Section 4.5

WATER SAVINGS ACTION PLAN

KIAMA LEISURE CENTRE
4.5 Water Saving Action Plan Kiama Leisure Centre

The Kiama Leisure Centre is located at Havilah Place, Kiama. The facility consists of a 25 meter eight lane pool, and a smaller children pool (12m × 6m), a childcare facility, aerobics wing, gymnasium, indoor sports hall and a spa.
4.5.1 Baseline Water Usage Year

The baseline water usage data provided in Table 4.5.1 is for the 2002/03 Financial Year (the period immediately prior to the introduction of Level 2 Water Restrictions). This period was chosen as Council introduced a number of initiatives across its operations to reduce water consumption.

Table 4.5.1: Baseline water use for the Kiama Leisure Centre. Baseline year is the 2002/03 Financial Year.

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Kiama Leisure Centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation Name:</td>
<td>Kiama Municipal Council</td>
</tr>
<tr>
<td>KMC Assessment No.:</td>
<td>4899/201</td>
</tr>
<tr>
<td>Meters:</td>
<td>HDSM0026</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Description</th>
<th>Normal Operation</th>
<th>With variation from Normal Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Terralong St, Kiama</td>
<td></td>
</tr>
<tr>
<td>Use (eg. Restaurant, Holiday Park, Golf Course, etc)</td>
<td>Leisure Centre</td>
<td></td>
</tr>
<tr>
<td>Sydney Water Account Number/s</td>
<td>4772481</td>
<td></td>
</tr>
<tr>
<td>Baseline Start Date</td>
<td>1 July 2002</td>
<td></td>
</tr>
<tr>
<td>Baseline End Date</td>
<td>30 June 2003</td>
<td></td>
</tr>
<tr>
<td><strong>A</strong> = baseline water use per annum (kL)</td>
<td>11 121</td>
<td></td>
</tr>
<tr>
<td>Business Activity Indicator</td>
<td>Attendance (individual visits)</td>
<td></td>
</tr>
<tr>
<td><strong>B</strong> = Quantity of Site Business Activity Indicator per annum (corrected for variations)</td>
<td>195000 (90% will use facilities, and 75% of those use amenities)</td>
<td></td>
</tr>
<tr>
<td>Is baseline representative of normal water use</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>If NO, description of variation (eg. restrictions, shutdown, refurbishment etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C</strong> = Impact of variation on water use (ie. variation from normal) kL per year</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>D</strong> = A – C baseline water use corrected for variation (kL)</td>
<td>11 121</td>
<td></td>
</tr>
<tr>
<td><strong>E</strong> = D / B baseline water use key performance indicator (KPI)</td>
<td>0.0570</td>
<td></td>
</tr>
<tr>
<td>Baseline KPI Units</td>
<td>kL/individual attendance for the 2002/2003 financial year.</td>
<td></td>
</tr>
</tbody>
</table>

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1 Sydney Water Corporation
4.5.2 Technical Review Synopsis

A Walk-Through Water Usage Technical Review was conducted at the Kiama Leisure Centre on the 6th of January 2006. The following is a summary of the results of that review. A comprehensive report for the review can be found in Appendix B-4.

Site and Fixture Survey

Table 4.5.2 provides a breakdown of water fixtures and facilities at the Leisure Centre. This table provides information on what exists, how much exists, and, were appropriate, its water consumption performance at the time of the review.

Table 4.5.2: Breakdown of water fixtures and facilities at Kiama Leisure Centre.

<table>
<thead>
<tr>
<th>Fixture / Facility</th>
<th>Location</th>
<th>Number and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pools</td>
<td>NE wing</td>
<td>2 pools [25m, 8 Lane pool + 12m × 6m children’s pool]. Water consumed for the month of January was 522 kL.</td>
</tr>
<tr>
<td>Toilets</td>
<td>Kids Corner</td>
<td>1 of [3/6 dual flush cistern]</td>
</tr>
<tr>
<td></td>
<td>Aerobics area change room</td>
<td>3 of [2 × 3/6 dual flush cistern – women’s amenity + 1 × 3/6 dual flush cistern – men’s amenity]</td>
</tr>
<tr>
<td></td>
<td>Indoor Sports Hall change rooms</td>
<td>8 of [5 × single flush 8L – women’s amenity + 2 × single flush 8L cistern &amp; 1 × 3/6 L dual flush cistern – men’s amenity]</td>
</tr>
<tr>
<td></td>
<td>Pool change rooms</td>
<td>8 f [3 × single flush 8 L &amp; 2 × 3/6 L dual flush – women’s amenity + 2 × single flush 8 L &amp; 1 × 3/6 L dual flush cistern – men’s amenity]</td>
</tr>
<tr>
<td></td>
<td>Outdoor toilet</td>
<td>1 of [8L single flush cistern] Rarely used</td>
</tr>
<tr>
<td></td>
<td>Family Room</td>
<td>1 of [3/6 L dual flush cistern]</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>24</td>
</tr>
<tr>
<td>Hand Basin</td>
<td>Kids Corner</td>
<td>1 of (2 taps) [flow rate ~ 4 L/min]</td>
</tr>
<tr>
<td></td>
<td>Aerobics Wing change room</td>
<td>4 of (8 taps) [2 in women’s hot and cold taps, flow rate ~ 4 L/min, aeration installed + 2 in men’s hot and cold taps, flow rate ~ 4 L/min, aeration installed]</td>
</tr>
<tr>
<td></td>
<td>Indoor Sports Hall change rooms</td>
<td>2 trough systems (8 taps) + 2 disabled hand basins (2 Taps) [4 × spouts with cold only &amp; 1 spout cold only in disabled w/c, flow rate ~ 8 L/min, no aeration - women’s + 4 × spouts with cold only &amp; 1 spout cold only in disabled w/c, flow rate ~ 8 L/min, no aeration – men’s]. Taps appear to be ~ 20 years old and may not be suitable for aeration devices</td>
</tr>
<tr>
<td></td>
<td>Pool change rooms</td>
<td>As for indoor sports hall</td>
</tr>
<tr>
<td></td>
<td>Outdoor toilet</td>
<td>1 of (1 tap) [flow rate ~ 8 L/min, no aeration, cold only]. Tap appears to be ~ 20 years old and may not be suitable for aeration devices</td>
</tr>
</tbody>
</table>

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2 As per Guidelines for Water Savings Action Plans, DEUS, October 2005, page 14
### Current Water Use

The following provides information on the patterns of water use at Kiama Leisure Centre at the time of the water usage technical review was undertaken. Table 4.5.3 provides a breakdown of water use by fixture and facility, while Figure 4.5.1 provides a diagram of the data as outlined in Table 4.5.3.

**Table 4.5.3:** Estimated water use by fixture and facilities at Kiama Leisure Centre. Estimates based on information drawn from Sydney Water Corporation, Kiama Leisure Centre staff and records, and measurements and observations during *Walk Through Water Usage Technical Review*.

<table>
<thead>
<tr>
<th>Fixture / Facility</th>
<th>kL/d</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilets</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>Hand basins</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Safe room basins</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Pools</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>Showers</td>
<td>2.0</td>
<td>Cleaning pool concourse and pool and sports hall amenities (1 hour per day, 10 L/min)</td>
</tr>
<tr>
<td>Pool Hose (cleaning)</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td>Urinals</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Unaccounted</td>
<td>5.2</td>
<td></td>
</tr>
<tr>
<td><strong>Total (not including unaccounted)</strong></td>
<td><strong>27.5</strong></td>
<td></td>
</tr>
</tbody>
</table>
Breakdown of Water Use by Fixture and Facility

Unaccounted 16%
Toilets 14%
Hand basins 1%
Safe room basins 0.03%
Urinals 4%
Pool Hose (cleaning) 27%
Shower 6%
Pools 32%

Figure 4.5.1: Estimated breakdown of water consumption by facility and fixture and Kiama Leisure Centre.

Figure 4.5.1 and Table 4.5.3 indicate that the single biggest consumers of water at the Kiama Leisure Centre are the pools, followed by cleaning that involves the use of a hose to clean the pool concourse, pool amenities and sports hall amenities. However it should be noted that the amenities combined account for 25% of the water used at the site, hence initiatives to reduce water in these should have a significant affect on water consumption at the site.

Note also that an estimated 16% of the water consumed at the site is unaccounted for. Possible reasons for this could include one or a combination of the following:

- Leakage, either from fixtures and / or sub-surface pipe leaks (eg. during the usage technical review, a toilet was damaged and leaking badly. The barrier tap set up indicated that the damage and leak was not recent).
- Inappropriate use of amenities including the occasional occurrence of youths turning all showers on and leaving amenities to fill with steam.
- Underestimation in the estimates of water usage of fixtures identified in the technical review.
- Activities that use water picked up in review process.

The true cause of the unaccounted water use can be addressed by monitoring the site water meter using an automatic data log set to record meter readings every half hour, 24 hours a day for at least two weeks. This will help define a base flow for the site.
Site Meter Monitoring

The site water meter for Kiama Leisure Centre (Identity No.: HDSM0026) was monitored from the 11\textsuperscript{th} to the 29\textsuperscript{th} of February by Council staff. The results for this monitoring program are provided in Figure 4.5.2.

![Leisure Center Water Meter Monitoring](image)

**Figure 4.5.2:** Meter monitoring data for Kiama Leisure Centre (Meter HDSM0026) from the 11\textsuperscript{th} to the 29\textsuperscript{th} of February.

Estimated water usage (Table 4.5.3) puts the annualised daily average for the centre at 32.7 kL/day. The average for the monitored period gives an average of ~ 57 kL/year. While there is a definite difference between the averages, the difference are not excessive considering that:

1. the estimated average is an annualised average, and
2. the time of the year for the monitoring period is particularly busy regarding pool use because it summer and school holidays

The data provided in Figure 4.5.2 does not particularly regarding checking the estimated base flow (unaccounted water use) identified in Table 5.2 because the second reading during the day was taken at ~ 4:00 pm each day, ~ 5 hours before close of business. This issue needs to be addressed, preferably using an automatic data logger to monitor the Leisure Centre’s water meter every half hour, 24 hours a day for at least two weeks.
Water Using Facilities and Fixtures

Various actions have been undertaken to improve water efficiency at the Kiama Leisure Centre. Examples include the installation of a 10,000L water tank and pump to supplement the cleaning of the pool concourse and nearby amenities (not operational during audit due to pump failure). Also the installation of flow restriction (10 L/min) on the pool hose used to clean pool concourse and nearby amenities, and the installation of water efficient fixtures in the recently upgraded Aerobics area amenities.

The following is a general description of the facilities and fixtures at the Leisure Centre. For a comprehensive list of facilities and fixtures, outlined in Table 4.5.2 provided earlier.

Pools

The leisure centre has two pools, ie. A 25m, eight lane pool, and a 12 m x 6 m children’s pool. Both are filled from a single point using a ballast tank and flotation valve system (Figure 4.5.3). This system adjusts pool level by acting the towns water valve when the pool level drops, usually due to a reduced number of patrons in the pool. When the number of patrons in the pools increase, the excess water produced drains to the sewer.

![Figure 4.5.3: Filling point for both pools. Towns water fills from pipe to which meter is attached. Ballast tank is underneath grate.](Image)
Toilets

The condition and toilet cistern sizes at the Kiama Leisure Centre vary greatly. Toilets located in the Aerobics area, Kids Corner and family room are relatively new and in a good state of repair (Figure 4.5.4). Those in the Sports Hall and Pool amenities appear much older and, to varying extents, are in a more degraded state with some leakage evident during the review.

![Figure 4.5.4: Varying states of repair and age of toilets at the Kiama Leisure Centre. The cisterns pictured on the left are mostly 8-L single flush units in varying states of repair and feed to toilets in both the Sports Hall and Pool amenities. The toilet picture to the right is a relatively new dual flush system located in the Aerobics area.](image)

Hand Basins

As is the case for toilets, variation in hand basins occurs between the Aerobics area, Kids Corner and the family room, relative to the Sports Hall and pool amenities (Figure 4.5.5). Flow rates are generally lower in the former (~ 4 L/min) and fixtures are newer. Aeration is uniformly not present in the latter, and taps do not appear easily adaptable to these devices.

![Figure 4.5.5: Varying age of hand basins at the Kiama Leisure Centre. The basin on the left is located in the Aerobics area amenities, having flow restriction and aeration fitted, producing a flow rate of 4.5 L/min. The basin pictured to the right is located in the Sports Hall amenities. The taps provide only cold water and produce a flow rate almost twice that of the Aerobics area](image)
amenity fixtures. The above shows no aeration fitted, and the spout has no thread to accept such devices.

**Showers**

Unlike toilets and basins, there is not a great deal of variation between flow rates or visible state of repair of showers in any of the amenities distributed throughout the leisure centre (Figure 4.5.6). The vast majority of showers produced a flow rate of ~ 8 L/min, with the only exception being that installed next to the spa which produced a flow rate of ~ 5.5 L/min (Figure 4.5.6).

![Showerheads at Kiama Leisure Centre](image)

**Figure 4.5.6:** Showerheads at Kiama Leisure Centre. The showered pictured to the left is typical of those found in all amenities distributed throughout the Centre, producing a flow rate of ~ 8 L/min. The showered picture to the left occurs only next to the Centre’s spa, producing a flow rate of ~ 5.5 L/min.

**Tubs**

There is only one tub located in the staff room, termed (Figure 4.5.7). There is no aeration fitted to the spout and the flow produced is 9 L/min.

However, according to the Centre Manager, the tub is only used intermittently by staff, and represents a negligible contribution to overall water use at the Centre. For this reason it has not been factored into the estimations provided in Table 4.5.3.
Figure 4.5.7: Staff “safe” room basin and tap.

Spa

The Kiama Leisure Centre has one spa available to patrons (Figure 4.5.8). The spa is filled with water from the pool and is only topped occasionally using fresh tap water. Since most of the water used by the spa is captured by that used by the pools, the spa has not been included in the estimates provided in Table 4.5.3

Figure 4.5.8: Kiama Leisure Centre spa.

Urinals

There are only three urinals in the Centre. The unit located in the Aerobics area amenities is a 6-L cistern that flushes only while the cord is being pulled. The other two units are (oddly) dual flush 3/6 L dual flush units, one located in the Sports Hall amenities, and the other in the pool amenities.
### 4.5.3 Water Savings Initiatives Implemented in the Past Five Years

A number of initiatives have been implemented at Kiama Leisure Centre over the past five years. These are provided in Table 4.5.4 below.

**Table 4.5.4:** Water savings initiatives implemented at Kiama Leisure Centre in the past 5 years.

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Number of Units</th>
<th>Installation Date</th>
<th>Cost ($A) Total Cost (A$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation of 10,000 Litre rain water tank plus pump to supplement cleaning of pool concourse and amenities</td>
<td>1 10,000-L tanks, 1 electric pump, plus pipe work.</td>
<td>9/2005</td>
<td>~ 1,000 (pump) ~ 3,500 (tank) 5,000</td>
</tr>
<tr>
<td>Construction of Aerobics Wing with water efficient devices (Aqualoc washers, aeration, 3/6 Litre dual flush cisterns, water saving shower heads)</td>
<td>4 cisterns 16 Taps 4 spouts 4 showerheads</td>
<td>2003</td>
<td>~ 1600 ~ 280 ~ 60 ~ 720 ~ 1760 ~ 440 ~ 75 ~ 760</td>
</tr>
<tr>
<td>Installation of flow restrictor on tap outlet for hose used to clean pool concourse and amenity (restricting flow to ~ 100 L/min)</td>
<td>1</td>
<td>11/2005</td>
<td>100 100</td>
</tr>
<tr>
<td>New ¼ turn taps on basins in pool amenity. These are designed to improve action and reduce leaks by making operation easier.</td>
<td>12 sets (2 taps per set)</td>
<td>3/2005</td>
<td>~ 3240 ~ 3480</td>
</tr>
</tbody>
</table>
### 4.5.4 Action Plan

Table 4.5.5: Water Savings Measures – recommended actions for Kiama Leisure Centre. Water savings per year and costs to implement are estimates only based on information available at the time of the walk-through technical review. It is recommended that water savings and cost of implementation be reviewed when developing detailed plans for the larger projects. Note that successful completion of projects is subject to both internal and external funding availability. Cost effective projects are those having a positive Estimate of Return (assumes inflation = 3%\(^3\), cost of water = $1.013 per kL\(^4\)).

<table>
<thead>
<tr>
<th>Project No.</th>
<th>Measure Description</th>
<th>Responsibility</th>
<th>Cost to Implement</th>
<th>Savings (kL / year)</th>
<th>Estimate of return over 10 years (based on NPV using DCF value)</th>
<th>Time Required</th>
<th>Planned Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Installation of flow control (<em>Aqualoc</em> washers calibrated to achieve flow of 6 L/min) on all hand basins having a flow rate of 7 L/min or more to achieve flow rate of 6 L/min or less. This includes all taps in the Pool and Sports Hall amenities, the outdoor toilet, staff room and first aid room.</td>
<td>Business Manager Holiday Parks</td>
<td>~ $850 (~31 taps fitted with <em>Aqualoc</em> washers)</td>
<td>30</td>
<td>- 69%</td>
<td>2 months</td>
<td>August 2006</td>
</tr>
<tr>
<td>2</td>
<td>Where not already done, replace toilet cisterns with 3/6 L dual flush systems (includes Sports Hall and Pool amenity, and outdoor) as they expire</td>
<td>Business Manager Holiday Parks</td>
<td>~ $5750 (~13 toilets)</td>
<td>268</td>
<td>- 60%</td>
<td>Ongoing</td>
<td>July 2007</td>
</tr>
</tbody>
</table>

\(^3\) Source: Australian Bureau of Statistics, April 2006  
\(^4\) Source: Sydney Water Corporation, December 2005
<table>
<thead>
<tr>
<th>Project No.</th>
<th>Measure Description</th>
<th>Responsibility</th>
<th>Cost to Implement</th>
<th>Savings (kL / year)</th>
<th>Estimate of return over 10 years (based on NPV using DCF value)</th>
<th>Time Required</th>
<th>Planned Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Eliminate base flow (leaks) by:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Install ⅛ turn taps into Sports Hall amenities. These taps simplify action of taps, hence reduce leakage. Installation should help reduce base flow.</td>
<td>Business Manager Holiday Parks</td>
<td>$3480 (12 sets 2 per set, includes labour)</td>
<td>4 Months</td>
<td>October 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Investigate options for preventing excessive / deliberate miss-use of showers and basins. This might include timed auto shut off showers, and spring loaded tap handles.</td>
<td>Business Manager Holiday Parks</td>
<td>$0</td>
<td>Ongoing</td>
<td>Ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>Develop and implement regular auditing and maintenance protocols for water fixtures on site (including external garden taps, amenity blocks and water outlets for cleaning purposes). The goal should be to reduce water consumption from leaks to almost zero.</td>
<td>Business Manager Holiday Parks</td>
<td>$0</td>
<td>Up to ~ 1500 kL/yr</td>
<td>+ 218%</td>
<td>Monthly</td>
<td>Commence October 2006 then ongoing</td>
</tr>
<tr>
<td>d.</td>
<td>Develop and install signage at all water use points requesting patrons use water wisely and report leaks to reception desk</td>
<td>Business Manager Holiday Parks</td>
<td>$500 (25 @ $20 / sign)</td>
<td>4 Months</td>
<td>July 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>Using an automatic data logger develop a periodic water meter monitoring program. This will help identify water use patterns and accurately determine base flows allowing anomalies and leaks to be quickly identified.</td>
<td>Business Manager Holiday Parks</td>
<td>$93 (Cost of two data loggers between 11 sites)</td>
<td>4 Months</td>
<td>Commence October 2007 then ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project No.</td>
<td>Measure Description</td>
<td>Responsibility</td>
<td>Cost to Implement</td>
<td>Savings (kL / year)</td>
<td>Estimate of return over 10 years (based on NPV using DCF value)</td>
<td>Time Required</td>
<td>Planned Completion Date</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>-----------------------------------------------------------------</td>
<td>---------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>8.</td>
<td>Incorporate purchasing policy into existing Leisure Centre Policies and Procedures that requires the replacement of existing water fixtures and devices (from tap washers through to toilet cisterns) <em>at least</em> meet contemporary Sydney Water Corporation water efficiency recommendations.</td>
<td>Business Manager Holiday Parks</td>
<td>0</td>
<td>Difficult to quantify</td>
<td>N/A</td>
<td>1 Month</td>
<td>October 2007</td>
</tr>
<tr>
<td>9.</td>
<td>Prepare and seek tender for all refurbishment work to include the use of water saving fixtures that meet or exceed contemporary water efficiency standards.</td>
<td>Business Manager Holiday Parks</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>1 Month</td>
<td>October 2007</td>
</tr>
<tr>
<td>10.</td>
<td>Check quarterly water bills and trend consumption and cost relative to previous bills. Anomalies to be identified and solved ASAP</td>
<td>Business Manager Holiday Parks</td>
<td>0</td>
<td>Contributes to project 3</td>
<td>As per project 3</td>
<td>Ongoing</td>
<td>Commence August 2006 Ongoing</td>
</tr>
<tr>
<td>11.</td>
<td>Include water conservation as a specific topic at staff meetings. Issues covered should include performance to date, unusual consumption patterns, and raising of issues, concerns and ideas from staff regarding water conservation</td>
<td>Business Manager Holiday Parks</td>
<td>0</td>
<td>Difficult to quantify</td>
<td>N/A</td>
<td>Ongoing</td>
<td>Commence August 2006 then ongoing</td>
</tr>
<tr>
<td>12.</td>
<td>Report water consumption and bill amount as separate line in Leisure Centre budget reports</td>
<td>Business Manager Holiday Parks</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>4 Months</td>
<td>Commence July 2006 then ongoing</td>
</tr>
<tr>
<td>13.</td>
<td>Business Manager to formally report on Leisure Centre water consumption performance to Council</td>
<td>Business Manager Holiday Parks</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>Annually</td>
<td>Annually</td>
</tr>
</tbody>
</table>
WATER USAGE
WALK THROUGH
TECHNICAL REVIEW
Prepared by Kiama Municipal Council

KIAMA LEISURE CENTRE
LEISURE CENTRE

Review Date: 6th of January, 2006

Time: 9:00 – 11:00am

Participants: Andrew Thomas – Kiama Council Environment Officer
Jenene – Operations Manager

Meter Number: HDSM0026

Meter Size:

Opening Hours: weekdays 6:00am - 8:30pm
   Fridays 6:00am - 7:00pm
   Saturday 7:00am - 6:30pm
   Sunday 9:00am - 6:30pm

Operational Hours: half an hour before opening, and roughly 45 minutes after closing. Occasionally Indoor Sports Hall is hired out until 10:00pm.

SITE DESCRIPTION

The Kiama Leisure Centre is located at Havilah Place, Kiama. It consists of a 25 meter eight lane pool, a smaller children’s pool (12m × 6m), a childcare facility, aerobics wing, gymnasium, indoor sports hall and a spa.
Water Using Facilities and Devices:

<table>
<thead>
<tr>
<th>Fixture / Facility</th>
<th>Location</th>
<th>Number and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pools</strong></td>
<td>NE wing</td>
<td>2 of [25m, 8 Lane pool + 12m × 6m children’s pool]</td>
</tr>
<tr>
<td><strong>Toilets</strong></td>
<td>Kids Corner</td>
<td>1 of [3/6 dual flush cistern]</td>
</tr>
<tr>
<td>Aerobics Wing change room</td>
<td>3 of [2 × 3/6 dual flush cistern – women’s amenity + 1 × 3/6 dual flush cistern – men’s amenity]</td>
<td></td>
</tr>
<tr>
<td>Indoor Sports Hall change rooms</td>
<td>8 of [5 × single flush 8L – women’s amenity + 2 × single flush 8L cistern &amp; 1 × 3/6 L dual flush cistern – men’s amenity]</td>
<td></td>
</tr>
<tr>
<td>Pool change rooms</td>
<td>8 f [3 × single flush 8 L &amp; 2 × 3/6 L dual flush – women’s amenity + 2 × single flush 8 L &amp; 1 × 3/6 L dual flush cistern – men’s amenity]</td>
<td></td>
</tr>
<tr>
<td>Outdoor toilet</td>
<td>1 of [8L single flush cistern] Rarely used</td>
<td></td>
</tr>
<tr>
<td>Family Room</td>
<td>1 of [3/6 L dual flush cistern]</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>24</strong></td>
</tr>
<tr>
<td><strong>Hand Basin</strong></td>
<td>Kids Corner</td>
<td>1 of [flow rate ~ 4 L/min]</td>
</tr>
<tr>
<td>Aerobics Wing change room</td>
<td>4 of [2 in women’s hot and cold taps, flow rate ~ 4 L/min, aeration installed + 2 in men’s hot and cold taps, flow rate ~ 4 L/min, aeration installed]</td>
<td></td>
</tr>
<tr>
<td>Indoor Sports Hall change rooms</td>
<td>2 trough systems + 2 disabled hand basins [4 × spouts with cold only &amp; 1 spout cold only in disabled w/c, flow rate ~ 8 L/min, no aeration - women’s + 4 × spouts with cold only &amp; 1 spout cold only in disabled w/c, flow rate ~ 8 L/min, no aeration – men’s]. Taps appear to be ~ 20 years old and may not be suitable for aeration devices</td>
<td></td>
</tr>
<tr>
<td>Pool change rooms</td>
<td>As for indoor sports hall</td>
<td></td>
</tr>
<tr>
<td>Outdoor toilet</td>
<td>1 of [flow rate ~ 8 L/min, no aeration, cold only]. Tap appears to be ~ 20 years old and may not be suitable for aeration devices</td>
<td></td>
</tr>
<tr>
<td>Family Room</td>
<td>1 of [flow rate ~ 6.5 L/min, aeration fitted, hot and cold operated by single handle]</td>
<td></td>
</tr>
<tr>
<td>First aid room</td>
<td>1 of [flow rate ~ 7.5 L/min, no aeration, cold only]. Rarely used, tap appears to be ~ 20 years old and may not be suitable for aeration devices</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>12 Basins, 28 spouts, and 31 taps</strong></td>
</tr>
<tr>
<td><strong>Showers</strong></td>
<td>Aerobics Wing change room</td>
<td>4 of [2 in women’s, flow rate ~ 8.5 L/min + 2 in men’s, flow rate ~ 8.5 L/min]</td>
</tr>
<tr>
<td>Indoor Sports Hall change rooms</td>
<td>12 of [6 in women’s, flow rate ~ 8.5 L/min + 6 in men’s, flow rate ~ 8.5 L/min]</td>
<td></td>
</tr>
<tr>
<td>Pool change rooms</td>
<td>As for indoor sports hall</td>
<td></td>
</tr>
<tr>
<td>Family Room</td>
<td>1 of [shower head broken off, flow rate ~ 7.5 L/min]</td>
<td></td>
</tr>
<tr>
<td>Spa</td>
<td>1 of [flow rate ~ 5.5 L/min]</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>30</strong></td>
</tr>
<tr>
<td><strong>Urinals</strong></td>
<td>Aerobics Wing change room</td>
<td>1 of [6 L cistern, flush for length of pull]</td>
</tr>
<tr>
<td>Indoor Sports Hall change room</td>
<td>1 of [3/6 Dual flush cistern]</td>
<td></td>
</tr>
<tr>
<td>Pool Change room</td>
<td>As for Indoor Sports Hall change room</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>Tubs</strong></td>
<td>Safe room</td>
<td>1 of [Hot and cold with single hand valve operation, flow rate ~ 9 L/min]</td>
</tr>
</tbody>
</table>
Pool hose
- Wall, South end of 25 m pool
  - 1 of [outlet fitted with 10 L/min water flow restrictor]. Used ~ 2 hours per day, 7 days per week to clean pool tiles, concourse and pool change rooms. Now used only when rain water tank system located on NE corner is not operational.

Garden taps
- External Walls
  - 6 of [standard garden taps] rarely used since water restrictions

Facilities

- **Cisterns**
  - Purchase policy to replace existing 8L cisterns as they expire with dual flush 3/6 L.
  - Purchase policy to replace existing 8L urinals as they expire with 6L pull flush units that flush only while rope is pulled?

- **Showers**
  - Fit all showers with flow restriction disks (insert in pipe work just before the threaded section of pipe where the taps screw in)

  - **What about shower heads?**
  - **Recommend AAA with 9L/min-1**

- **Taps**
  - Fit aerators to all taps not yet fitted.
  - where taps are not compatible with aerators, replace with taps with those that can accept aerators
  - laundry, kitchen, bathroom, etc → flow reduce disk = colours
  - taps recommended flow = 6L.min-1

People / Behavioural

- **Staff meetings**: report on water progress and input from staff (ideas, concerns, improvements to device and practice)
- **Signage throughout change rooms** encouraging wise water use, and encouraging reporting leaks. This includes instructions on, and importance of using, dual flush.
- **Minimum turn over agreement** between the report of and repair of a leak.
- **Commitment to a minimum turn over** between the report and repair of leaks, using visual tools such as charts and graphs to highlight performance
- **Incorporate water conservation policies and procedures into employee training programs**
- **Provide incentives by linking water conservation measures to staff performance reviews**
- **Develop routine maintenance procedures to include 3 monthly audit of water facilities for leaks (e.g. taps, showers, toilets, cisterns, etc)**
**Kids Corner**

- 1 × 3/6 L dual flush toilet
- 1 × hand basin
  - Flow rate = 4L/min
  - Only one cold tap fitted
  - Aerator/flow control device fitted?

Kids Corner 3/6L dual flush toilet recently installed.

Kids Corner hand basin. Fixtures are new and flow suggests flow restriction already exists.

**Comments and Suggestions:**
- The fixtures are relatively new and there appears to be no need to improve them. The basin flow rate and appearance of the tap and water flow suggest flow restriction has already been installed.
Aerobics Wing

This area of the Leisure Centre, including the facilities, is relatively new (how new?).

Aerobics floor:

- Refrigerated water bubbler.
  - Economaster® Series 2000

Economaster® Series 2000 refrigerated water bubbler.

Comments and Suggestions:

- 1.5 visits / person $\times 0.65 \times (530 \text{ persons / day} \times 0.1) = 51.7 \text{ visits / day}$
- Ensure bubblers are regularly checked for leaks
- Benchmark flow 2 L.min$^{-1}$, however this is not an important issue as consumption is due to thirst or the filling of bottles with fixed volumes.

Women’s Change Room:

- Hand basins $\times 2$
  - Flow rate = 3.5 L/min
  - Separate taps for hot and cold water
  - Flow rate suggests flow restriction has already been installed

---

Usage coefficient supplied by Fernando Ortega, Sydney Water Corporation
**Showers × 2**
- Flow rate ~ 8.5 L/min which is above the recommended max of 7 L/min
- No auto shut off system installed for either hot or cold taps.

**Toilets × 2 (6/3L dual flush)**
**Cleaners tap × 1**
- Flow restrictors can be installed but this may effect performance
- Tap head locks could be installed but not recommended\(^1\)

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\(^1\) Fernando Ortega, Sydney Water Corporation
Aerobics Wing, Women’s change room cleaners tap

Comments and Suggestions

- The fixtures are relatively new and there appears to be no need to improve them. The basin flow rate and appearance of the tap and water flow suggest flow restriction has already been installed. Dual Flush toilets are already in place.
- Shower heads produce a flow below 9 L/min and hence fall with water efficiency benchmark.
- Taps produce a flow below 6 L/min and hence fall within water efficiency benchmark.
- Spring-loaded basin taps could be installed to prevent improper use.
- Install signage to encourage wise water use.
- Consider system for reducing / controlling shower periods with automatic shut off (e.g. Warrumbungle’s Showers).

Men’s Change Room:

- Hand basins × 2
  - Flow rate = 3.5 L/min
  - Separate taps for hot and cold water
- Urinals × 2
  - 6L single pull flush, flush time lasts for as long as cord is pulled
  - This type of system comes recommended for water efficiency
- Toilet × 1 (6/3L dual flush)
- Showers × 2
  - Flow rate ~ 8.5 L/min
  - Type of shower head and flow rate restriction unknown – ask Brett. Upgrade if necessary.
- Cleaners tap × 1

---

Fernando Ortega, Sydney Water Corporation
Aerobic Wing, Men’s change room urinal

Comments and Suggestions

- The fixtures are relatively new and there appears to be no need to improve them. The basin flow rate and appearance of the tap and water flow suggest flow restriction has already been installed. Dual Flush toilets are already in place.
- Shower heads produce a flow below 9 L/min and hence fall with water efficiency benchmark
- Taps produce a flow below 6 L/min and hence fall within water efficiency benchmark
- Spring-loaded basin taps could be installed to prevent improper use.
- Install signage to encourage wise water use
- Consider system for reducing / controlling shower periods with automatic shut off (e.g. Warrumbungle’s Showers)
Safe Room

- Deep washing basin mainly used for washing hands:
  - Flow rate = 6L/min
  - No apparent water savings devices fitted

Comments and Suggestions:

- Tap is at the cut off point for water efficiency. Fit flow restrictor and perhaps aerator to compensate

Gymnasium

- Refrigerated Bubbler
  - Aerobics room

Comments and Suggestions

- 1.5 visits / person × 0.65¹ × (530 persons / day × 0.2) = 103.4 visits / day
- As for aerobics room

Indoor Sports Hall

Women’s Change Room

- Hand basin = Common trough system.

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¹ Usage coefficient (proportion of visitors that would use bubbler) supplied by Fernando Ortega, Sydney Water Corporation
- Estimated to be ~ 20 years old with original taps (×5 including 1 in disabled toilet)
- Tap flow rate ~ 8L/min
- Tap design suggests flow control devices cannot be fitted.

Indoor Sports Hall Women's change room hand basin

- Toilets × 5 (8L single flush)
  - Single flush but flushes for as long as button is pushed for.
Indoor Sports Hall Women’s toilet

Cisterns to the right are Indoor Sports Hall Women’s change room, while those to the left are Indoor Pool Women’s change room.

- Showers × 6
  - Flow rate = ~ 8.5 L/min

- Cleaners tap × 1
Men’s Change Room

- Hand basin = Common trough system.
  - Estimated to be ~ 20 years old with original taps (×5 including 1 in disabled toilet)
  - Tap flow rate ~ 8L/min
  - Tap design suggests flow control devices cannot be fitted.

- Toilets × 3 (2 × 8L single flush and 1 × 6/3L dual flush)
  - Single flush but flushes for as long as button is pushed for

- Urinal (6L dual flush)
• Showers × 6
  ○ Flow rate = ~ 8.5 L/min

• Cleaners tap × 1

Comments and Suggestions:

• Present flushing system (i.e. flush so long as button is pressed) is reasonable water efficient. Consider changing cisterns to 3/6 L dual flush as present systems expire.
• Fit plastic disk flow restrictor behind all taps (i.e. unscrew and remove tap and fit disk). Cost ~ $7.
• Consider key locking cleaners tap to prevent misuse.

Pool Change Rooms

Ladies Change Room

• Hand basin = Common trough system.
  ○ Estimated to be ~ 20 years old with original taps (×5 including 1 in disabled toilet)
  ○ Tap flow rate ~ 8L/min
  ○ Tap design suggests flow control devices cannot be fitted.

• Toilets × 5 (3 × 8L single flush and 2 × 6/3L dual flush)
  ○ Single flush but flushes for as long as button is pushed for

• Showers × 6
  ○ Flow rate = ~ 8.5 L/min
  ○ Shower heads appear to be fairly old. Flow restriction fitted?

• Cleaners tap × 1

Men’s Change Room

• Hand basin = Common trough system.
  ○ Estimated to be ~ 20 years old with original taps (×5 including 1 in disabled toilet)
  ○ Tap flow rate ~ 8L/min
  ○ Tap design suggests flow control devices cannot be fitted.

• Toilets × 3 (2 × 8L single flush and 1 × 6/3L dual flush)
  ○ Single flush but flushes for as long as button is pushed for

• Urinal (6L dual flush)

• Showers × 6
Flow rate = ~ 8.5 L/min
Shower heads appear to be fairly old. Flow restriction fitted?

- Cleaners tap × 1

Comments and Suggestions:
As for Indoor Sports Hall amenities

**Outdoor Toilet**

- 8L single flush
- Rarely used – was original used to service Netball Courts which are now no longer part of the Leisure Centre. The Netball Courts now have their own toilets.

- Basin with old style tap incompatible with flow restriction devices.
Outside toilet hand basin tap.

Comments and Suggestions

- Insert flow restriction disk behind tap
- Existing cistern flushes only so long as button is pushed so it is reasonably efficient as is. When existing system expires, replace with 3/6L dual flush.

**Spa (Editing Completed to here, not inclusive)**

- Standard garden size taps × 2
  - one hot and one cold for filling spa. To prevent unauthorized use, tap handles have been removed *(was this done post – baseline year?)*
  - Emptied every three days and refilled – *from pool or taps?*
  - Fresh water only used to top up. Refilled from pool each night.
Fresh Water taps for topping up Spa. Note that handles have been removed

- **Shower × 1**
  - ~5.5 L/min
  - NOVA shower head with internal thread, but not fitted with flow reduction
  - Separate hot and cold taps for shower

![NOVA shower head fitted next to spa](image)

**Comments and Suggestions:**

- Given the flow rate,
- Has flow restriction been fitted?
- Fit aerator to head?
- What avenues exist for increasing water use efficiency for spas? → not much
- Spring loaded taps for spa shower as existing ones are difficult to completely turn off.

**Pool Concourse and Tiles**
High traffic area used by patrons to access and exit pool.

- Tap outlet and hose designated for cleaning concourse and pool
  - fitted with 10 L/min water flow restriction (see picture) → 2 hours per day
    - fitted as instructed by Sydney Water as part of water restrictions
    - Pool staff report that reduced flow and reduced pressure decreases effectiveness of hoses purpose leading to potential health issues and increase cleaning time
    - increase cleaning time may lead to a ‘false’ water savings
    - area collects body fats, skin, food stuffs, and other substrates and bacteria. Effective cleaning is essential for health and safety reasons.
    - further, the pool is indoor, hence UV rays are much reduced, increasing likelihood of bacteria growth
  - Concourse and tiles cleaned daily in the evenings (usually b/w 7 and 9 pm), including change rooms and toilets in pool area
A 10,000L tank has been installed behind the Leisure Centre. The pump has been upgraded to increase available pressure to enable the rainwater to be used to do most of the concourse cleaning.

Comments and suggestions:

- Discussions with Sydney Water and perhaps Illawarra Department of Health will be needed to sort out pressure issue in regards to restrictors on town water supply.
- Find out if water tank is being used and if it is adequate with regards to pressure. Given the size of the concourse and frequency of cleaning, determine how often this tank can be used before it comes empty. Is towns water make up fitted? Is it worth proposing another tank be installed once first one has been demonstrated to be effective?
- Is the present frequency and duration of cleaning necessary? This will require discussions with staff and Illawarra Health.

**Pool**

- 25 metre pool and kiddies pool (chase up Jenene to find out volumes of each)
- Pools filled from single filling point (see picture below) using a ballast tank and float valve system

![Ballast tank](image)

Comments and Recommendations

- Check makeup tank float valve is on the correct level so the pool does not overflow.
- Check the number of times they backwash (no more than once per week)
  - Check with health standards
- Ensure drainage barriers are not blocked
- Investigate in near future the possibility of recycling back wash water to make up tank (being trailed at Leichhardt Council with Australian Water Technologies, and Warringa Council also), or to use for toilet flushing
Family Room

- Shower × 1
  - Fitted with hose to provide mobility to shower head.
  - Head regularly broken off as was the case during review.
  - Flow rate with shower head broken off = ~ 7.5 L/min

- Toilet × 1 (6/3L dual flush)

- Hand basin × 1
o Flow rate = ~ 6.5 L/min
o faucet relatively new
o aerator appears to have been installed
o what about flow regulator

Family room hand basin tap. Despite presence of aerator, flow seemed quite high. Could this be due to the presence of the bubbles giving a false reading from the cup meter?

Comments and Suggestions

- Flow rate seems high despite presence of aerator.
- Several supposedly indestructible shower heads have been trialled to prevent damage and breakage. None have been successful. Perhaps the shower needs to have the hose removed and the head to be fixed as per normal showers.
- Has a flow restrictor been added?

First Aid Room

- Hand basin × 1
  o Old style, non threaded tap
  o Flow rate = ~ 7.5 L / min

Comments and Suggestions:

- Replace tap with one that accepts aerators
- install aerator
Building Exterior

- 6 outdoor garden type outlets
  - All except the northern tap are used for irrigation purposes
  - Northern tap is used for cleaning pool vacuum bag on a daily basis for a period of 20 minutes
  - One of the three taps on the eastern side of the building has had the entire faucet removed to prevent fouling of awning

Comments and Suggestions:

- All of the taps except that which has had entire faucet removed have unsecured tap handles. Tap handles should be locked or be removable to prevent unauthorised use (remove tap valve handle and replace with special key turn on).
- Irrigation rarely occurs. Consider removing some taps completely.
- Flow restrictors – are they appropriate? Only if they exceed 10L.min⁻¹
- Consider 10 000L tank as alternate water source for irrigation
- Confirm use of taps – could they be used for other purposes such as window cleaning. This may be important if using 10 000L tank as alternate source → i.e. pressure.
- If storm water is collected, irrigation using this water would negate or reduce need for these taps.
- I suspect irrigation is not a regular / routine task undertaken by Leisure Centre Staff.

Alternate Sources

The Leisure Centre has a roof with a very large catchment area. However, the roof material is asbestos, making it unsuitable for collecting rainwater due to health
concerns. However, a 10,000L water tank has been installed at the rear of the Leisure Centre using the separate Swim Club meeting room as a catchment. Installation includes piping to inside the Leisure Centre with a valved outlet at the N/E corner of the indoor pool. The purpose of this tank is to use the rainwater for cleaning the hard surfaces surrounding the pool. This water started being utilised in January 2006.

The Centre has a large Carpark that could be used for the collection of stormwater. Use of this storm water may be limited due to the nature of the Centre as most of the water use is related to the pool which cannot be filled using stormwater. However, there is a nearby sports field which could be irrigated using stormwater. Blue Haven Retirement Village is also close by.