

Melbourne Water - Melbourne, Australia



The building was given a full 6 Star rating by the Green Building Council of Australia

Jets™ vacuum toilets:

- 72x 50M model

Vacuumator™ units/pumps:

- 1x 130MBA unit
(2x 65MBA pumps)
- Upgradeable to 195MBA with 3 pumps

Other details:

- Finished in 2011
- 6 Star Green Star Certificate
- Located in Docklands
- Currently 1,100 occupants
- System capacity: 1,200 people
- Ready for future upgrades

Access to water is limited in Australia's fastest growing city. Citizens of Melbourne are already facing restrictions on water use, while authorities have constructed a large and expensive desalination plant to stand by in case of water shortages. Setting an example for others to follow, Melbourne Water chose Jets™ to reduce its own consumption.

Challenges

- Melbourne's population increases by about 100,000 every year.
- Existing water sources are strained to the point where a desalination plant had to be built to secure the city's water supply for periods of drought.
- Water restrictions are in place, limiting when and how water can be used.
- Recycled water is already used for non-drink purposes to reduce demand.
- Transporting and treating the city's sewage requires a great deal of energy.

Jets™ solution

- Using just 1 litre of water per flush, Jets™ vacuum systems reduce the volumes of water and sewage associated with toilet flushing by up to 90%.
- As water consumption goes down, so does water and waste water charges.
- Vacuum toilets allow for easier source separation, so water can be recycled much easier and at a much lower cost than in traditional mixed systems.
- The city's sewage transport and treatment costs will be reduced as more and more vacuum toilets are installed in place of traditional toilets.

Results

When a water and sewer authority such as Melbourne Water selects Jets™ vacuum toilets for its own employees, it demonstrates how sustainable sanitation is possible without sacrificing user comfort or system reliability.

Melbourne Water's use of Jets™ vacuum toilets also speaks volumes about the water saving and sewage-reducing qualities of this system.

Furthermore, and perhaps most importantly, it **encourages sustainable thinking** by showing others that there are commercially available, practical ways of saving water, which will help secure the city's water supply long term.



Melbourne Water's new purpose-built HQ is part of Digital Harbour, an urban community within Melbourne's Docklands built with sustainability in mind.



The Jets™ 130MBA vacuum unit used by Melbourne Water features two 65MBA pumps.

The available slot for a third pump (seen on the left) means it can be upgraded to a larger Jets™ 195MBA unit simply by installing another 65MBA pump in this slot.

This allows for more vacuum capacity to be added quickly and easily, should the toilet system ever need expanding.

Legion House - Sydney, Australia



The glass lift and stair contrast the old brick wall nicely, while providing a modern entry

Legion House is part of a larger real estate project, where Grocon and GPT Group joined forces in developing sustainable offices in the heart of Sydney. Taking the Legion House into the 21st century came with its own, unique challenges. But Grocon had used Jets™ toilets before, and so a vacuum sanitary system quickly became part of the design.

Challenges

- Water balanced designed required minimal water use throughout the building.
- Two new office floors were to be added to the top of the building.
- The refurbishment had to be carried out with minimal impact to the building due to its heritage listing and protection status.
- Not enough sun and wind available for power generation in downtown area.

Jets™ solution

- Using just 1 litre of water per flush, Jets™ vacuum systems reduce the volumes of water and sewage associated with toilet flushing by up to 90%.
- The flexible installation possibilities of the Jets™ vacuum system allowed toilets to be installed in the two new office floors with ease.
- Small-diameter vacuum piping and the ability to run piping above, around or under obstacles enabled Grocon to install water saving Jets™ vacuum toilets as needed without compromising the building's integrity and status.
- Power is now created on-site through biomass gasification, while rain water is harvested for use in the vacuum toilets and water saving fixtures.

Results

Grocon used Jets™ vacuum toilets in its Pixel building which opened in 2010, and as such the company is no stranger to Jets™ technology. In other words, Grocon's decision to use the very same system in Legion House, with the building's particular challenges and requirements, is a very bold statement about their trust in the **flexibility and reliability of vacuum toilet technology**.

Grocon and its financing partner GPT Group are both outspoken believers in sustainability, and have stated that they planned for Legion House to be one of the most sustainable buildings in the world - taking it one step further from the results achieved in the Pixel building.

Jets™ vacuum toilets:

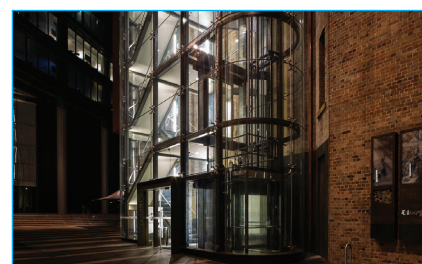
- 12x 50M model

Vacuumarator™ units/pumps:

- 2x 15MB pumps

Other details:

- Originally built in 1902
- Heritage listed building
- Recently refurbished by Grocon and GPT Group
- Off-grid, zero carbon building



"Legion House will set a new benchmark for the creation of sustainable city precincts"

GPT Group CEO and Managing Director
Michael Cameron



Two compact Jets™ 15MB Vacuumarator™ pumps generate the vacuum needed to operate Jets™ vacuum toilets in Legion House, while also providing redundancy should one pump fail. Run time is automatically distributed between the two pumps for maximum reliability.

The Pixel building - Melbourne, Australia



The characteristic colour panels are designed to let daylight in but keep sun heat out

On a former brewery site in Melbourne, this office building has attracted the likes of U.S. Secretary of State Hillary Clinton and Julia Gillard (Australian ex-Prime Minister) on their hunt for green technology which can help build a better, more sustainable future.

Challenges

- Energy demand is accelerating world wide, and global availability of safe drinking water is already a major challenge which will only increase in scale.
- In the rapidly developing Asian economies, vast numbers of people are moving up the social ladder and into the fast-growing middle class, which is used to having an abundance of energy and water at its disposal.
- Energy and water supplies cannot keep up with this rapid growth.
- New and more sustainable ways of providing power and water are needed.

Jets™ solution

- Using just 1 litre of water per flush, Jets™ vacuum systems reduce the volumes of water and sewage associated with toilet flushing by up to 90%.
- Because of their low water use, Jets™ systems can be installed where water is scarce for natural reasons or by design - the latter is the case with Pixel.
- The Pixel building was designed to be self-sustained, and collects and filters rain water for use by its occupants. Although connected to the public water supply, that connection was designed as a back-up only.
- Its architects scoured the world for the best solutions available for this prestigious project to ensure a full 6 Star Green Rating, and chose Jets™.

Results

The Pixel building features one of the most sophisticated water treatment and utilisation systems ever to be built. After use, grey water is recycled and used again. Photovoltaic panels and wind turbines supply more energy than the Pixel building uses. The Jets™ system keeps water use for toilets at a minimum. **With Pixel, Grocon shows us that a viable, sustainable future is possible.**

Pixel achieved a perfect score of 100 under the Greenstar rating system, with a score of 75 being the benchmark for the 6 Star Green Rating. Five extra points were awarded for innovation, one of which was for the Jets™ vacuum toilet system.

Jets™ vacuum toilets:

- 9x 50M model

Vacuuarator™ units/pumps:

- 1x 15MB pump

Other details:

- Uses sustainable technology
- Collects and filters rainwater
- Carbon neutral: generates more energy than it uses
- Designed by studio505
- Built by developer Grocon



"In creating this pilot project, we have sought to identify best of type technology from around the world"

Grocon CEO Daniel Grallo speaking to the U.S. Secretary of State and the Australian Prime Minister



Castelão stadium - Fortaleza, Brazil



The Castelão stadium in Fortaleza, Brazil was one of the 2014 World Cup stadiums

Jets™ vacuum toilets:

- 950x 50M model

Vacuumarator™ units/pumps:

- 6x 130MBA units
(12x 65MBA pumps)

Other details:

- Seats 70,000 spectators
- World's largest vacuum sanitary installation

Originally built in the 1970's the Castelão stadium in Brazil underwent a complete renovation in preparation for the 2014 FIFA World Cup. A Jets™ vacuum sanitary system ensures spectators have access to reliable and hygienic toilets at every match.

Challenges

- Brazil is facing a water crisis in urban areas, and infrastructure for water and sewage is being overloaded. Stadiums add considerably to this strain on infrastructure, when tens of thousands of fans flush toilets during half time.
- It is common for stadiums to have water tanks holding millions of litres of water, as the public water supply simply cannot cope with this demand.
- Laying new 110mm soil pipes that rely on gravity for sewage transport is often difficult in renovation projects, especially in heavy concrete structures such as stadiums.
- With Brazil's high water prices, operating a traditional toilet system with large numbers of users is very costly.

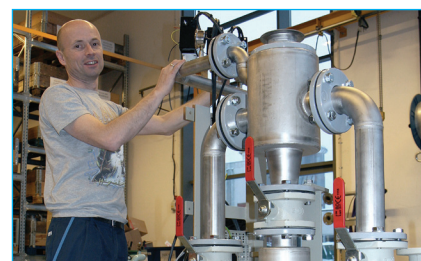
Jets™ solution

- Using just 1 litre of water per flush, Jets™ vacuum systems reduce the volumes of water and sewage associated with toilet flushing by up to 90%.
- The size of water tanks in the stadium can be considerably reduced.
- 50mm pipes used in vacuum systems are easier to install when renovating. Pipes can be laid horizontally or even upwards if need be.
- The low water consumption of Jets™ systems means their ROI time is remarkably short in areas such as Brazil where water is pricey.

Results

Castelão has **the world's largest onshore vacuum sanitary installation**. Even conservative estimates indicate savings in excess of 500,000 litres of fresh water at every match, by using Jets™ vacuum toilets.

The increased hygiene of vacuum toilets compared to traditional toilets, is an added bonus for spectators.



Uninove university - São Paulo, Brazil



Renovated in 2007, ROI time for this university's Jets™ system was just 15 months

Jets™ vacuum toilets:

- 720x 50 model

Vacuumarator™ units/pumps:

- 2x 195MBA units
(6x 65MBA pumps)

Other details:

- 26,000 students
- World's second largest vacuum sanitary installation
- Saves 360,000 litres of water every day using Jets™

The Uninove university has about 26,000 students, who generate a total of 60,000 toilet flushes every day - in a city where water is costly. So when a renovation of the university was due, the management looked around for a more modern sanitary technology than the traditional toilet in order to save water and money. They found Jets™.

Challenges

- Brazil is facing a water crisis in urban areas, and infrastructure for water and sewage is being overloaded.
- Clogging and vandalism were recurring problems for service staff, as a blockage could put a whole group of toilets out of action.
- As is the case with many educational institutions, the budget was limited. However, the restrooms were to be renovated despite the cost of doing so.
- With Brazil's high water prices, universities find themselves paying steep water bills due to the high number of students using toilets on the premises.

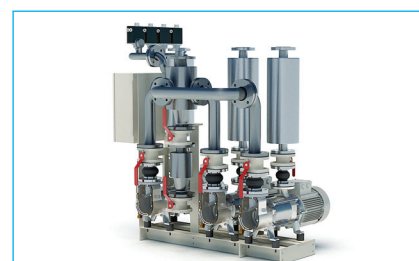
Jets™ solution

- Using just 1 litre of water per flush, Jets™ vacuum systems reduce the volumes of water and sewage associated with toilet flushing by up to 90%.
- Students appreciated the new Jets™ toilets, resulting in far fewer problems with blocked toilets. The vacuum present in the piping system means that one blocked toilet does not affect the other toilets.
- The short pay-back time and subsequent net savings of vacuum toilet systems made Jets™ an excellent choice for a university on a limited budget.
- The low water consumption of Jets™ systems means their ROI time is remarkably short in areas such as Brazil where water is pricey.

Results

The university's water use for toilet flushing was reduced from 420,000 litres to just 60,000 litres per day. Daily water expense was reduced from \$1,800 to just \$320. The Jets™ system paid for itself in 15 months due to reduced costs (the time was even shorter if one also deducts the cost of the traditional toilets which would otherwise have been used in the renovation).

This system alone saves more than 1,000,000 litres of water every 3 days. (Yes, that's **one million litres saved every 3 days!**)



Banco Santander Headquarters - São Paulo, Brazil



Adding more bathrooms after the building's completion was easily accomplished

Jets™ vacuum toilets:

- 508x 50M model
(412 initially - then expanded)

Vacuuarator™ units/pumps:

- 1x 130MBA unit
(2x 65MBA pumps)
- 1x 195MBA unit
(3x 65MBA pumps)

Other details:

- 90,000 m² office complex
- Saves USD \$165,000 annually
- Less than two years ROI time

The new headquarters of Banco Santander have had several previous owners, the first of which never intended for the building to be equipped with vacuum toilets at all. But thanks to the flexibility of the Jets™ vacuum toilet system, our technology could be implemented into the building's design at a late phase in the construction process.

Challenges

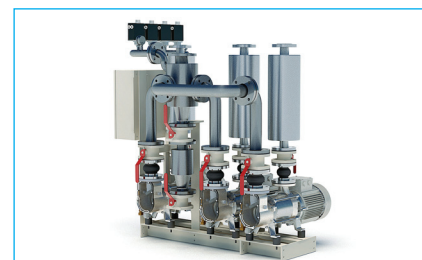
- The building was not designed for vacuum toilets when construction began.
- After the project had been on hold for some time, a new owner took over and saw the advantages of a Jets™ installation.
- São Paulo has a limited water supply, and is faced with droughts which have the potential to literally leave the city waterless.
- Sewage transport and treatment is also troublesome in São Paulo, and the closest connection point was already working at full capacity.
- Sewage had to be pumped to the next available point, 200 metres away.

Jets™ solution

- The small-diameter pipes and installation advantages of the Jets™ system made vacuum toilet installation possible after construction had started.
- The flexibility of vacuum piping will also enable much easier changes in the layout, to suit the needs of future tenants if so required.
- Using just 1 litre of water per flush, Jets™ vacuum systems reduce the volumes of water and sewage associated with toilet flushing by up to 90%.
- The Jets™ system effortlessly pumps sewage 200 metres to the next available sewer connection point, with no need for additional pumps.

Results

The Jets™ system in this building was supplied in 2007 when the construction work was back on track. Within two years of finishing the building, reduced water and sewer costs meant the Jets™ system had paid for itself. Every year since then, the building's owners have benefited from annual savings of USD \$165,000 thanks to the Jets™ system. Even after the building's completion, extra bathrooms were added with ease. Jets™ solutions create **new opportunities for property development** in areas with overloaded public water and sewage systems.



The building was initially fitted with 2x Jets™ 130MBA units. As more bathrooms were added to the building, one unit was easily upgraded to 195MBA by adding an extra pump for more vacuum capacity.

DNIT department - Brasília, Brazil



Entrance area of the DNIT building in the capital city Brasília

Jets™ vacuum toilets:

- 355x 50M model

Vacuumator™ units/pumps:

- 2x 130MBA units
(4x 65MBA pumps)

Other details:

- Federal government building
- 75,000 square metres
- 5,500 employees
- 1,500 daily visitors

In Brazil, the National Department of Transport Infrastructure (Departamento Nacional de Infraestrutura de Transportes - DNIT) had its headquarters retrofitted with Jets™ vacuum toilets in 2010.

Challenges

- Any building housing this many people will use vast amounts of water.
- Just like in the rest of Brazil, water is expensive in the city of Brasília.
- Retrofitting existing bathrooms is usually a very expensive process.
- Sewage must be pumped uphill to reach the public sewer connection.

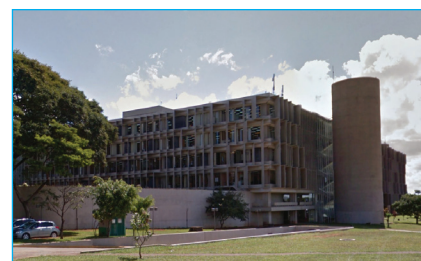
Jets™ solution

- Using just 1 litre of water per flush, Jets™ vacuum systems reduce the volumes of water and sewage associated with toilet flushing by up to 90%.
- Since the use of Jets™ vacuum toilets reduced water consumption in the building significantly, the retrofit soon covered its own investment cost.
- The Jets™ pumps have built-in transport capacity, easily enabling uphill transport to the sewer connection without needing additional pumps.

Results

Brazil is facing a water crisis, and large buildings with thousands of users such as the DNIT building have the greatest potential for saving water in an effort to manage the country's water resources more responsibly.

In choosing a Jets™ vacuum toilet system for the DNIT building, the Brazilian government is recognizing that **this technology is part of the solution** for the country's strained freshwater supplies.



"Today, there is a whole new awareness of the potential of vacuum toilets for saving water in Brazil"

Marco Cerulli, Managing Director of Tavola Engenharia (Jets™ distributor in Brazil)