

# Water Efficiency in Childcare Centres - Summary of Findings from Water Savings Partnership Pilot Assessments

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## Executive Summary

This report collates findings from a range of water efficiency assessments at childcare centres in Sydney as part of Sydney Water's Water Savings Partnership pilot program. 110 assessments were completed for childcare services and preschool education. A sample of 91 assessments were used to produce this summary of findings.

The average water use benchmark across the centres was found to be 35 L/child/day, and the average potential water saving was 30% of total consumption.

Table 1.1 shows some broad benchmark categories could be used as an initial benchmark for childcare centres, based on these findings to date.

**Table 1.1 Proposed Benchmark Categories for Childcare Centres**

Category	Benchmark
High	Over 40 L/child/day
Typical	Between 25 and 40 L/child/day
Best Practice	Under 25 L/child/day

Table 1.2 shows the average water use and recommended saving in each end-use category.

Table 1.2 Average Water End-Use and Recommended Savings and Proportions

Water Use Category	Average Water Use Proportion (%)	Average Recommended Savings (%)	Savings Opportunities
Child Bathroom Taps	19.3%	8.1%	Reducing flowrates by: <ul style="list-style-type: none"> <li>Manually adjusting connected shutoff valves (temporary)</li> <li>Installing pressure compensating aerators</li> <li>Replacing taps, including the use of 'time flow' taps in selected areas.</li> </ul> Aim for a WELS 6 star rating in bathroom areas and WELS 4 star rating in kitchens and other areas.
Staff Bathroom Taps	8.4%	4.1%	
Kitchen Taps	3.5%	0.7%	
Laundry Taps	1.2%	0.0%	
Other Taps (craft sinks, nappy change rooms, bottle prep rooms)	5.8%	2.1%	
Child Toilets	34.5%	7.0%	Replace toilets with new versions with a WELS rating of 4 stars or higher.
Staff Toilets	10.1%	2.1%	
Washing Machines	10.9%	5.2%	Replacement with an efficient machine with a WELS rating of 5 stars or more.
Leaks	0.5%	0.5%	Regularly check the centre's water using devices such as toilets and taps for leaks, and repair these promptly. Regularly complete a leak test by using the meter.
Kitchen Pre-Rinse Spray Valves	2.3%	0.1%	Replace with WELS 6 star version if flowrate is above 4 litres per minute.
Outdoor Water Use	1.5%	0.1%	Use watering cans, buckets and troughs for garden care and water play rather than continuous hose use.
Staff Showers	0.3%	0.0%	Replace with version with WELS 4 star or higher rating when used regularly.
Dishwashers	1.8%	0.0%	Replace a domestic dishwasher with a WELS 6-star rated version or a commercial dishwasher with rinse water recirculation and a water use of 5 litres per cycle or less.
<b>Total</b>	<b>100.0%</b>	<b>30.0%</b>	

In general, child care centres tended to show a high level of engagement in water conscious behaviours and relatively lower levels of leakage compared to other sectors.

Details of savings recommendations are discussed in Section 5, and a summary of tips for saving water in childcare centres is included in Section 7.

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## 2 Introduction and Approach

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This report collates findings from a range of water efficiency assessments at childcare centres in Sydney as part of Sydney Water's Water Savings Partnership pilot program.

The Water Savings Partnership pilot program is a collaboration between Sydney Water and five councils which aims to engage, educate and support non-residential customers to drive the adoption of behaviours, products and services that reduce their potable water demand. The program provides customers with a tailored service offering, detailed water efficiency assessments, site-specific recommendations as well as funding opportunities to support the implementation of water saving opportunities.

The program has taken segmental approach to outbound customer engagement and site assessments to build knowledge of the non-residential customer landscape, and to gain insights that inform the development of pilot programs and services to support customers into the future.

There have been over 250 detailed water efficiency assessments completed by the program from 2020 - 2022 in the pilot LGA areas of Blacktown, Campbelltown, City of Sydney, Northern Beaches and Parramatta.

Of these, 110 assessments were completed for childcare services and preschool education. A sample of 91 assessments were used to produce this summary of findings for water efficiency in childcare centres.

This document is a collation of notable findings, recommendations and observations on water use - including:

- Where water is used on average across most childcare centres.
- Benchmarking water use and recommended categories for centres to assess their own water efficiency performance.
- Key savings opportunities.
- Anecdotal observations on common opportunities and challenges.
- A summary of water efficiency tips suitable for childcare centres.

These findings have been drawn from:

- A review of all available reports and analysis provided by Sydney Water, with some filtering of included statistics to maximise the accuracy of findings.
- Interviews with available project officers.
- Phone interviews with a sample of participating centres.
- Initial engagement with industry regulators and member associations.

### 3 Where is Water Used?

Figure 3.1 shows the averaged breakup of water use at a typical childcare centre by end use. This is based on averaged analysis across 56 sites deemed to have the most reliable findings, and includes centres from all participating LGA's.

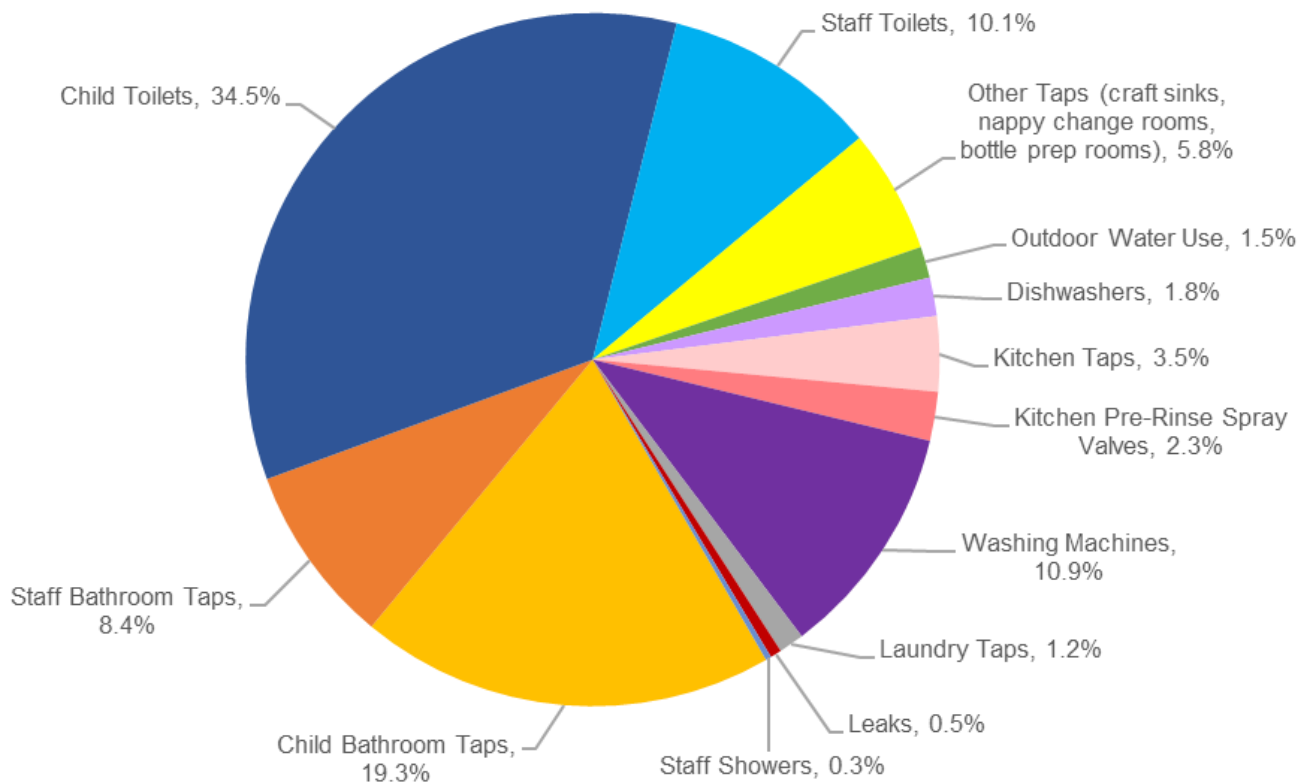


Figure 3.1 Childcare Centres Average Water End-Use Breakup

Key points to note from this breakup include:

- Bathrooms contributed the greatest portion of an average centre's total water use with 53.8% from children's bathrooms and 18.8% from the staff bathrooms. This was followed by the laundry at 12.1%, where washing machines were the greatest contributor. 7.6% of consumption on average was from the kitchen and the remaining 7.8% was spread across other smaller end uses.
- Toilets contributed the greatest portion of an average centre's total water use at 44.6%, with children's toilets representing 34.5% and staff toilets 10.1%.
- Taps contributed the second greatest portion of an average centre's total water use at 40.5%, with bathroom taps representing 27.7%, kitchen taps at 5.8%, other taps at 5.8% and laundry taps at 1.2%.
- Washing machines contributed the third greatest portion of average centre's total water use at 10.9%. Inefficient top-loader washing machines were commonly observed to be in use, resulting in this high contribution. Washing machines are also expected to require high levels of energy use.

- Dishwashers contributed a minimal 1.8% to an average centres total water use, with efficient commercial dishwashers commonly observed to be in use. It is worth noting that hand-washing of dishes would fall into the separate 'kitchen taps' category.
- Outdoor water use contributed 1.5% to an average centres total water use. This was based on observation and discussions with staff, use included outdoor water play, garden watering and wetting down sandpits.
- Observed leaks contributed a minimal 0.5% which is less than most industry segments, indicating that effective leak reporting and management are being practiced



## 4 Benchmarking

The water use benchmark measure for childcare centre is the number of litres used per child per day (L/child/day).

This benchmark is used as a performance measure that allows sites to track their water use over time, identify and investigate unexpected increases in use, compare their performance with similar business types, and to set water efficiency goals.

Figure 4.1 below plots the water use benchmarks of 79 centres, these ranged from 12 to 83 L/child/day. The average water use benchmark was found to be 35 L/child/day.

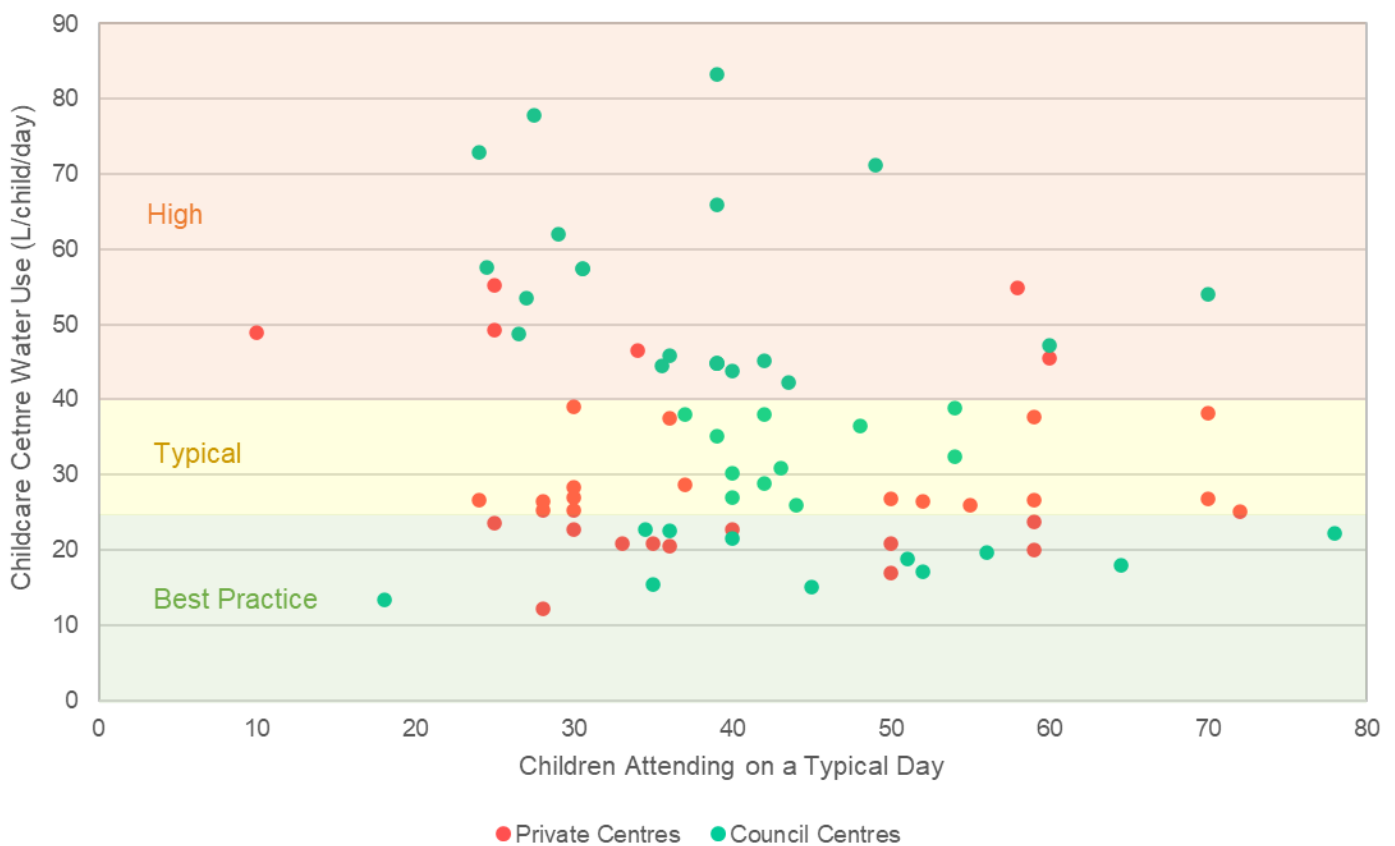


Figure 4.1 Childcare Centres Benchmark Plot

Key points to note from this include:

- Each benchmark is derived from 'calendar day baseline water use' derived from billing data as part of each detailed assessment, along with child numbers provided by site staff during the site visit.
- Based on this distribution, some initial broad benchmark categories are suggested as shown on the graph and noted in Table 4.2 below. 13% of centres fell into the 'best practice' efficient range of under 25 L/child/day, 61% of centres fell in the 'typical' range of 25-45 L/child/day, and 26% of centres fell into the 'high' range of over 40 L/child/day.

- There doesn't appear to be any significant correlation between water use benchmarks for Council and private centres, or the capacity of the centre.
- There did not appear to be any consistent driver for higher benchmarks, though centres that already have relatively efficient toilets and taps tended to benchmark lower, as did centres that made less use of their washing machine. The remaining variability could be attributed to a range of factors, including the age of children attending, and minor variation in the cultures of hand washing and toilet use frequency between centres. Therefore, while some centres are achieving low benchmarks of under 18 L/child/day, it is not expected to be feasible for all centres to achieve this – even if all water efficiency recommendations were actioned.
- The inclusion of staff numbers in the benchmark was considered (L/person/day children and staff), but this tended to show a similar comparison between that didn't appear to justify the added complexity of calculation – especially considering the staff that might work part-days.

Table 4.2 shows some broad benchmark categories could be used as an initial benchmark for childcare centres, based on these findings to date.

**Table 4.2 Proposed Benchmark Categories for Childcare Centres**

Category	Benchmark
High	Over 40 L/child/day
Typical	Between 25 and 40 L/child/day
Best Practice	Under 25 L/child/day

## 5 Savings Opportunities

### 5.1 Summary

From the assessments completed, on average a childcare centre has the water saving potential of 30.0% as a proportion of its total water use if they implement all recommendations listed in the below Table 5.1.

Table 5.1 Average Childcare Centre Recommendations and Water Saving Potential

Saving Opportunity	Average Saving as a Proportion of Total Water Use (%)	Range Observed Across Individual Centres, Minimum to Maximum (%)
<b>Taps</b>		
Child Bathroom Tap Improvements	8.1%	0.0% to 38.1%
Staff Bathroom Tap Improvements	4.1%	0.0% to 18.5%
Kitchen Tap Improvements	0.7%	0.0% to 3.6%
Other Tap Improvements (craft sinks, nappy change rooms, bottle prep rooms)	2.1%	0.0% to 13.6%
<b>Toilets</b>		
Child Toilet Retrofit	7.5%	0.0% to 23.1%
Staff Toilet Retrofit	2.3%	0.0% to 7.4%
<b>Other Replacements</b>		
Washing Machine Replacement	5.2%	0.0% to 29.3%
Pre-Rinse Spray Valve Replacement	0.1%	0.0% to 1.6%
<b>Repairs and Practices</b>		
Leak Repairs	0.5%	0.0% to 22.4%
Outdoor Water Use Practices	0.1%	0.0% to 1.6%
<b>Total</b>	<b>30.0%</b>	<b>0.0% to 49.4%</b>

The area with the greatest potential for water saving as a proportion of total water use was the bathrooms at 21.3%, with the majority found in the children's bathrooms at 15.1%, compared to staff bathrooms at 6.2%.

This was followed by the laundry, where savings related to the replacement of inefficient washing machine that were estimated to save 5.2%.

The combination of all other areas would contribute to a water saving potential of 3.4%.

It was noted that for hot water used in taps, washing machines and pre-rinse spray valves there is an energy saving in addition to the water saving achieved by these opportunities.

Each recommendation is discussed further below.

## 5.2 Tap Improvements

Taps collectively contribute 33.5% of water use and have the potential to save 15.0% of an average centre's water use when improvement recommendations are implemented. These recommendations include:

- Manually adjusting connected shutoff valves to reduce flow rates: this is a temporary zero-cost solution where the shutoff valves upstream of the tap are manually tightened to reduce the flow rate and volume of water used. This is only suitable for moderate changes on cold taps as a temporary measure as it can result in poor tap performance and pressure fluctuations in some cases.
- Installing Water Efficiency Labelling Scheme (WELS) rated pressure compensating aerators on compatible tap spouts: this is a mid-term cost-effective solution where an existing tap aerator is replaced with an advanced WELS rated pressure compensating aerator that optimises the flow pressure while reducing the flow rate.
- Replacing taps – this is a long-term solution where an existing tap is retrofitted with a more efficient WELS rated version.
- Replacement of taps with versions that have a timed-flow function are recommended in some areas as they limit the duration of use and have a shut off feature that prevents water loss from taps being left running and encourages shorter durations of use – such as a push button, lever or sensor activation with an electronic timer.

### 5.2.1 Basin taps

Basin taps used for hand washing contributed the greatest proportion of water use.

Recommended basin tap flowrates are equivalent to a WELS 6-star rating, with flowrates of 4.5 L/minute or less.

For timed-flow taps used in children's bathroom areas it is important to ensure that these can be activated without much strength – so lever and electronic designs more commonly found to be suitable than push-button designs.

It was common for staff bathrooms to have higher basin tap flowrates compared to child bathrooms. This was often due to these areas being a lower priority for refurbishment and having not been replaced as recently. For this reason, retrofits in staff bathrooms were more often found to be financially feasible despite child bathrooms using more water overall.

### 5.2.2 Kitchen taps

Kitchen taps are mainly used for dish washing and volumetric purposes such as filling vessels.

Recommended flow rates for kitchen taps are equivalent to a WELS 4-star (6 to 7.5 L/minute) or 3-star (7.5 to 9.0 L/minute) rating.

### 5.2.3 Other taps

Other taps include taps used in the craft sinks, nappy change rooms and bottle preparation rooms.

Recommended flow rates range from a WELS 5-star to 4-star rating, which allows for higher flowrates than for basin taps. This is because these taps are used for cleaning and volumetric purposes, and need to be fit for purpose.

### 5.3 Toilet Retrofit

As mentioned in Section 3, toilets represent the largest area of water use on average at 44.6%, and likewise the assessment findings highlighted toilet retrofit as a key potential saving. Combining child and staff toilet savings totals 9.1% of average childcare centre water use.

Recommended WELS ratings for replacement toilets are a 4 stars or better – equivalent to a full flush of 4.5L or less and a half-flush of 3.0 L or less.

Due to the higher relative capital cost associated with retrofitting a toilet compared to other recommended measures, and the return on investment often being greater than 5 years, toilet replacements would often be more feasible when supported by other drivers or incentives. These might include the need for upgrades or rebates to offset the capital costs.

It was common for staff bathrooms to have higher toilet flush volumes compared to child bathrooms. This was often due to these areas being a lower priority for refurbishment and therefore toilets having not been replaced as recently. For this reason, retrofits in staff bathrooms were more often found to be financially feasible despite child bathrooms using more water overall.

### 5.4 Washing machines

Washing machines are used at most centres for washing child clothes, aprons, tea towels, and toys as needed. The number of washes ranges between centres, typically from 4 to 15 loads per week and correlating with the number of children attending the centre.

On average, the assessments identified 5.2% of total water use could be saved through a washing machine retrofit.

Replacing an older washing machine with an efficient and durable front-loading unit can be a relatively expensive upgrade, but there are additional benefits beyond water savings that contribute to the return on investment of a replacement, including:

- Energy savings, associated costs and carbon abatement.
- Improved performance.

It is recommended that replacement machines with a 5-star WELS rating are selected.

A zero-cost behaviour opportunity is to ensure that where possible, staff wait until a load is full before running a wash cycle. This is particularly relevant for machines that do not have an effective load sensor to adapt the wash volume to the load size.

### 5.5 Leaks

#### 5.5.1 Minor Leaks

Savings from repairing minor leaks such as running toilets, leaking taps and hoses amounted to 0.5% of average sites total water use. This is much lower than many industry segments, which indicates that leak identification, reporting and repairs are managed in an effective manner across most sites.

#### 5.5.2 Major Leaks

No major pipe leaks or concealed leaks were identified during the assessments, though this is expected to remain a risk for childcare centres as with most sites.

### 5.5.3 Managing Leaks

To manage leaks effectively over time, it is recommended that:

- Site checks are completed regularly to visually check for minor leaks.
- Leaks are reported immediately and there is a process in place to repair these as soon as possible.
- Meter leak checks are completed regularly. This requires staff know where the main water meter is, and then regularly check for the meter registering water use at the start or end of the day when no water is being used for any other purpose. Alternatively the meter could be read at the end of the day and the start of the next day to see if it has moved. Unexpected flows would show a need for closer investigation.
- Water usage over time is compared over time from bills or other platforms, with any unexpected high use showing a need for closer investigation.

### 5.6 Pre-Rinse Spray Valves

Pre-rinse spray assemblies are used to remove food scraps and grease from dishes before they go into the dishwasher. Efficient devices have a single-orifice nozzle that produces a powerful fan-pattern jet that uses water velocity rather than volume to increase cleaning efficiency. Versions with a WELS 6 star rating use 4 litres per minute of water or less.

On average, the assessments identified that the majority of sites with pre-rinse spray valves already had efficient versions installed, so on average only 0.1% of total water was calculated be saved through a pre-rinse spray valve retrofit.

### 5.7 Outdoor Water Use Practices

Outdoor water use represented a low portion of average water use, as mentioned in Section 3. Similarly, estimated savings achievable from changing outdoor water use practices is relatively small at 0.1% of total average water use.

This represents an average, however, and for centres using more water outside the potential savings could be more significant.

Recommendations for outdoor water use included:

- Using a watering can for garden watering instead of a running hose, especially when involving children in this as an activity.
- Use buckets or troughs for water play, avoiding continuous tap or hose flow wherever possible.
- Making use of existing rainwater tanks, by connecting these to nearby toilets. Some centres have rainwater tanks that are not connected to any water uses due to uncertainties over water quality in the tank over time. Use of this for toilet flushing would avoid water quality risks and typically make more regular and consistent use of the water.

### 5.8 Dishwashers

While there were no instances of dishwashers being recommended for upgrade in the sample of centres analysed for this report, it would be recommended to upgrade to a water efficient version in any refurbishment or if a unit has reached the end of its serviceable life.

There could also be the potential to save water at some centres by replacing hand washing practices with a water and energy efficient domestic or commercial dishwasher.

It would be recommended to select a domestic dishwasher with a WELS 6-star rating or a commercial dishwasher with rinse water recirculation and a water use of 5 litres per cycle or less.

## 6 Positive Observations and Challenges

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### 6.1 Sources of Information

Beyond the reported findings from the water efficiency assessments, this section attempts to capture some anecdotal findings on external factors influencing the potential for water efficiency improvements in childcare centres.

These findings would not necessarily apply to all centres, but were derived from common themes noted in:

- Interviews with project officers who conducted assessments (as available), and
- Phone interviews with 8 centres.

### 6.2 Positive Observations

Staff who were engaged across various centres demonstrated a strong awareness of current water use practices and an interest in sustainability, both in the efficient operations of their centres and in teaching children in attendance of positive behaviour and practices.

This was a positive observation that encourages water conscious behaviours to become a valued part of the culture and learning at the centres.

### 6.3 Challenges

#### 6.3.1 Access Water Use Information

Childcare centre staff do not always have access to water bills, which include water use information and trends. This raises a challenge in identifying increases in water use and responding to unexpected variations efficiently.

There is an opportunity to improve this by taking and recording regular readings of the water meter – for example every month.

#### 6.3.2 Competing Needs for Funding and Reactive Replacement of Fittings

Similar to many workplaces, it is easy for water to become a low priority in childcare centres due to water's relatively low cost compared to other expenses. This makes it difficult to prioritise water efficiency opportunities in the context of other needs competing for the same funds.

Many centres have an 'urgent' process in place to address fittings that are leaking or broken, but 'like for like' replacement is common in this context. This is where something as similar as possible to the existing fitting is installed without any additional scope to consider an upgraded or improved fitting instead. Even in the case where upgraded fittings are encouraged there are a range of criteria to consider in addition to water efficiency performance, making rapid selection of replacement fittings difficult. These criteria might include:

- Price,
- Durability,
- Practicality,



- Safety for kids,
- Convenience in sourcing and installation, and
- Ease of maintenance.

It is also common practice for only the failed unit to be replaced, leaving other similar units at a similar age and wear level with a high risk of failing in a similar way.

These challenges could be improved with a more proactive approach to worn or failing fittings, such as:

- Developing a minimum standard or a list of approved water efficient fittings to be used in the event of any urgent repairs that meets all necessary criteria and also has an appropriate WELS rating.
- Considering a policy of replacing similar fittings at the same time if one or more fittings is leaking or broken – before the other similar fittings also require similar attention in the future.
- Upgrading water fittings before they reach end of life and begin to fail. This approach is best practice.

## 7 Summary of Water Efficiency Tips for Childcare Centres

A simplified summary of tips for improving and maintaining water efficiency in childcare centres is provided below - based on the combined findings discussed in this report. This would be suitable to be used as targeted guidance material for childcare centre staff.

Recommended water efficiency tips for childcare centres include:

- **Understand how much water is used in your centre** by collating water bills or regular readings of the main water meter to identify water use trends and unexpected water use increases.
- **Calculate and compare your centre's water efficiency benchmark.** Calculate your average water use (in Litres per day) and divide that by the number of children attending the centre on an average day to get 'Litres per child per day'. If the centre is above 40 L/child/day it would fall into the 'high use' category. If the centre is below 25 L/child/day then it is already in the 'efficient' category. In between is the 'typical' category.
- **Implement a routine leak inspection schedule** where regular checks of water fixtures and equipment for leaks are done. Report and repair any leaks immediately, even if they appear small.
- **Regularly check the main meter for leaks** by watching to see if it registers any water flow at a time when no water is expected to be used, by or comparing meter readings from closing to opening the next business day<sup>1</sup>. If the meter shows consistent flow but no cause is visible then this may indicate a 'concealed leak' and a specialist concealed leaks investigation and repair provider can assist.<sup>2</sup>
- **Understand where, when, and how much water is used on site.** This can be done by completing a fixture and equipment survey and noting how much water is used for each device.

A flowrate in Litres per minute (L/min) can be calculated by using a measuring jug and a timer to record the time it takes to fill a litre jug with water, then by dividing 60 by the number of seconds taken to fill the jug. E.g. if it takes 7 seconds to fill 1 litre, the flowrate of the tap is  $60 \div 7 = 8$  Litres per minute.

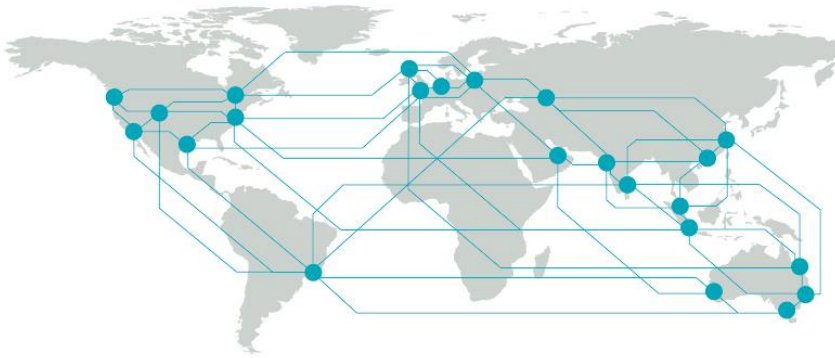
- **Upgrade water-using devices and equipment** to be more efficient. Consider as a priority key water using devices such as taps, toilets and washing machines.

Recommended flowrates for taps are under 4 L/min (equivalent to WELS 6 star) in staff and child bathrooms. Up to 7 L/min (equivalent to WELS 4 star) is recommended in kitchen and other staff areas where some filling of vessels is required. If tap flowrates are higher than this, consider installing 'pressure compensated aerators' in tap spouts – this is an easy, cheap and effective way to get high-performing low flow taps. For washing machines, models with a 5 star WELS rating are recommended.

<sup>1</sup> The Sydney Water website has additional guidance on checking the main meter for leaks: <https://www.sydneywater.com.au/your-home/saving-water-at-home/leak-detection.html>

<sup>2</sup> Sydney Water offers a specialist concealed leaks investigation and repair service. For more information on the WaterFix® Concealed Leaks service, visit: <https://www.sydneywater.com.au/your-home/helping-you-save-water/waterfix-concealed-leaks.html>

- **Be proactive with maintenance and repairs** by:
  - Developing a minimum standard or a list of approved water efficient taps and toilets to be used in the event of any urgent repairs.
  - Planning to replace similar fittings at the same time if one or more fittings is leaking or broken – before the other similar fittings also require similar attention in the future.
  - Upgrading water fittings before they reach end of life.
- **Use actionable signage** around water-using areas to provide an easy method to report any leaks and to act as a timely reminder to practice water-wise behaviours.
- **Avoid continuous hose use outside.** Minimise the use of hoses with continuous flow, instead use buckets, containers and watering cans for water play and garden watering.
- **Avoid hosing for washdown of floors and kitchens.** Use brooms and mops to clean floor and kitchen areas instead of hosing.
- **Ensure washing machines and dishwashers are run on full loads.**



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