

Water Efficiency Case Study

HMP Wandsworth

20,852m³ a year identified savings

£33,360 per annum potential savings



Background

In September 2014, we sent a water efficiency auditor to HMP Wandsworth to take a look at the prison's current water use practices and see if there was any way to help reduce its consumption without impacting business activity. HMP Wandsworth is a large prison in south west London with a separate vulnerable prisoner unit. It is currently able to hold 1,877 prisoners and is the largest prison in London and one of the largest prisons in western Europe. At the time of visit, the prison inmate population was around 1,600, with a total day staff of approximately 500 and a night shift staff of 20 to 30 people.

Water use was at 141,611m³ per year, costing the prison £141,526 per annum. There was also no non-return to sewer allowance, so on top of this cost, there was a sewage disposal cost of £84,768 per annum, this puts the total cost at over £226,294 per year. HMP Wandsworth's management accepted our offer of a water efficiency audit to see if they could get these numbers down.

AMR

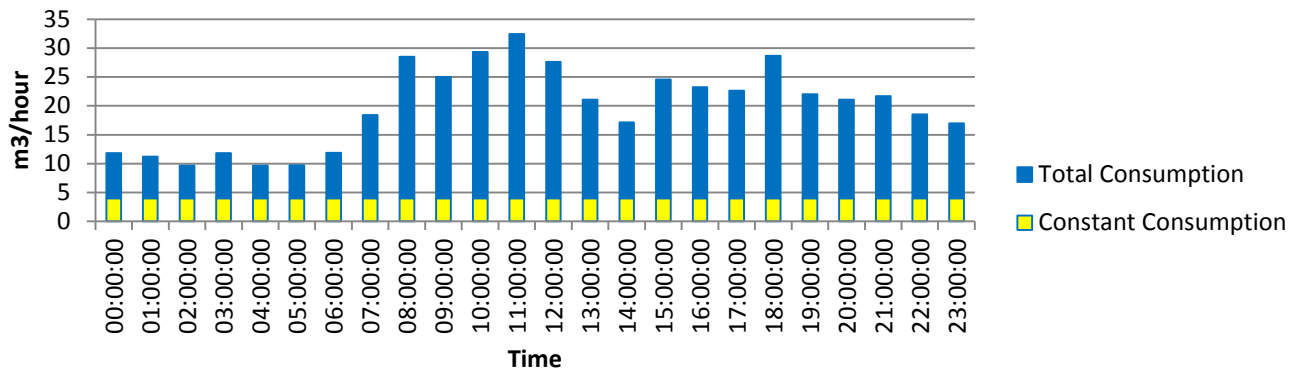
As part of the audit offer, we installed Automatic Meter Reading (AMR) equipment on the main supply meter to HMP Wandsworth. This enabled the examination of water use data in 15-minute intervals, giving a better understanding of the water use on site, an indication of peak demand and any continuous flow, highlighted as constant consumption, which may be indicative of a leak.

Identified opportunities for water efficiency

Water management and use was well-controlled within HMP Wandsworth with a clearly defined regime of responsibility, action and improvements. The prison's management had already sub-metered most of the site, which made understanding the journey of the water and accounting for specific uses much easier.

Leakage

Evidence from the AMR data and sightings of standing water in the drainage pump sump indicated that there may be a mains water leak on site. However, further investigation including the production of a detailed water balance for the site, showed that 99 per cent of the site's water use was accounted for, confirming there were no major leaks on the premises. A number of smaller leaks were identified, of between 50 and 100ml/minute (26 to 52m³ per year) each.



Pressure

Even though the majority of water was supplied under gravity from elevated tanks, some areas of the prison are supplied direct from the pumped distribution system. The pressure of the water supplied by the pump system is 4.5 to 4.8 bar. This was very high for a local mains supply and distribution system, more so because no building at the prison is higher than four floors. High pressure in the water distribution system means higher flow of water in taps and hoses supplied under this pressure. Ideally, the system should be 1.5 to two bars of pressure, although it was recommended to reduce this at a steady rate to ensure all connected equipment continued to perform satisfactorily. A reduction to the pressure of this system would save energy as well as reducing stress on the system and reducing wear on the pumps. A reduction from 4.5 to three bar would save approximately 547m³, £875 and 0.5 tonnes of carbon a year in this case.

Urinals

There are 70 toilets which have urinal facilities across HMP Wandsworth. Only some of these were equipped with pressure/Passive Infrared

(PIR) flush controls and some were clearly not operating correctly as there was continuous flow in the urinal. This continuous flow was evident when looking at the AMR data below. These urinals were estimated to be using a minimum of 11,000m³ per year. Installing PIR sensors would eliminate flushing during low use and at night and typically reduce water use by more than 60 per cent. In this case that would save more than 6,600m³, £10,560 and 6.6 tonnes of carbon per year.

Toilets

Many of the toilets identified on site are of the larger nine-litre style, as they were fitted before 1991. These can all be retrofitted with a cistern displacement device, which we can provide free of charge, or the ball cock can be adjusted in each cistern so that the fill is reduced to an acceptable level. One wing in the prison was equipped with victory valve toilets (a method of flushing using water directly from the main supply). The valves fitted can be pressed and released, after which a pre-defined volume of water will flush, however the toilet will continue to flush until the handle is released. It was thought that this method of flushing was leading to excessive water use in this particular wing. Installed valves should be set to the minimum flush available and to automatically shut off.

Kitchens

In one kitchen, disposal of food waste was performed using macerators. It is not best practice to dispose of food waste to the sewer and it was recommended that the practice not continue. Although water flow only occurs when the

macerator is switched on due to interlocking water use, eliminating their use would save around 9,198m³ of water, £14,716 per year and around 9.1 tonnes of carbon per year.

Our audit also advised HMP Wandsworth's management on the production of a water balance and the prison's water use practices, encouraging them to update existing water distribution plans and develop these to help water management in the future.

All these measures, when implemented, would give yearly water savings in excess of 20,852m³, saving the prison over £33,360 on annual water bills.

"We were aware of a leak inside the prison estate but our own investigations were inconclusive. The water audit provided us with a very clear understanding of where our water was going and how it was being used and what we could focus on to reduce our consumption. They produced an excellent report that gave us an understanding of our water usage on site, which was extremely helpful. Thanks for a job well done."

*Barry Heath - Site manager
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