

DESIGN AND DEVELOPMENT GUIDE FOR SUSTAINABLE AQUATIC FACILITIES



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Introduction



Dear Friends,

The purpose of this publication is to provide the National Federations and different aquatic partners more information and details than those existing today in the FINA Handbook related to the construction of swimming pools at different levels or aquatic centres.

We trust the information provided will allow to further develop our sport worldwide.

Sincerely

Dr. Julio C. Maglione
FINA President

A handwritten signature in black ink, appearing to read "Julio C. Maglione".





Roberto Colletto
CEO
A&T Europe (Myrtha Pools)

Keep them simple

As players in the field of public swimming pools, we are witnessing how demand for aquatic spaces is consistently growing worldwide. Unfortunately, there is still a large gap between the needs it reflects and availability in terms of public swimming pools.

The drivers for such a strong demand are many and varied. In the first place, there is the boom in swimming and the other pool sports. This boom is being driven by the popularity of the new generations of international names and sustained by a large social base that is growing day by day, due to the attractiveness and the many benefits of these sporting practices.

The lack of appropriate facilities is particularly serious in certain countries where the death toll caused by drowning is just unbearable. To reverse this situation and at the same time reduce the impact of polluted water-related diseases, all children must be taught to swim. This means that adequate and suitable pools for the safe practice of swimming have to be built.

To fill that supply gap in a sustainable way these new swimming pools must be designed to be user-friendly and simple to operate. They have to have low maintenance costs too. Design and construction should be as basic as possible and use proven, environmentally friendly materials.

This is the only way to avoid the risk of one day becoming just another abandoned sports facility.

"Pools For All" offers the best chance to achieve a viable and long-lasting result.



Joaquín Pujol
Architect and CEO
Pujol Arquitectura

For a rewarding social experience

Those of us who are part of the swimming family can recognize when designers have truly thought about us when making the decisions involved in designing the installations for our sports.

The kindness and comfort of the different areas of an aquatic centre are much appreciated by athletes, officials and spectators, as is the excellence of the technical conditions of the field of play.

We also value the harmony between the light (natural and artificial), the equilibrium of the volumes and the quality of the materials used. It helps to make our experience as users rewarding. And it makes us loyal.

To see, in the same place, some people pushing the limits of the human body and others learning to relate to the water or looking after their health by swimming, is merely a reflection of how valuable swimming is for the development of the human being.

Because sharing the technological advances that contribute to the progress of the different disciplines with the people who go into the water simply seeking an experience of wellbeing strengthens social bonds.

This improvement in human contact is another of the collective benefits that come from practising one of the most complete sports in suitable installations.

"Pools For All" aspires to promote a radical spread of all these benefits.



Enric Truñó
Director
Sport Assistance

Management is key from the very beginning

To be successful, it is essential to define beforehand why and for whom you wish to build a new swimming pool, how the investment is going to be paid, with what criteria it will be run, and with what means and resources it will be maintained.

It is crucial to know how to approach a comprehensive aquatic services and activities project in specialist halls so that the different users can access programmes tailor-made for their needs. These include everyone from children learning to swim to competition swimmers, and all kinds of people, of all ages, who wish to be fit, to look after their health or simply to enjoy swimming.

The aim is to obtain a plural and diversified sports centre offering a large number of activities and programmes. It therefore has to be capable of incorporating a large, important group of users.

And it is necessary, consequently, to have a method in order to draft a Management Plan that includes all these aspects and other complementary ones, to get the size of the sports facilities just right and thus guarantee its sustainability beyond its inauguration.

"Pools For All" has the answers to all these questions.







Presentation

IMPROVING ACCESS TO AQUATIC FACILITIES WORLDWIDE

Pools For All is a FINA Project that offers standardized tools for the worldwide design, construction and operation of a complete range of sustainable aquatic facilities compliant with the regulations of its different sports disciplines.

The sustainability of facilities built for doing sport is the core feature of Pools For All. Economic sustainability, social sustainability and environmental sustainability.

With the term "sustainability" we are referring to the optimization of the fundamental components of an aquatic facility: spaces, technology, resources, programme and management in the broadest sense.

This sustainability has to last throughout a life that begins with the first initiative and continues with the architectural, technological and management plan. Then with its execution, the inauguration, the running-in period and perhaps its official opening with a national or international meet, before it finally enters the stage of ordinary functioning that, if things are done properly, should last for many years.

Because if the facility functions properly by its own means, with no shortcomings and providing maximum financial returns, it will be able to adapt without too much difficulty to the changes of all kinds that will undoubtedly appear on the horizon. This will keep the facility from falling into disuse, and the goal of it having a long useful life will be achieved.

This sustainability can only be achieved with good planning. Good planning of the management, of the architecture of the facility and of the technology that is going to be used. All these are essential pieces and they should not be considered in isolation because they are closely related to one another.

The first step will always be to define the management model. Only then we will be able to proceed to establishing what the different areas of the programme are. And then, once the fundamental management decisions have been made, it will be time for the architectural design.

WHY POOLS

Among the main objectives of FINA, the following are now particularly relevant:

- To promote and encourage the development of aquatic sports as much as possible throughout the world.
- To provide fair sport.
- To encourage participation in aquatic disciplines at all levels throughout the world regardless of age, gender or race.
- To promote and organize World Championships and other FINA competitions.
- To encourage the rise in the number of facilities for aquatic disciplines throughout the world with the support of other interested parties.

Directly or indirectly, all these objectives converge at a key point: the swimming pool.

The swimming pool is the point on which *Pools For All* focuses. The programme will facilitate the development of new facilities wherever they are needed by providing the conditions to make optimum technological features and their sustainability possible.

Reality has shown that the conditions that aquatic installations must have in order to be able to host major international championships, especially in terms of spectator capacity, have frequently become a burden that is too heavy for the legacy that they leave to the local community in which they are inserted.

The work that FINA has done in recent years through its Facilities Committee has clearly shown this and other challenges, as well as some shortcomings, in the endowment, the design and the operation of swimming pools and aquatic facilities all over the world.

"Pools For All is a FINA Project that offers standardized tools for the worldwide design, construction and operation of a complete range of sustainable aquatic facilities compliant with the regulations of its different sports disciplines."

On the other hand, there is complete unanimity on the fact that swimming helps children, adolescents and young people to exercise in a fun but educational environment, and that it should not be missing from their education. Nevertheless, we are still a long way from achieving that goal even in the most developed countries.

Anyone who lives near an expanse of water or who makes use of swimming pools, beaches, coasts, seas, rivers, lakes and dams, either as a means of recreation or transport, should know how to swim in order to be able to save lives, whether their own, those

of their families, or of anybody else in need of assistance. Very sadly, in its report of 18 November 2014, the World Health Organization found that 372,000 people die each year from drowning.

These were the reasons that led FINA to launch, in collaboration with UNESCO, the "Swimming For All, Swimming For Life" project at the Doha Convention in December 2014. "Swimming For All, Swimming For Life" will make a major contribution to achieving better education, culture, health and quality of life for millions of people all over the world who still do not know how to swim, in some places more than others.

Its objective is to teach people, especially children, to swim in order to promote physical activity worldwide through the implementation of a special programme with standard criteria across the world in countries where the need is greatest, contributing to the prevention of drowning, providing a means of reaching everyone, and preparing people for life.

However, in order to teach somebody to swim, besides a method a swimming pool is needed. And unfortunately not everyone today has access to a swimming pool in reasonable conditions.

Therefore, in order to fulfil its objectives, FINA is adopting and implementing the *Pools For All* project.



POOLS FOR WHOM / POOLS WITH WHOM

The encouragement of participation in aquatics disciplines at all levels regardless of age, gender or race is one of the main objectives of FINA, as has already been mentioned.

Pools should principally be made available for children. Swimming helps them to exercise in a fun but educational environment, and it is an aspect that should not be lacking in their education. **FINA has a social responsibility towards children and young people, especially the ones not yet acquainted with our magnificent natural element, water.**

Pools should be available to people of all ages. Swimming crosses all age boundaries. It is important in childhood, adolescence, middle age and old age. Swimming gives people benefits at every stage of their lives. At any age it ought to be possible to go to an aquatic facility with the necessary conditions.

Pools For All is aimed at people with disabilities too. People with different needs but the same rights, who need facilities without architectural barriers. People to whom the practice of swimming may bring added benefits.

Last but not least, our pools are for competitive and high-performance swimmers. This project addresses their needs as well.

One of the core ideas of Pools For All is understanding aquatic facilities as places of coexistence. It is fundamental for all users, to share spaces and swimming pools. In this respect too, *Pools For All* is a social project. Because it sets out to create a favourable environment for social mixing, knowledge and mutual enrichment, teaching the value of examples and respect.

It is now a good idea to look at another very important perspective, Pools with Whom. Because a vital aspect for the development of the project, a necessary condition, is that it should have sufficient logistical and financial backing in each case. Backing that will normally come from the public authorities, alone or in collaboration with the private sector in a public-private partnership (PPP). However, in certain circumstances we should not rule out the possibility of the major national or international philanthropic organizations taking on the role of sole promoter from time to time.

Accordingly, Pools For All guarantees them an efficient investment. Because one of the intentions of Pools For All is, precisely, to avoid the appearance of new white elephants: facilities that fall into disuse prematurely through being unable to bear the burden of their own expense.

POOLS WHAT FOR

The pools that this project envisages are for learning to swim, for promoting physical activity through swimming, for competing and for high-performance swimming.

Pools For All wants aquatic facilities to be efficient containers, offering a comprehensive programme and services, capable of staging competitions in the best technical conditions, and at the same time making it possible to capitalize on their daily use.

It has to be possible to use swimming pools to learn to swim, for fun, health reasons, training and competition. For this, pools must be well run and equipped with the right technology to provide flexibility and allow them to be used for different purposes at the same time.

In the first place, sporting programmes with the necessary diversification to meet the different needs of the various disciplines: swimming, diving, synchronized swimming and water polo.

Pools For All is intended to provide the best environment for training, performance and high performance. Starting with the talented swimmers detection programmes. Encouraging participation in competitions. Ensuring high-performance results through effective athlete development.

Under Pools For All, aquatic facilities will be prepared to organize events, competitions and championships, at different levels and ages in accordance with FINA and National Federation requirements (through a permanent agreement with the National Federation with the aim of developing all the aspects of competitive swimming in the facility). A broad, complete programme will be established for each type or category of swimming pool in conformity with the priorities of the National Federation responsible for competitions and high-performance swimming.

Secondly, given that swimming occupies one of the outstanding places among the physical activities most recommended for people's health, *Pools For All* hopes to fit out aquatic facilities as health, wellness and leisure centres. They should offer activities for people of all ages, specific programmes for sectors of the population with special needs, and attractive leisure programmes designed so that individuals and families can enjoy the water to the full.

Pools For All offers the tools for planning and organizing the spaces for both competition and all other uses, with the aim of getting the most out of them.

WHERE POOLS

Unlike some sports, whose intrinsic determining factors dictate where they can be introduced, swimming in theory has no frontiers. However, its progress does encounter barriers of various kinds, although fortunately they are not insurmountable.

We must mention here the importance that the right choice of its specific site has for the feasibility of a planned public swimming pool. Factors as important as the availability of public transport play a part in it.

Obviously, the shortcomings, needs and the challenges that the development of swimming faces at its different levels vary according to multiple factors: the region, the level of income, tradition, etc. Some have to do with the availability of the basic infrastructures, others with maintenance difficulties or with dealing with the legacy of a major international competition.

Pools For All assumes this heterogeneity with a comprehensive catalogue of principles and standardized solutions. A catalogue that hopes, ultimately, to construct a larger and more united worldwide swimming family.

"The encouragement of participation in aquatics disciplines at all levels regardless of age, gender or race is one of the main objectives of FINA."

DTORIO

#SWIMTRIALS16





A photograph of a swimmer's arm and goggles in a pool. The swimmer is wearing a blue cap and goggles, and is performing a butterfly stroke. The water is a clear blue.

Aquatic Facilities





The Project

THE RELEVANCE OF A MANAGEMENT PROJECT

There are many reasons for introducing the management requirements at the very moment of considering the design for the construction of a new swimming pool. Below we mention some aspects of this requirement.

If the sports facility is built for a particular event, it must be designed to last and represent an authentic legacy of the sporting occasion that was the reason for it being built. It is important to stress here that FINA has made the commitment to avoid any further white elephants in the field of swimming.

In this respect, any new aquatic facility has to be aimed at promoting sporting activity among the people living close to it with the goal of contributing to the improvement of everyone's health.

The new facility's programme must be broad and inclusive. Apart from guaranteeing the practice of recreational and competitive swimming, it has to be part of a comprehensive offer of activities and services associated with health for the general public with the shared aim of promoting the wellbeing of users.

An offer of top-quality services addressed to everybody is the only way of ensuring the future profitability of the sports facility. The aquatic centre's financial self-sufficiency must be an unavoidable objective.

For this reason, the preparation of a long-term management and financial feasibility plan prior to the end design of the facility is key to guaranteeing that the envisaged financial, sporting and social targets are effectively met.

The management project has to achieve the proper operational integration of the different theoretical modules that must be part of the facility, taking into account the social and sporting realities of the territory in question.

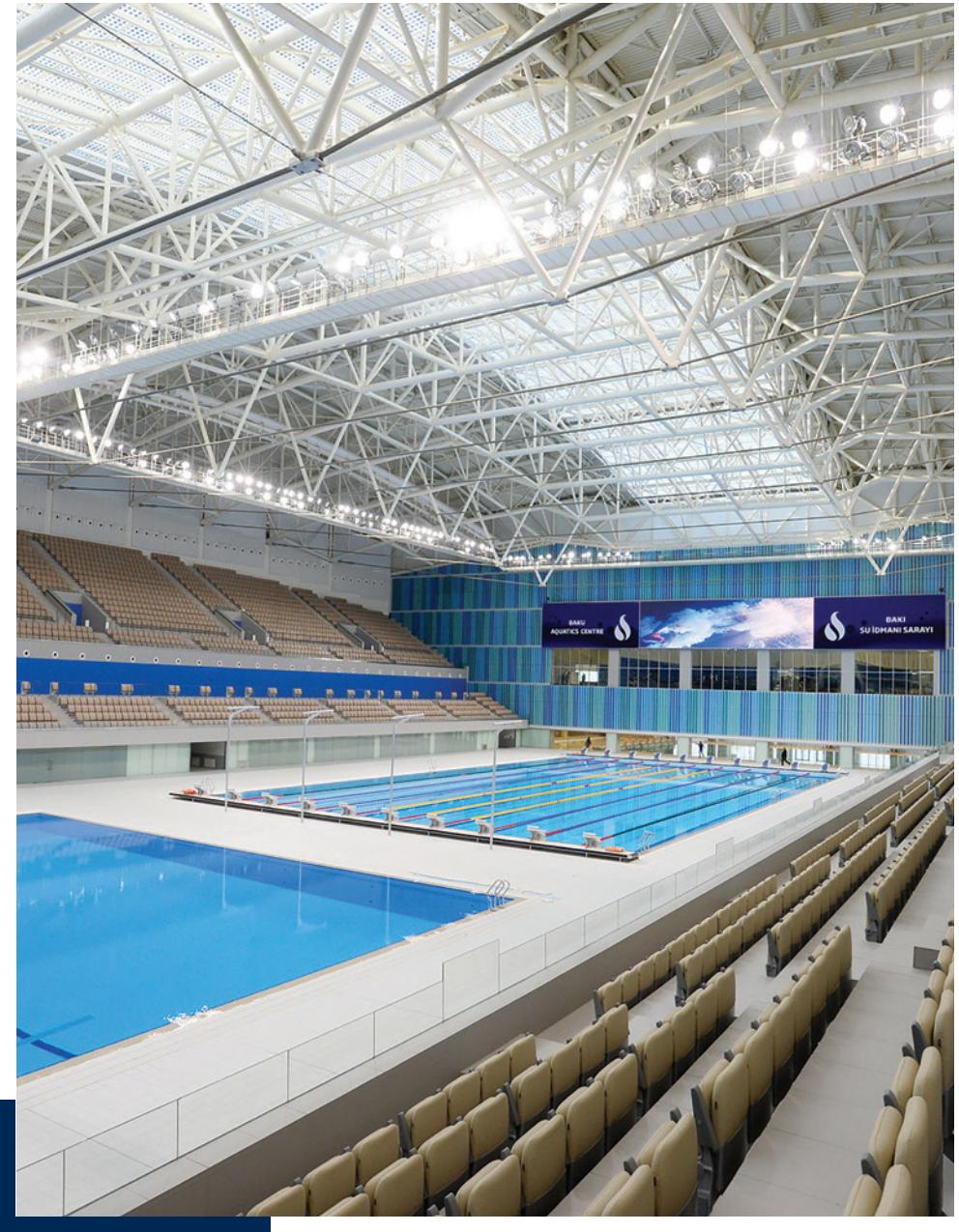
As a general rule, professional advice and a certain degree of accompaniment in the sports facility's initial operating stage are crucial for ensuring a positive management dynamic.

Good management design will maximize the positive aspects of the investment and reduce the risk of a possible negative financial outcome.

The quality of the service and the financial and social sustainability of the sports facility will depend to a large extent on the success of its operational management.

In any case, a new swimming pool must always adopt the best practices of respect for the environment.

It may be useful to direct the management of the facility towards agreements with swimming clubs or federations. In some cases it will be appropriate for the promoter—whether it is a public authority, a public-private partnership (PPP) or a private foundation—to hand over the running to these entities, although in general it will be necessary to envisage a prior process of management training, besides giving them the necessary temporary support to ensure the success of the operation.



CATEGORIES

The project establishes five categories of aquatic centre. The category is the key factor that defines the different areas and services that are part of the aquatic centre.

The Project distinguishes five categories in ascending numerical order, from AC-1 to AC-5.

The requirements that establish the difference between categories are based on the number and size of swimming pools, the number of aquatic disciplines that they can offer, the number of spectators that can attend the different levels of competition, and other factors that determine both of the competition programme and the programme for daily use.

POLÍTICAS

The Project provides recommendations and requirements for all kinds of swimming pools: for competition, training, or simply for recreational purposes.

The number and size of swimming pools is the key decision for configuring a successful aquatic centre because they will define the activities that can be held in it, for both competitions and ordinary everyday use.

In considering a management project the first decision is how big the swimming pool will be.

The uses of the facility in question and the types of aquatic sports that it is proposed to include in it will also have to be borne in mind. In this respect the Programme will provide a variety of options and solutions for the configuration of the water areas and the pools.

The Project also proposes taking into account new technologies that can offer a lot of advantages, flexibility and above all savings in space and costs.

AQUATIC DISCIPLINES

The Project also supplies relevant information, requirements and recommendations that will have to be borne in mind in each of the different aquatic disciplines that a particular swimming pool proposes to include, whether swimming, water polo, synchronized or diving. And for each case it sets out in detail parameters referring to the different types of use, namely learning, training and competition.

These requirements are associated with the size of pools, the conditions of the field of play and the FINA rules.

COMPETITION LEVEL

A large number of aquatic sports competitions are promoted by FINA and its member federations. They range from national and local meets and championships to FINA's signature events, through other competitions such as the Olympic Games or continental swimming championships.

Each one has its own requirements. The requirements of a competition determine the number of spectators that a facility

must seat in order to be able to host it. The level of competition and the number of spectators are directly related factors. In other words, the type of competition that an aquatic centre aspires to host will determine the facility's capacity.

The five categories of swimming pools established in this programme make it possible to develop any of these competitions that meet the corresponding requirements.

CAPACITY

The number of spectators is a very critical reference, especially in the World Swimming Championships, which require a capacity of 15,000 spectators, and the Olympic Games, which demand a capacity of 20,000 seats.

In other international competitions, the offer will normally be somewhere between 2,000 and 6,000 places.

"The project establishes five categories of aquatic centre. The category is the key factor that defines the different areas and services that are part of the aquatic centre."

The Project will in any case provide a guide for the optimization of the number of spectators with the aim of adjusting the size of the building and, consequently, holding down the building and maintenance costs. Also in this field it will be essential to introduce the variable of the number of spectators at the design stage and bear in mind the alternative of proposing a quota of permanent seats and another of temporary seats.

THE LEGACY PROGRAMME AND THE COMPETITION PROGRAMME

To do all the aquatic sports in daily use and in competition, the facility has to have a series of suitable areas associated with these activities.

In the attached document Room Area Schedule (RAS) these areas are listed and described for each category of aquatic centre.

The facilities programme that is detailed describes all the essential areas for doing aquatic activities and, also, others that are indispensable for guaranteeing financial viability in each type of centre.

The Pools For All project provides the tools for properly and strategically organizing the daily use programme and the competition programme with the aim of getting the most out of the available spaces and thus reducing the building's surface area to the necessary minimum.

The RAS document clearly distinguishes the competition programme, which is temporary, from the legacy programme, more permanent in nature, so that facilities, equipment and services can be strategically sited and used after the competition in the context of ordinary daily use.

ESTIMATED BUILDING BUDGET

The estimated budget for building an aquatic facility requires an in-depth study of each of the areas that will be part of it. It may depend on variables that are unknown or insufficiently known. These are factors such as the country in question, the specific region, the sociological make-up of the population, the weather and climate, the economy, the level of earnings and many other elements that will have to be studied carefully.

But in any case the Pools For All project provides a clear reference by establishing a proportional relationship of costs for each category of aquatic facility (in which category AC-1 is assigned a cost of x, and category AC-2 a cost of y, which is the result of multiplying the cost of AC-1 by z, and so on with the remaining categories). In this way, the reference can be adapted to any continent, country, or to other specific factors.

ESTIMATED RUNNING COSTS

With the aim of guaranteeing the financial sustainability of each proposed category of swimming pools it is necessary to prepare a suitable annual budget that covers the operations that will foreseeably be carried out in them.

For each case the income and outgoings from the operation of the centre and the resulting EBITDA are estimated with the idea of obtaining a financial break-even of the operation. The possible amortizations derived from the investment made for its construction are therefore not taken into account. In fact, the starting point is the hypothesis that the investment will be provided by the public authority promoting the project as sunk costs. In the event of a Public-Private collaboration (PPP) the amortization of the private contributions will be taken into account.

In reference to the income from the operation of the aquatic centre we start with a hypothesis of the possible number of season-ticket holders for each category of pool and other complementary income. In each case and country the possible contribution of the public authorities to boost income will be established.

In light of the enormous diversity of financial realities among the different countries in the world, the proposal is based on calculations defined on the basis of the average parameters obtained from specific experiences.

Moreover, the running costs for each category are estimated. These include human resources, energy and water consumption, maintenance, communications and marketing, administration, suppliers and external services.

Finally, the EBITDA for each category and the break-even point of the operation are determined.

MEP (MECHANICAL, ELECTRICAL, PLUMBING)

The Pools for All project does not consider dealing with and defining the mechanical and electrical installations. This is an area that is subject to too many variables that are hard to predetermine. For example, the alternatives between an exterior or an interior installation, the site's weather and climate, or the quality and security of the energy supply.

In any case, the Pools For All project offers a list of references of mechanical and electrical equipment necessary to provide an adequate service to an aquatic centre.

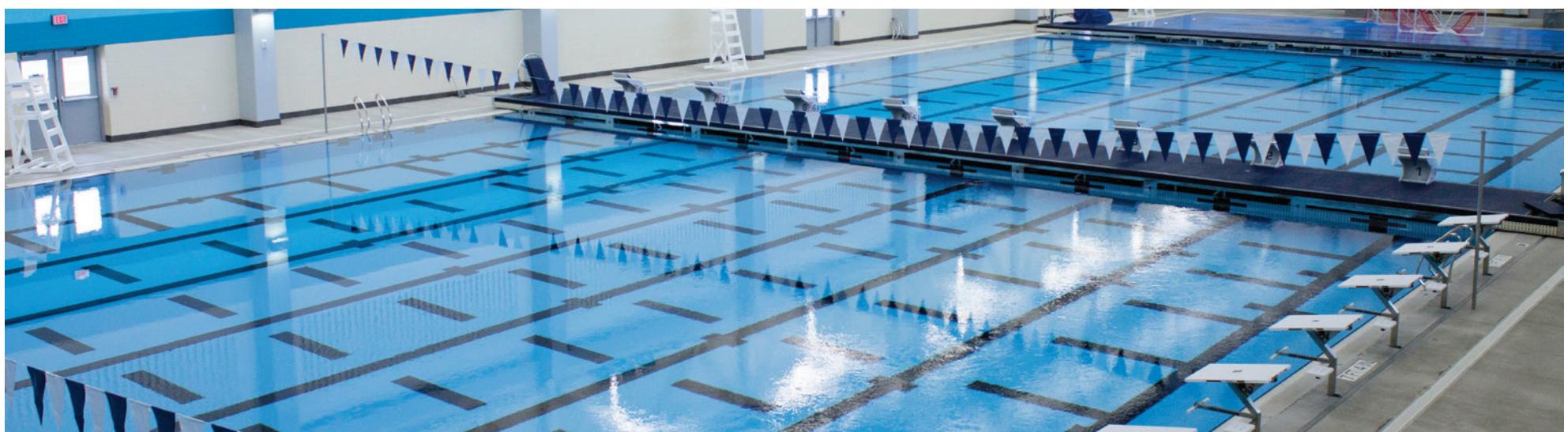
Aquatic centres have characteristics that make them key actors in the sphere of the promotion of energy saving and efficiency. The fact that their energy consumption is relatively high and they show a certain degree of technological complexity in their energetic metabolism makes it possible for a wide range of technical solutions to converge in their installations.

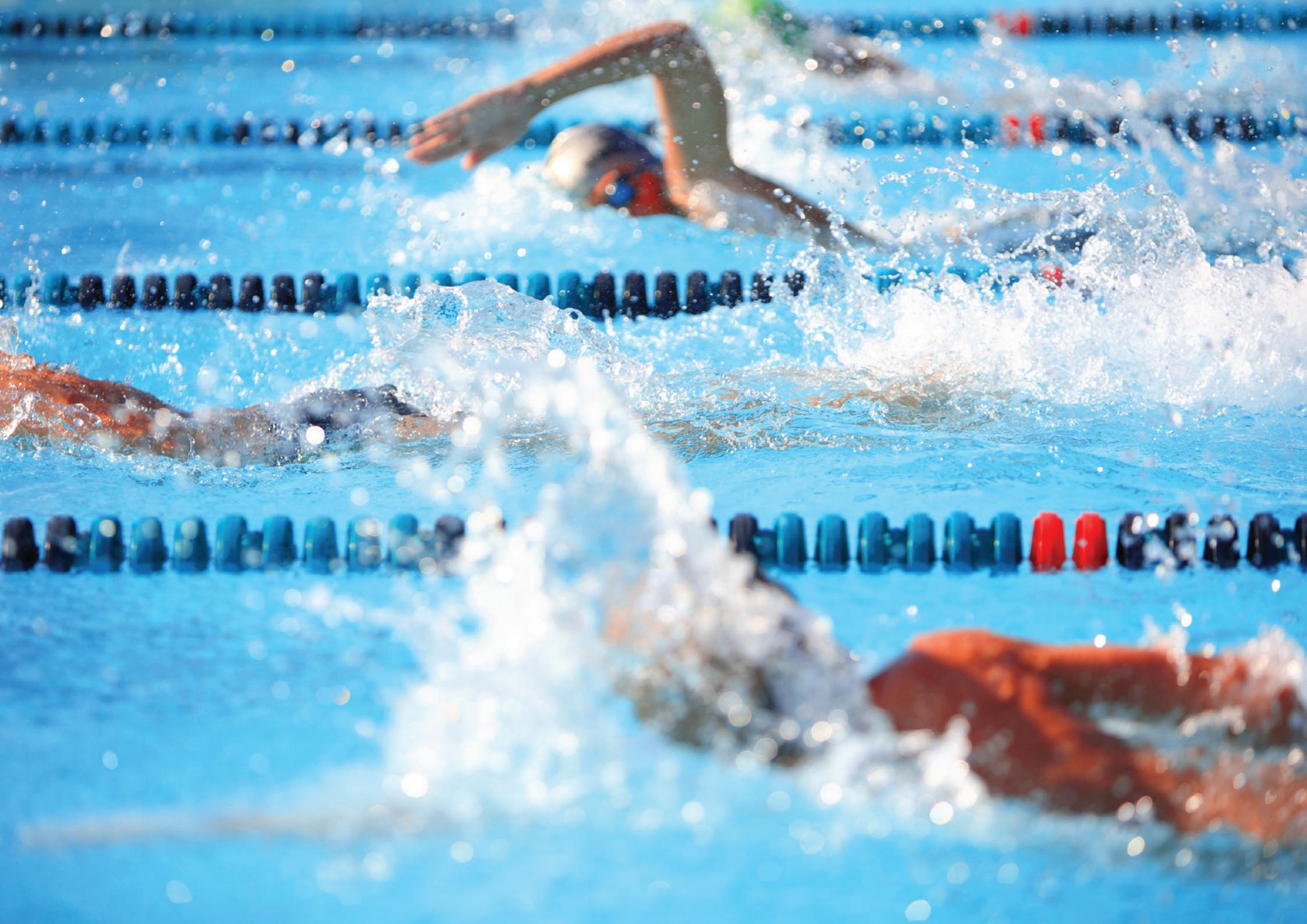
In this general context, architecture and engineering must work together to create a new vision; a sustainable new vision that globally incorporates aspects of the minimization of the environmental impact and energy consumption at every stage of a building's life: plan, construction and use.

MAINTENANCE

In the interests of Health and Safety and users satisfaction, the highest standards of cleanliness, repair and professional practice must be a management priority providing a safe, healthy and environment working place of all its employees, athletes and members and other third parties, as spectators, who come into contact with the facilities.

In the period when the facility is operational, it will be very important to properly plan the human, technical and financial resources to make it possible to introduce a system of preventive and predictive maintenance and thus increase the life of the building and its installations and reduce energy consumption.





5 CATEGORIES SUMMARY • TABLE

(Minimum requirements)	1	2	3	4	5
	AC-1	AC-2	AC-3	AC-4	AC-5
Pools	Main Pool Hall Swimming Pool 25x12,5m. Depth: 1,1-1,35m Swimming Pool 12,5x6m. Depth: 1,1m	Main Pool Hall Swimming Pool 25x25m. Depth: 2m	Main Pool Hall 1 Bulkheads, 1 Movable Floor	Main Pool Hall 2 Bulkheads, 1 Movable Floor Diving Pool 25x20m. Depth: 5m	Main Pool Hall 1 Bulkheads Secondary Pool Hall
					Secondary Pool Hall
		Swimming Pool 25x12,5m. Depth: 1,1-1,35m	Swimming Pool 25x12,5m. Depth: 1,1-1,35m	Swimming Pool 25x12,5m. Depth: 1,1-1,35m	Swimming Pool 50x25m. Depth: 2m
					1 Bulkheads, 1 Movable Floor
Aquatic disciplines	Swimming (learning & training)	Swimming Water Polo Synchronized Swimming (Training)	Swimming Water Polo Synchronized Swimming	Swimming Water Polo Synchronized Swimming Diving	Swimming Water Polo Synchronized Swimming Diving
Competition Level	Local	Local National	Local International	Local National International	Local National International
Venue seating capacity	Not required	500	750	5 000	15 000
Permanent seating capacity		300	500	2 000	3 000
Temporary Seating capacity		200	250	3 000	12 000
Number of members	2.150-2.600	4.400-5.300	5.400-6.500	7.000-9.240	9.400-11.300
Building Area	3 500 m ²	7 000 m ²	10 500 m ²	18 000 m ²	25 000 m ²
Estimated construction cost	15 PFA*	30 PFA*	45 PFA*	75 PFA*	100 PFA*
Estimated running cost	3 PFA*	5 PFA*	8 PFA*	12 PFA*	15 PFA*

*PFA - proportional relationship of costs for each category of aquatic facility



AQUATIC EVENTS AND COMPETITIONS

There are a large number of sports competitions in different aquatic disciplines that are promoted by FINA and its member federations. Each of them has its own requirements for swimming pools and spectators. Five categories of swimming pools that are established in the present proposal enable to develop any type of these competitions.

	AC-1	AC-2	AC-3	AC-4	AC-5
Swimming					
Olympic Games					
Youth Olympic Games					
World Championships					
World Swimming Championships (25m)					
World Masters Championships					
World Junior Swimming Championships					
Swimming World Cup					
National Competitions					
Diving					
Olympic Games					
Youth Olympic Games					
World Championships					
World Masters Championships					
World Junior Diving Championships					
Diving Grand Prix					
Diving World Cup					
Diving World Series					
National Competitions					

	AC-1	AC-2	AC-3	AC-4	AC-5
Synchronized Swimming					
Olympic Games					
World Championships					
World Masters Championships					
Synchronised Swimming Olympic Games Qualification Tournament					
Synchronised Swimming World Trophy					
World Junior Synchronised Swimming Championships					
National Competitions					
Water Polo					
Olympic Games					
Men's Water Polo Olympic Games Qualification Tournament					
Women's Water Polo Olympic Games Qualification Tournament					
World Championships					
Men's Water Polo World League					
Women's Water Polo World League					
World League Super Final Women					
World League Super Final Men					
World Men's Youth Water Polo Championships					
World Women's Youth Water Polo Championships					
World Men's Junior Water Polo Championships					
World Women's Junior Water Polo Championships					
Men's Water Polo World Cup					
Women's Water Polo World Cup					
National Competition					

MANAGEMENT SUMMARY

Management consists in defining the organization, and other contents related to the processes of the organization. This term includes strategies, methods, tools and others.

This "management" section is divided into chapters, which are repeated and suited in content to each of the categories previously named AC1, AC2, AC3, AC4 and AC5. Following we will see some reading keys to understanding each chapter, and a diagram that will give a first image of what each of the categories in relation to management represents. (diagram 1.)

- **Chapter 1.** Catalogue of services "Swimming for all": This chapter will describe which and how many services are offered in accordance with the activities that can be done in the swimming-pool. It will also deal with the number of users making use of the swimming-pool spaces in relation with 3 parameters: sportspersons users, preschoolers users, and finally general public users. Lastly, this chapter will list how many FINA disciplines can be done in each category, and what kind of competitions might be carried out.
- **Chapter 2.** Catalogue of services "Wellness for all": This section will explain how many and which services are offered in accordance with the activities that can be done in the wellness spaces.
- **Chapter 3.** Sports facility spaces programme: It details the total square meters of 2 areas: swimming and wellness.
- **Chapter 4.** Swimming and wellness programme use plan: This chapter explains the planned number of uses/week the two areas described in the programme have.
- **Chapter 5.** Organization of the service: This section explains the quality model to be followed in each category. Definition of the strategic lines, processes and procedures, and evaluation of each area, all are defining aspects of the model.
- **Chapter 6.** Workforce: This chapter defines the total number of hours needed to carry out the services presented in the sections: Swimming for all and Wellness for all, as well as the distinction of fixed hours required for categories to function normally. In this respect, covering hours according to facility opening are considered, except in those in which this relation does not exist and a lower ratio is established.
- **Chapter 7.** Marketing and communication. This chapter about marketing and communication defines the objectives, the tools required to achieve them, the marketing and communication actions to be used, and how to quantify them.

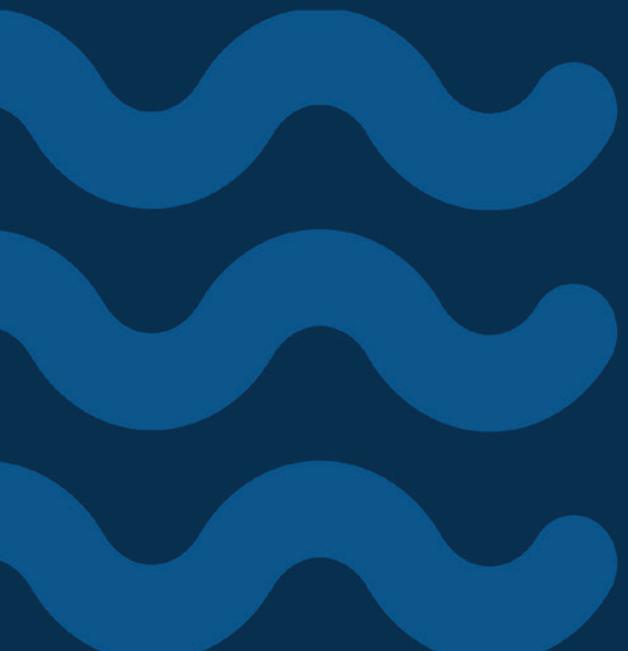
Summary indicators – files		RESULT INDICATORS – FACILITIES MODULS			
1.	2.	3.	4.	5.	
1. Swimming for all					
Number of services	15	16	20	23	26
Number of users (athletes)	200	270	300	475	630
Number of users (school)	100	145	250	250	290
Number of users (population)	600	720	990	1.350	1.400
Number of hours / week (offer)	2.000	2.815	3.140	4.230	4.675
Number of aquatic disciplines (fina)	1	3	3	4	4
Number of competitions	Local	National / local	International / national / local	International / national / local	International / national / local
2. Wellness for all					
Number of services	10	13	15	19	25
Number of hours / week (sports - health)	550	620	770	810	1.270
Number of hours / week (leisure)	100	240	230	430	490
Users/week/sport and healthy activity	2.150	3.800	5.630	7.435	9.550
Users/week/leisure	150	820	1.880	6.240	7.730
3. Sports facility spaces programme					
M2 total	3.500 m2	6.500 m2	9.815 m2	15.600 m2	18.240 m2
M2 swimming	970 m2 swimming	100 m2 swimming	3.290 m2 swimming	4.800 m2 swimming	6.850 m2 swimming
M2 wellness	1.130 m2 wellness	2.1900 m2 wellness	2.735 m2 wellness	3.800 m2 wellness	4.400 m2 wellness
4. Swimming & wellness programme use plan					
Uses / hour week (total)	9.500	15.170	22.630	33.165	42.690
Uses/hour week (aquatic activities)	4.350	5.190	7.410	8.925	9.560
Expected occupancy vs max. Occupancy	75%	75%	75%	75%	75%
Uses/hour week (wellness activities)	5.150	9.980	15.220	24.240	33.130
Expected occupancy vs max. Occupancy	80%	80%	80%	80%	80%
5. Organization					
Number of processes	12	12	12	12	12
Number of aspects/procedures	37	37	37	37	37
Number of operational areas	4	5	5	5	5

- **Chapter 8.** Operating Budget. This last chapter compiles information from previous chapters, such as areas and human resources, and links them to the two possible scenarios. These two scenarios that lead us to achieve the break even depends on two variables: the number of subscribers, and the users' maximum quota for each of the scenarios.

Following, Diagram 1 presents quantifiable data of each chapter of the management according to categories. Expansion for each variable is to be found in each of the chapters and their correspondant categories.

Summary indicators – files	RESULT INDICATORS – FACILITIES MODULS				
6. Human resources	1	2	3	4	5
Anual hours of labour contracts	44.600	66.470	92.220	134.710	156.600
Annual number of fixed labour hours	38.765	52.350	74.800	100.570	114.300
Annual number of variable laboral hours	7.830	14.120	17.425	34.140	45.300
Number of full-time employees	15	23	29	49	57
Number of part-time employees	27	39	60	70	97
7. Marketing and communication	1	2	3	4	5
Number of main marketing goals	3	4	4	4	4
Number of communication tools	12	16	19	23	25
Number of marketing actions	8	10	13	15	16
Number of communication actions	33	45	52	64	89
8. Operating budget	1	2	3	4	5
Total m2 for users and athletes (approx.)	2.100 m2	3.800 m2	6.000 m2	9.450 m2	12.300 m2
Total annual operating expenses	1.227.000	1.930.000	3.250.000	4.665.000	6.000.000
Break even - Scenario 1	2.150 members	4.400 members	5.400 members	7.700 members	9.400 members
Income members	60 €/month (maximum)	60 €/month (maximum)	60 €/month (maximum)	60 €/month (maximum)	60 €/month (maximum)
Break even - Scenario 2	2.600 members	5.300 members	6.500 members	9.200 members	11.300 members
Income members	50 €/month (maximum)	50 €/month (maximum)	50 €/month (maximum)	50 €/month (maximum)	50 €/month (maximum)
Total working hours a year	46.618 hours/year	66.472 hours/year	92.229 hours/year	134.712 hours/year	159.591 hours/year
Total employees	42 employees	62 employees	89 employees	119 employees	150 employees





Aquatic Centre Categories

AQUATIC CENTRE 1

The AC-1 Aquatic Centre is the most basic category in the Pools For All classification system. It is a sports complex designed principally for training and learning to swim.

The water area is composed of two swimming pools: a main pool and a secondary one. The main pool, measuring 25 x 12.5 metres by 1.1 to 1.35 metres deep, is sufficient for daily training and ideal for learning to swim. The secondary pool, 12.5 x 6 metres by 1.1 metres deep, is designed for various water-related activities.

To complete the range of sporting activities offered by the AC-1 Aquatic Centre, besides the water areas there are fitness rooms and rooms for group fitness.

Besides the sports areas, the AC-1 Aquatic Centre offers all the services necessary for doing these activities, such as the changing rooms, the spa area, a medical centre, and others.

The AC-1 is designed for an area with an effective population of 20,000 people, an approximate total of 2.150-2.600 members, and it has the capacity to accommodate 870 users daily.

The building's approximate built surface area is in the region of 3,500 m² with an estimated cost of 15 PFA units.

	AC-1	DAILY USE	STAFF & MAINTENANCE
Pools	Main Pool Hall Swimming Pool 25x12.5m. Depth: 1.1-1.35m Swimming Pool 12.5x6m. Depth: 1.1m		SPORT
Aquatic disciplines	Swimming (learning & training)		POOLS
Competition Level	Local		
Venue seating capacity	Not required		
Permanent seating capacity			
Temporary Seating capacity			
Number of members	2.150 - 2.600		
Building Area	3.500 m ²		
Estimated construction cost	15 PFA*		
Estimated running cost	3 PFA*		

* PFA - proportional relationship of costs for each category of aquatic facility

TRAINING & LEARNING



NATIONAL COMPETITIONS

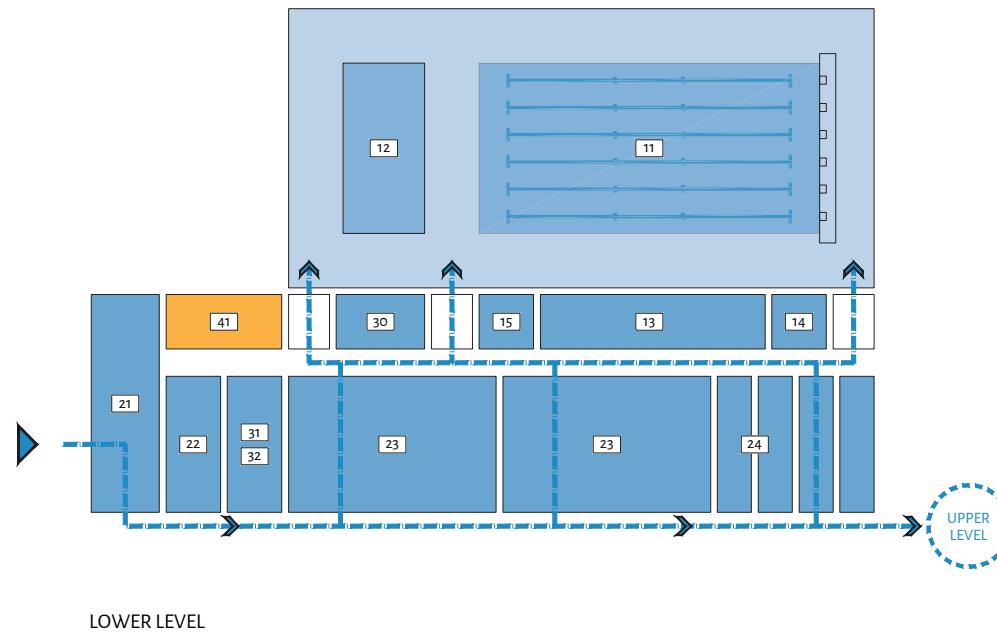


INTERNATIONAL COMPETITIONS





DIAGRAM - DAILY USE



POOLS

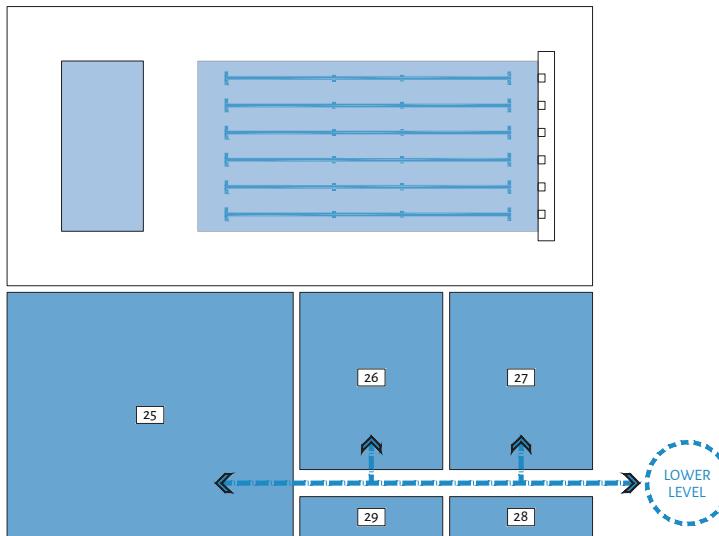
- 11 Swimming Pool (25 x 12.5)
- 12 Secondary Pool (12.5 x 6)
- 13 FOP Equipment Storage
- 14 First Aid
- 15 FOP Toilet

SPORT

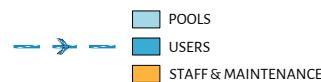
- 21 Entrance Hall / Welcome Area
- 22 Reception/ Administration
- 23 Changing Room
- 24 Team's Changing Room
- 25 Fitness Room
- 26 Cycling Room
- 27 Activities Room
- 28 Personal Trainer Room
- 29 Storage
- 30 Spa Area - Secondary Pool
- 31 Medical Centre
- 32 Physiotherapy Area

OPERATIONS

- 41 Trainers Changing Room



UPPER LEVEL



AQUATIC CENTRE 2

The AC-2 Aquatic Centre is a type of sports complex designed for both daily training and learning to swim, and for local competitions, with a capacity for 300 spectators extendible to 500 during events.

The water area is composed of two swimming pools: a main pool and a secondary one. The main pool, measuring 25 x 25 metres by 2 metres deep, is suitable for swimming and water polo competition and daily training. The secondary pool, measuring 25 x 12.5 metres by 1.1 to 1.35 metres deep, is ideal for learning to swim and for doing various water-related activities.

To complete the range of sporting activities offered by the AC-2 Aquatic Centre, besides the water areas there are fitness rooms and rooms for Group fitness.

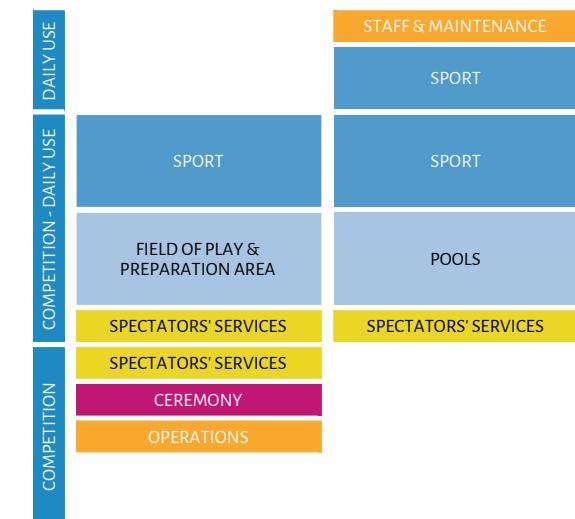
Besides the sports areas, the AC-2 Aquatic Centre offers all the services necessary for doing these activities, such as the changing rooms, the spa area, a medical centre, a bar-restaurant, and others.

The AC-2 is designed for an area with an effective population of 45,000 people, an approximate total of 4.400-5.300 members, and it has the capacity to accommodate up to 1,200 users daily.

The building's approximate built surface area is in the region of 7,000 m² with an estimated cost of 30 PFA units.

AC-2	
Pools	Main Pool Hall Swimming Pool 25x25m. Depth: 2m Swimming Pool 25x12.5m. Depth: 1.1-1.35m
Aquatic disciplines	Swimming Water Polo Synchronized Swimming (Training)
Competition Level	Local National
Venue seating capacity	500
Permanent seating capacity	300
Temporary Seating capacity	200
Number of members	4.400-5.300
Building Area	7.000 m ²
Estimated construction cost	30 PFA*
Estimated running cost	5 PFA*

* PFA - proportional relationship of costs for each category of aquatic facility



TRAINING & LEARNING



NATIONAL COMPETITIONS

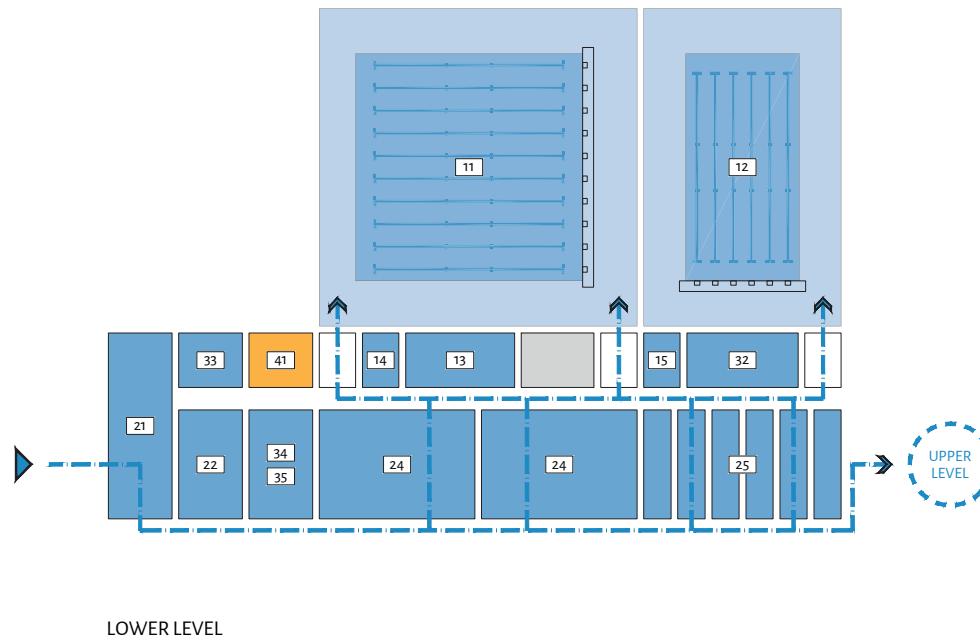


INTERNATIONAL COMPETITIONS

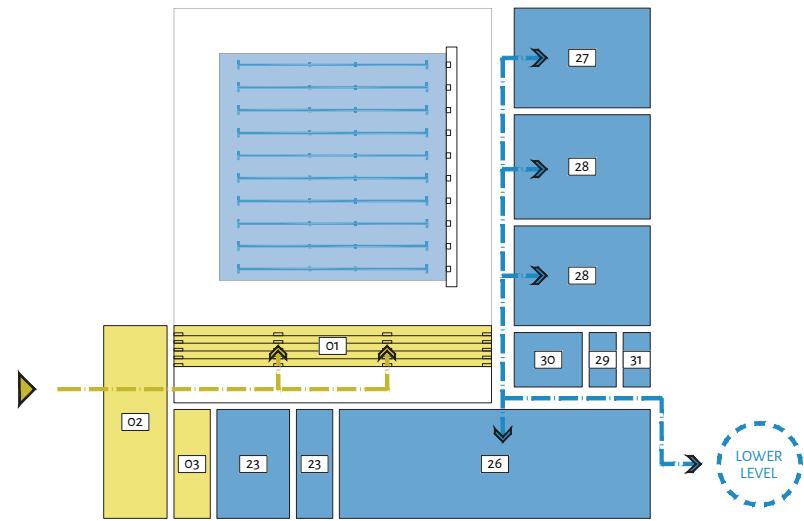




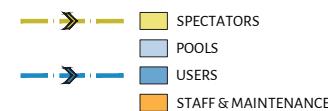
DIAGRAM - DAILY USE



SPECTATORS SERVICES		SPORT				STAFF & MAINTENANCE	
01	Spectator Seating	21	Entrance Hall / Welcome Area	30	Storage	41	Trainners Changing Room
02	Spectator Entrance Hall	22	Reception / Administration	31	Toilets		
03	Spectator Toilets	23	Bar - Restaurant	32	Spa Area - Secondary Pool		
POOLS							
11	Swimming Pool (25 x 25)	24	Changing Room	33	Beauty Centre		
12	Secondary Pool (25 x 12.5)	25	Team's Changing Room	34	Medical Centre		
13	FOP Equipment Storage	26	Fitness Room	35	Physiotherapy Area		
14	First Aid	27	Cycling Room				
15	FOP Toilet	28	Activities Room				
		29	Personal Trainer Room				



UPPER LEVEL



AQUATIC CENTRE 3

The AC-3 Aquatic Centre is a type of sports complex designed for both daily training and learning to swim and for national competitions, with a capacity for 500 spectators extendible to 750 during events.

The water area is composed of two swimming pools: a main pool and a secondary one. The main pool, measuring 50 x 25 metres by 3 metres deep, has a bulkhead and a movable floor, and is suitable for swimming, water polo and synchronized swimming competition and for daily training. The secondary pool, measuring 25 x 12.5 metres by 1.1 to 1.35 metres deep, is ideal for learning to swim and for doing various water-related activities.

To complete the range of sporting activities offered by the AC-3 Aquatic Centre, besides the water areas there are fitness rooms and rooms for group fitness.

Besides the sports areas, the AC-3 Aquatic Centre offers all the services necessary for doing these activities, such as the changing rooms, the spa area, a medical centre, a bar-restaurant, and others.

The AC-3 is designed for an area with an effective population of 75,000 people, an approximate total of 5,400 - 6,500 members, and it has the capacity to accommodate up to 1,500 users daily.

The building's approximate built surface area is in the region of 10,500 m² with an estimated cost of 45 PFA units.

	AC-3	DAILY USE	STAFF & MAINTENANCE
Pools	Main Pool Hall Swimming Pool 50x25m. Depth: 3m 1 Bulkheads, 1 Movable Floor	SPORT	SPORT
Aquatic disciplines	Swimming Water Polo Synchronized Swimming	FIELD OF PLAY & PREPARATION AREA	POOLS
Competition Level	National International	SPECTATORS' SERVICES	SPECTATORS' SERVICES
Venue seating capacity	750	IF FAMILY / VIPS	IF FAMILY / VIPS
Permanent seating capacity	500	CEREMONY	CEREMONY
Temporary Seating capacity	250	OPERATIONS	OPERATIONS
Number of members	5,400 - 6,500	MEDIA	MEDIA
Building Area	10 500 m ²		
Estimated construction cost	45 PFA*		
Estimated running cost	8 PFA*		

* PFA - proportional relationship of costs for each category of aquatic facility

TRAINING & LEARNING



NATIONAL COMPETITIONS

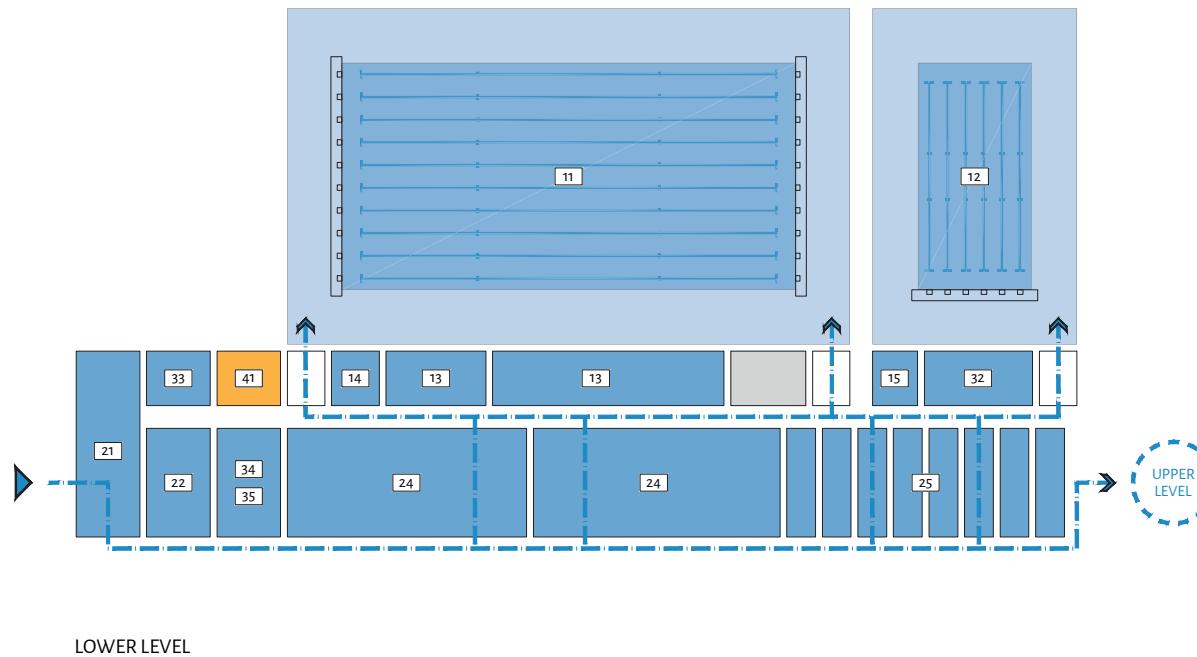


INTERNATIONAL COMPETITIONS

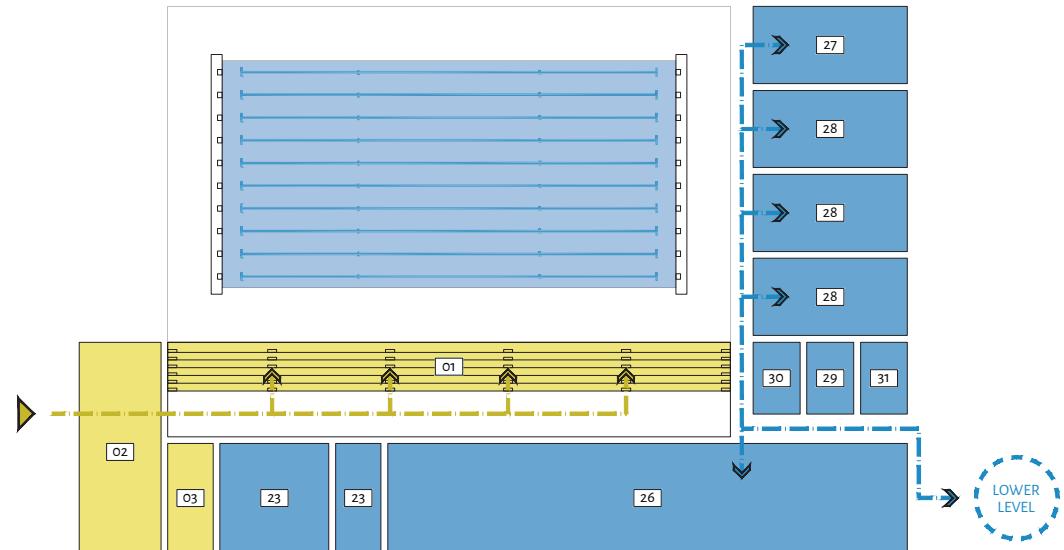




DIAGRAM - DAILY USE



SPECTATORS SERVICES		SPORT		STAFF & MAINTENANCE	
01	Spectator Seating	21	Entrance Hall / Welcome Area	30	Storage
02	Spectator Entrance Hall	22	Reception / Administration	31	Toilets
03	Spectator Toilets	23	Bar - Restaurant	32	Spa Area - Secondary Pool
POOLS		24	Changing Room	33	Beauty Centre
11	Swimming Pool (50 x 25)	25	Team's Changing Room	34	Medical Centre
12	Secondary Pool (25 x 12.5)	26	Fitness Room	35	Physiotherapy Area
13	FOP Equipment Storage	27	Cycling Room		
14	First Aid	28	Activities Room		
15	FOP Toilet	29	Personal Trainer Room		
				41	Trainners Changing Room



AQUATIC CENTRE 4

The AC-4 Aquatic Centre is a type of sports complex designed for both daily training and learning to swim and for high-level international competition, with a capacity for 2,000 spectators extendible to 3,000 during events.

The water area is composed of three swimming pools: a main swimming pool, a diving pool and a secondary swimming one. The main pool, measuring 50 x 25 metres by 3 metres deep, with two bukheads and a movable floor, is suitable for swimming, water polo and synchronized swimming competition and for daily training. The diving pool, measuring 25 x 20 metres by 5 metres deep, can be used for both diving competition and training. The secondary swimming pool, measuring 25 x 12.5 metres by 1.1 to 1.35 metres deep, is ideal for learning to swim and for doing various water-related activities.

To complete the range of sporting activities offered by the AC-4 Aquatic Centre, besides the water areas there are fitness rooms and rooms for group fitness.

Besides the sports areas, the AC-4 Aquatic Centre offers all the services necessary for doing these activities, such as the changing rooms, spa areas, a medical centre, a bar-restaurant, and others.

The AC-4 is designed for an area with an effective population of 100.000 people, an approximate total of 7.000 - 9.240 members, and it has the capacity to accommodate up to 2,575 users daily.

The building's approximate built surface area is in the region of 18,000 m² with an estimated cost of 75 PFA units.

AC-4		STAFF & MAINTENANCE
Pools	Main Pool Hall Swimming Pool 50x25m. Depth: 3m 2 Bulkheads, 1 Movable Floor Diving Pool 25x20m. Depth: 5m Secondary Pool Hall Swimming Pool 25x12.5m. Depth: 1.1-1.35m	
Aquatic disciplines	Swimming Water Polo Synchronized Swimming Diving	
Competition Level	Local National International	
Venue seating capacity	5 000	
Permanent seating capacity	2 000	
Temporary Seating capacity	3 000	
Number of members	7.000 - 9.240	
Building Area	18 000 m ²	
Estimated construction cost	75 PFA*	
Estimated running cost	12 PFA*	

* PFA - proportional relationship of costs for each category of aquatic facility

TRAINING & LEARNING



NATIONAL COMPETITIONS

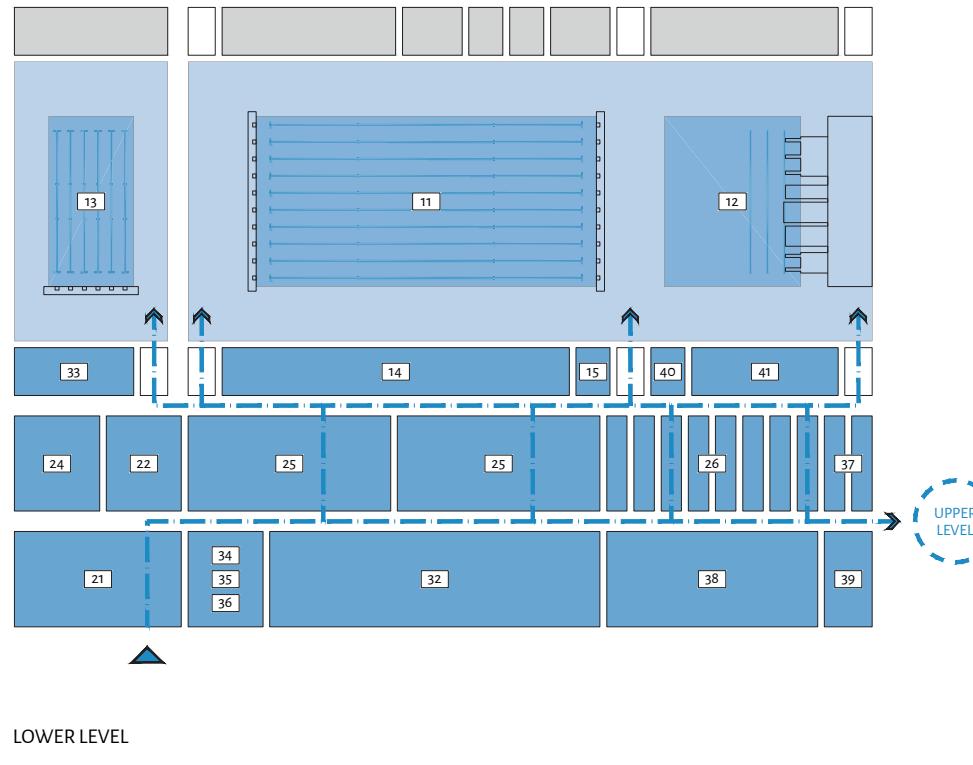


INTERNATIONAL COMPETITIONS



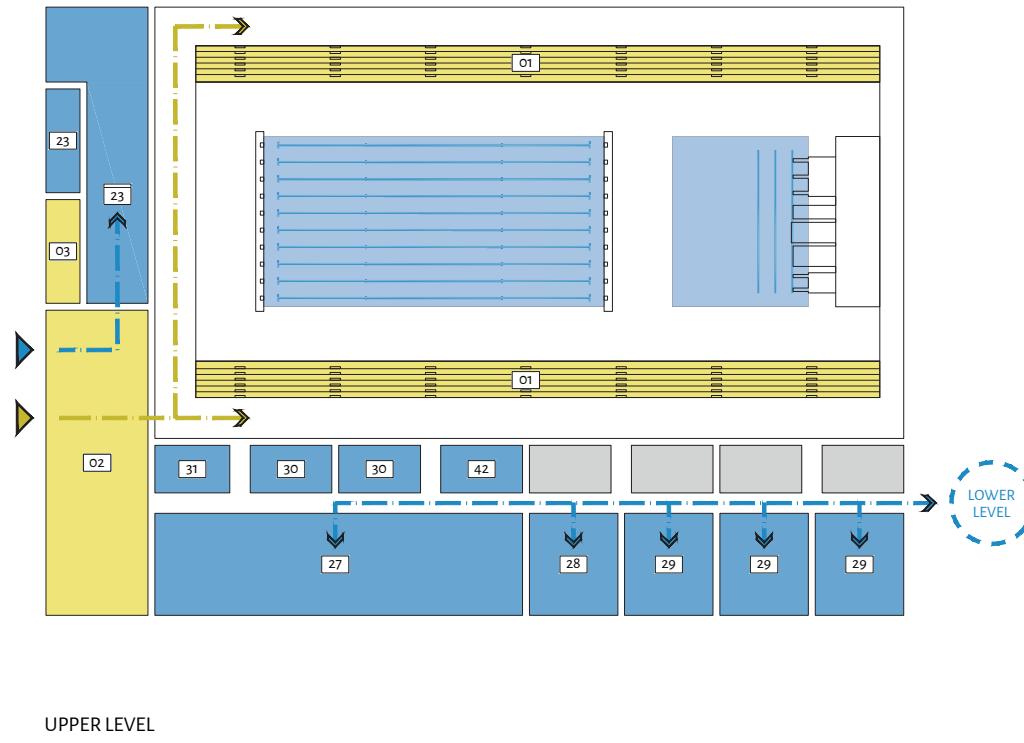


DIAGRAM - DAILY USE



—> SPECTATORS
—> POOLS
—> USERS

SPECTATORS SERVICES			SPORT			
01	Spectator Seating		21	Entrance Hall / Welcome Area	32	Spa Centre
02	Spectator Entrance Hall		22	Reception	33	Spa Area - Secondary Pool
03	Spectator Toilets		23	Bar - Restaurant	34	Beauty Centre
POOLS			24	Sports Store	35	Medical Centre
11	Swimming Pool (50 x 25)		25	Changing Room	36	Physiotherapy Area
12	Diving Pool (25 x 20)		26	Team's Changing Room	37	Athletes Changing Room
13	Secondary Pool (25 x 12.5)		27	Fitness Room	38	Diving Dry Land
14	FOP Equipment Storage		28	Cycling Room	39	Athletes Gym
15	First Aid		29	Activities Room	40	Athletes Medical Area
			30	Personal Trainer Room	41	Federation Offices
			31	Storage	42	Toilets



AQUATIC CENTRE 5

The AC-5 Aquatic Centre is the most complete category in the Pools For All classification system. It is a sports complex designed for daily training and learning to swim and for high-level international competition, with a capacity for 3,000 spectators extendible to 15,000 during events.

The water area is composed of three swimming pools: a main swimming pool, a diving pool and a secondary swimming one. The main pool, measuring 50 x 25 metres by 3 metres deep, has a movable bulkhead, and it is suitable for swimming, water polo and synchronized swimming competition and for daily training. The diving pool, measuring 25 x 20 metres by 5 metres deep, can be used for diving competition and training. The secondary swimming pool, measuring 50 x 25 metres by 2 metres deep, with a bulkhead and a movable floor, offers the flexibility necessary for doing daily training and learning to swim or various water-related activities.

To complete the range of sporting activities offered by the AC-5 Aquatic Centre, besides the water areas there are fitness rooms and rooms for group fitness.

Besides the sports areas, the AC-5 Aquatic Centre offers all the services necessary for doing these activities, such as the changing rooms, spa areas, a medical centre, a bar-restaurant, and others.

The AC-5 is designed for an area with an effective population of 125,000 people, an approximate total of 9.400 - 11.300 members, and it has the capacity to accommodate up to 2.800 users daily.

The building's approximate built surface area is in the region of 25,000 m² with an estimated cost of 100 PFA units.

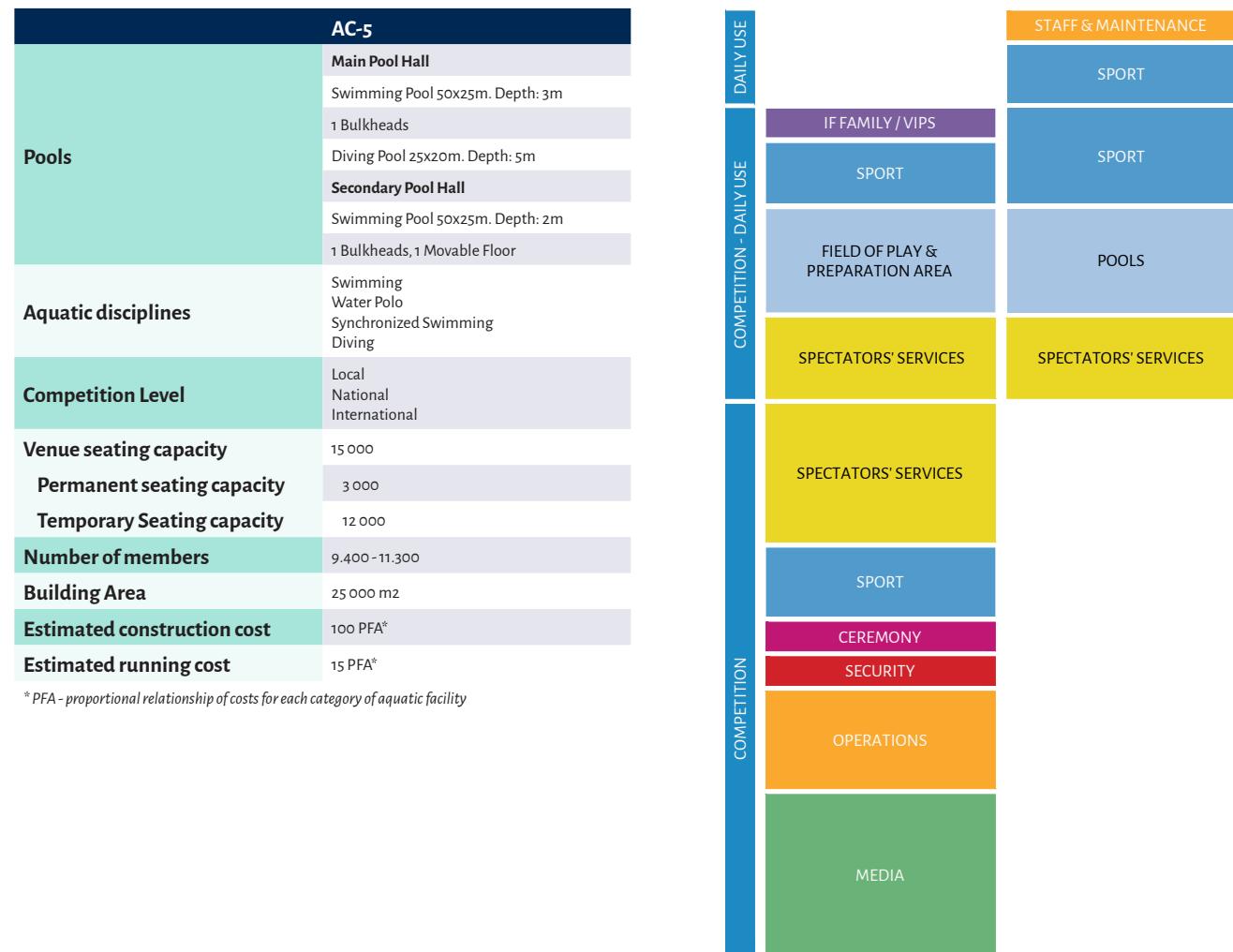
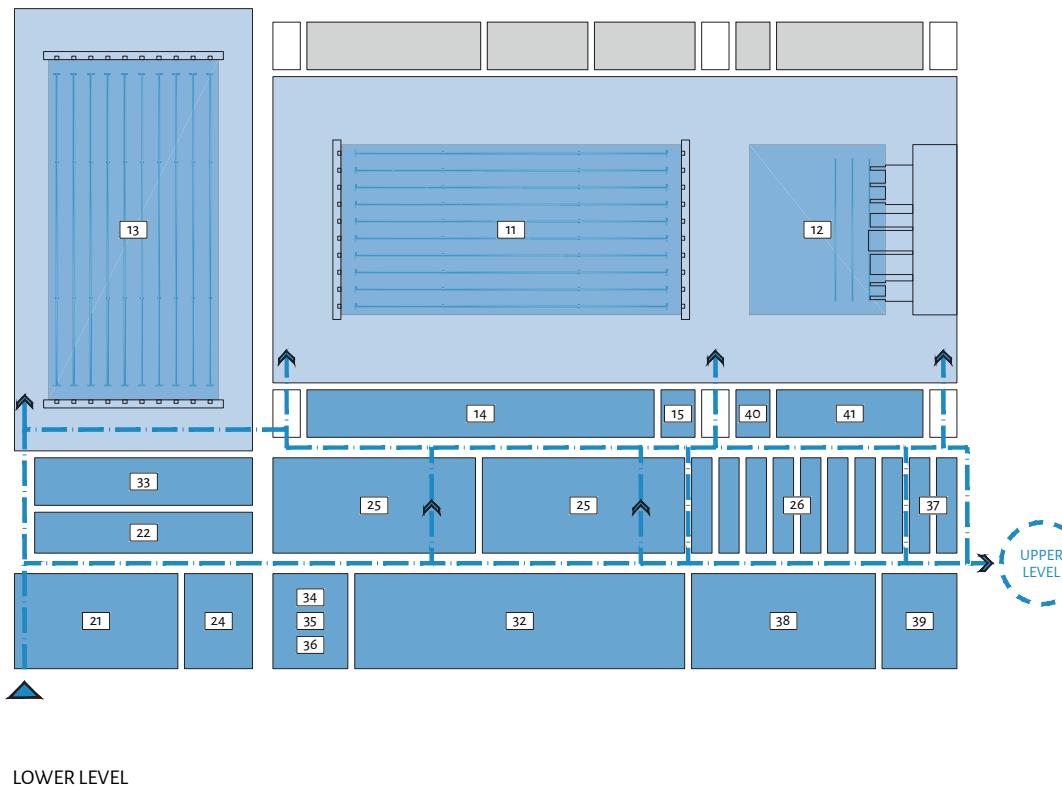




DIAGRAM - DAILY USE



LOWER LEVEL

UPPER LEVEL

SPECTATORS SERVICES

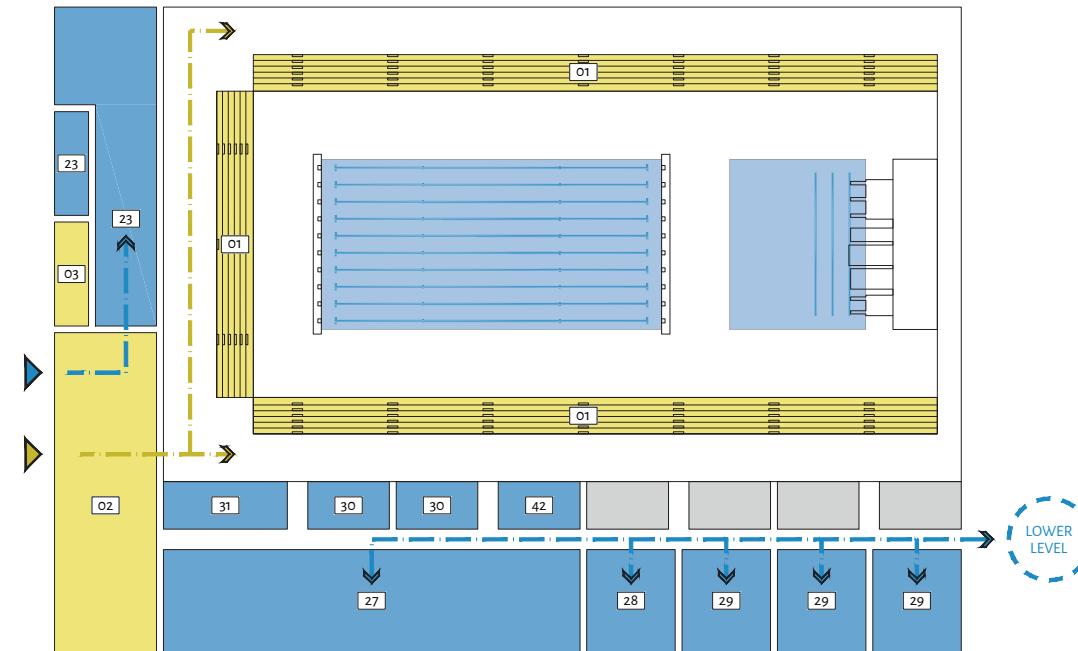
- 01 Spectator Seating
- 02 Spectator Entrance Hall
- 03 Spectator Toilets

POOLS

- 11 Swimming Pool (50 x 25)
- 12 Diving Pool (25 x 20)
- 13 Secondary Pool (25 x 12.5)
- 14 FOP Equipment Storage
- 15 First Aid

SPORT

- 21 Entrance Hall / Welcome Area
- 22 Reception
- 23 Bar - Restaurant
- 24 Sports Store
- 25 Changing Room
- 26 Team's Changing Room
- 27 Fitness Room
- 28 Cycling Room
- 29 Activities Room
- 30 Personal Trainer Room
- 31 Storage
- 32 Spa Centre
- 33 Spa Area - Secondary Pool
- 34 Beauty Centre
- 35 Medical Centre
- 36 Physiotherapy Area
- 37 Athletes Changing Room
- 38 Diving Dry Land
- 39 Athletes Gym
- 40 Athletes Medical Area
- 41 Federation Offices
- 42 Athletes Toilets



UPPER LEVEL

SPECTATORS
 POOLS
 SPORT





Pools

CONSTRUCTION SYSTEMS

INTRODUCTION

Swimming pools are the central feature of Aquatic Centres.

Throughout the history of competitive swimming, pools have been built using concrete in all its variations as the basic component of their construction.

The use of concrete logically involved taking precautions against the effects of chlorinated water.

The technological development of the building industry and the appearance of new materials that to a large extent have helped to improve the technical, financial and energy-saving features of building methods, have been a positive influence on the way swimming pools have been built.

Therefore, since the second half of the 20th century, new materials and technologies have appeared as alternatives to concrete in the construction of swimming pools.

Steel, in its stainless version, fibreglass and vinyl, along with high-precision industrial processes, have made it possible to replace concrete with technologies that produce substantial improvements in construction times, useful life, and greater accuracy in the control of the measurements and tolerances.

“With high-precision industrial processes, have made it possible to replace concrete with technologies that produce substantial improvements in construction.”



Lloret de Mar Swimming Pool- Spain . Designed by Pujol Arquitectura, Swimming Pool built by Myrtha Pools.

CONCRETE POOLS

The use of reinforced concrete as the basic material for the construction of swimming pools has been the predominant factor in the majority of swimming pools built in the world over the years.

It is true that concrete performs in its function as a water container very solidly. Nevertheless, and in the case of competition swimming pools, concrete is in many ways incompatible with water.

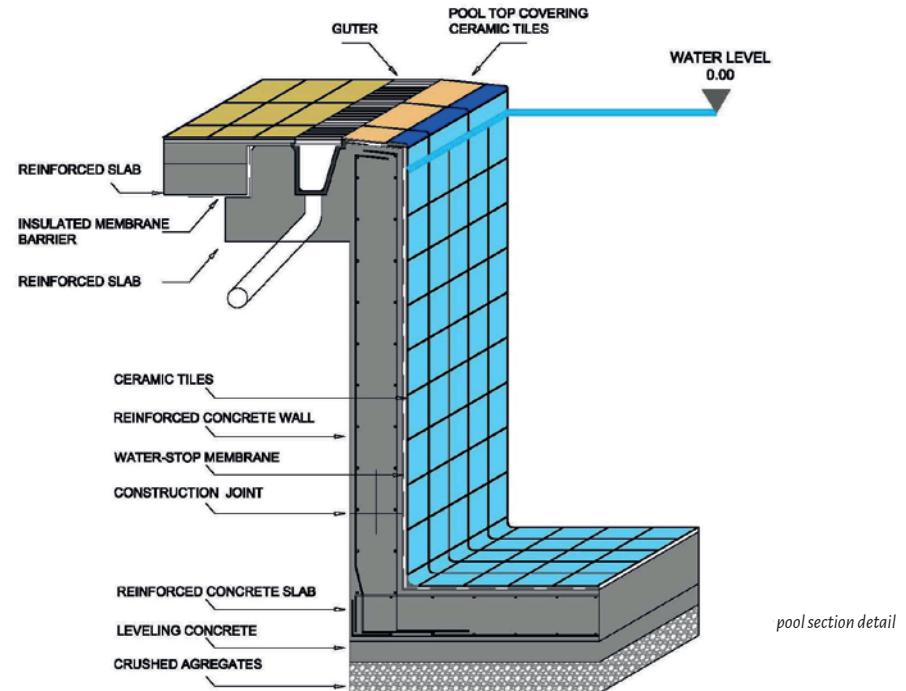
The need for swimming pools to be watertight means that concrete has to be treated with waterproof products, and the metal reinforcements must be protected effectively and preferably lined with ceramic tiles.

Another aspect that poses problems is the difficulty of achieving the necessary precision that the pool must have with regard to dimensions and tolerances.

Throughout its life, concrete is constantly subjected to retractions generating water leakage that is not easy to detect at source and to eventually repair.

From the structural point of view, concrete is a heavy material that produces many static loads that affect the whole building and this can have serious financial repercussions.

This is even more marked when its site is located in an area of seismic activity.



pool section detail



Madrid '86 aquatic centre, designed by Pujol Arquitectura.

STAINLESS STEEL MODULAR POOLS

The introduction of stainless steel modular pools and PVC for swimming pool construction has made it possible to go from a traditional and absolute building process, using concrete, to an industrial building process, which involves the assembly of stainless steel walls with a very hard PVC base attached while hot that creates a structure possessing great static resistance.

The use of panels whose sizes are adaptable to the design, easy to handle and secured to a substructure, allows for the swimming pool to be installed in the final stages of overall construction.

The vertical panels are joined together on a reinforced concrete base all around the edge of the pool. The panels are screwed to one another and to profiles at the bottom and the top. At each join between panels, a brace makes the structure rigid and provides the static resistance.

The joins between panels are sealed with liquid PVC, fusing the two PVC surfaces together. A rigid PVC profile provides a perfect aesthetic finish and protects the welding underneath.

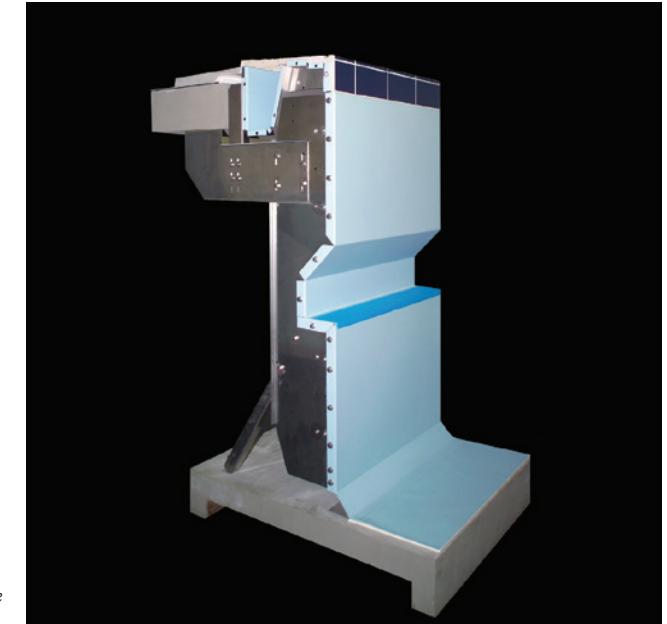
The entire structure is of stainless steel, not welded to avoid any risk of corrosion. The steel is thus never in contact with aggressive, oxidizing chlorinated water.

The membrane that covers the pool floor is laid on the concrete base, directly or with a soft material placed in between.

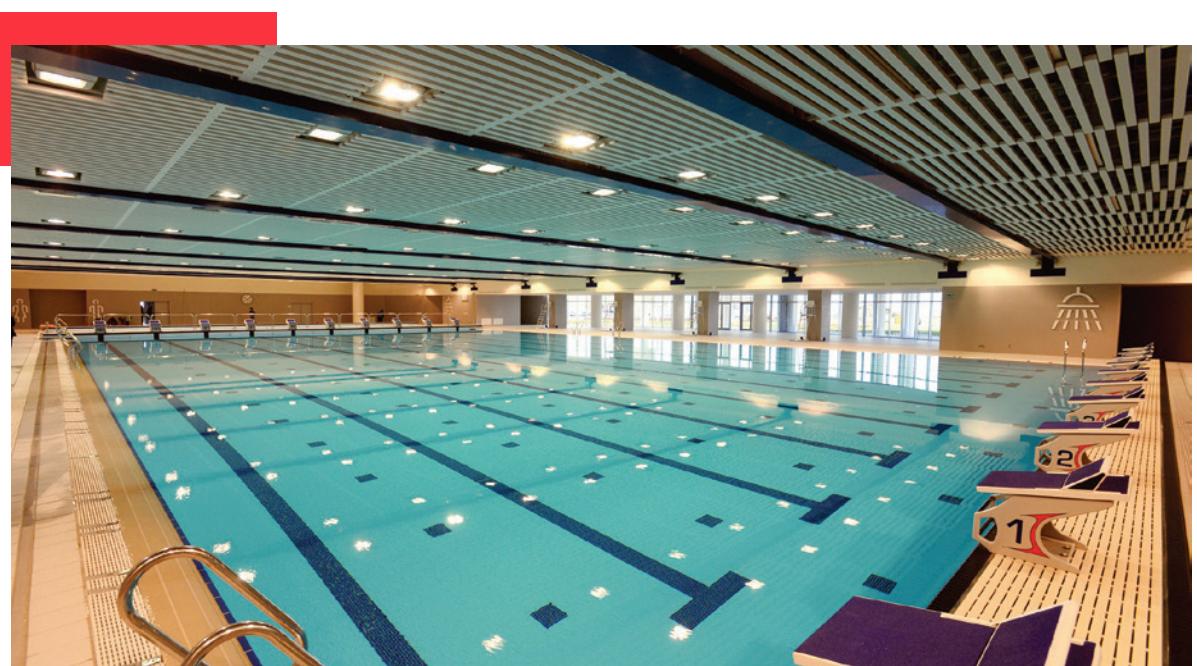
This panel system is light, tough, easy to adapt, and it can be installed in the most difficult surroundings. It furthermore has the advantages of pinpoint accuracy, rapid installation, multiple design applications, low maintenance and respect for the environment.



Stainless Steel modular panels built by Myrtha Pools. View from the plant room



*Stainless Steel modular panel prototype
designed by Myrtha Pools.*



*Baku Aquatic Palace - preparation swimming pool built with
Stainless Steel modular panel prototype by Myrtha Pools.*

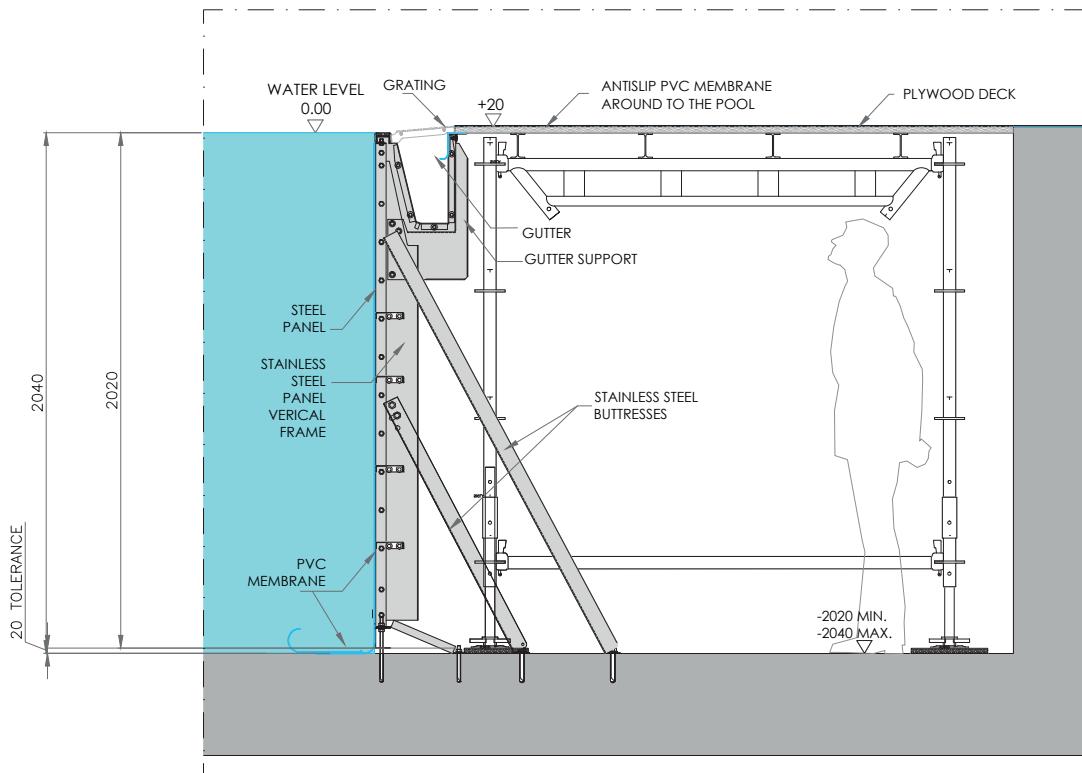
TEMPORARY POOLS

In recent times, with world level competitions requiring seating for crowds in excess of 10,000, the installation of a permanent pool is not always possible, especially indoors.

Temporary Pools Technology has been specifically designed to meet the need for such "special events".

Temporary pools to be used for major swimming events such as European or World Championships; competition pools can easily be installed within stadiums or convention centers, unique opportunities for unforgettable events at sustainable costs.

This system avoids interventions or damages on the stadium floor, however the great advantage at the conclusion of the competition, the pool is disassembled and reinstalled permanently elsewhere.



Temporary stainless steel modular pools section detail design by Myrtha Pools.



Rio 2016 Olympic Aquatics Stadium, Designed by AECOM and Pujol Arquitectura, Competition pool built by Myrtha Pools.



Roma 2009 - Tennis Stadium. Competition pool built by Myrtha Pools.

REFURBISHMENT OF EXISTING POOLS

Exclusive technology develops refurbishment of existing pools. The renovation process may include the walls, the floor covering, and the overflow gutter separately or in combination and it does not require any major demolition works.

The Refurbishment Technology does not require destructive demolition of the existing structure, thereby resulting in considerable savings with regard to both the installation time and overall costs. The internal surface of the original pool remains unchanged, only the accessories on the walls or on the floor are replaced.

There are many reasons to renovate: many existing pools fail to meet today's health code regulations and therefore require modifications necessary to bring them into compliance.

In other cases, refurbishment can be achieved by the owners in order to meet new design criteria.

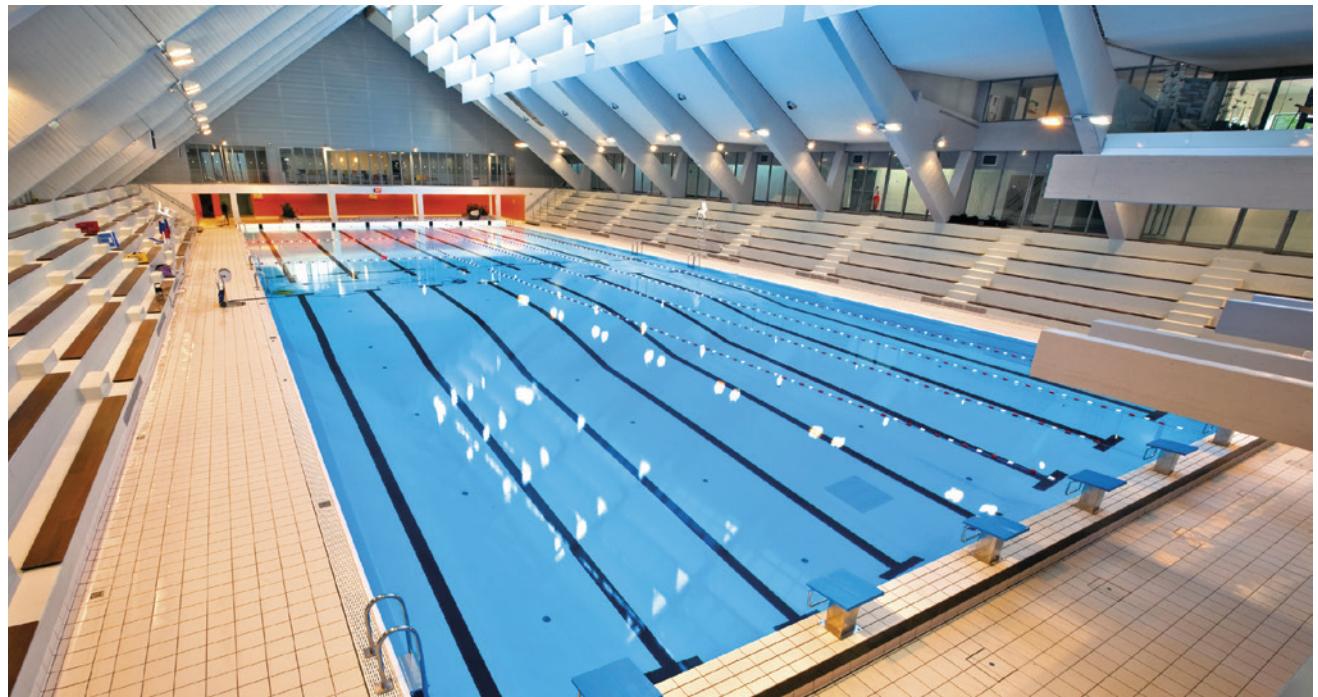
Recently, many competitive pools have been upgraded, and leisure components have been added to include freeform sections, lazy rivers and special equipment; also many owners are driven to upgrade their facilities to change the filtration equipment and technology from a skimmer system to an overflow gutter technology.

Finally, most of the traditional pools, including reinforced concrete, gunite and shotcrete, over time develop structural problems that require significant maintenance and interventions, resulting in substantial investment. The Refurbishment Technology system solves all of the problems that often arise in concrete pools that have been in operation for extended periods of time.

Refurbishment Technology is designed and engineered to be free standing resistant structures, installed thanks to an unparalleled high-precision assembly process, as well as a significantly fast installation. When building a pool, the time of construction is a very relevant issue to be considered both from the pool building time side, and for the impact of the whole site construction times. A shorter installation time means a substantial savings in direct cost, not to mention the indirect costs such as overhead, energy, insurance, etc. Building with this technology, pool allows a shorter installation time compared to traditional construction, where the building process requires long times.



Refurbishment pool in Kremlin Bicetre Paris. Build by Myrtha Renovation System



Refurbished pool in Kremlin Bicetre Paris - France.
Build by Myrtha Renovation System

FLOATING SWIMMING POOLS

The floating swimming pool is basically a reinforced pvc membrane welded to form a tank, hung on a floating dock.

The membrane is kept in the correct shape by the water pressure, since the water level in the pool is higher than the surrounding water.

To help maintaining the shape, when necessary, the pool's floor is connected to ropes fixed on the river or sea floor, or loaded with heavy loads.

The floating dock is a modular one, therefore any size and shape may be achieved.

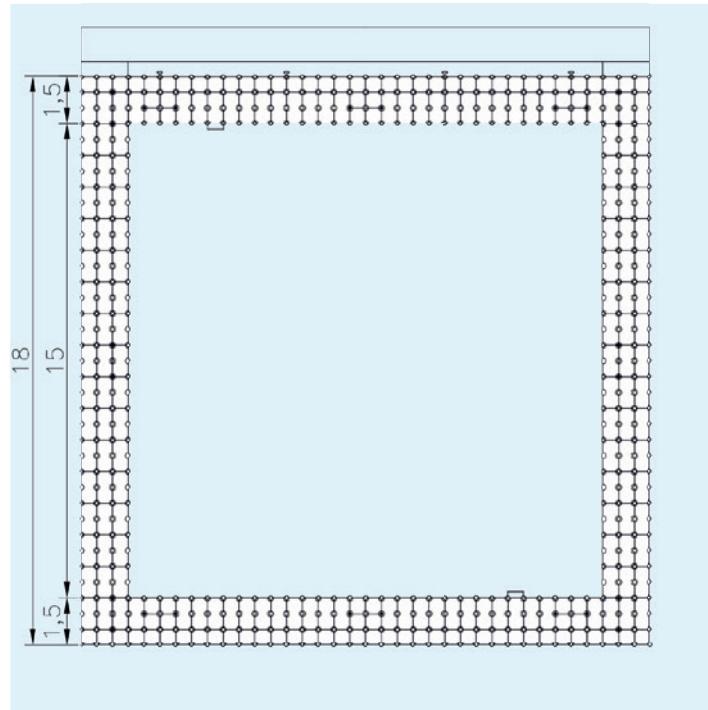
Black racing lines are painted on the pool's floor and targets on the pool's wall.

When it's necessary to have a fully solid headwall, a structure of rigid plastic slats may be fixed to the wall.

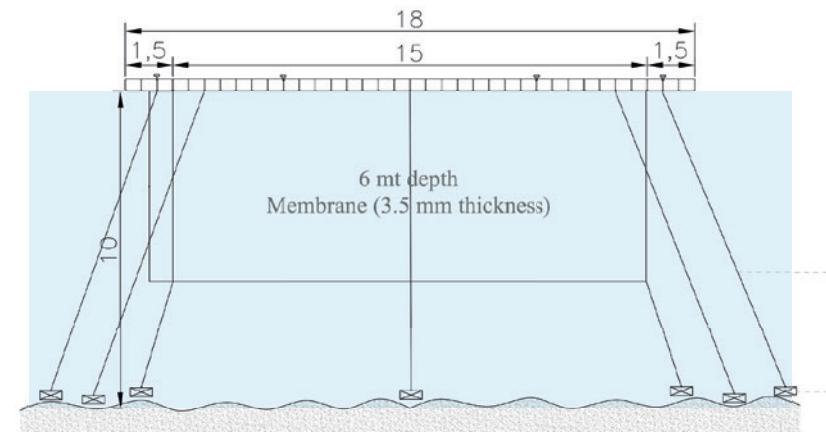
A filtration and water circulation system may be supplied, providing pvc inlets or drains welded on the membrane and connected by flexible pipes to a filtration system located on the ground.



Floating swimming pool



Floating swimming pool. Plan



Floating swimming pool. Cross section

COMPETITION POOLS

GENERAL INTRODUCTION

The swimming pools in which the aquatic disciplines of swimming, water polo, synchronized swimming and diving are held have to provide the best possible setting for competitive use and training.

The rules that govern the design of these swimming pools are specified in the FINA Facilities Rules (FR).

The Facilities Rules set general standards and also minimum standards according to the different categories of international competition. In both the Olympic Games and the World Championships these are governed by specific rules.



Windsor 2016 - Canada - Pool Built by Myrtha Pools.

SWIMMING

Competitive swimming is held only in pools that are 50.00 metres or 25.00 metres long.

The World Championships, the Olympic Games and the vast majority of international competitions are held in 50.00-metre pools, although there are also some international competitions and World Championships that take place in 25.00-metre pools.

Most 50.00-metre pools are 25.00 metres wide, thus making it possible to have from 8 to 10 competition lanes.

The permitted depth is variable, so while 2.00 metres is the normal depth, depths of between 1.35 and 1.00 meter are also permitted.

Certain tolerances must be incorporated in the length of swimming pools to make it possible to install the touch pads that supply the competition timekeeping information.

Pools that share the swimming and the synchronized swimming competitions must be 3.00 metres deep.

There are a series of technical requirements that are necessary for swimming competitions to be held, such as starting blocks, lane markings on both the floor and the sides of the pool, lane ropes, and so on. All of them are duly specified in the FR.

Logically, there are also regulations referring to the conditions of the water that stipulate not only the health and salinity conditions but also the water temperature for competition.

Besides the above-mentioned requirements, pools for the World Championships and the Olympic Games are subject to special requirements.

The role played by the pool deck (the space surrounding the pool) is also very important for competitions to be held in optimum conditions.

The minimum recommended size for the pool deck of a swimming pool is 4.00 metres wide. In accordance with the level of competitions held in it, this must increase up to a minimum of 10.00 metres for the World Championships and the Olympic Games.

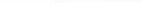
The water temperature in Swimming competitions shall not be less than 25° plus 3° Centigrade.



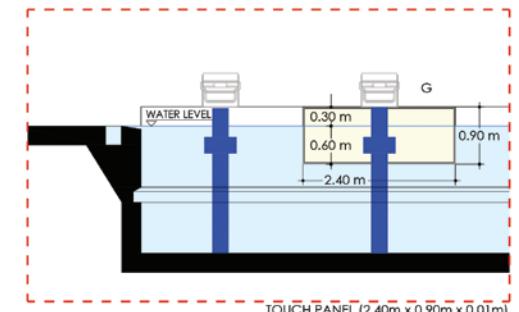
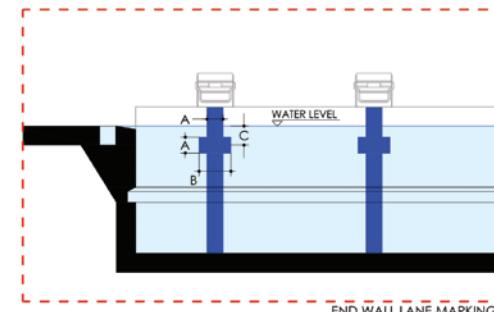
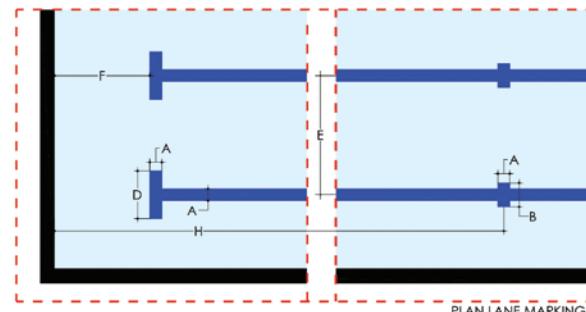
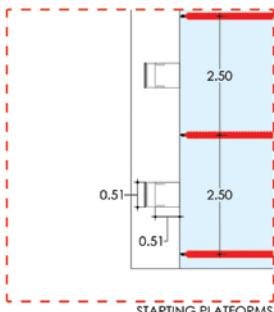
POOLS. COMPETITION POOLS

50M SWIMMING POOL FOR OLYMPIC GAMES AND WORLD CHAMPIONSHIPS

DIAGRAMS AND LANE MARKINGS

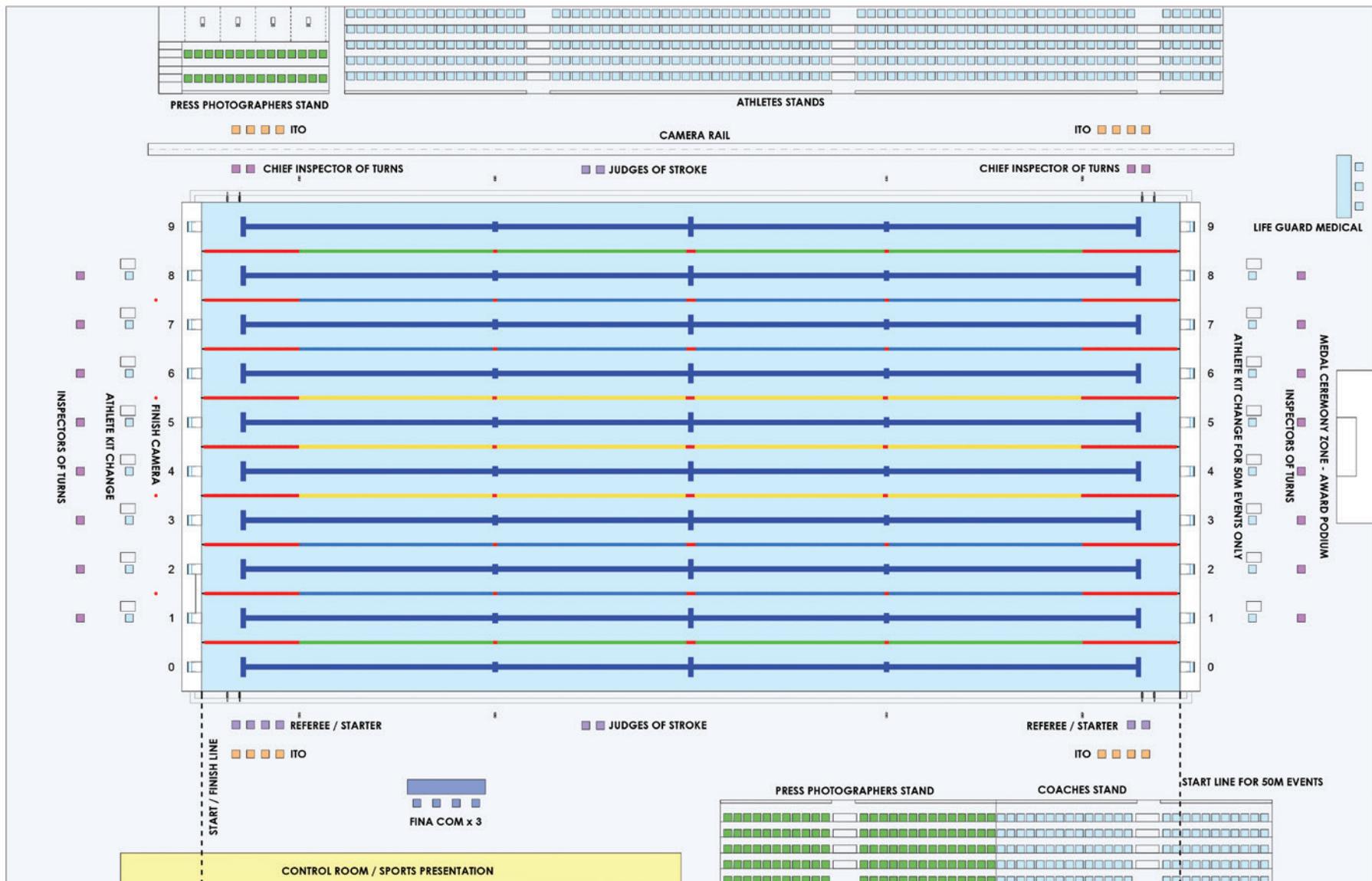
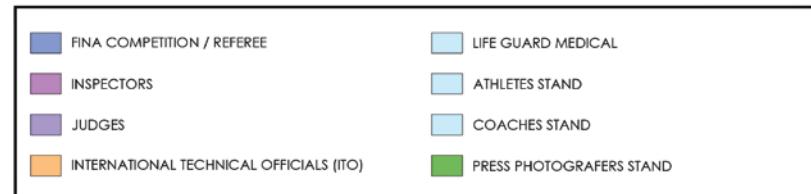
FR 3.8 LANE ROPES	
9	
8	
7	
6	
5	
4	
3	
2	
1	
0	

FR 2.14 FINA LANE MARKINGS	
WIDTH OF LANE MARKINGS, END, LINES, TARGETS	A $0.25\text{m} \pm 0.05\text{m}$
LENGTH OF END WALL TARGETS	B 0.50m
DEPTH TO CENTRE OF END WALL TARGETS	C 0.30m
LENGTH OF LANE MARKER CROSS LINE	D 1.00m
WIDTH OF RACING LANES	E 2.50m
DISTANCE FROM END OF LANE LINE TO END WALL	F 2.00m
TOUCH PAD	G $2.40\text{m} \times 0.90\text{m} \times 0.01\text{m}$
DIST. FROM CENTRE OF CROSS LINE TO END WALL	H 15.00m



FIELD OF PLAY FOR OLYMPIC GAMES AND WORLD CHAMPIONSHIPS

SWIMMING



WATER POLO

The water polo field of play measures 30.60 metres long by 20.00 metres wide for men's teams, and 25.60 metres long by 20.00 metres wide for women's teams.

The minimum depth of water shall be no less than 1.80m. and preferred 2.00m. metres.

The field may be installed in any kind of pool, as long as the goals and the re-entry area can be placed at the ends. Along the sides it is advisable for there to be a distance of 1.00 metre between the edge of the field of play and the sides of the swimming pool.

The minimum recommended swimming pool size for registering a water polo field for men's competition must be 35.00 x 22.00 metres, while for women's competition it must be 30.00 x 22.00 metres.

The water polo field of play is marked out with clearly visible elements that are reflected through colours in the lanes that delimit the field.

To make the referees' work easier, the installation of walkways measuring 1.00 metre wide by 0.70 metres high along the entire length of the field will be obligatory in all international matches.

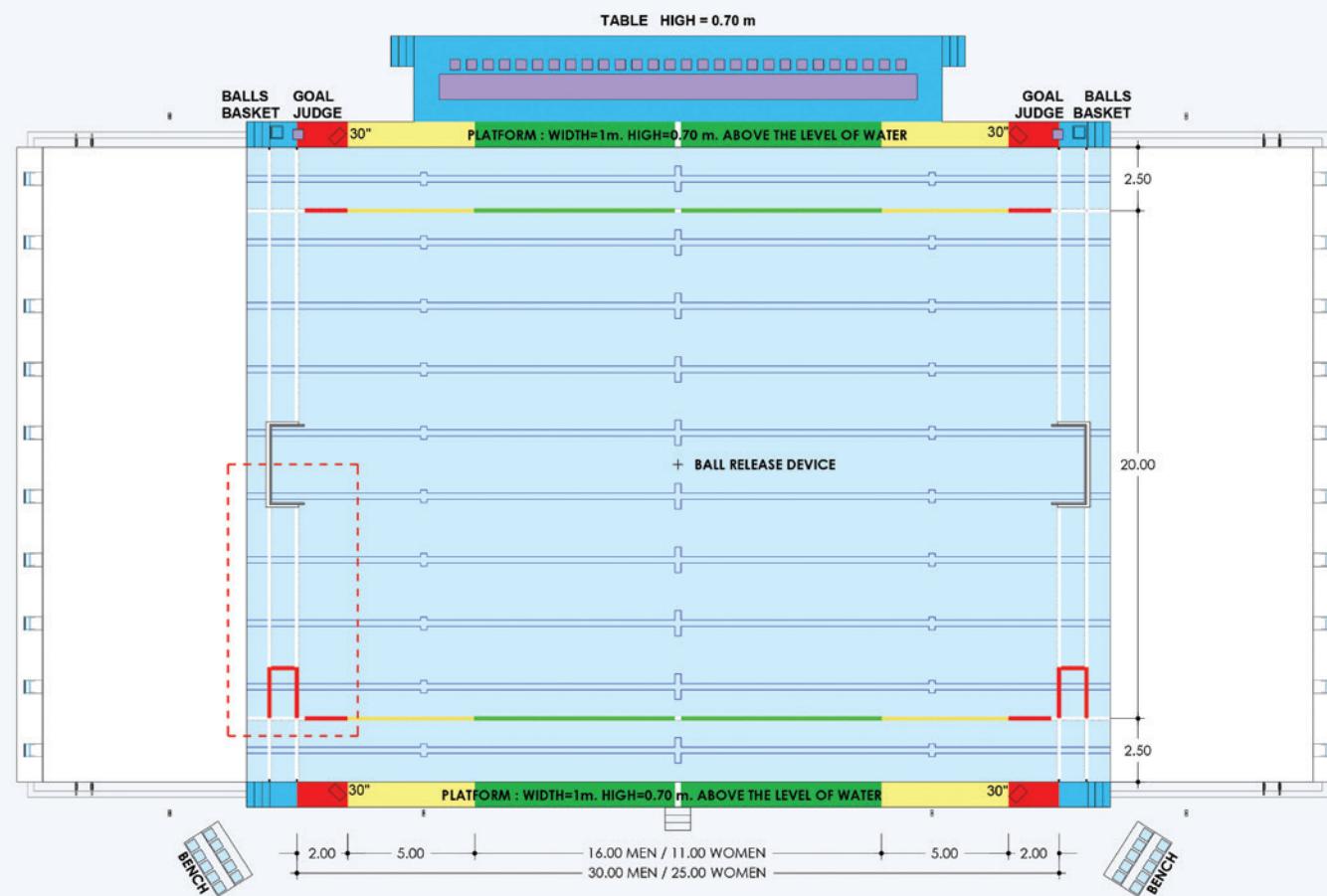
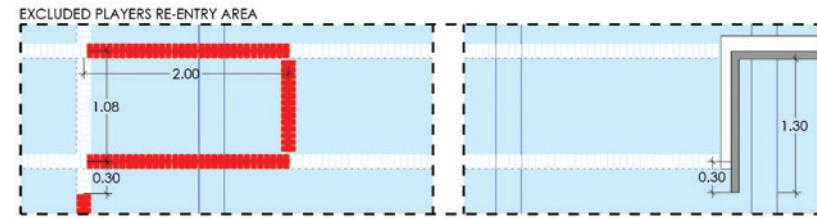
The pool deck around the field must provide enough room for the reserve players of the competing teams on one side, and the competition officials' table on the opposite one.

The water temperature in water polo matches shall not be less than 26° plus 1° minus 1° Centigrade. This water must meet the requirements for health and salinity.



FIELD OF PLAY FOR OLYMPIC GAMES AND WORLD CHAMPIONSHIPS

WATER POLO



SYNCHRONIZED SWIMMING

Synchronized swimming usually takes place in pools that are also used for swimming and water polo.

The synchronized swimming competition is held in areas of different sizes and positions depending on whether it is the figure section or routine competition.

In the different areas the depth requirements always vary, from a minimum of 2.00 metres to a maximum of 3.00 metres.

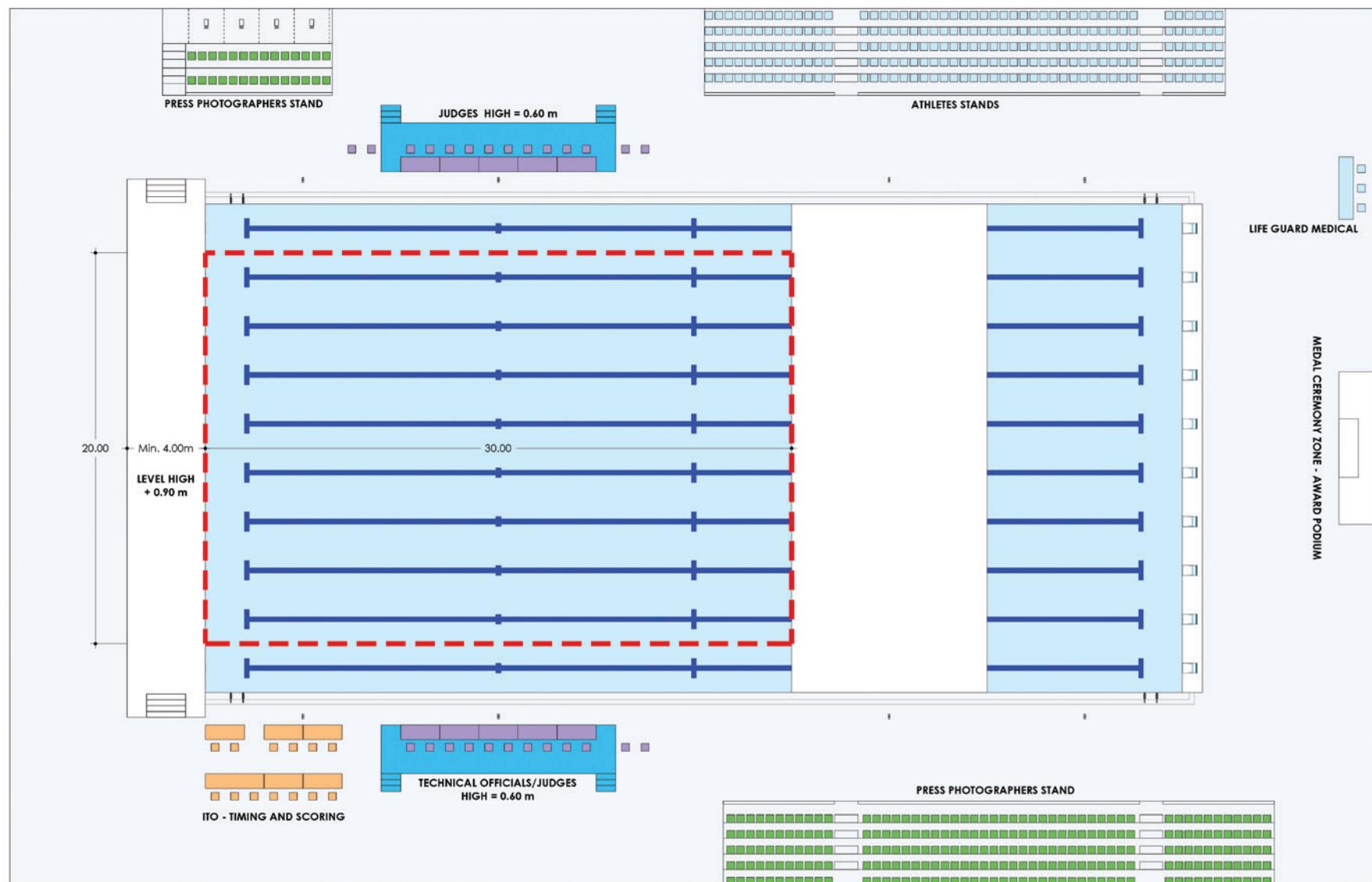
The maximum surface area that requires a depth of 3.00 metres is 12.00 x 12.00 metres.

The condition of the water must provide sufficient visibility on the swimming pool floor and the temperature shall not be less than 27°C.

L"The synchronized swimming competition is held in areas of different sizes and positions depending on whether it is the figure section or routine competition."



FIELD OF PLAY FOR OLYMPIC GAMES AND WORLD CHAMPIONSHIPS
SYNCHRONISED SWIMMING



DIVING

The acrobatic aspect of diving and the safety measures that this entails make it advisable to place the platforms and springboards in a separate pool, specifically for them.

The size of this pool will vary according to the arrangement and number of platforms and springboards, as regards the width, while the minimum length is determined by the safety measures that are applied to platforms and springboards.

It is usual for diving pools to share, except for the safety measures, their space with the other disciplines of swimming, water polo and synchronized swimming. In this case the size of the pool is determined also by the needs of these other disciplines.

The design of the diving platform and the minimum required depth of the water are regulated by a complex table of measurements and parameters that are set out in detail in the FR.

As in the other disciplines the condition of the water is also regulated, and the minimum temperature is set at 26°C.

To help divers in their visual perception of the water surface, markings on the floor of the pool are specified. Besides this the surface of the water must be agitated by a mechanical device installed under the diving platform.

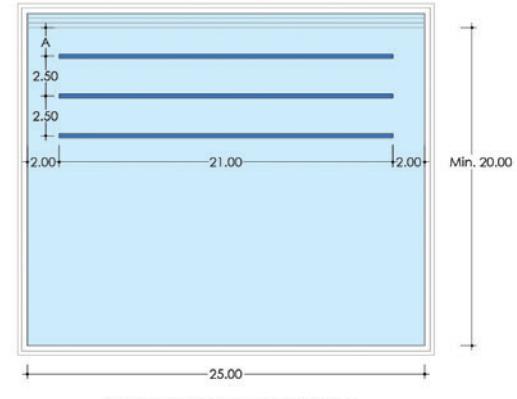
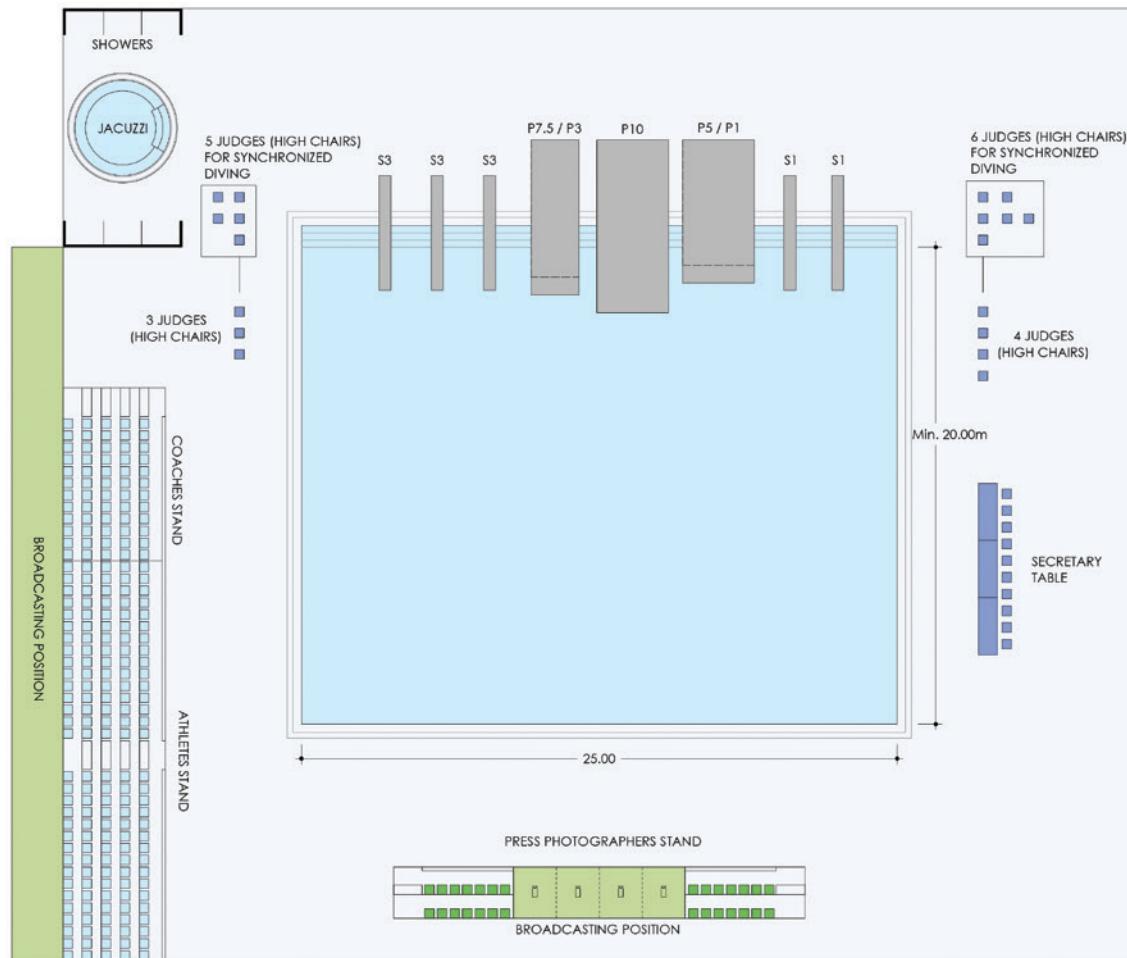
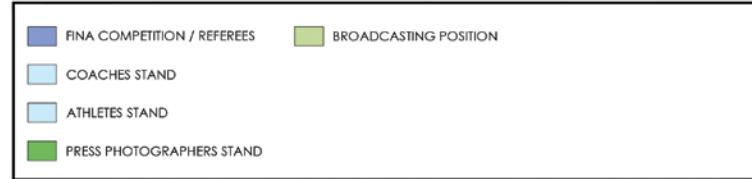
The rules also specify static requirements for platforms and springboards.

A specific number and arrangement of platforms and springboards is required for the World Championships and the Olympic Games, as can be seen in the FR.

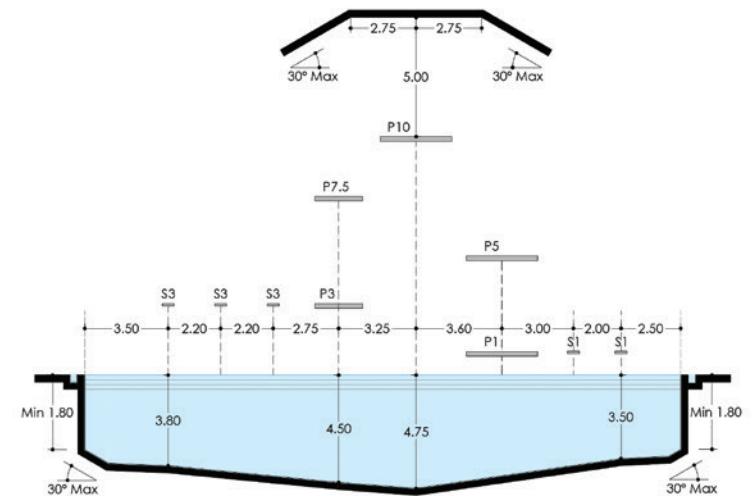


FIELD OF PLAY FOR OLYMPIC GAMES AND WORLD CHAMPIONSHIPS

DIVING



DIVING MARKING LANES: FR 6.3
 A = Distance from the end of the wall and plummet of 3 metres springboard.
 ■ Dark color. Contrasting color of the bottom of the swimming pool.
 Width: Minimum 0.20 metres, maximum 0.30 metres.



CONSTRUCTION ACCESORIES

REMOVABLE HEADWALLS

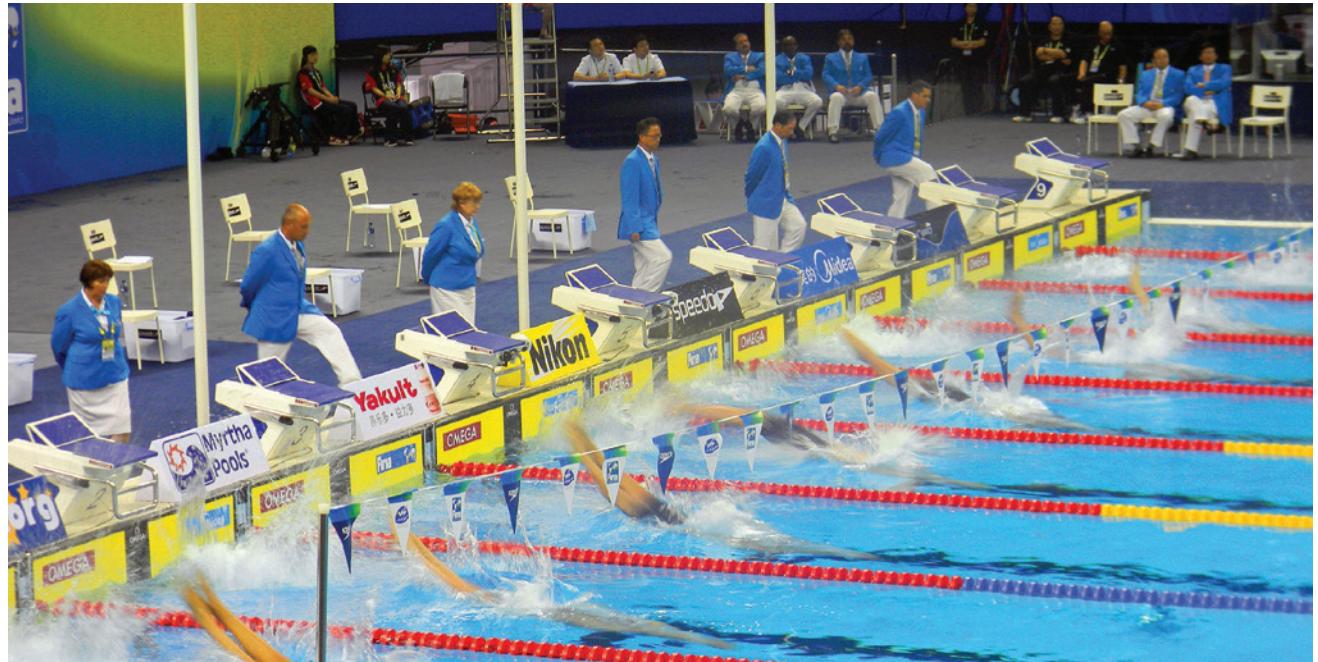
FINA regulations recommend competition pools with overflow on all four sides to have headwalls 30 cm higher than the water level, at the start and turning ends of the pool. For this purpose, removable headwalls, allow the water overflow on all four sides and at the same time provide an ideal support for the timing electronic touch pads, starting blocks and floating lane line anchors.

Removable headwalls are made of a stainless steel supporting structure, made up of base frames, crossed tubes and support structure for the starting blocks. The visible stainless steel parts are polished to a mirror-like finish for aesthetic reasons.

The structure is composed of different sections, which may have the same length as the lanes. Each section rests upon back and front supports. The front supports are fixed on an anchor plate inserted into the overflow gutter, while the back supports are directly placed on the pool deck.

The steel structure is coated with a special covering incorporating grids and corner-pieces in anti-slip ABS stabilised with UV rays.

The ABS covering makes up both the vertical board and the upper horizontal surface of the headwall. The vertical grids, internally reinforced with a stainless steel square tubes system, are also equipped with anchors for floating lanes and with black ABS targets.



Myrtha removable headwalls



Myrtha removable headwalls

FOOTREST SYSTEM FOR BACKSTROKE

New footrest system for backstroke, has been designed to facilitate the backstroke swimmers' start during competitions.

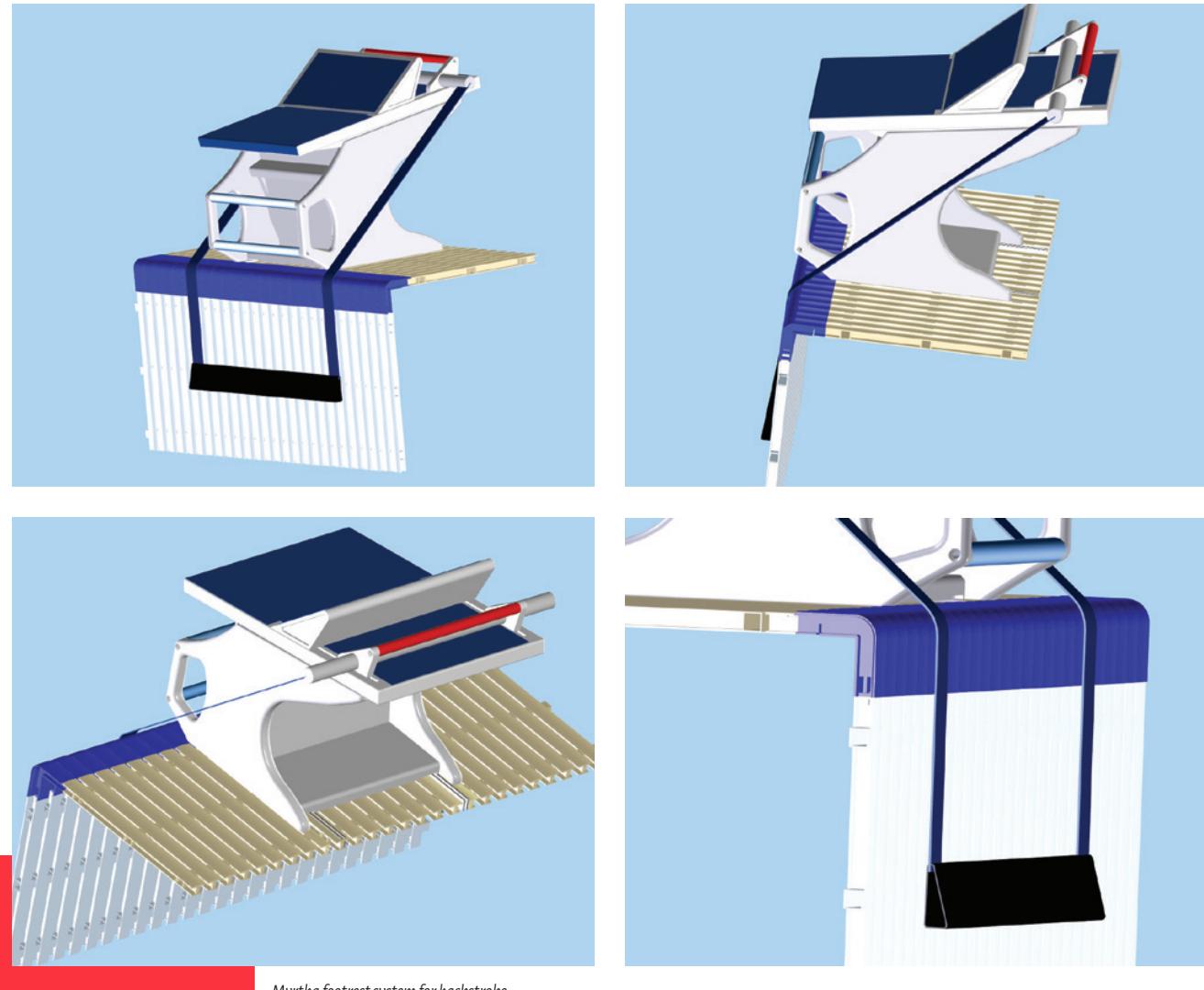
The footrest provides the athlete with a stable support on the wall and allows him a faster and safer start, without any slipping risk. At the same time it could also facilitate performance and timing improvement.

The new system consists of a stainless steel basement, covered with an anti-slip material, on which the athlete places his feet in preparation for the start.

The basement rests on the pool wall, at water level, and is connected with a cable system to a support structure adjustable and removable, made of polyester material and placed on top of the starting block.

The new system is adjustable, depending on the needs of the swimmer, and it is easily removable from the block: immediately after each start, in fact, the judges will remove it, so that it avoids obstructing the dynamics of turn during the race.

During FINA World Championships in Barcelona in 2013, backstroke athletes took advantage of this new support.



Myrtha footrest system for backstroke

AIR SAFETY CUSHION FOR DIVING

The system, installed worldwide in Olympic and similar high level facilities, was born out of the concept of generating a uniform mixture of water and air in the area where the diver enters the pool.

It produces an air cushion that allows the diver to practice the most difficult of dives without risk of serious injury when entering the water.

The coach controls the system with a hand held remote, that starts and stops an air valve that corresponds to the selected position.

He may therefore activate the system before the diver actually leaves the diving board.

The valve then closes automatically basing on a time factor controlled by a programme inside the electrical control box. The system includes a high pressure compressor, with a large capacity air tank which regulates the released air through a series of spargers, installed in the floor of the pool.

INSTALLATION

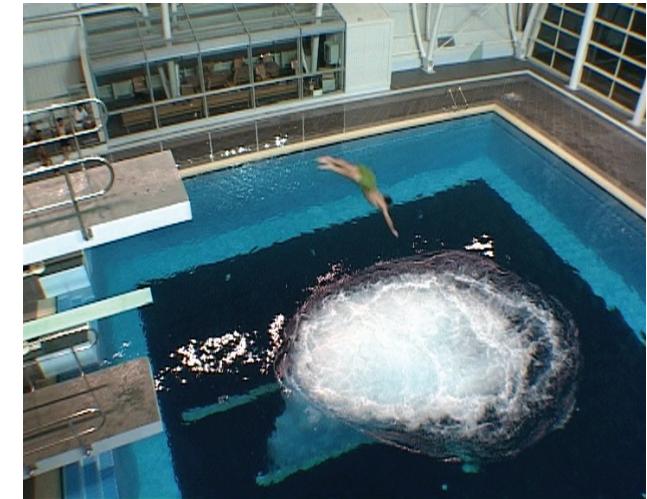
Installation may be carried out both in pools under construction and also possible in case of existing pools. In the first case it is necessary to provide designs and technical instructions for the necessary operations in concrete, as well as supervision under the guidance of their own installers specialised in this type of work.

HOW IT WORKS

Safety air cushion system is a combination of a high-pressure compressor, a large capacity air tank and then all the necessary tubes and connectors with the spargers installed on the floor of the pool. In addition the system includes all of the necessary valves, as well as automatic devices, safety systems and air filters, to ensure an appropriate air flow, readily available to the spargers.

A motorized valve assembly is used to direct the air to the appropriate sparger, and the system is operated through a control panel which is mounted on the pool deck.

A portable radio wave control device is connected to this panel for the coach to use at his ease.



Myrtha air safety cushion for diving diving



European Games Baku 2015. Designed by Pujol Arquitectura, Pools Built by Myrtha Pools

LEARNER POOLS

LEARNER SWIMMING POOLS

The swimming pool is a facility that has to be able to respond to heavy demand. It is a space shared or used together by different types of users. A swimming pool is a place used by bathers for different reasons and also a place suitable for the organization of high-level sporting competitions.

However, without a good learning plan, the above-mentioned circumstances will not arise.

Thus, every Aquatic Centre must include spaces where people can learn to swim. Spaces suited to people of all ages and walks of life so that they can get used to the water.

Learner pools must be shallow so that instructor and pupil can share the same conditions.

These special learner pools may be separate from those used by other groups. This has traditionally been the solution. Nevertheless, and through the incorporation of technologies and accessories, such as movable bulkheads and floors, it has been possible to meet all needs in a multi-purpose environment. This allows for learning activities to be shared with those of other groups in a single container / swimming pool, thus avoiding the increase in built area, in terms of square metres, involved in having to add a special pool for learners to the construction.

"A swimming pool is a place used by bathers and for the organization of high-level competitions."



MOVABLE BULKHEAD

The movable bulkhead allows simultaneous activities to take place inside separate areas of the same swimming pool. Built out of stainless steel, the structure can be drawn across the width of the pool by means of two rails, located externally on the flooring surface. The sliding movement is made possible using two stainless steel flywheels located on the two opposite ends of the bulkhead. Flywheels are connected to the sliding system by a double chain reduction gear.

The bulkhead's movement may also be electric, driven by two low voltage electric motors substituting the flywheels. the movement is thus operated by remote control.

Unlike other floating systems, the bulkhead, has the advantage of an extreme accuracy and regularity of movement along the pool. Once secured in fixed positions, the bulkhead can also mark competition fields, in perfect accordance with FINA regulations.



Kantrida Center, Rijeka (Croatia). Designed by Studio Zoppini. Pool built by Myrtha Pools



Lloret swimming pool - Spain, Designed by Pujol Arquitectura. Pool Built by Myrtha Pools

MOVABLE FLOOR

The movable floor allows the usable depth of the pool to be varied so that different activities may be practised inside: competitions, synchronised swimming, disabled/remedial activity, swimming instruction, diving, aqua-gym, baby swim and all other activities that require different levels of water depth.

The usable typologies of the movable pool floor are different and thanks to its adaptability technology allows the perfect integration of each one of these systems inside the pool itself without any difficulty.

MOVABLE FLOOR WITH WALL MOVEMENT

The extreme functional capacity of this floor consists in the fact that the mechanism thanks to which it moves, unlike the one of other movable floors, is placed along the walls and not on the floor of the pool, that can therefore be easily cleaned in every point, also with automatic cleaners. The movable floor is formed by floating frame of stainless steel pipes and composite resin beams. The heads of the steel beams are connected to two screw jacks that allow the movement of the floor up and down. The movable floor is furthermore provided with all the safety elements required from the international regulations.

FLOATING MOVABLE FLOOR

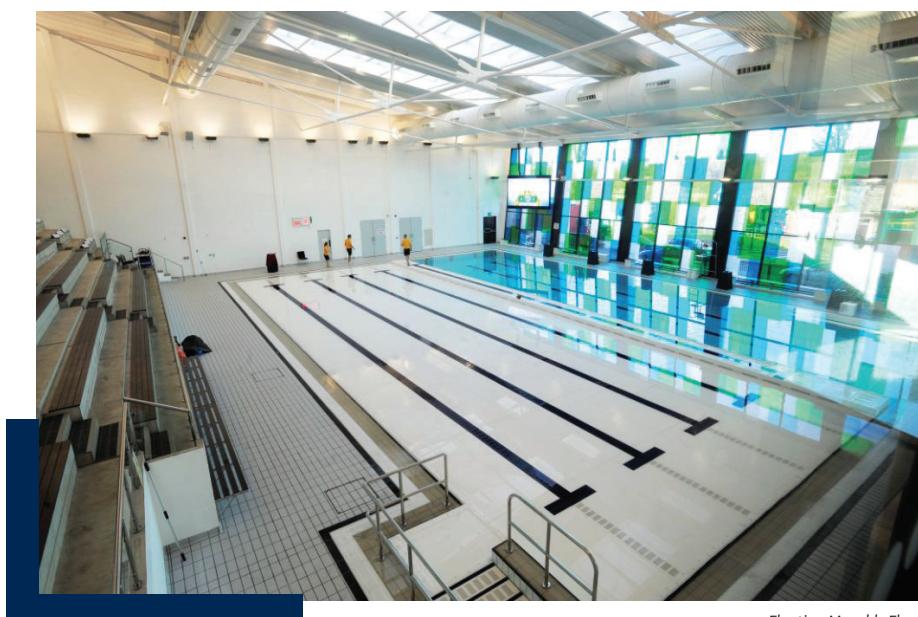
This is a floating structure constructed using fibreglass elements, anchored down at different points on the pool floor through a cable system. Held under tension by an actuating mechanism placed outside the pool, the cables allow the positioning and fixing of the movable floor into the desired placement, even in a sloping position with respect to the pool's floor. This allows not only ease of cleaning but also pool maintenance.

REMOVABLE FLOORS FOR DEPTH REDUCTIONS

An easier possibility to change the depth of the pool consists in the use of a trestle structure resting on the floor and easily removable after the period of utilization. It is a set of structures made of an ABS grating on the upper shelf and of a stainless steel trestle, that are hitched together to cover the whole surface of the pool floor. This system is the ideal solution for all those swimming structures that need to change the depth of the pool only periodically, or for some months of the year. In fact, besides being very simple and fast to be installed in the pool, it does not require any intervention on the pool walls and its costs are no doubt less considerable than those of the movable floor.



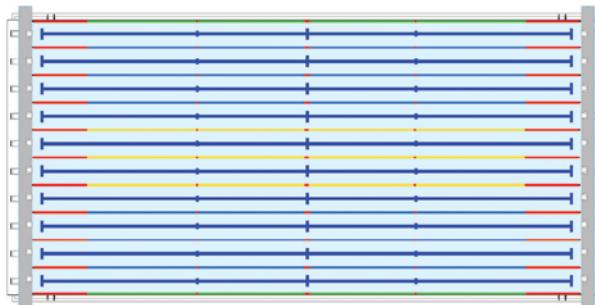
Barcelona Swimming Club-Spain, Swimming Pool and movable floor built by Myrtha Pools



Floating Movable Floor

POOL CONFIGURATIONS WITH THE MOVABLE BULKHEAD AND MOVABLE FLOOR

The incorporation of a movable floor measuring 25.00 m x variable width at one end of a 50.00 x 25.00 metre pool will make it possible to have an area of adjustable depth. By moving the two bulkheads this will allow for the pool to be subdivided into three spaces whose sizes can be chosen depending on the different activities that it is wished to organize in them. Thus, with the incorporation of the movable floor, the pool can be used by persons or for activities that require different depths of water for their exercises, for example: people with disabilities, swimming lessons, recuperation therapy, babies, and so on.

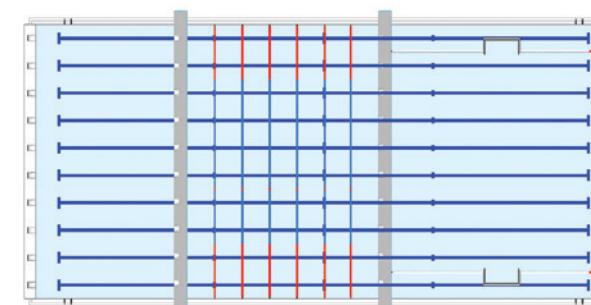


CONFIGURATION 1

Swimming Training and Competition

Size: 50.00 m x 25.00 m

Depth: 2.00 m



CONFIGURATION 2

Training

Size: 25.00 m x 25.00 m

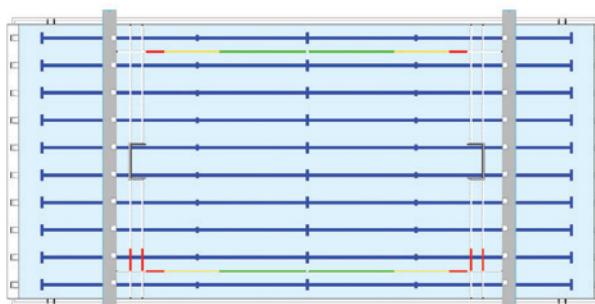
Practice

Size: 25.00 m x variable width

Learning

Size: 25.00 m x variable width

Depth: 0.700 m and variable

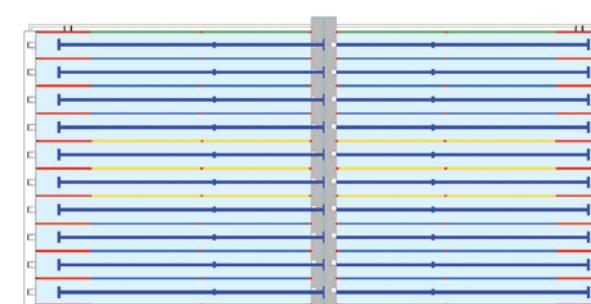


CONFIGURATION 3

Water polo competition

Size: 30.00 m x 25.00 m

Depth: 2.00 m



CONFIGURATION 4

Practice

Size: 25.00 m x 25.00 m

Training

Size: 25.00 m x 25.00 m

Depth: 2.00 m

PREPARATION POOLS

PREPARATION SWIMMING POOL

For high-level competitions, swimmers must have a suitable place to practice the preparation and warm up for the competition.

This space must have a swimming pool of preferably the same size and technical characteristics as the pool in which they are about to compete.

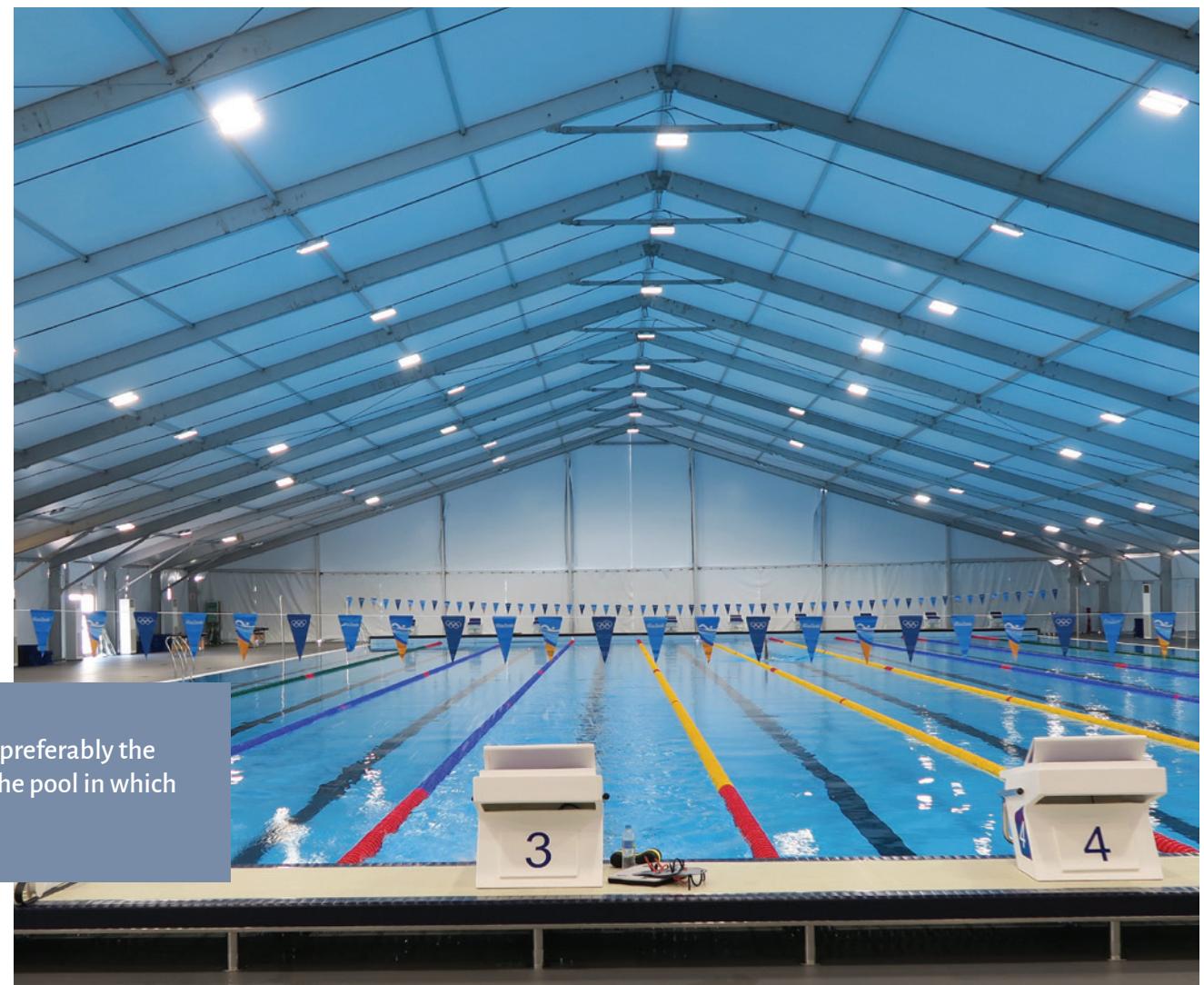
Although in most cases these warm-up pools are part of the Aquatic Centre, in certain circumstances this space may be envisaged as a temporary installation.

Along with the above-mentioned area of water, swimmers also need places adjacent to the pool, where they can do all the activities associated with preparing for competition.

In these suitably sized places, swimmers do physical exercises, activities for concentration, rest and recuperation, among others.

There is available technology that helps to develop the athlete's preparation, as it is shown on the following Virtual Trainer system.

"This space must have a swimming pool of preferably the same size and technical characteristics as the pool in which they are about to compete."



Rio 2016 - Parque Dos Atletas - Build by Myrtha Pools

VIRTUAL TRAINER

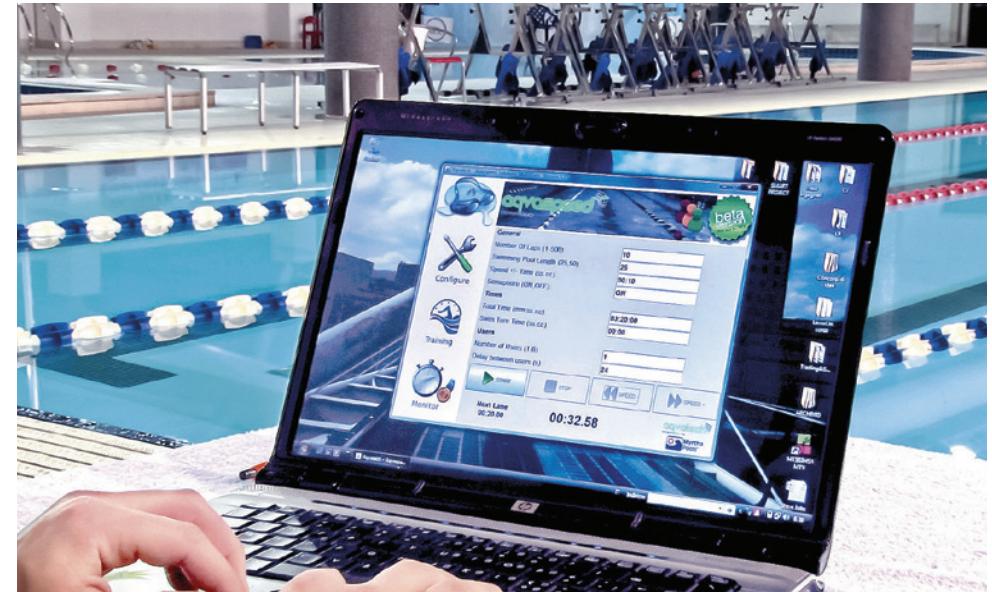
The Virtual Trainer is an innovative patented system used to pace the swimmers' training activity. The system controls a LED strip that runs along the entire length of the pool and is waterproofed by a sheath. The LED strip can be placed either on the pool floor or on the water surface along the floating lane line. At the beginning of the training session, the strip receives pre-programmed impulses that progressively switch on the LED lights, according to a previously established time and for a specific number of laps. The athlete's point of reference is the constant light flow that can be easily followed. This provides the swimmer with immediate feedback as to whether they are on pace with the program and so they are able to adjust accordingly. The perception approximation is less than half a second and the LED intensity allows for perfect visibility in any light conditions.

TECHNICAL FEATURES

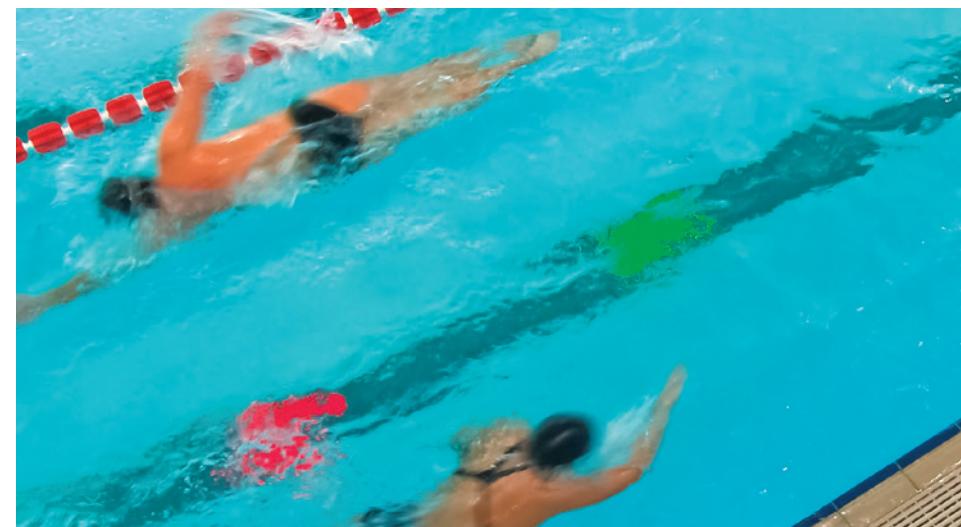
The working principle is based on the possibility of programming the system with a wireless remote control, a laptop, which is included with the system, or a smartphone. Any type of program or training rhythm can be stored and sent to the LED circuits. The Virtual Trainer also contains a number of preinstalled training programs. Additional or personalized programs, that meet the swimmer's physical features or goals, can be manually stored in the laptop or smartphone through the available applications. Online programming of laptop and smartphone is also possible.

The Virtual Trainer can manage programs for up to eight lane lines with single or up to six swimmers per lane. Each swimmer follows a different colored light. The system also contains applications such as countdown and backstroke delay, which can be personalized for the individual swimmers. Two types of LED strips are available; multicolor with six different colors suitable for six swimmers in the same lane or one-color for swimmers that normally train alone.

The system can be run on electricity or batteries (lasting for more than 5 hours). LED strip lengths are available for both 25 and 50 m pools. The system is available both for temporary or permanent installations on the bottom of the pool. In case of permanent equipment, as the LED circuit is only 2.5 mm thick, it does not interfere with automatic cleaning robots' activity on the floor.



Myrtha Virtual Trainer



Myrtha Virtual Trainer

WATER TREATMENT

INTRODUCTION

A good pool project should always take into consideration high water quality, the physical safety of swimmers, expected user load, and regulatory requirements. The design shall take these criteria into account, always while integrating local public health requirements and the ease of maintaining the pool. The technology has employed many resources into researching and developing specific studies of Filtration, Chemical Water Treatment and has developed new solutions for Water Circulation. These mentioned systems are developed in the following section.

FILTRATION AND CHEMICAL WATER TREATMENT

The following three systems have to be designed together, to guarantee the desired result:

- **Filtration** is the process for removing floating particles from the pool's water.

The components of a filtration system are:

- Pumps and strainers
- The filtering media
- The governing electrical panel
- The balance tank operating system
- The filters

- **Chemical water** treatment is the process to check the water parameters and inject chlorine and other chemical products to guarantee water not be infective

- **Water Distribution** is the process for distributing the filtered and chlorinated water into the water volume, to avoid "dead areas" where bacteria may proliferate

The following filtration systems are suitable to the clients needs, in term of quality and investment required;

The traditional **sand filtration** system covers the majority of the needs, especially when the initial investment has to be limited. Sand may be substituted by other media, like crushed glass. The filtration cycle and the water speed through the media, have to follow local rules.

Alternatively there is a **Perlite automatic filtration system** which is acknowledged to be the most innovative filtration system currently available, and an excellent solution in terms of both economics and environmental sustainability. The Perlite Filter consists of a steel outer structure and a filter core made up of a system of small, flexible stainless steel spiral tubes wrapped in a dense polyester mesh.

The Perlite Filter uses perlite as the filter medium. Perlite is a non-toxic fossil powder that can filter particles as fine as one micrometer. Use of this medium reduces the amount of chemicals required while dramatically increasing water quality and transparency.

The Perlite Filters are internally insulated with a protective anti-corrosion layer, specifically designed for surfaces in contact with chemically-treated water. The greatest advantage of the Perlite Filter is its pneumatic system, which



Sand filters

allows the effective regeneration of the filter cake. This cycle, called Bump, automatically regenerates the perlite cake every day in order to optimize the filter's capacity.

The control panel of the Perlite Filter manages the filtration cycles, the regeneration of filter cake and the perlite loading. This system can be interfaced with control units for the adjustment of pool water chemical levels, heat exchangers, and variable frequency pumps. Variable frequency pumps avoid turbulences inside the pool during competitions and training sessions.

MAINTENANCE OF THE PERLITE FILTER:

The Perlite Filter includes a preset cleaning program that is based on the use of specifically prepared and dosed chemical products. In recent years the Perlite has been installed at hundreds of sites all over the world without need to access the inside of the filter. If access is necessary, the Perlite Filter is equipped with an automatic system for lifting the filter cover.

THE ADVANTAGES OF THE PERLITE FILTER:

The advantages of the Perlite System are numerous:

- Space-saving design: the Perlite Filter is a compact filter with overall dimensions smaller by 70% compared to traditional sand filters. The system is suitable also for temporary installations in most of the great competition events installation, as Rio 2016 Olympic pool at the Olympic Aquatic Stadium.
- Water saving: the Perlite Filter allows backwash water savings of up to 90%
- Time saving: the frequency of the Perlite's cake reconstitution operations offers a considerable time savings
- Savings on chemical products
- Removal of particles down to 1 micron in size
- Maximum transparency of water
- The efficient regeneration of perlite means that it can be used for weeks, or even months, before needing to change the filter cake, with consequential high savings both on material and labor costs
- Environmental sustainability: thanks to all its advantages, the Perlite Filter is currently considered as the best earthfriendly solution for pristine pool water

CHEMICAL TREATMENT

The chemical treatment has the scope to check the water parameters (Free chlorine, pH, Redox etc)and , when required, to inject into the filtration circuit, the necessary chemical products. Chlorine is today required by the majority of the Countries to be in the pool water as free-chlorine, that will attack viruses and bacteria introduced into the pool by swimmers and will limit their proliferation.

Chlorine may be injected under the form of Sodium or Calcium Hypochlorite in solution, or be produced locally by electrolysis of salt. Other disinfection systems are offered on the market, and Myrtha may adopt the product and system more suitable for the client's need and local conditions and local norms.

WATER DISTRIBUTION



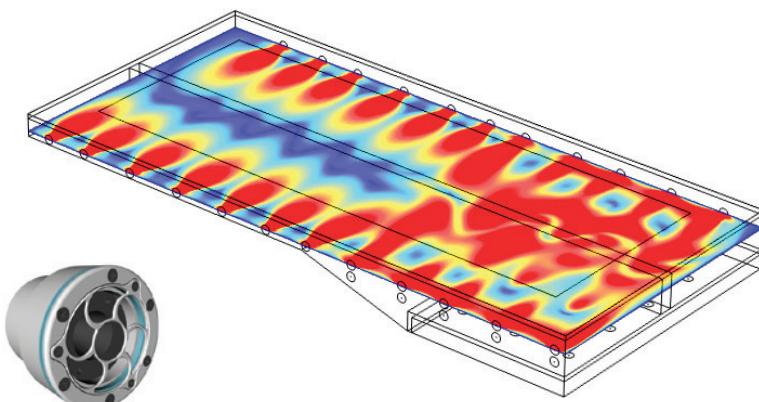
Perlite Filter

The water distribution system has the scope of distributing into the pool's water the chlorinated water coming back to the pool from the filtration system. If water is well distributed there will not exist in the pool "dead zones" where chlorine is absent and bacteria may proliferate.

New technology developed the "Strahlenturbulenz system" that guarantees a perfect water distribution, with water injected only from the pool's wall, avoiding pipes underneath the concrete floor.

Distribution system includes:

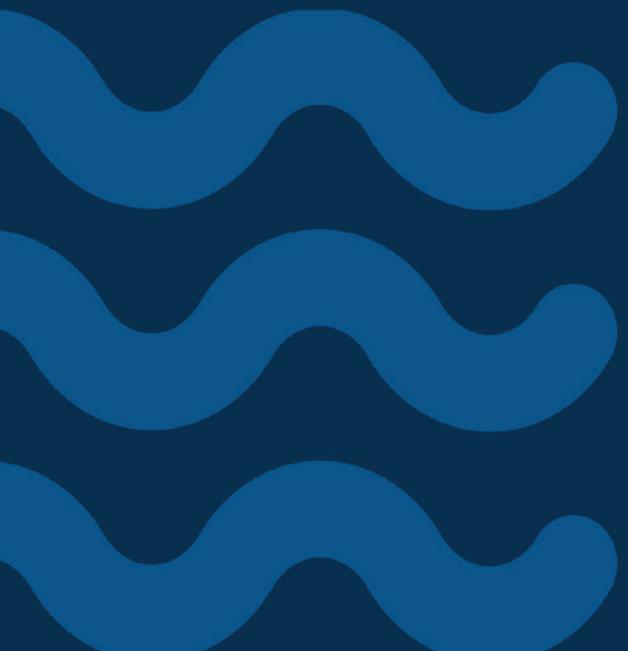
- The inlets , suction points and draining pits on the wall and floor of the pool
- The piping and fittings, both in the technical room and around the pool
- The control valves, either hand operated or automatic.



Myrtha Inlets

Myrtha Water Distribution System





Other Operational Areas

OTHER OPERATION AREA

MEP - MECHANICAL, ELECTRICAL AND PLUMBING

This section of the report deals with the MEP engineering services for aquatic facilities. Because this is an area subject to too many variables that are hard to predetermine, for example, the alternatives between an exterior or an interior facilities, the site's weather and climate, or the quality and security of the energy supply, this section offers some engineering design criteria and a list of references to the mechanical and electrical equipment necessary to provide an adequate service to an aquatic centre.

THE PHILOSOPHY BEHIND THE ENGINEERING DESIGN IS TO SATISFY THE FOLLOWING CRITERIA:

- Implementing sustainable design and resource efficiency principles wherever practicable
- Energy savings generated by the actual concept of the building (the shape and orientation of the building, thermal inertia, degree of transparency, control of internal ventilation).
- Low energy consumption.
- The use of materials with a low impact on the environment.
- Providing a design that complies with the local/international codes and standards for engineering and health and safety.

SERVICE PROVISION

- Services to be provided under the scope of the MEP include the following:

MECHANICAL ENGINEERING SERVICES

- Gas for boilers
- Fuel oil to standby generators
- Low Temperature Hot Water (LTHW) heating
- Variable Refrigerant Flow (VRF)
- Heating system
- Direct Expansion (DX) cooling
- General Ventilation
- Toilet exhaust and makeup
- BMS/Control System

ELECTRICAL ENGINEERING SERVICES

- High Voltage Distribution
- Low Voltage Distribution
- Essential and Life Safety Generators
- Small Power Installation
- Lighting
- Emergency Lighting
- Lightning Protection
- Earthing and Bonding
- Works Associated with Mechanical Plant and Equipment
- Facilities for the Disabled

EXTRA LOW VOLTAGE (ELV) SERVICES

- Fire Alarm Installation
- Security Systems
- Structured Wiring
- BMS Control Systems (Containment)

PUBLIC HEALTH SERVICES

- Domestic Cold Water System
- Hot Water System
- Drainage Above Ground
- Surface and Rainwater Disposal
- Swimming Pool services (excluding pool water treatment)

FIRE PROTECTION SERVICES

- Fire Hose-reels and Hydrants

VERTICAL TRANSPORTATION

- Olympic Family /Spectators Lifts
- Goods Lifts

WATER FILTRATION:

- Water treatment
- Filtration system
- Balance tank

OTHER SERVICES SHALL BE INCLUDED DEPENDING ON THE AQUATIC FACILITIES' REQUIREMENTS:

- Security
- IT
- Broadcast Services (including Broadcast Power)
- Standby Generators (other than Life Safety)
- Scoring Systems
- Media
- Communications

MAIN PLANT LOCATIONS

- The main plant items will generally be located in designated plant rooms within the building.
- A large open space is recommended for the engine room, structured around the tanks of the various swimming pools, where the areas will be located that are intended fundamentally for the production of energy, both calorific and electrical, and the treatment and purification of the swimming pool water.
- The pool tanks will have to be exposed so that they can be inspected on all four sides.

DISTRIBUTION OF SERVICES

- The width and the size of this corridor around the perimeter of the swimming pool tank will be sufficiently large and spacious for all the conduits and installations to be amply and easily accessible, thus allowing for optimum control of their operating status.







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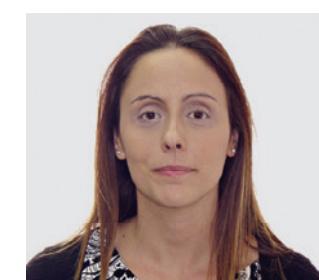
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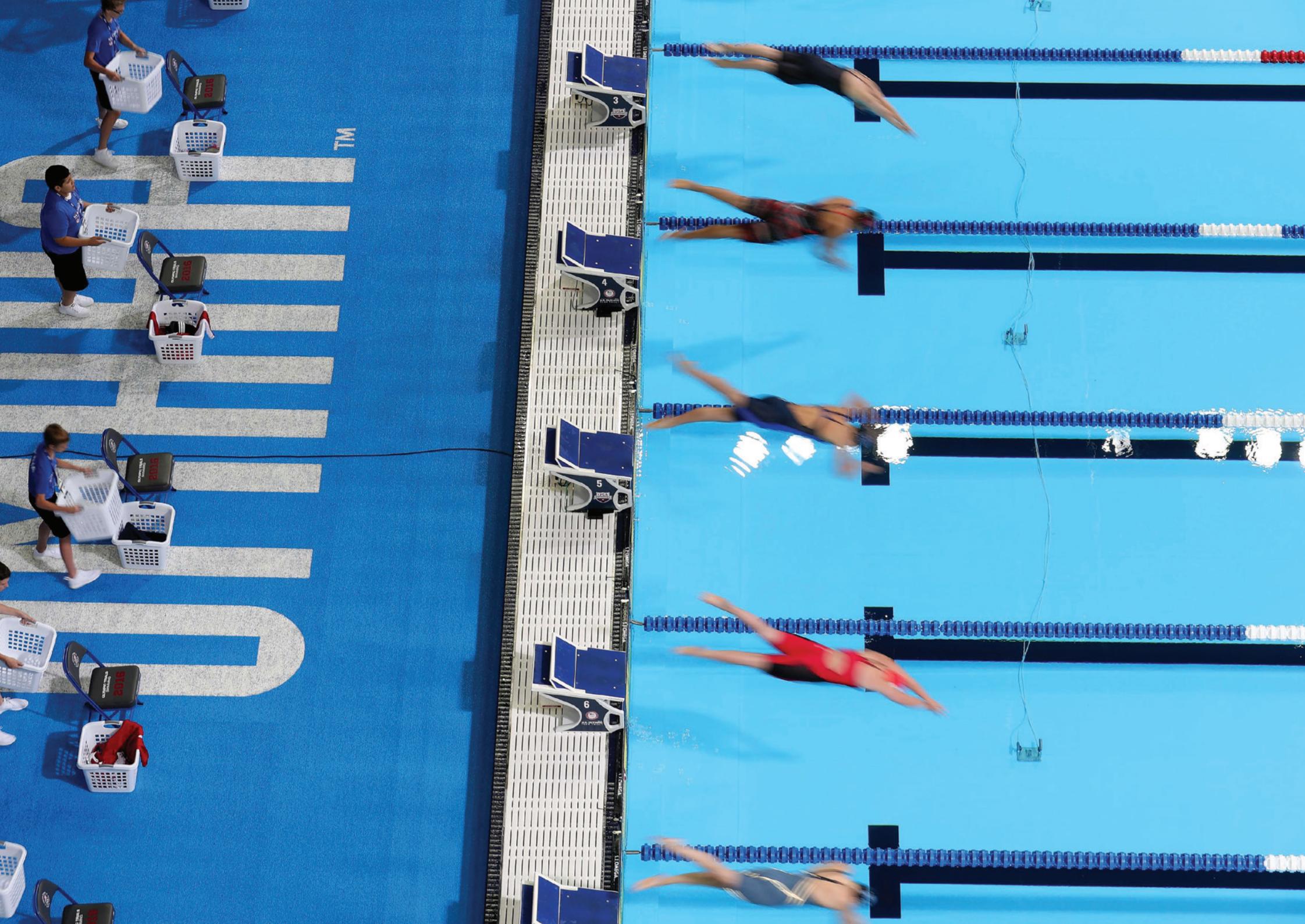
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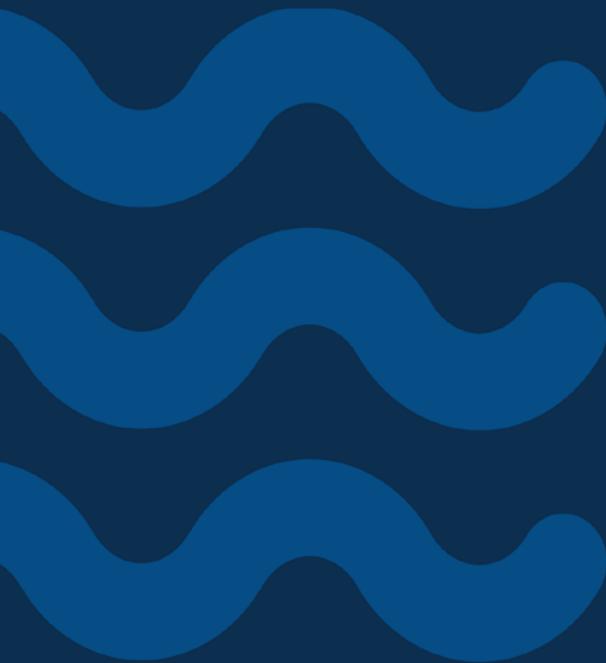


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