “** *Mike Tolson Operations Manager Mindarie Regional Council*

### About Leachate Recovery Systems:

Landfill leachate recovery practices can vary from one site to the next based on the nature of the leachate, how old the site is, the methods used to recover the leachate and what is done with the leachate once recovered.

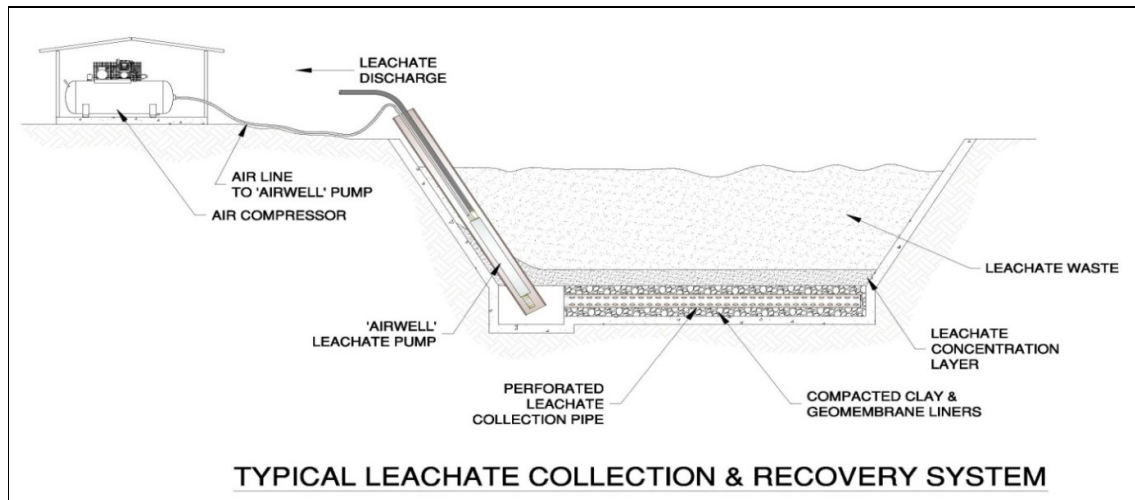
Leachate can vary in its flow rate, viscosity and corrosiveness even from bore to bore or sump on the same site. Individually, these variables can be quite easily managed. However it is the combination of these variables that make reliable and efficient pumping difficult to achieve.

With these variables in mind, an air-operated landfill leachate recovery pumping system has several advantages over other methods of pumping leachate such as:

- Increased safety due to NOT having to run power lines around the landfill site
- Added safety due to NOT having a 240V electrical power supply close to a bore and potentially explosive environment (methane gas)
- Cost savings with no power infrastructure needed close to bores
- Easy to maintain with few mechanical parts
- Adjusts to varying bore yields
- Handles solids and corrosive fluids better than other pumps
- Self-regulating (shuts down automatically when there is no fluid to pump and restarts when fluid is detected)
- Multiple pumps can be operated and controlled from one power source
- Capable of operating 24/7

Designed to handle low flow or varying yield bores; solids and corrosive fluids; extreme pumping conditions and bores located remote from power are some of the unique features of the Airwell pumping system making it ideal for leachate recovery on tailing dams and landfill sites.

The Airwell Group has been manufacturing and installing **direct air displacement** leachate recovery systems for tailings dams and landfill sites for nearly 30 years in Australia and currently has systems in operation over sixteen landfill locations around Australia. As well as its landfill leachate recovery capabilities, the Airwell pumping system is also ideal for methane gas collection line dewatering and is used for both purposes (often in conjunction with each other) in a number of landfill sites.



A Typical Airwell Leachate Recovery Pumping System

