AQUATIC FACILITY GUIDELINES

8 Facility Development

NZRA
NEW ZEALAND recreation ASSOCIATION

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Authors: Robyn Cockburn and Trish Amos, Lumin

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The Aquatic Facility Guidelines have been developed for use by aquatic managers. They provide detailed information covering the management and operation of an aquatic facility.

This document is a companion document to the Facility Management Manual which can be found on the Sport NZ website and the NZ Recreation Association website:

http://nzrecreation.co.nz/index.php/facilities-home/facilities-guidelines

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1 Introduction

If you look around the country you will see a vast range of aquatic facility designs. Many were designed to meet the community needs at the time and took little consideration of future demands and needs. Others, designed to the highest levels, are under-utilised or uneconomic. Therefore it is imperative before any facility is built that a thorough and considered process is undertaken.

New Zealanders need the right aquatic facilities in the right places to achieve the various and sometimes competing community aspirations and outcomes. Generating greater participation and success of these facilities requires clear identification of facility needs, good decision making, more collaboration and smarter investment by relevant stakeholders and agencies.

A recent review of aquatic facilities identified one of the biggest issues in facility management was the lack of involvement of facility managers at the design stage. Many issues which affect the operation and management of a facility occur because of a lack of understanding and knowledge of post-construction use of facilities by engineers, architects and designers.

Facility managers are best placed to provide advice at the design phase regarding both design and operational issues as well as provide balanced input into user demands and needs.

The six stages in the lifecycle of a facility identified by Sport NZ are:

Concept: Identifying the need for a facility and developing the strategic case for developing it, including assessing the specific need in the wider context of the desired facility network.

Plan: Ensuring the facility will be fit-for-purpose, sustainable, and future-proof. Assessing and determining feasibility.

Design: Developing the functional and spatial requirements of the facility. Details are confirmed and estimates finalised.

Build: The construction of the facility.

Operate: The management and maintenance of the facility to ensure it delivers a quality experience, including developing the most effective and efficient operating model and the programming of the facility.

Improve: Evaluating the success of the facility, how it has delivered on the identified outcomes, and what improvements can be made.

The greatest impact on the strategic outcome is made in the concept, plan and improve stages of the facility lifecycle.

In 2013, the National Facilities Strategy for Aquatic Sport was completed. This document provides a framework for developing aquatic facilities in the future, which meet the needs of users.

Further information

http://www.srknowledge.org.nz/wp-content/uploads/2013/07/National-Aquatic-Facilities-Strategy.pdf

http://www.sportnz.org.nz/managing-sport/strategy-and-policy/better-value-from-new-zealand-sporting-facilities

2 Facility Development Trends

Traditionally many local authority leisure facilities have been built for specialist or limited market users (i.e. competitive aquatic sports). The demographic profile of residents in the project area, their current participation patterns and use of surrounding facilities requires organisations developing facilities to consider three distinct user markets:

Recreation and leisure market: (60-70% of users) usually made up of families, people coming with friends and groups for fun, relaxation, social activity and low level competition/participation.

Competitive/training/fitness market: (20-30% of users) usually made up of people predominantly attending facilities alone for structured fitness or aquatic sport activities and competition.

Health and therapy market: (10% of users) usually made up of older adults and specialist health condition groups such as those with arthritis, asthma or mobility conditions. They require water of higher temperature and facilities associated with health and relaxation such as spa or hydrotherapy pools.

Research throughout New Zealand and overseas indicates that the recreation and leisure market will continue to be the largest as it contains people of all ages, ability, types, interests and gender. The competitive/training/fitness is a more specialist market containing younger, fitter and more active people who make time to train and compete.

Industry facility trends indicate that the majority of current community indoor aquatic facilities revenue does not meet annual operating costs. To ensure the best financial viability and attract potential interest from other funders or investors, any future facility must be designed with components that can:

- Provide a mix of shallow water leisure/recreation water with some deeper water areas for programmed activities
- Provide components that have the potential to contribute positive revenue streams such as spa, sauna facilities, food and beverage, retail sales, childcare and meeting space for hire
- Provide health and fitness facilities that have the capacity to be profitable and off set pool operating costs and/or attract private commercial investment or delivery interest
- Provide ancillary services that are complimentary to co-location with the aquatic facility and that can be leased space for services such as sports medicine, health therapies and massage

Develop facilities that can be co-located with other community facilities and services so as to create social infrastructure hubs.

The ultimate is a facility of good quality that meets the expectations of a wide cross section of its community and that is appropriate for a long life (50 years), low maintenance civic amenity. Sound design and detailing should reflect minimising the long term costs of operating the facility and thorough consideration to practical issues such as:

- Planning for convenience of operation
- Selection of materials, building systems and standards
- Minimising any internal moisture
- Free draining floors
- Thermal insulation including all glazing
- Ease and frequency of maintenance and cleaning
- Discrete effect of ventilation and associated plant and equipment

- Frequency of plant and maintenance shutdown
- Heat recovery and energy management
- Hot water reticulation
- Water quality and standards for compliance
- Acoustic performance (target reverberation time maximum 1.7 seconds).

3 Initial Planning

The first questions which need to be asked and answered are:

- What are the key reasons for developing the facility?
- Who is the facility being built for?
- How do we know it is going to be used by those groups and individuals?
- Where is the best location?
- How is it going to be managed?
- How will the design/construction costs be met?
- How will the ongoing operational and development costs be met?

Needs Assessment

- Establish the need for the project
- Establish key characteristics of the population
- Establish the type, number and requirements for facilities mix
- Engage with other organisations/activities who could co-locate
- Define roles and responsibilities within the stakeholders
- Identify a gap in facility provision (re-development, reallocation of space and new facilities should all be considered).

Feasibility

- Formalise the need
- Assess locations for the facility (including redevelopments)
- Assess the scope of the facility, building on the facilities mix
- Concept costs including whole of life and operational costs
- Is the project feasible to progress to business case?

4 Planning Process

The planning process for the development of a new, or redevelopment/retrofit of an existing facility can be broken down into the stages outlined below.

4.1 Stage 1 – Needs assessment

An aquatic facility aims to meet the needs of the community. A facility's financial sustainability is also linked to how well it services existing and future sport and recreation needs. Initial clarity about the needs of the community that will be met by the indoor facility, and the setting of clear objectives to reflect needs is a key ingredient for success. Understanding need may involve: defining the facility catchment, undertaking a strategic view of community facilities in the long term in the area, and identifying what role the facility can play in addressing the need. It is important that the drivers for a facility in terms of community need can be clearly articulated and where possible quantified

A thorough assessment of needs is fundamental to the success of the project. For local authorities there is a statutory obligation to consult with the affected community; for other facility developers it is commercially astute to determine needs before investing significant funds.

Needs assessment checklist:

- Define the project and prepare study briefs
- Resource the project
- Identify key community values and organisational philosophy
- Review previous reports
- Identify current and future trends
- Analyse social indicators
- Review existing and comparative provision
- Consult the community
- Identify gaps and duplications
- Analyse information gathered
- Develop options

As a guide, the needs assessment and feasibility stages of the planning process may cost up to 5% of the total cost of development, but can determine up to 65% of the final building cost. It is worth doing, and doing well, in order to minimise future costs and investment.

4.2 Stage 2 – Feasibility

To determine the meaning of success, facility providers must identify what they want to achieve through their proposed facility. Setting objectives for the facility should also clearly determine the relative commercial and community focus of a facility. Some facilities may have greater focus on commercial success, while other facilities may weight delivery on social objectives (social inclusion, health, participation, safety).

A feasibility study will assess the viability of the facility proposal. A good study provides an excellent guide to what will be developed for the capital investment and minimises or eliminates unanticipated surprises during construction and operation.

It should determine:

- The range of opportunities and services to be offered at the facility
- How the facility should be managed
- The best location for the facility
- Projected use and demand
- Projected income and expenditure over a 10 year period
- What areas and features should comprise the facility
- The practicality of the design and technical aspects
- Whether the community and funders can afford both the cost of construction and ongoing operation of the facility
- The economic and social impact that the proposed facility is likely to have on the community
- Feedback and input from other facility managers who can advise on options based upon their experiences

Case study: Kapiti Coast

Feasibility Study - Kapiti Coast Aquatic Centre

Case study: Far North District Council

Aquatic Strategy and Feasibility Studies for Kaikohe, Kaitaia and Kerikeri

Case study: Timaru

http://www.stuff.co.nz/timaru-herald/1402773/Simpler-aquatic-centre-feasible

In preparing a business case, there are several key steps to include. They are:

- Set vision and objectives. Determine the purpose of the facility
- Identify service mix required to meet community needs and ensure alignment to existing strategies and policies (e.g. Sport and Recreation Plans)
- Select the site. Demonstrate that the site is located within a growth area or urban regeneration area
- Identify and engage further with stakeholders and the community, particularly potential operators

- Select management and operating model including determination of the following:
    - Are other parties able to contribute to capital and/or operating costs
    - Will the facility or programmes generate full-time use
    - Resourcing – are the right skills available in-house
    - Ability to retain and mitigate risk including ownership, financial, construction and ongoing operations
    - Who pays the operational costs
- Set principles for design of the facility that address functionality, user experience, access and sustainability
- Provide strategy for ongoing asset managements
- Prepare concept design including preliminary costing
- Identify funding opportunities and sources
- Prepare business case.

Engaging stakeholders

Good relationships and common values between facility partners are a key component of the success of facilities. A relationship of trust and common purpose between partners is a characteristic of facilities that operate well. Engagement of stakeholders and the community should be undertaken at targeted points throughout the various stages described above.

In principle, early awareness and involvement of stakeholders and community in the process will provide greater 'buy in' and ownership of the facility, and allow best management of potentially complex relationships between stakeholder groups.

Identify and engage potential partners

- Partners in the successful development and operation of a facility can include user groups, clubs and associations and commercial service providers
- A particular operating model such as a shared use will involve particular partners
- Do all partners share the vision? If not how can they be aligned?
- Are there any partners missing that are needed to deliver on the vision?
- Is there potential for a shared use model and if so who should be engaged?
- Consider site selection and operating and management models.

Engagement strategy

- Identify communities of interest
- Who will have input and who will be informed
- How the community will be engaged and when
- The organisations, groups, and individuals to be consulted with may be different at different stages of the project.

4.3 Stage 3 – Design process

Design

While the design of recreation facilities is undertaken by many, few have aquatic experience. It is imperative that the design team has aquatic expertise, as many post-construction maintenance issues arise from a lack of understanding and knowledge of aquatic environments. For example, designing a facility where water flows from a toddlers' pool into a leisure pool may look nice but would not achieve acceptable water treatment standards.

When designing an aquatic facility, designers need to work from a functional perspective of operators and users, viability and target markets as well as a design/visual perspective.

The design of an aquatic facility will involve consideration of the size, location and nature of the site and its surrounds, the facilities to be developed, the objectives of the facility, who the primary user groups will be, and the budget. Implementing a facility design that suits the activities and the users is also a component of success. Responsive design can create a place where people come to play, meet and connect with the local community, that is inviting and stimulating, visually sensitive and expressive, and has a feel good atmosphere for people of all ages and cultures.

Factors to consider in concept design:

- Site analysis
- Size and shape
- Topography
- Vegetation
- Exposure to wind
- Views
- Watercourses
- Land contamination
- Compatibility with surrounding land uses
- Opportunities and constraints
- User requirements
- Facility users' needs in terms of pool space and ancillary area, characteristics of spaces, linkages between spaces and accessibility
- Identity of facility
- User groups, club identities, desired facility outcomes
- Flexibility and changing functions
- Shared use
- Passive surveillance and crime prevention through design (CPTED)
- Cost estimates
- Approvals

Site selection

Selection of the appropriate site is critical and will be a significant factor in the success of the facility. Where possible, co-location with existing infrastructure including public transport, education, health and community services, existing local sports clubs, business and shops can contribute significantly to the success of facilities. Key considerations in site selection are:

Location

- Areas of demand
- Accessibility for pedestrians, cyclists, private vehicles and public transport (including those with a disability)
- Physical barriers such as rivers and major roads
- Existing infrastructure

Availability

- Land ownership
- Land tenure
- Land cost and affordability

Site analysis

- Size and shape
- Topography
- Vegetation
- Exposure to wind
- Views and visibility of the site
- Watercourses
- Geotechnical information

- Land contamination
- Compatibility with surrounding land uses

Linkages

- Proximity to and ability to link with adjacent or nearby complementary facilities or services (e.g. schools, childcare, existing sport and recreation facilities, libraries, community centres, shopping centres, medical centres etc.).
- Transport links (to all modes) are important.

Functional and iconic potential

- Gateway site
- Site well known to the regional community
- Extent of support and interest in the site as an indoor facility by stakeholders and the community; network of existing clubs and organisations willing to participate
- Interest of potential private sector partners – are there areas of the site that will be attractive to them?

4.4 Pool specifications

NZS 4441:2008 covers the essentials of design and construction of public and institutional, fresh and salt water swimming pools and the provision for water treatment. This has been updated to take into consideration changes within the aquatic, building, health and safety and legal environments. The Building Act and Building Code have superseded the original NZS 4441 specifications and should be thoroughly reviewed in association with NZS 4441:2008 when preparing pool specifications for design and build criteria.

4.5 Stage 4 – Construction and handover

Commissioning and handover of the facility needs to be planned and timed to ensure the facility is fully operational before the doors are opened to the community. Often political pressure and demands dictate opening of facilities before they have been fully tested and commissioned, leading to operational implications for both management and users. Do not underestimate the time required – a minimum of 23 weeks should be included in the project timetable for commissioning and handover.

5 Description of Activity Spaces

5.1 Main pool

The main swimming pool should be 25m long with a minimum width of 20m sufficient to accommodate eight lanes at 2.5m wide each. Wheelchair and disability access (ramp) to be provided but should not occupy any area of the swimming lanes. Depth of water should be incorporated into the main pool structure to provide an even sloping floor from 1350mm to 1800 or 2000mm. This will provide for programme and activity space where people can stand and an area of deeper water for skill development of aquatic sports such as water polo and underwater hockey but not for national competition level. The depth of the pool can be adjusted through the inclusion of a moveable floor for use by aquatic sports requiring significantly deeper pools.

Flush to concourse rollout or overflow channels to ease access and enhance the attractiveness of the main pool. Turning areas at each end of the main pool are not to be flush but provide an up stand fit for the purpose of turning while swimming. The concourse area surrounding the main pool should not be less than 3.0m in width with the exception of the side of the main pool which incorporates the access ramp (1m wide).

Pool concourse drainage and pool water return flow should be kept separate.

The main pool will preferably be tiled with appropriate fully vitrified ceramic swimming pool tiles. Pool floor and pool ends to incorporate non-slip tiles with all dimensions and pool markings to comply with the most recent FINA regulation for swimming. The main pool must have a separate balance tank, circulation and filtration system. Spectator seating (elevated) for between 250 and 300 persons should be provided.

5.2 Leisure and water play pool

The leisure pool should have a minimum water surface area of 150 m^2 and the water depth should vary from 0.0 mm to 1200 mm and provide ease of access for persons with disabilities or mobility difficulties. Depending on the design, size and dimensions selected for the main pool consideration to providing additional space at 1.2 m in this area may be required to provide a range of structured fitness programmes and activities in water operated at a higher temperature.

This pool should provide outlets and equipment that facilitate interactive water play and fun activities that will be attractive to families and children. A minimum of six water features is recommended and these should be designed and installed in such a way that they are easily inter-changeable. Features that include moving water, small slides, geysers, fountains, pipes and waterfalls, spouts and sprays. The range of interactive water features should be developed to compliment rather than compete with those provided elsewhere.

A separate balance tank, circulation and filtration system provided and rollout and overflow channels flush with the concourse and separated from pool water flow return. Pool surfaces should be tiled and non-slip where people's feet come into contact with the pool floor. Given the nature of activity consideration to a pool membrane safety surface such as the Myrtha Pool system may be worthwhile. An area of spectator seating should be incorporated

5.3 Pre-school (toddlers) pool

A toddlers pool adjacent but physically separate to the shallow water area of the leisure pool should have a water surface area of not less than 30 m^2 and vary in depth from 300 mm – 400 mm. As the pool is designed to cater for children under five years it should be easily accessible.

The pool should have its own balance tank, circulation and filtration system. Pool surfaces should be non-slip pool tiles of safety surface membrane.

Parent and caregiver seating should be located in close proximity to this pool.

5.4 Teaching and hydrotherapy pool

These pool share similar characteristics. They are generally the same size and operate a higher water temperature (34 ºC). The pools can either be designed as separate bodies of water or integrated into one pool tank with the ability to discreetly separate appropriate space for teaching or hydrotherapy programmes.

The minimum desirable water space for both activities is 100 m^2 (Teaching 60 m^2 and Therapy 40 m^2).

The teaching area water depth will ideally be 700 mm to 800 mm deep while the hydrotherapy pool area 1400 mm deep. Access via a ramp and chair/bed hoist should be provided.

This pool or pools should have a separate balance tank, circulation and filtration system.

5.5 Spa and sauna facilities

A spa pool separate from any other body of water with capacity for up to 15 people is desirable along with a dry sauna facility of approximately 10 m^2 directly adjacent.

A cold water plunge pool or shower facility should also be in the immediate proximity. Seating within and external to the spa pool should be provided to encourage socialisation between those in and out of the spa pool.

5.6 Health and fitness facility (optional)

280 – 300 m^2 of floor area visually connected but physically separate from the pool hall will provide adequate space for fixed fitness equipment and clear floor area for aerobic exercise and fitness programmes.

This area should have separate air conditioning and ventilation and have floor surfaces appropriate for high impact from weights equipment and protection for those doing exercise.

5.7 Food and beverage area (optional)

An area of approximately 80m^2 clear space with tables and seating for 45 (10-12 tables. Kitchen/preparation area 30m^2 and servery area of not less than 15m^2. The option to take food and beverage to defined seating areas in the pool hall should be included.

Space for vending options should be allowed for. This can be accommodated in the designated food/eating space or in the entrance and lobby area adjacent to reception for supervision purposes.

An option for inclusion of outdoor courtyard to extend social areas and that provides opportunity for facility users to enjoy moving to an outdoors space is desirable.

5.8 Secondary and support areas

Entrance lobby and foyer

Entrance to the facility should have an air lock lobby area that protects heat loss from the building. Sufficient area for large groups queuing or assembly while entering or existing the

building should be provided. This will customarily be up to one full school class (approximately 30 people).

Provision of large open space with lots of natural light is desirable. Foyer areas should be tiled with some seating for those waiting to collect others or for facility programme or general enquiries.

The foyer and entrance lobby should be physically and acoustically separate from the main pool hall but have strong visual connectedness. Space for notice boards and signage should be provided to communicate facility programmes, activities and important notices.

Reception

The reception area should be immediately apparent to those entering the facility and directly adjacent to the lobby and foyer. Adequate space for two people to operate behind the reception desk (20 m^2). This location should if possible provide supplementary not primary supervision of activity in the pool hall so should be visually connected.

Administration offices

Offices for functions of programmes administration, facility operations and management should be provided and connected to the reception and area of most customer interaction. A minimum of two offices, each of approximately 12 m^2 – 5 m^2. One room will also be used for the reconciliation and safe keeping of monies received. CCTV for the reception area and this office should be included.

Female and male changing

A total minimum area of 260 m^2 should be provided for accommodating changing facilities for both male and female customers. Equal space allocation is to include both open change space to accommodate large groups such as school classes and separate private change cubicles (approximately five). In addition this area will include appropriate numbers of toilet and shower facilities to comply with building consents and ordinances.

Fresh hot water showers as well as toilet facilities for each changing area are to be located and designed in a way that encourages and makes it easy for swimmer to use before entering the pool.

Family and accessible changing

Separate changing/toilet/shower facilities for families and those with disabilities are to be provided. These can be dual use with similar services in up to a minimum of four rooms of 5 m^2 in area each. They would include a toilet, basin, shower, seating and change table and have compliant access features such as rails and handles.

Staff facilities

Staff facilities should include a space for breaks in work. This area should be approximately 20 m^2 with washing, cooking and fridge facilities and space for up to four people to sit at any one time. An area for bathroom facilities, changing and safekeeping of staff property should be connected or immediately adjacent. An area of 10 m^2 each for male and female staff should be provided.

Equipment storage

An equipment store with direct access to both poolside and external to the building is needed. The minimum area for storage of equipment in a facility of this size is 30 m^2.

Meeting room

A small well-appointed meeting room with capacity for up to 25 people is desirable. This room would provide hire space for use by regular facility users and groups wishing to conduct small meetings on site. It would not be allocated to anyone group or organisation and would also be used for regular community group or facility staff meetings. The area of this room would ideally be 30 m^2.

Outdoor area and play space

Access to outdoor recreation and activity space is an important feature of indoor facilities. Functionally this can provide space for facility users to enjoy the outdoors and participate in alternative activities as individuals and groups.

Outdoor space provides opportunity for picnicking, barbeques, sports, play and relaxation. Ideally located in close proximity to the leisure pool and food and beverage area of the indoor facilities it provides direct indoor-outdoor flow and should be designed in such a way that it is viewed as a functional extension to the indoor leisure space. A total outdoor space of between 800 m^2 -1200 m^2 is desirable and which provides the following features:

- Paved area for outdoor seating (tables and chairs) ideally as an extension to the indoor food and beverage area
- Paved area incorporating minimum two gas or electric barbeque units with bench/table seating in close proximity for groups of up to 20
- Paved area with vertical water jets (12 -15) – free draining recycled water feature that provides link between indoor and outdoor water play theme. Jets when activated stop and start randomly. (Children enjoy interaction, standing on and running through).
- (Optional) Basketball half court (14 m x 15 m) with single backboard – ideally surface will be synthetic for safer use impact resistance and/ or a beach Volleyball Court (22 m x 13 m) sand court
- Children's (Under eight years) adventure play structure
- Generous shade provision as built extensions to the building or independent shade structures strategically located throughout the outdoor area.

Note: Area should be secure, well landscaped with lighting levels sufficient to make the entire area useable at nighttime.

5.9 Typical community pool primary and secondary components

Description of component	Area (m^2)
Main Pool (25 m x 20 m)	500
Leisure Pool	120
Toddlers Pool	25
Teaching and Hydrotherapy Pool	100
Spa Pool	10
Sauna/shower	15
Kitchen and Social area	100
Foyer and entry	100
Reception	30
Administration Offices/storage	35
Male and Female Change	260
Family and Access Change	40
Staff facilities	30
Pool store	30

Description of component	Area (m^2)
Meeting	30
Pools concourse, access ways and corridors	270
Spectator seating	190
Plant rooms	220
Total estimated building area	**2105**

Exclusions – Development areas that will also need consideration in facility developments:

- Car parking and landscaping
- Inclusion of existing pool facilities
- Separate public toilets
- Crèche/child-minding facilities
- Health therapy facilities (massage/physio/sports medicine)
- Fitness centre
- Waterslide or other attraction
- Bicycle racks
- Flag poles
- External seating
- External lighting
- Signage

5.10 Buildings

Buildings need consideration of their uses, pedestrian and vehicle traffic patterns, durability, aesthetics and economies. Materials used and methods of construction should account for any environmental procurement policies that the future asset owners or authorities may have.

The substantive building for the pool hall should provide clear spans over all pool areas and their surrounds, allowing for a minimum 3.0 m wide pool deck and minimum ceiling height of not less than 5 m at any one point. Provision within the roof and or walls is to be made for natural light penetration without significantly sacrificing too much thermal insulation or contributing too much glare affecting supervision or user comfort.

A single plant-room capable of storing appropriate plant and equipment selected for circulation, filtration, and chemical water treatment is required with separate rooms to accommodate heating and ventilation equipment.

Provision needs to be made for the storage of customers clothing and valuables in lockable lockers and open lockers.

Services

Adequate plant and services will be required to meet the recommended minimum turnover rates for each separate body of water.

Pool type	Minimum turnover time
Main pool	3 hours
Leisure pool	2 hours
Teaching/hydrotherapy pool	2 hours
Toddlers pool	30 minutes
Spa pool	30 minutes
Waterslide	15 minutes

A separate balance tank, filtration system and circulation system is recommended for each pool to minimise the risk of microbiological contamination of pool water and the down time and revenue losses associated with interruptions to service. The toddler's pool should have capacity to be easily and quickly drained and re-filled from the teaching pool, leisure pool or main pool.

Water treatment systems that include UV, ozone water sterilisation and sodium hypochlorite disinfection are recommended. This provides for both better water and air quality making for better user experience and repeat visits. Effective water treatment practice also ensures the long-term protection of important community assets. All plant services systems and processes must comply with standards and legislation relating to the safe and efficient operation of public swimming pools i.e. NZS 4441 and NZS 5826.

5.11 Water temperatures

Industry accepted water temperatures for the different pool types are:

Main pool	*27 ºC (± 2 ºC)*
Leisure pool	*32 ºC (± 2 ºC)*
Teaching/Hydrotherapy pool	*34 ºC (± 2 ºC)*
Toddlers pool	*33 ºC (± 2 ºC)*
Spa pool	*38 ºC (± 2 ºC)*

Air circulation to the pool hall enclosure and surrounding amenities should have a target temperature of 25ºC – 27ºC, with humidity no greater than 70%. A forced air heating and ventilation system should provide six air changes per hour.

5.12 Lighting and sound

Non-glare or diffused artificial lighting is required to provide a minimum light level to the main pool hall of 500 lux. Water glare should be avoided and theme lighting considered to provide alternative levels/mood to the leisure pool area and surrounds.

Acoustic control is important to maintain a comfortable and healthy environment for swimmer and spectators. Machinery noise levels outside the facility should be kept at less than 40dB above the ambient level both day and night.

5.13 Finishes

Non-slip and non-abrasive surfaces to pool areas are important and tiling to all pool and public areas is preferable if the allocated funding permits. Other suitable alternatives are also worth consideration. Wall finishes must be impervious, easily cleaned and maintained.

All structural elements need to be of sufficient quality or protected in such a way that makes them fit for use in an indoor swimming pool environment. Any fittings or fixtures in contact or near to swimming pool water or wet areas must be of an appropriate grade stainless steel. Ceiling linings in the pool hall and amenity areas should have sound absorption capability, non-corrosive and not contribute to creating too much glare.

6 Design Pitfalls

A review of selected aquatic facilities in 2005 (Aquatics Facility Review, Sport NZ 2005) identified a number of pitfalls and issues, which occurred during the design of new or retrofitted facilities that lead to operational, managerial, maintenance, and financial issues.

6.1 Projected vs. actual use

Projection rates declined after an initial high use of a new or retrofitted facility. Most aquatic facilities experience a significant reduction after the first 18 months. Top performing council facilities average eight swims per capita per annum, but nationally it is more realistic to base projected use on an average 5.5 swims per capita per annum.

6.2 Aesthetics vs. operational costs

In many instances aesthetics were the key consideration in facility design, with little consideration given to the impact on future operational costs. A poorly designed facility could result in the facility needing higher numbers of lifeguards resulting in higher operational costs. Staff costs can account for up 50% of an annual operating budget.

The location of spectator seating, foot traffic flow, floor drainage and slopes, surface colours and cleanability all have an impact upon the use and safe operation of the facility.

6.3 Cost cutting or cost incurring

Cutting costs at the design stage by removing heat recovery units, downsizing plant rooms, removing storage areas, not installing acoustic installation, not putting ventilation into switchboard, or installing lighting which requires scaffolding to replace light bulbs incur significant and unnecessary operational costs. Taking design shortcuts will only lead to increased operational costs and potentially increased capital expenditure post-opening to reconcile the issues raised from omissions at the design phase.

The Energy Efficiency and Conservation Authority (EECA) have produced a number of case studies on energy savings in swimming pools. They estimate installing a heat recovery unit at the time of construction has a payback period of less than three years. The payback period for post-construction installation of heat recovery units is considerably longer.

Further information

www.eeca.govt.nz/eeca-programmes-and-funding/programmes/energy-supply-renewable-energy-programme/swimming-pools

Case study

Case Study - Centennial Pool

6.4 Use appropriate materials

While it sounds obvious it is often overlooked in the design phase. Aquatic environments are highly corrosive so materials should be durable and easily maintainable. For example the use of high grade stainless steel, nonslip surfaces for pool surrounds are assumed but some facilities have been designed without due consideration to such issues.

6.5 Pool size

A rule of thumb for costing facilities is based on the estimate that 20-25% of the capital cost will be the annual operating cost. To build an Olympic specification pool in a small town would not achieve anything except financial ruin. Therefore, building an aquatic facility appropriate to the community must be at the top of any design brief. More important is determining what the facility will be used for and by whom. In the past, most facilities focused on competitive swimming as the determining factor for pool size. Now the range of aquatic activities is highly varied and their requirements are all quite different.

Similarly, depending upon the proposed use, the provision of equipment – touch pads, goals, scoreboards, storage, seating location and traffic flow need to be considered. It is noted that the FINA rules clearly state that they relate to competitive use and training and are not designed to govern issues related to general public use of aquatic facilities. Often facilities are built to high FINA specifications when no such use will occur or will be limited.

For specific information on national aquatic sporting and competition requirements, contact the national organisation for their policies and procedures. Do not rely upon local clubs and interest groups' interpretations, as they may not be consistent or compatible.

6.6 Multipurpose options vs. dedicated designs

The rise in leisure pool demand has seen a significant reduction in the amount of pool space dedicated to 'learn to swim'. Wave/fun pools have not lived up to the promise of being able to provide good teaching facilities and be good income generators, and there are other ways of making a traditional rectangular pool work as a leisure space.

Learn to swim is an area which continues to grow, especially as schools have moved away from providing these opportunities. Providing purpose designed and built facilities for learn to swim may be more financially astute than opting for a multipurpose design, which does not meet any needs adequately.

The inclusion of moveable pool floors provides flexibility for a wide range of pool users as the pool depth can be adjusted to suit the different needs of pool based activities e.g. scuba diving training, springboard diving, and underwater hockey.

7 Design Considerations

7.1 “Field of play” dimensions

Pool use	Dimensions
Learn to swim	25 m x 25 m, depth 0.90 m (max)
Recreational swimming	No specifications
Competitive swimming	50 m x 25 m, depth 2 m (Olympic pool specs only) 25 m x 25 m, depth 1.35 m (min with starting blocks)
Diving	Width and length dependent upon platform size, depth 1.8 m (min)
Waterpolo	30 m x 20 m (men), 25 m x 20 m (women), depth 1.8 m (min)
Underwater hockey	20 m – 25 m x 10 m – 15 m, depth 1.5 m – 2.5 m
Canoe polo	35 m x 23 m, depth 0.9 m (min)

7.2 Siting of pools

The siting of pools within a facility needs to be considered in the context of access, thoroughfares, use levels, water flows and safety. Siting a learners’ pool beside a dive pool increases the risk and hazard issues and similarly impacts upon lifeguarding requirements.

In some facilities the location of the wave pool as the first pool within the facility means users of other amenities within the facility need to pass directly past the wave pool, which when in use, becomes inconvenient (potential for customers to get wet) and hazardous. Considering all users, access and seating within a facility during the design phase is essential for good design and user comfort.

7.3 Interactive features

When incorporating interactive features into the facility design the following should be taken into consideration:

- Location and appropriateness of features and pools
- Water flow, circulation and treatment requirements
- Location and accessibility of controls and safety switches
- Accessibility for maintenance
- Ease of supervision and lifeguarding
- Impact upon other facility users
- Ability to be ‘closed’ to users.

7.4 Seating

Appropriate seating for customers, spectators and competitors should provide for easy access to the pool deck as well as good lines of sight into the pools. Different types of seating will provide different benefits. To ensure the appropriate seating is used, the requirements of users should be considered during the feasibility phase. For example, competitive users require space for gear bags and equipment, so often seating capacity may be reduced by nearly half to accommodate this space demand. Similarly, providing no seating around a toddlers' pool could lead to the use of movable seating, which may become a hazard.

7.5 Accessibility

Providing for disability access to various pools and their associated facilities is an important consideration for pool design. This should include the inclusion of permanent ramp access, or the use of hoists and temporary ramps for redeveloped pools. If using a hoist, consideration needs to be given to its location in terms of both the pool, and space poolside for wheelchairs to be parked. When providing ramp access to pools, location and gradient of the ramp are important factors to ensure safe entry to the pool. A storage space for water wheelchairs also needs to be considered in the design stage to ensure there is an appropriate place for these to be located.

8 Facility Upgrades

8.1 Common upgrades

NZS 4441:2008 indicates provisions required for upgrade of existing facilities. If and when components in the plant room or pool surround are in need of replacement, this Standard will help with the sizing and minimum requirements of these items.

8.2 Current thinking

Meeting customer needs: Meeting the needs of the community and providing the correct balance between fun attractions such as hydro slides, splash pools and spas and more functional pool spaces for 'learn to swim' and other aquatic programmes can affect the long term financial return on the upgrade and repeat business.

Technology: Including where appropriate new technology such as variable speed drive on electric motors, off =-peak low rate operation of pumps, independent water treatment systems for each attraction and continuous electronic water quality monitoring and dosing systems.

Energy use: Incorporating energy efficient measures into a facility upgrade should be standard practice.

Case Study: PowerCo Aquatic Centre, Hawera

In 2008/2009 PowerCo Aquatic Centre in South Taranaki completed a facility upgrade to their indoor pool complex. A new thermal pool, children's spray park and a hydro slide were installed and a new splash feature was added to the outdoor toddlers pool.

Community*: Desire for more fun factors at the Aquatic Centre triggered an upgrade of the facility. A steering committee, which included community stakeholders, was formed to guide the re-development.*

Innovation*: Attractions - The hydro slide, thermal pool and spray-park have made the facility more popular as a recreation and leisure venue while smart programming has established more options suiting the differing needs of different customers. This combination has resulted in the total number of visits increasing from 68,727 per year and the current average attendance is 94,666 per year.*

Programmes*: The AquaSchool delivered 8,500 lessons per annum. Introduction of the new children's spray park and leisure pool, released the indoor learners' pool for increased learn to swim activity. Focus turned to increasing the capacity of the swim school to meet known demand and increase financial viability of the Aquatic Centre. In the space of four years, the number of swim lessons increased to 21,429 lessons for the 2012/2013 financial year.*

Technology*: The upgrade project featured a number of advanced technological applications, which include electronic Variable Speed Drive (VSD) units to enable soft graduated starts for all electric motors, and off-peak low rate operation of pumps and fan motors during periods of low demand. The new attractions have independent water treatment systems all of which feature Prominent™ medium pressure ultra-violet light irradiation units for secondary disinfection of pathogens and also reduce undesirable chloramine and trihalomethane by-products of chlorine disinfection.*

Controlling energy use*: The Aquatic Centre has dual heating systems with an efficient electrical heat pump backed up by existing dual gas fired boilers and the indoor pool has a run-around-coil heat recovery system. Low energy lighting systems have been introduced with auto switching and electric motors ramp down overnight to save energy.*

Electronic water quality monitoring and dosing: Continuous monitoring of the water quality and treatment is through a Prominent™ multi-channel controller which records and reports data for each of the pools, managed through a dedicated computer. This computer is accessible online by Siemens (Auckland) so that remote fault analysis is possible by technicians. This reduces the costs of maintenance issues for minor interruptions to service. With this advanced level of technical support the plant runs with few interruptions to service and rarely requires technicians on site.

Results*: The increased levels of attendance following the facility upgrade show that improvements have met the needs identified through the community consultation. Significant energy savings have also been made.*

Further information

Facility Management Manual www.nzrecreation.org.nz

NZS 4441: 2008 – Swimming Pool Design Standard


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