

# **TOWARDS A RELEVANT ARCHITECTURE**

**An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal, South Africa.**

**Craig John Howie**

I.

**ARCHITECTURE DESIGN DISSERTATION.**

**September 2010**

**DECLARATION.****Craig John Howie**

Submitted in fulfilment of the requirements for the degree of Masters, in the Graduate Programme in Architecture,  
University of KwaZulu-Natal, South Africa.

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. I confirm that an external editor was not used. It is being submitted for the degree of Master in Architecture in the faculty of humanities, Development and Social Sciences, Univeristy of KwaZulu-Natal, South Africa.

None of the present work has been submitted preivously for any degree or examination in any other Univerisity.

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**Signed on the 17.03.2010**

## **DEDICATION.**

For this dissertation I consider myself to be extremely privileged in being afforded the opportunity of combining two passions in my life – those being, architecture and sport. For me they have a common goal, a striving for excellence.

I dedicate this work to my family who have always been so supportive of my goals. Dad, Mom, Nikki & Dave. Thank you!

To my beautiful wife Hayley, thank you for all your love, support and patience!

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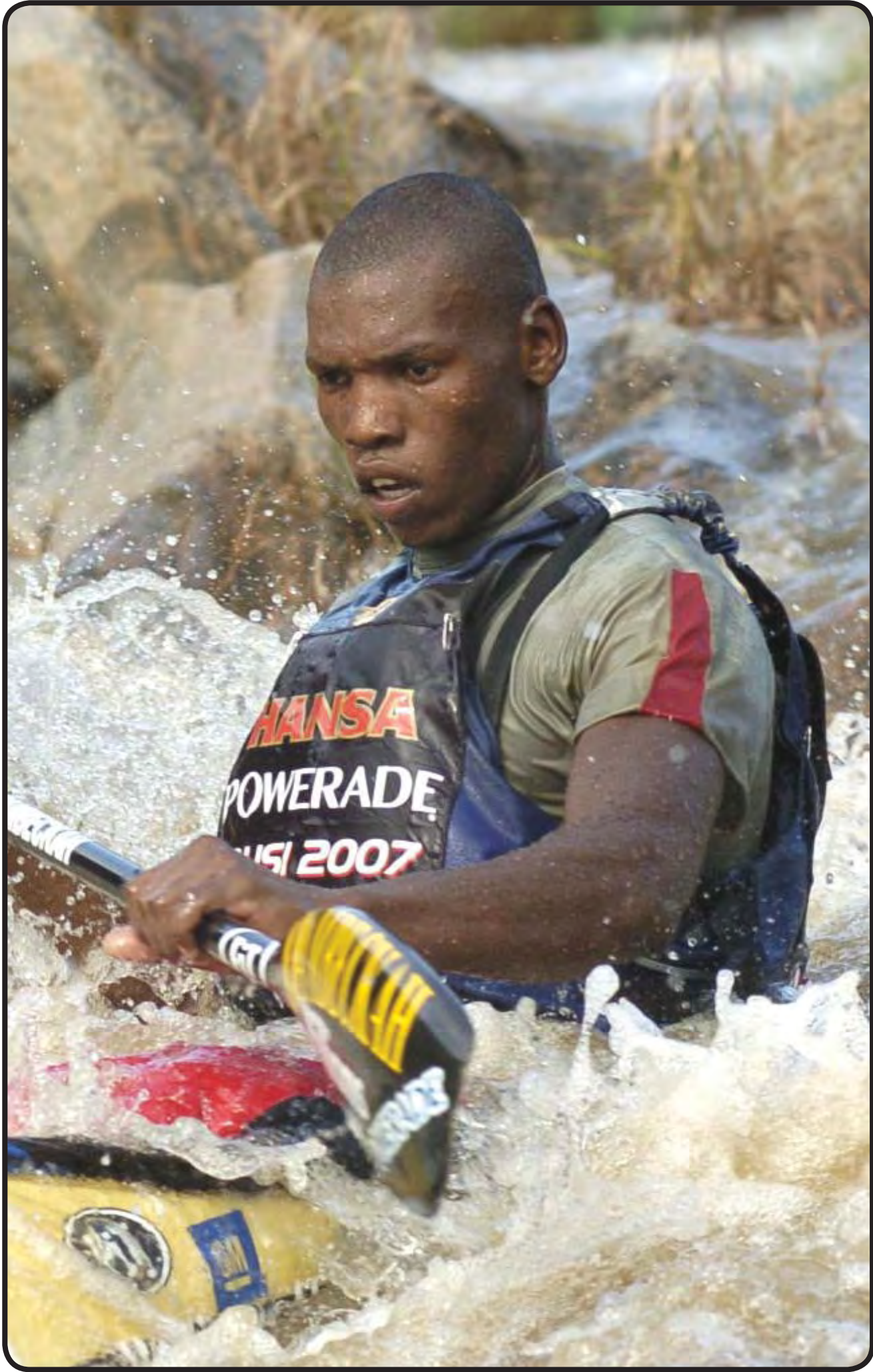


illustration 00.01: South African canoeist, Michael Mbanjwa K2 winner of the 2008 Dusi Canoe Marathon\_ source: [www.info.gov.za](http://www.info.gov.za)

# INTRODUCTION 00

## ABSTRACT.

2008 was a year which highlighted how far South Africa has fallen behind the rest of the world in the international Olympic sporting arena. High hopes for the Olympic Games in Beijing ended in a lower-than-expected medal tally that sparked great debate in South African society. The reasons for this phenomenon are numerous and complex and it is not the intention of this dissertation to investigate all these concerns. However, what is of an architectural concern is the inadequate and often sub-standard sporting facilities which athletes in South Africa, in non-mainstream sporting codes, have to contend with.

The challenge for architects in this regard is to design buildings for these sports, that are both adequate and of a suitable standard, while remaining relevant to their context. This to promote professionalism and inspire athletes to succeed through the creation of high quality, world-class facilities for competition, training and preparation.

Rowing, canoeing and kayaking are highly competitive and technologically advanced Olympic sports. Many South African athletes compete in these disciplines and have enjoyed limited international success. Unfortunately, as there are currently no international regatta centres in Southern Africa, these same athletes have to travel abroad to compete and train at such facilities. South African athletes and the sports of rowing, canoeing and kayaking would thus benefit greatly from having access to locally based regatta facilities.

KwaZulu-Natal has a proud sporting heritage and is synonymous with water sports as a result of its favourable climate and geographic location. This coupled with various other established sporting infrastructure, makes it the ideal Province for hosting major sporting events. Both Durban as a city and KwaZulu-Natal as a Province, have an impressive track record for hosting large sporting events. The Province has future aspirations of hosting major sporting events including the Commonwealth Games and the Olympics Games, with Durban soon hoping to be bidding to host the 2020 Summer Olympics. To host such events will require the design of many specialised sporting facilities for the city and will include the need for an international regatta centre. In my opinion, the best site for such a centre in KwaZulu-Natal is at Camps Drift in Pietermaritzburg.

The requirements for an international regatta centre are both highly technical and very specific as set out by the respective world sporting governing bodies. These requirements need to be strictly adhered to in order for the *Centre* to be considered to be of an international-standard. The challenge will be to design architecture that is functional in achieving these set criteria while, remaining *relevant* to the social, economic and environmental context of its design.

Thus the purpose of this research document is to determine a *relevant architecture* for the design of an *International Regatta Centre for KwaZulu-Natal*.

## **ACKNOWLEDGEMENTS.**

I would like to thank the following people for their assistance in compiling this research document:

- My fellow class mates, for your support and friendship.
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- The staff in the Barrie Biermann Architecture Library.
- The staff at Paton Taylor Architects, for your input into my studies.
- And finally, to all the interviewees who gave up their valuable time to meet with me.



## INTRODUCTION.

This document will form the foundation of the design programme for: *An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal*. The research will focus on three specific areas: the functional design of related water sports facilities; the chosen case study area; and the design of a *relevant architecture*.

In order to fully accommodate the needs of water sports athletes, spectators and officials, a full range of facilities will be provided; with the intention of creating a comprehensive programme for the *Centre*. The building will incorporate: administration; social; training; medical and storage facilities. The *Centre* will potentially attract daily use by local water sports athletes as a training venue; weekly use for local competitions and recreation athletes; monthly use for inter-provincial competitions; and annual use for national and international competitions; as well as potentially attracting foreign national teams to South Africa to train during the northern hemisphere winter. In addition to accommodating the water sports athletes, the building is to also provide an interface where families and the public can engage with the *Centre*, so as to promote the activities of the *Centre* and the associated sports while ensuring constant use of the venue.

The choice of site is of utmost importance, not only to conform to the technical requirements of an international regatta centre, but also to maximise the potential that it has to make a meaningful contribution to the context in which it is designed. This will require a number of potential sites to be investigated and evaluated, ultimately resulting in a case study area that should provide the best framework in which the *Centre* can take shape.

The architectural response will attempt to be relevant to the social, economic and environmental concerns of its context, which will form the theoretical framework for this dissertation. Guidelines for an appropriate *relevant architecture* will be gathered through an investigation of available pertinent literature, analysis of international precedent studies, local case studies and semi-structured interviews with key informants.

It is the goal of this research document to reach a conclusion, which will take the form of a design brief, to be used to formulate an accommodation schedule. This design brief and accommodation schedule will then be used to inform the design programme.

## TERMINOLOGY & ABBREVIATIONS.

### FISA.

FISA, the Fédération Internationale des Sociétés d’Aviron, is the International Rowing Federation which is the governing body for international rowing. The Olympics, Rowing World Cup, World Rowing Championships, and other such competitions are overseen by this organization.

### ICF.

ICF, the International Canoeing Federation, is the governing body for international canoeing and kayaking. The Olympics, Canoeing / Kayaking World Cup, World Canoeing / Kayaking Championships, and other such competitions are overseen by this organization.

### REGATTA.

The term regatta, when used in this dissertation document, refers to ‘a meeting of boats to race’, namely rowing, canoeing or kayaking boats. Please note that the term regatta, which is often associated with sailing races, is not being referred to.

### ROWING.

Rowing is a sport in which athletes race against each other on rivers, lakes or on the ocean, depending upon the type of race and the discipline. The sport can be either recreational or competitive. Rowing sprint racing is held over 2000m.

There are generally two types of sprint rowing:

*Sweep Rowing* – each rower has one oar (or blade) held in both hands. This is carried out in pairs, fours and eights.



Illustration 00.02: Example of sweep rowing.

Source: www.flickr.com

*Sculling Rowing* – each rower has two oars (or sculls) one in each hand. This is done in singles, pairs, fours and eights.



Illustration 00.03: Example of sculling rowing.

Source: www.flickr.com

## ADAPTIVE ROWING.

Adaptive rowing is a Summer Paralympic event and is a special category of rowing races for those with physical disabilities. Racing is held over 500m and 1000m.



Illustration 00.04: Example of adaptive rowing. Notice the harness system and stabilising pontoons attached to the riggers.

Source: www.flickr.com

## CANOE/KAYAK.

Internationally the term canoeing is used as a generic term to describe both canoeing and kayaking. However, the two paddling disciplines are different:

The most common difference is that with *competition canoes* paddlers kneel and paddle with a single-bladed paddle. (C1, C2, C4 = Canoe for 1, 2 or 4 people.)

5.

In *competition kayaks* paddlers sit and paddle with a double-bladed paddle. (K1, K2, K4 = Kayak for 1, 2 or 4 people.)

In this dissertation the two paddling disciplines will be referred to collectively as canoe/kayak. Where the terms canoeing or kayaking are used separately they will refer to their specific discipline. Canoe/Kayak sprint racing is held over 500m and 1000m.



Illustration 00.05-06: Example of canoeing (left) and kayaking (right).

Source: www.flickr.com



illustration 01.01: Rowing is one of the oldest Olympic sports\_ source: [www.flickr.com](http://www.flickr.com)

# RESEARCHBACKGROUND01

# 01. RESEARCH BACKGROUND.

## 01.01 BACKGROUND OF THE TOPIC.

The intention of the research in this dissertation is to prepare for the design of: *An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal*. It is helpful to dissect the proposed topic to gain a clear understanding of the background which led to its choice:

**(01) Towards a Relevant Architecture: (02) An International Rowing & Canoeing Regatta Centre (03) for KwaZulu-Natal, South Africa.**

### (01) Towards a Relevant Architecture

*“A designer must first document the existing conditions of a problem, define its context, and collect relevant data to be assimilated and analyzed. This is a critical phase of the design process since the nature of a solution is inexorably related to how a problem is perceived, defined and articulated.”* (Ching, 1996:1)

The research component of this dissertation serves as an instrument to document the existing conditions of the problems involved in designing an *International Regatta Centre for KwaZulu-Natal*. The theoretical underpinning of the dissertation is the endeavour towards an architectural response which is *relevant* and balanced regarding social, economic and environmental concerns of designing sustainably.

Albie Sachs, a judge of the South African constitutional court summarises the concept of a *relevant* South African architecture well, *“...an architecture that affirms Africa – its climate, its landscape, its people – rather than negating it.”* (Sachs in Marschall & Kearney, 2000:1)

### (02) An International Rowing & Canoeing Regatta Centre

*An International Rowing & Canoeing Regatta Centre* is a venue where there are facilities for rowing, canoeing and kayaking sprint competitions. A number of buildings and facilities are required for these competitions, and need to be designed based on technical criteria set out by the respective world sporting governing bodies. The extent to which these criteria are met will then classify the venue to be eligible to host various levels of international competition.

### (03) for KwaZulu-Natal, South Africa

Currently South Africa and KwaZulu-Natal lack sufficient regatta facilities and do not have an *International Rowing & Canoeing Regatta Centre*. KwaZulu-Natal has a climate that is conducive to water sports and a reputation for being a popular sporting destination, making the province ideal for the proposed *Centre*. With ambitions of hosting future international sporting events such as the Commonwealth Games and Summer Olympic Games,

the province will require an *International Regatta Centre*. A regatta centre in KwaZulu-Natal has great potential to add further value to sport in the province and to promote rowing, canoeing and kayaking to a wider population.

## 01.02 RESEARCH PROBLEM.

Essentially, the research problem of this dissertation is how best to design *An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal*.

The challenge is to create an architecture which is appropriate, well balanced, and in due course, *relevant* to the technical and functional requirements of a regatta centre. This while also considering the social, economic and environmental concerns, will all contribute to designing a centre which is a *relevant* architectural response.

This dissertation will attempt to address the difficulty in creating a building that speaks to its users, and the public at large, of its nature and usage. As well as in the broader context, acting as an activity node that advertises these sports, encourages public awareness and approachability, which is sorely lacking in paddling disciplines. Associated with this is the concern of creating a positive public place that will make a contribution to the greater public realm.

A concern of a more practical nature is the avoidance of the danger that a number of International and Olympic sporting venues have fallen into in the past: that is the creation of buildings which become a ‘white elephant’ after the event they were built for. This issue will need to be carefully addressed, possibly by making the venue cater for a variety of uses.

The broad research question for this document is therefore:

What is a *relevant architectural* response regarding the technical, social, economic, and environmental design concerns of an *International Rowing & Canoeing Regatta Centre for KwaZulu-Natal*?

### 01.03 KEY QUESTIONS.

The key questions are the main issues that need to be taken into consideration, and subsequently dealt with, in the design of the *Centre*. By understanding their requirements, the design can respond appropriately.

Highlighted below are the key questions of this dissertation:

- Who will be the client/s for the building?
- Who will be the possible funder/s for the building?
- What activities need to be accommodated, and what are their various requirements?
- What are the technical design requirements of rowing, canoeing and kayaking disciplines?
- Where is an appropriate site for the *Centre*?
- How should the project respond to its context?
- What structural form is appropriate?
- How have other architects dealt with similar building designs?
- How successful are other local projects of this type?
- What would the client's brief be?

Broader questions to be asked:

- What constitutes a *relevant* architecture response for the *Centre* design?
- How can the sports of rowing, canoeing and kayaking in South Africa be improved by the built environment?
- How can the *Centre* positively affect the host community?
- What are the social, economic, and environmental concerns to be considered when designing a *Regatta Centre within an African / South African / and KwaZulu-Natal context*?
- What particular design strategies can be implemented to facilitate a mix of uses at the *Centre*?

### 01.04 WORKING HYPOTHESIS.

The working hypothesis informing this research document is: a *relevant* architectural response to the technical, social, economic, and environmental concerns of the *Regatta Centre*, will result in a design which is appropriate and well balanced to the context of KwaZulu-Natal.

### 01.05 OBJECTIVES OF RESEARCH.

The task at hand is the design of an *International Regatta Centre* with club and training facilities. There are five main objectives of the research in this dissertation:

- To gain a working knowledge of the technical requirements of an international-standard regatta course and the associated facilities.
- To create a basis regarding the social, economic and environmental needs of its design, thus suggesting what constitutes a relevant response to the *Centre*.
- To determine the basic design requirements, such as siting, planning, appropriate structure and building materials, while informing strategies to fulfil these requirements.
- To update and contribute to the existing base of knowledge on the design of sports facilities in particular the design of regatta centres in South Africa.
- To inform the design brief for the *Centre*

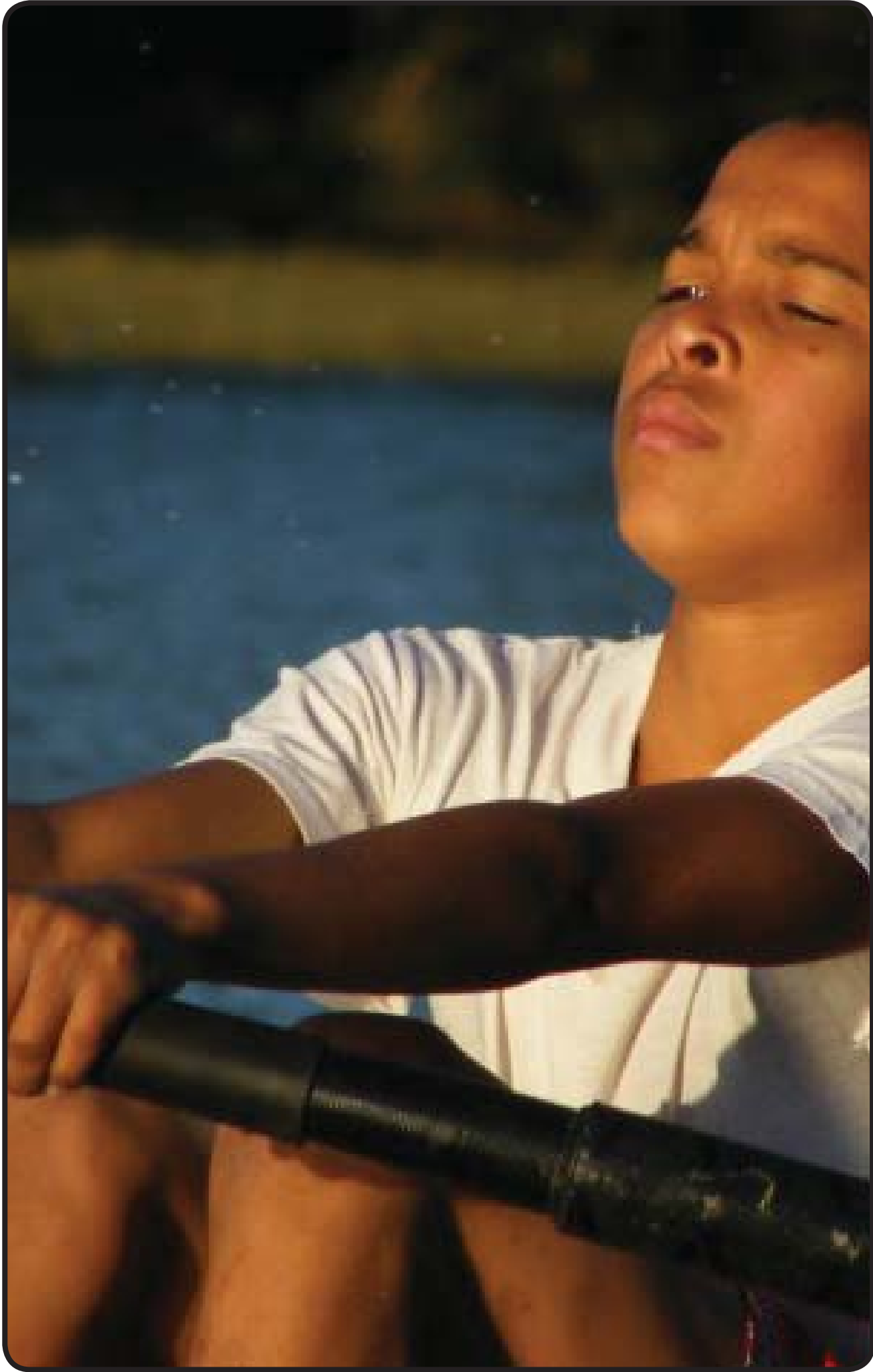


illustration 02.01: A young rower out practicing. source: www.flickr.com

## RESEARCH METHODOLOGY 02<sup>9.</sup>

## 02. RESEARCH METHODOLOGY.

### 02.01 INTRODUCTION.

In this chapter the methods of data collection will be defined and explained. The research methodology that will be employed in this dissertation document will be aimed at facilitating and creating a design programme for the proposed *Regatta Centre*.

### 02.02 RESEARCH PLAN.

In terms of the research that will be carried out for this dissertation, the methodology will be broken up into two areas of study: primary research and secondary research. The primary and secondary research programmes will be qualitative, where conclusions will be drawn from the data analysed by the researcher. The data gathered will be used as a sample, representative of both national and international trends in the chosen field of study.

### 02.03 PRIMARY RESEARCH.

The primary research included information gathered through semi-structured interviews with key informants and case studies of local water sports facilities in KwaZulu-Natal.

The interviews consisted of meetings with experts in the fields of rowing, canoeing, kayaking, water sport facility management, architecture and the related fields of study. Prior to meeting with interviewees, a questionnaire was given to them so that they were given time to reflect on their responses. These questionnaires were then used in the interview process as a guide.

These interviews provided information that will be used to create the design brief and accommodation schedule for the proposed design scheme. Valuable local knowledge was gathered through these interviews with the semi-structured format allowing for specific questions to be dealt with, while also allowing for a clear understanding of individual users' perspectives.

As there are currently no international regatta centres in South Africa, it was decided that various local water sports facilities would be visited. These included visits to canoeing clubs, rowing clubs and even sailing clubs

The criteria used in the selection of case studies included:

- Ability to investigate aspects identified in the precedent studies.
- Prominence of the building locally.
- Ability to compare and identify local trends in design.

Case studies conducted included the analysis of the following water sports facilities:

- The Natal Canoe Club at Camps Drift in Pietermaritzburg.
- The Kingfisher Canoe Club at Blue Lagoon in Durban.
- The Umzinyathi Canoe Club at Shongweni Dam outside Durban.
- The Durban Rowing Club at the Durban Harbour.
- The Pietermaritzburg Rowing Club at Camps Drift in Pietermaritzburg.
- The Point Yacht Club at the Durban Harbour.
- The Royal Natal Yacht Club at the Durban Harbour.
- And, the Henley Midmar Yacht Club at Midmar Dam in Howick.

## 02.04 SECONDARY RESEARCH.

The secondary research in this dissertation consisted of a literature review focusing on three areas of study: water sports facilities; the technical design requirements of an international regatta centre; and the proposed theoretical framework of *relevant architecture*.

Firstly, a review of literature regarding international regatta centres assisted in the choice and formulation of precedent studies.

Secondly, an extensive review of the technical design requirements for regatta centres set out by the International Rowing Federation and the International Canoeing Federation was undertaken. This allowed for a clear understanding of what constitutes an *International Regatta Centre*.

Finally, an extensive literature review was done, investigating the social, economic, and environmental design concerns of creating an architecture that is *relevant*. This review was vital to the formation of a theoretical framework which would best form the foundation of a design that was: *Towards a Relevant Architecture*.

Actual and published architectural projects were scrutinised, including architectural aspects not specifically linked with regatta centres. These were identified as avenues of investigation by the chosen case study area and the proposed theoretical framework. Sources of this secondary data include published materials, such as books, journal articles, and internet pages. Non-published materials such as designs and construction drawings were also consulted.

The criteria used in the selection of precedent studies included:

- Relevance to the building being designed.
- Prominence of the building internationally.

Precedent studies conducted included the analysis of the following water sports facilities:

- A recently completed Boathouse in Oxford, England by Belsize Architects.
- The Sydney International Regatta Centre in the Penrith Lakes district by Woods Bagot Architects.
- The Shunyi Olympic Aquatic Park in Beijing by BlighVollerNiell Architects.
- The Eton College Rowing Centre at Dorney Lake, England by Belsize Architects.
- The London Regatta Centre in the East of London, by Ian Ritchie Architects.
- And, an overall study of various design trends in recently completed international water sports facilities.

## 02.05 CONCLUSIONS.

The precedent studies allowed for current trends in international regatta centre design and international water sports facility design to be acknowledged. The semi-structured interviews provided a platform for informal discussion which allowed for the introduction and conversation around areas of importance not considered by the researcher prior to meeting. The case studies highlighted the utilitarian nature of a prominent and fully operational local water sport facilities and also provided first-hand evaluation of existing local water sports environments, and the people that use them.

Findings and observations from the secondary and primary research were then synthesized to inform the design brief and the accommodation schedule.





illustration 03.01: **Marathon kayaking is already a very popular sporting discipline in KwaZulu-Natal**. source: [www.flickr.com](http://www.flickr.com)

# LITERATURE REVIEW & THEORETICAL FRAMEWORK 03

## 03. LITERATURE REVIEW & THEORETICAL FRAMEWORK.

### 03.01 INTRODUCTION.

This chapter will focus on two areas: firstly, the chosen literature will be reviewed; and secondly, the concept of *Relevant Architecture* will be analysed, regarding the proposed design. The intention of this will be to highlight particular design strategies for the proposed *Regatta Centre*.

The literature review will focus on three areas:

- Water sports facilities in general.
- The technical requirements of an *International Regatta Centre*.
- *Relevant Architecture*.

The theoretical framework will focus on three areas:

- Social design concerns.
- Economic design concerns.
- Environmental design concerns.

### 03.02 LITERATURE REVIEW.

#### 01. WATER SPORTS FACILITIES.

A preliminary overview of literature based on waters sports facilities highlighted the following issues:

- Literature regarding local water sports facilities is rarely produced, and the available literature is old and outdated, as there has been very little recent development of substantial water sports facilities in South Africa.
- Literature regarding international water sports facilities is available, however, much of the literature is very basic.
- Literature regarding the chosen building typology of an international regatta centre is extensively covered regarding its technical requirements. However, there is very little architectural literature regarding existing building designs.

A broad overview of literature regarding water sports facilities and regatta centres enabled the identification of international building examples, and the identification of various international design trends in recently completed water sports facilities. This will be reflected on and further analysed in *Chapter 04: Precedent Studies*.

#### 02. TECHNICAL REQUIREMENTS OF AN INTERNATIONAL REGATTA CENTRE.

Following on from the overview of literature regarding water sports facilities, a more detailed review of the technical requirements of an international regatta centre was undertaken.

Both FISA, and the ICF, have criteria set out in various documents to assist in achieving international rating. According to these documents an international regatta centre should consists of the following facilities:

- An International-Standard Regatta Course: A stretch of water which meets the criteria set out for regatta courses.
- Regatta Course Buildings: A series of buildings staggered along the regatta course used during events by race officials.
- Finish Facilities: A finish tower building with specific functions for each level.
- Spectator Facilities: Both permanent and temporary facilities for spectators including grandstands and other spectator amenities.
- Competitor's Facilities: A building for housing various competitor facilities such as storage boathouses, changerooms and other competitor amenities.
- And finally, various Club and Training Facilities can also be included.

The detailed requirements for these facilities will be reflected on in *Chapter 07: Formulation of the Design Brief*.



Illustration 03.02: The Putrajaya Water Sports Centre in Malaysia.

Source: [www.london-regatta-centre.org.uk](http://www.london-regatta-centre.org.uk)

### 03. RELEVANT ARCHITECTURE.

Following on from the review of the technical requirements of an international regatta centre, it was realised that the proposed design would need to be appropriately conceptualised. This led to an analysis of the concept of relevant architecture.

The idea of *relevant architecture* has been at the core of many architectural theories in the past. Terms such as 'regional architecture', 'appropriate architecture', 'authentic architecture', 'environmental architecture', 'sustainable architecture', 'ethical architecture' and a 'South African architecture' have always meant an architecture that "...calls for the rejection of universal formulas, imitation of international paragons and the uncritical embrace of stylistic or technological fashions in favour of an architectural expression that is determined by the specific and unique parameters of its place." (Marschall & Kearney, 2000:1)

Sabine Marschall, Co-Author of the Book *Opportunities for Relevance*, suggests that *relevant architecture* is firmly rooted in the search for a genuinely South African architectural language. Saying that *relevant architecture* takes into account the specific conditions, "...economic, social, environmental, cultural, technological – currently prevailing in the, post-apartheid South Africa." (Marschall & Kearney, 2000:2) Stating that, "...architecture should be socially relevant and empowering by generating employment, providing training opportunities, building capacity by engaging and involving people in various ways, and creating structures that serves the community's needs more than the architect's image." (Marschall & Kearney, 2000:2)

Renowned South African architect, Professor Jo Noero in his *Sophia Gray Memorial Lecture* in 2007 titled, *The Expedient & The Ethical, The Everyday & The Extraordinary*, reiterates this point suggesting that a *relevant architecture* is a responsible architecture based on, "...a set of ethical considerations." (Noero, 2007:2)

For the purpose of this dissertation the foundational principles of *relevant architecture* concerning the proposed design scheme will be considered to be: technically, socially, economically and environmentally relevant architecture.

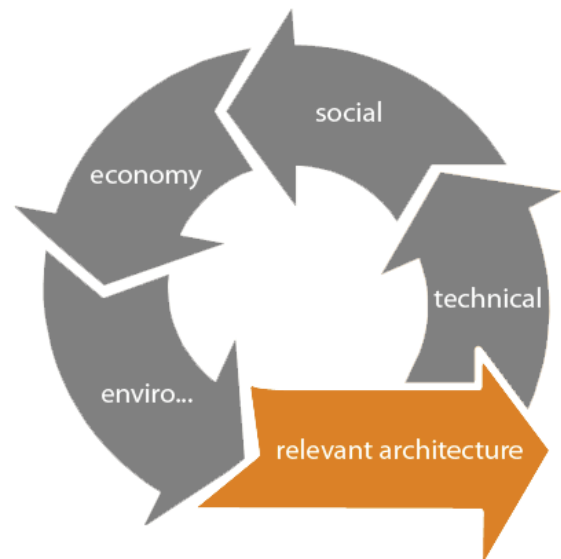


Illustration 03.03: Relevant Architecture diagram.

### 03.03 DEVELOPMENT OF A THEORETICAL FRAMEWORK.

#### 01. SOCIAL DESIGN CONCERNS.

##### Introduction.

This section will serve to highlight and discuss various socially relevant design strategies for potential inclusion into the design of the *Regatta Centre*. From the various literature reviewed, three areas have been highlighted for their relevance to the proposed design. These are: community participation; flexibility in design; and connection to the environment.

##### Community Participation.

Community participation is very important to the social make-up of a building design. According to Marshall, this can be achieved by actively designing to include such participation, suggesting that one of the potential benefits of community participation can be the transfer of skills and knowledge which can contribute considerably to the development of human capacity. (Marschall & Kearney, 2000:16)

Steve Kinsler, of East Coast Architects, summarises the importance of community participation well: *“The cornerstone to the long-term sustainability of any project is the social benefit that can be derived from the facility, both during its design and construction, and the usefulness and accessibility of the end product.”* (Kinsler, 2007:8)

The proposed *Regatta Centre* will need to consider strategies of how it will encourage community participation at the facility, through design, construction and the eventual building.



Illustration 03.04: One of ten previously unemployed women from the local community of Shayamoya, who worked for three months to make over 15000 adobe bricks for the construction of the *Seven Fountains Primary School* in Shayamoya township, Kokstad. These women were empowered by a conscious decisions made by the design team to incorporate community participation.

Source: East Coast Architects

##### Flexibility in Design.

The intended multi-disciplinary character of the *Regatta Centre* and the nature of water sports programmes being seasonal, suggests a building that needs to be able to adapt to changing requirements.

Marschall suggests that *relevant architecture* emphasises the concept of architecture as a process - the idea that a building will continuously evolve and change over time. (Marschall & Kearney, 2000:15)

A building designed with spaces which display the significance of flexibility: the ability to adapt and be modified to the user's needs as the requirement arises, seems to be the answer. Herman Hertzberger however warns against the trend of flexibility in design saying that *“...flexibility has become something of an architectural catchphrase denoting some miracle panacea to a number of design problems.”* (Hertzberger, 1991:146) Flexibility, as Hertzberger continues, *“...signifies the denial of a fixed or clear-cut standpoint due to the understanding that no single solution would be preferable in all eventualities.”* (Hertzberger, 1991:146) stating that, *“Flexibility ultimately represents a complete set of unsuitable solutions to any one problem.”* (Hertzberger, 1991:146)

Rather than flexibility, Hertzberger suggests that a form that starts with change in mind will more readily adapt to shifting functions, calling this a *polyvalent space*. Defining a polyvalent form as one *“...that can be put to different uses without having to undergo changes itself, so that a minimal flexibility can still produce an optimal solution.”* (Hertzberger, 1991:147) What sets these polyvalent forms apart from the neutral, supple forms of flexible architecture is their ability to maintain a constant identity, despite adaptations for various uses. (Hertzberger, 1991:148)



Illustration 03.05: An example of a polyvalent space in one of Hertzberger's Apollo Schools. This central hall invites the teachers and children to use the spaces for anything from home work to small plays and lessons or even school meetings. The space performs all these functions without having to undergo any physical change.

Source: Hertzberger, 1991:215

Therefore the *Regatta Centre* should be designed with change in mind. Instead of flexibility, the idea of polyvalent spaces should be conceptualised. Spaces that maintain constant identity yet can effortlessly perform multiple functions without having to undergo change will help address numerous requirements of the *Centre*.

### Connection with the Environment.

From the overview of various literature regarding water sports facilities, one of the key design trends noted was the attempt for the buildings to have a strong connection with the environment. (See Chapter 04:07 *International Design Trends in Recent Water Sports Buildings*.) Also, from the overview of literature regarding regatta centres, it is apparent that the buildings being designed will be within some kind of natural landscape, and therefore the proposed design should respond appropriately.

The *Regatta Centre* should both contribute to the beauty of the natural environment and allow for the building's users to enjoy the environment. Renowned Australian architect Glenn Murcutt is of the school of thought that architecture and the natural environment should neither oppose nature, nor prevent its occupants from enjoying the landscape. (Fromonot, 2003:47) Françoise Fromonot suggests that architecture should rather reveal the natural environment to people and enable them to live in it. (Fromonot, 2003:47) He suggests that the basics of organic life: water, air and light should not be merely seen as "...necessities for survival, but rather the challenge is to make them visible, legible almost palpable, to make their presence felt in the very stuff of the building." (Fromonot, 2003:47)



Illustration 03.06: *Simpson-Lee House*, by Glenn Murcutt, which nestles into its natural surroundings.  
Source: [www.archnewsnow.com](http://www.archnewsnow.com)

Well-known Mexican architect, Luis Barragán describes what he calls the disengagement with people and the natural environment. *"Before the machine age, even in the middle of cities, nature was everybody's trusted companion... Nowadays, the situation is reversed. Man does not meet with nature, even when he leaves the city to commune with her. Enclosed in his shiny automobile, his spirit is stamped with the mark of the world whence the automobile emerged; he is, within nature, a foreign body."* (Barragán, 1967:77)



Illustration 03.07-08: *Luis Barragan House* (left) in Mexico City promotes the connection between man and the environment, with the garden feeling like an extension of the room. (right) One of the many fountains used by Barragan in his designs as a sculptural element, celebrating the natural element of water in his architecture.  
Source: [www.archidose.org](http://www.archidose.org)

The *Regatta Centre* design should actively promote the connection between man and the environment, and between building and the environment. The building should highlight nature wherever possible while itself promoting the beauty of the environment.

### Conclusion.

The three main areas of focus covered in this section: community participation; flexibility in design; and the connection to the environment are all equally *relevant* design strategies which should be reflected on in the design of the *Regatta Centre*.

## 02. ECONOMIC DESIGN CONCERNS.

### Introduction.

Judge Albie Sachs, in the foreword to the book *Opportunities for Relevance – Architecture in the new South Africa*, proposes that tight budgets should not be regarded as obstacles to be overcome, “...but as spurs for the development of the new South African architectural process and imagination.” (Albie Sachs in Marschall & Kearney, 2000:xi)

The reality of contemporary architectural practice in South Africa is characterised by the fact that most projects are frequently restricted by a very low budget. (Marschall & Kearney, 2000:41) Marschall however puts forward the notion that *relevant architecture* will consider financial constraints not as a problem but rather as an opportunity for architects to liberate themselves from the “...unsuitable conventionalism and the commands of international paradigms.” (Marschall & Kearney, 2000:41) They suggest that the more limited a budget is for a particular project, the greater the opportunity for the professional team to challenge their resourcefulness, inventiveness and imagination. (Marschall & Kearney, 2000:41) Saying that, “...low-cost projects will potentially force the designer to abandon stylistic idioms and other preconceptions and return to basics in order to find truly original, new solutions to old problems.” (Marschall & Kearney, 2000:41)

This section will serve to highlight and discuss various economically relevant design strategies for potential inclusion into the design of the *Regatta Centre*. From the various literature reviewed, there have been five areas highlighted for their relevance to the proposed design. These are: total life-cycle costing; responsible resource management; multi-functionality of spaces; low-tech/maximum-benefit solutions; local materials and local labour.

### Total Life-Cycle Costing.

According to Peter Buchanan “...a building’s initial capital cost amounts to only a small fraction of the total cost of running and maintaining it.” (Buchanan, 2005:34) Suggesting that ‘Green Design’ is a sound investment in this regard as, “Over the years, the savings in utility bills achieved by energy efficiency can prove equal to or exceed what the building originally cost.” (Buchanan, 2000:34) Also Buchanan suggests that “...buildings which require less maintenance, and/or are easier to clean, can recoup several times over any extra investment necessary to achieve this.” (Buchanan, 2000:34) Going as far to say that even the, “wages, contentment and performance of the building’s occupants are considered, the cost benefits can prove staggering.” (Buchanan, 2000:34) Marschall suggests that materials and technology may be more expensive initially, but cost-effective in the long run. (Marschall & Kearney, 2000:58)

Therefore when designing the *Regatta Centre* the concept of total life cycle costing needs to be considered. Not only should the building be a ‘Green Design’ but also the future running and maintenance costs of the scheme should be carefully considered.

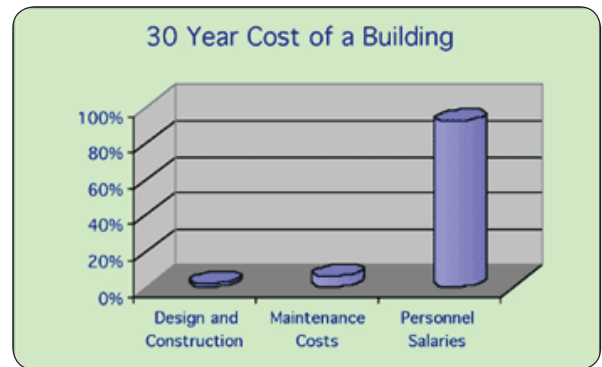


Illustration 03.09: A diagram illustrating that initial building costs account for very little of the total costs of a building in comparison to maintenance costs and personnel salaries over 30 years.

Source: www.wbdg.org

### Responsible Resource Management.

Modern society has a seemingly built in tendency to exploit resources. One need only look at any current environmental resource statistics to confirm this trend. According to Buchanan, buildings “...constitute nearly half the total energy consumption of the developed world.” (Buchanan, 2005:30)

It is a reality that buildings require resources in their construction and in their existence. However, the extent of resource use needs to be responsible. Buchanan suggests that the reliance on non-renewable energy resources can be significantly reduced and even eliminated through careful design strategies available to the architect. (Buchanan, 2000:30)

Buchanan proposes that the energy consumed by buildings should be from replenishable sources; saying that responsible resource management promotes the avoidance of using fossil fuel-derived energy, as well as the avoidance of the wasteful use of energy. “To live more gently on the earth we need to use non-depletable ambient energies of the sun, wind, waves and gravity, and constantly use replenishable materials such as woods from sustainably managed sources...” (Buchanan, 2000:30)

While there are practical and environmental reasons to reduce the consumption of energy generally, there are also potentially huge economic spin-offs from reducing resource abuse. The design of the *Regatta Centre* should consider how it will promote responsible resource management.

### Multi-functionality of Spaces.

“Multi-functionality, or ‘loose fit’, implies replacing the ‘one space – one function’ principle with the creation of spaces or architectural elements that can serve multiple purposes in order to achieve maximum utilisation of available space and resources. Multi-functionality is not only cost effective, but adds excitement and a sense of uniqueness to the building.” (Marschall & Kearney, 2000:43)

A good working example of the exciting possibilities of multi-functionality can be seen in the work of CS Studio Architects, in their *Uthango Lotyebiselwano Learning Circle* building, in Nyanga, Cape Town. The structure’s most interesting space is an open-air performance area which was originally planned as an indoor theatre. However, due to a lack of funds, its completion was abandoned. In the resulting building the courtyard-like outdoor performance area has actually become the main focus of the building, while individual elements serve two functions simultaneously. (Marschall & Kearney, 2000:43-44)



Illustration 03.10 *Uthango Lotyebiselwano Learning Circle*, Nyanga, Cape Town.

Source: Marschall & Kearney, 2000:40

Durban architect, Rodney Harber, points out that multi-functionality can also include buildings or a building complex that serves a combination of different purposes. (Harber, 1997:4) As the sporting disciplines of rowing, canoeing and kayaking are seasonal (Oliver, 2008) with athletes being very active in the warmer months and less active in the colder months, the design of the *Regatta Centre* will need to incorporate facilities that can sustain use of the buildings during the quieter periods of the year.

Therefore, in the endeavour for the *Regatta Centre* to be more economically relevant, spaces should be designed so that they can serve multiple purposes in order to achieve maximum utilisation of available space.

### Low-tech/Maximum-benefit Solutions.

According to Marschall, the search for imaginative, cost-effective low-tech/maximum-benefit solutions for climate control, lighting and ventilation; and the emphasis on simple, low tech construction methods instead of more conventional or high tech solutions, can considerably reduce initial construction cost of a building. As well as minimising the running expenses in terms of electricity supply and technical maintenance. (Marschall & Kearney, 2000:47)

Dieter Holm, in his article *Climate Conscious Design*, suggests that through passive climate control methods, climatically adapted buildings can be achieved at a very low or no major additional cost. Saying that, by observing passive climatic control methods and by consciously incorporating more low-tech solutions, cost reduction can be achieved. (Holm, 1997:22)

Marchall points out that making a conscious effort to incorporate more low-tech solutions and simple construction methods, particularly those that local communities are well familiar with, is also highly appropriate in consideration of prevailing labour skills levels. (Marschall & Kearney, 2000:48)

Marschall suggests that the frequent lack of craftsmanship and generally low level of skill of local labour forces, in South Africa, should not be perceived as a disadvantage or a problem for architecture, but rather be seen as an, “...opportunity to evolve a unique regional architectural expression.” (Marschall & Kearney, 2000:48)

Therefore the design of the *Regatta Centre* should consider what the low-tech/maximum-benefit solutions for climate control, lighting and ventilation should be. A simple study of the low-tech construction methods available in the chosen case study area will be done in the *Design Report* section of this dissertation.



Illustration 03.11: The Red Location Museum in Port Elizabeth by Noero Wolff Architects uses low/tech maximum-benefit solutions in its construction. Materials such as standard steel windows, concrete blocks, and gum poles are used in unconventional ways to great effect.

Source: Deckler, 2006:45

### Local Materials & Local Labour.

The use of local materials and labour are both essential considerations in the design of the *Regatta Centre*. These two areas will now be briefly discussed.

The specification and use of local materials sourced within a prescribed radius of the chosen case study area makes economic sense in a number of ways:

- The transportation costs can be radically reduced as the material would not have to travel vast distances to get to the construction site.
- Selecting local materials results in local entities benefiting and, through profit gain sustains the local economy.

Combined with the need to specify local materials, it is equally important to use local labour which makes economic sense in the following ways:

- Using local labour results in sustaining the local economy.
- Using local labour can result in skills transfer and empowerment of people within a community, thus ensuring long term development of the local economy.

*Seven Fountains Primary School* in Shayamoya, Kokstad, KwaZulu-Natal, designed by East Coast Architects, is a recently completed example of the successful use of local materials and local labour in a project. The project involved a dynamic series of community orientated programmes and initiatives that incorporated the community into the project, including a skills and materials audit which was done to inform the design choices for the building. In order to save materials costs and to reduce the embodied energy of the proposed buildings, various raw materials either on or very close to the site were used, including the following: sun-dried adobe bricks (manufactured on-site); stone from the site used for building plinths, terraces, retaining walls, and landscaping features; locally harvested thatch; and the use of saligna for roof structures instead of expensive steel or sawn-timber trusses were used.



Illustration 03.12: Children playing at the Seven Fountains Primary School, in Kokstad by East Coast Architects.

Source: East Coast Architects

The overall design strategy for material choice was that local products were given preference over imported products. (Kinsler, 2006:10-11) For example, clay bricks which were the primary masonry material of the building, were sourced from a local contractor in the Kokstad area ensuring that money remained within the local economy.

In addition, the project was constructed using a locally-based main contractor who was employed to ensure that as many people as possible from the local region would be employed on the contract. This ensured that the majority of the labour-force on the contract were residents of the area.

Similarly was the case at the *African Centre* at Somkhele, in Northern KwaZulu-Natal, also by East Coast Architects. Here 100% of the unskilled labour and 62% of the skilled labour came directly from the surrounding community. Additionally, where there were no available workers, local men and women were taught, thus ensuring that a skills transfer occurred. (Lipman, 2002b:36)

The long term economic benefits of both these buildings are that ongoing maintenance as well as future development can now be outsourced to local companies. The additional benefit in this instance is that the local economy has been given the opportunity for long term sustainable development.

19.

The design of the proposed *Regatta Centre* will need to consider how it will use local materials and local labour in its design.

### Conclusion.

The five main areas of focus covered in this section: total life cycle costing, responsible resource management, multi-functionality of spaces, low-tech/maximum-benefit solutions, local materials and local labour are all equally *relevant* design strategies which should be reflected on in the design of the *Regatta Centre*. Although there are, of course, many other ways of designing cost effectively, these discussed should be the key areas focused on in the design of the *Regatta Centre*.



Illustration 03.13: The Africa Centre, by East Coast Architects which successfully used local labour and materials in its construction.

Source: Phaidon, 2004: 638



### 03. ENVIRONMENTAL DESIGN CONCERNS.

#### Responsible Site Selection.

#### Introduction.

Environmental design is not a new endeavour. Architecture in its primitive form evolved out of the need for humans to protect themselves from the environment. (Thomas, 1996:3) One of the most vital concerns of architecture, if not the most vital, is for buildings to protect their inhabitants from light, heat and cold. It is saddening that in many newly built buildings this fundamental concern of architecture is sometimes not properly achieved.

Brian Kearney suggests that *relevant architecture* is climatically appropriate and environmentally responsive, designed in tune with the surrounding landscape, topography, flora and fauna. (Marschall & Kearney, 2000: 71)

This section will serve to highlight and discuss various environmental design strategies for potential inclusion into the design of the *Regatta Centre*. From the various literature reviewed, there have been six areas highlighted for their relevance to the proposed design. These are: responsible site selection; climate; sun, wind and rain; alternative energy sources; water conservation; building materials and construction processes.

When architects are afforded the opportunity to select a site they should do so circumspectly, considering the environmental consequences of such site choice.

*“In relation to the potential for the adaptive re-use of pre-existing structures we should surely restrict our current habit of exploiting ex-agricultural greenfield sites in favour of re-using ex-industrial brownfield sites. Rather than continuing to proliferate urban sprawl we should either re-use obsolete buildings or demolish them and re-use their sites once they have been cleared. Only provisions of this order will save us from the continual consumption of fertile land and along with this, ultimate depletion of the planet’s non-renewable resources.”* (Frampton, 2002:15)

Kenneth Powell argues that using brownfield sites or reusing buildings makes both functional and financial common-sense. (Powell, 1999:9) But, as Virginia Kent Dorris adds: confining new development to land that has already been altered by human intervention is also good land stewardship. (Kent Dorris, 1999:99)

As it is the case with this dissertation that the opportunity exists to select a site for the *Regatta Centre*, a large contributing factor to the appropriateness of the site should be gauged on whether the site offers the potential for re-use of pre-existing structures, the potential for re-use of existing infrastructure or is a brownfield site which has already been altered by human intervention.

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Illustration 03.14: The Beddington Zero Energy Development (BedZED) in England by Bill Dunster, is built on reclaimed brownfield land. Source: www.flickr.com

## Climate.

Brian Kearney suggests that, perhaps the principle means of developing architecture with lasting relevance to an immediate and wider context lies in the way we make buildings with respect to climate. (Marschall & Kearney, 2000:71)

Alaric Napier in his book *Enviro-friendly Methods in Small Building Design for South Africa* suggests that it is important for architects to have a working knowledge of the climatic and seasonal characteristics of the region being designed in. (Napier, 2000:9.1)

According to Napier, KwaZulu-Natal can be split into two climatic regions: Sub-Tropical Coast and Plateau Slopes. (Napier, 2000:9.3-4)

According to Napier, a Sub Tropical Coast climatic region has the following characteristics: (Napier, 2000:9.9-10)

Summer Rainfall mm: 750 to > 1000  
Winter Rainfall mm: 375 to 750  
January Temperatures: 20 to 25°C  
July Temperature: 15 to 20  
Prevailing Winds: S to SW & NE  
Relative Humidity: >70  
Hours Sunshine: <60 / week

Plateau Slopes: (Napier, 2000:9.9-10)

Summer Rainfall mm: 750 to > 1000  
Winter Rainfall mm: 250 to 375  
January Temperatures: 20 to 25°C  
July Temperature: 7 to 12 at lower altitudes  
Prevailing Winds: SE (summer) & SW (winter)  
Relative Humidity: 50 to 60  
Hours Sunshine: <60 / week

From these statistics it is apparent that the design of the *Regatta Centre* needs to consider high temperatures in summer, potential cool temperatures in winter, various prevailing winds and a high summer rainfall as design generators.

However, according to Kearney, it is necessary to understand not only the regional climate, the patterns of solar radiation, diurnal and seasonal temperature variations, rainfall quantities and types, winds and breezes, but also the local and site variations in these parameters. (Marschall & Kearney, 2000:75-76) The purpose of this is to detect the meaningful geometric patterns, the connections and the contradictions, so that these may be used as generators for ideas about siting, orientation, view, plan-form and building shape. (Marschall & Kearney, 2000:76)

(A detailed contextual climatic description of the chosen site will be done in *Chapter 06: Site Selection & Context*)

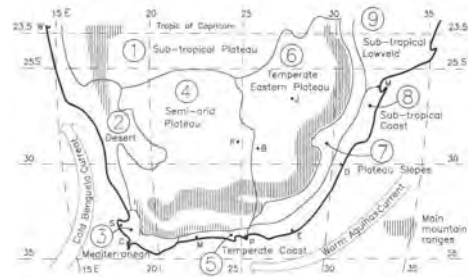


Illustration 03.15: South Africa's climatic regions.

Source: Napier, 2000:9.3.1

## Sun, Wind & Rain.

The primary driving force in climate is the sun, (Marschall & Kearney, 2000:78) meaning that there needs to be selective control of sunlight in and around buildings. Kearney suggests that carefully thought out orientation is one of the most basic yet fundamental manners in which to control the sun, "...orientation is cardinal, the most important natural gift being the way a north facing structure has a built-in sun control system by providing insulation in winter and protection in summer with a roof overhang." (Marschall & Kearney, 2000:78) However Kearney suggests that one should not face everything north but rather plan activities with and without the sun. (Marschall & Kearney, 2000:79)

Wind is an important factor that should be considered in the design process. "We need to consider how a building in the path of the wind will be ventilated or not; how the wind will flow around the structure; how wind driven rain will affect the building and its roofs, openings and materials." (Marschall & Kearney, 2000:78) Kearney suggests that wind should not be seen as a hostile climatic element, but rather perceived as a natural system to be used and controlled. (Marschall & Kearney, 2000:78)

Rain should be considered in its entirety. Kearney suggests that designers often forget that rain does not always fall gently and vertically, warning that wind-driven rain, especially in the sub tropics can be accompanied by gale-force winds, "...roof shapes will need to be sheltering; windows and doors facing such on-coming weather will need to be regarded as filters..." (Marschall & Kearney, 2000:78)

Alaric Napier suggests that when dealing with the elements of sun, wind and rain in buildings, a good way to look at the problems and solutions related to buildings is to observe how humans themselves make their bodies comfortable - by means of clothes. Saying that, "...there is a remarkable likenesses... clothes are designed for human bodily protection and comfort, inevitably relayed to environmental conditions of temperature, sun wind, rain or other. Buildings are the same, for the sake of the humans that they shelter." (Napier, 2000:1.4-7)

Therefore the buildings designed for the *Regatta Centre* will need to consider how they will carefully handle the three elements of sun, wind, and rain.

### Alternative Energy Sources.

Much of the destruction of the planet by industrial civilization is a result of the use of unreplenishable sources of energy such as fossil fuels. (Buchanan, 2000:30) As mentioned earlier by Buchanan, humanity should rather strive to make maximum use of renewable energy sources such as the sun, wind, waves and gravity. (Buchanan, 2000:30)

There are various alternative energy systems available that could be incorporated into the design and construction of the *Regatta Centre* buildings. Solar heating for the heating of water and the use of the sun and wind to generate electricity are among a few.

Kearney, however, suggests that there are some important questions regarding these systems that need to be considered before their inclusion in buildings. For example, will the initial cost of the integration of solar hot-water collection system be less or more than the lifecycle savings of the system? Will the system last the full lifecycle of the building or will some future generation be compromised and frustrated in having to replace an obsolete or defunct set of collectors and tanks? What is the composition of the system – does it incorporate materials and technologies which may seemingly save energy in this particular application, but waste expensive energies in its own production? Who will maintain and service such equipment? (Marschall & Kearney, 2000:90)

Kearney proposes that careful energy audits and budgets for such devices need to be done to gauge the feasibility of their inclusion. Kearney also emphasises that such alternative energy sources should not be stuck on as afterthoughts but conceived as being part of the design. (Marschall & Kearney, 2000:91)



Illustration 03.16: An apartment block in Singapore, exposing the energy hungry society that we live in.

Source: [www.flickr.com](http://www.flickr.com)

Two potential on-site energy production systems will now be briefly discussed:

### Solar Water Heating.

Traditional geyser systems accounts for 30% - 50% of the electricity consumed by an average household in South Africa. ([www.eskomdsm.co.za](http://www.eskomdsm.co.za)) In many buildings these geysers run continuously using large amounts of electricity heating water even when hot water is not required.

An alternative to traditional systems are solar water heater systems, which can drastically reduce monthly electricity use, as well as significantly reduce carbon emission rates. Using solar water heating does have its disadvantages, the major one being the initial cost of the system which is substantially more expensive than a traditional system. However, with initiatives like Eskoms' Solar Water Heating Programme which financially assists customers with the purchase of solar water heater systems, solar water heating is fast becoming more financially viable. ([www.eskomdsm.co.za](http://www.eskomdsm.co.za))

As the *Regatta Centre* will require large quantities of hot water for changeroom facilities, the *Centre* would gain greatly from having solar water geysers, as electricity use would be substantially reduced while at the same time being a responsible environmental response.

### Photo-voltaic Cells.

Photo-voltaic cells are commonly available and convert sunlight received into electrical energy. Buildings such as the Mont-Cenis Training Centre in Germany, successfully and intuitively handle electrical energy generated through photo-voltaic cells which cover 9290m<sup>2</sup> of its roof and west elevation. The centre generates two and a half times the energy consumed by the complex with the excess electricity then being exported back into the national grid and sold to the municipality.

There are still however many disadvantages with the use of photo-voltaic cells. The materials used in their production process, cadmium and arsenic, are toxic. Also, the energy generated needs to be stored, which is a problem as systems use batteries which increases their size, cost, and complexity. Also, these batteries have a set lifespan which when disposed of are very bad for the environment. ([www.newsociety.com](http://www.newsociety.com)) In South Africa the initial costs of the systems are very high and have a very poor payback rate, with there being no intuitive incentive initiatives to subsidise these costs like in various other countries.

The idea of using photo-voltaic cells in South African architecture is a very exciting prospect, however until they are made more feasible they are not appropriate for inclusion into the design of the *Regatta Centre*.

## Water Conservation.

### Rain Water Harvesting & Storage.

One of the most simple and effective ways of conserving water is to collect and store rain water. Rain water from roofs and hard surfaces can be easily collected using gutters and drains feeding rainwater tanks. This water can then be used for washing, flushing of toilets and watering of gardens, while substantially reducing storm water run away during peak periods. As with the on-site energy mechanisms, it is better that these gutter and tank systems be integrated into the design of the building instead of being appendices.

It should be the intention of the *Regatta Centre* design to actively conserve water where possible. Rain water harvesting and storage is one way that this can be achieved.



Illustration 03.17: Water storage tanks used at the *Seven Fountains Primary School* where a comprehensive network of gutters and water tanks collect the rainwater from roofs. This water is used for washing, and for watering the gardens and sports fields.

Source: East Coast Architects



Illustration 03.18: A winery in Australia by Glenn Murcutt boldly expresses rain water tanks as part of the buildings facade.

Source: [www.leridaestate.com](http://www.leridaestate.com)

## Water & Sewerage.

Operating within such close proximity to a natural water source will require great care to be taken when dealing with waste water. Waste water can be separated into two sections. These being: black-water and greywater.

### Black-Water.

Black-water is effectively all water which has been flushed from toilets, as well as any water from kitchen sinks, dishwashers or washing machines. (Wilhide, 2004:40) This water is contaminated with a variety of organic matter, and must be carefully dealt with.

There are various unconventional ways of dealing with black-water when traditional water services are not available. One option is to use waterless composting toilets. The system isolates human waste from the definition of black-water, with the remaining black-water then being treated with the greywater output from the building.

Joseph Jenkins, in his book *Humanure*, argues that human manure or 'humanure' is a resource and not a waste. (Jenkins, 2005:230) In the same way that nature recycles all natural forms of refuse into compost, products such as the Enviro-loo Dry Sanitation System provide the right environment for human waste, toilet paper and organic material to break down through a natural process. ([www.eloo.co.za](http://www.eloo.co.za))

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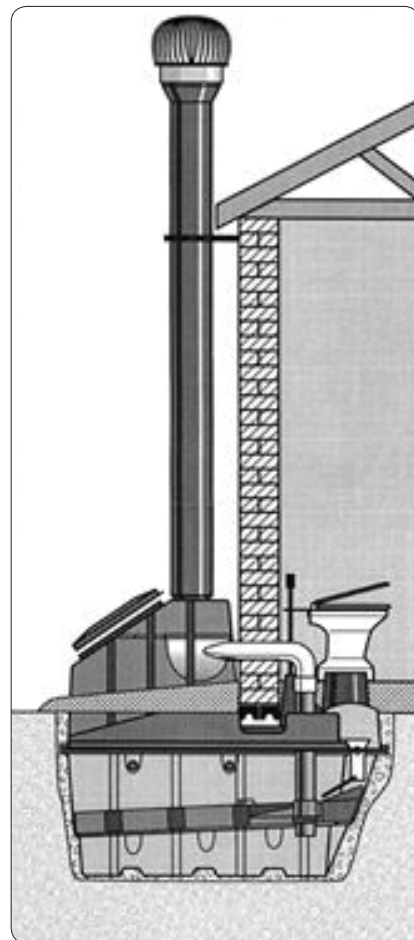


Illustration 03.19: A cross section of an Enviro-loo system.

Source: [www.eloo.us](http://www.eloo.us)

**Greywater.**

By definition, greywater is water mildly soiled from washing, showering or bathing. (Wilhide, 2004:40) It is possible to treat greywater in order to reuse it for similar purposes. A robust example of a treatment option available on the South African market is the Lilliput system. A Lilliput can be used to purify grey and black-water through a variety of systems, with the end product being clean enough to use again wherever non-potable water is required. This water could also enter into a network of wetlands which would provide a home to various local flora and fauna. A local working example of this system in practice is at the Africa Centre, in Somkhele in Northern-Kwazulu-Natal, done by East Coast Architects.

It should be the intention of the *Regatta Centre* design to deal with both its black-water and greywater responsibly. If water borne sewerage is not available as the chosen site, alternative intuitive ways of dealing with black-water and greywater should be explored further in the design.

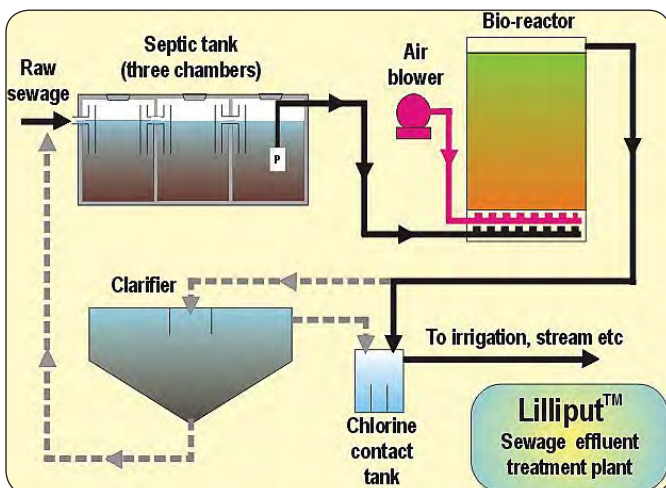


Illustration 03.20: The process of a Lilliput sewerage effluent treatment plant.

Source: [www.sewageworks.co.za](http://www.sewageworks.co.za)

**Building Materials & Construction Processes. Embodied Energy.**

*“Buildings not only use energy, it also takes energy to make them. This is embodied energy, which is all the energy required to extract, manufacture and transport a building’s materials as well as the energy required to assemble and ‘finish’ it.”* (Buchanan, 2005:33)

While everyone understands and acknowledges that buildings consume energy in their long term operation, it is less recognized that it takes a great deal of energy to make them. Buchanan refers to embodied energy as effectively being the energy “...locked into...” a building. (Buchanan, 2005:33)

There are two important points when considering the embodied energy ratings of materials:

Firstly, the data used for the calculation of embodied energy ratings in one country may differ significantly from the same material in another country. This is due to the local factors that influence embodied energy ratings varying from country to country.

Secondly, embodied energy ratings are most often given in MJ/Kg which is misleading as architects most often compare materials against one another based on size and not on weight. Ratings in MJ/m<sup>3</sup>, volume or ‘size’ is more appropriate for architect’s to compare materials and building elements against one another.

The design of the *Regatta Centre* should consider embodied energy of materials as a design generator. Materials with high embodied energy should be used sparingly or avoided, whereas the use of materials with low embodied energy should be encouraged.

MATERIAL	EMBODIED ENERGY	
	MJ/kg	MJ/m <sup>3</sup>
Aggregate	0.10	150
Straw bale	0.24	31
Soil-cement	0.42	819
Stone (local)	0.79	2030
Concrete block	0.94	2350
Concrete (30 Mpa)	1.3	3180
Concrete precast	2.0	2780
Lumber	2.5	1380
Brick	2.5	5170
Cellulose insulation	3.3	112
Gypsum wallboard	6.1	5890
Particle board	8.0	4400
Aluminum (recycled)	8.1	21870
Steel (recycled)	8.9	37210
Shingles (asphalt)	9.0	4930
Plywood	10.4	5720
Mineral wool insulation	14.6	139
Glass	15.9	37550
Fiberglass insulation	30.3	970
Steel	32.0	251200
Zinc	51.0	371280
Brass	62.0	519560
PVC	70.0	93620
Copper	70.6	631164
Paint	93.3	117500
Linoleum	116	150930
Polystyrene Insulation	117	3770
Carpet (synthetic)	148	84900
Aluminum	227	515700

**NOTE:** Embodied energy values based on several international sources - local values may vary.

Illustration 03.21: A graph showing the embodied energy ratings of various materials. This graph fortunately gives energy ratings based in both MJ/Kg and in MJ/m<sup>3</sup>.

Source: [www.canadianarchitect.com](http://www.canadianarchitect.com)

## Materials & Maintenance.

One of the best ways to reduce waste in buildings is to design buildings which lend themselves to being conserved. (Buchanan, 2005:33)

Buchanan puts forward the idea that buildings should be what he calls, “...long life, loose fit: generously accommodating and generic in organization so as to adapt to, yet set a dignifying framework for, change over generations; hospitable and socially convivial rather than merely utilitarian; pleasant in character and relatively timeless rather than saddled with gratuitous gestures that quickly become passé” (Buchanan, 2005:33) Going on to say that, “...they would be largely made with robust materials that mellow with age and weathering...” (Buchanan, 2005:33)

When it comes to selecting materials, there are a number of sustainable considerations in addition to the embodied energy of each:

Firstly, the life-cycle of the building should be considered. Most buildings are not designed with the end in mind, with the more frequent result being demolition with hardly any recycling or re-use of any components or materials. This would be termed a ‘cradle-to grave’ construction method. (Buchanan, 2005:34)

There is however another option: designing with the end in mind, and producing a building that can go from ‘cradle-to-cradle’. This means that building with re-usable materials is ethical (Buchanan, 2005:39), as is considering the ability of future generations to easily re-use entire components or recycle materials off of the building. In addition, it makes little sense to choose construction materials that are themselves toxic, or require toxic cleansing or treatment.

## Conclusion.

Through this brief study of some of the broad environmental concerns of the *Regatta Centre*, it is clear to see that there are many environmental design concerns which need to be considered. Responsible site choice; a clear understanding of the climate being designed in; an understanding of the effect of the three major elements of sun, wind and rain; on-site energy production; efficient water conservation; and carefully considered materials and construction processes will be vital considerations to the overall success of the *Regatta Centre* design.

## 03.04 CONCLUSIONS.

In many ways, *relevant architecture* is simply expanding the definition of good design to include a wider set of issues. Traditionally, architecture dealt with several factors, but cost, schedule, functionality and aesthetics drove the decision-making process, or as Vitruvius discussed - firmness, commodity and delight.

Today, with the pressing issues of sustainability and a movement towards a wider more holistic approach to architecture, just the traditional is no longer enough. If the design of the proposed *Regatta Centre* is to be *relevant*, it will need to consider the social, economic and environmental design concerns discussed in this chapter.

25.



Illustration 03.22: Seattle's 'Pavilion in the Park', designed by Miller|Hull Architects, displays a 'cradle-to-cradle' nature as it can be completely disassembled and transported to a whole new location by breaking it into four separate modules. Furthermore, the building can be expanded or reduced as needed. All the materials of the building are environmentally-responsible materials, putting emphasis on recycled content and durability.

Source: [www.millerhull.com](http://www.millerhull.com)



illustration 04.01: Kayakers busy running with their K2 boat during the Dusi Canoe Marathon\_source: [www.flickr.com](http://www.flickr.com)

# PRECEDENTSTUDIES04

## 04. PRECEDENT STUDIES.

### 04.01 INTRODUCTION.

The precedent studies in this chapter are all of international building examples. A rowing boathouse and six regatta centres will be briefly analysed. Included in this chapter will be a short section on recent international design trends in various other water sports buildings reviewed.

### 04.02 UNIVERSITY BOATHOUSE, OXFORD, ENGLAND.

**Location:** Thames River, Oxford, England  
**Architect:** Belsize Architects  
**Function:** Boathouse/Social/Residential facilities  
**Completed:** 2007  
**Latitude:** 51°44'31.43"N  
**Longitude:** 1°14'59.15"W

*"The new Boathouse for the University College Oxford is a sporting facility that lifts its mass just above the ground - it is the shell of a boat, allowing water to pass beneath it while providing both sheltered as well as interactive space for participation in the rivers events."* (www.belsizearchitects.com)

#### Background & Brief.

Belsize Architects were one of four architectural practices invited to submit a proposal for the design of a new boathouse. Their scheme was chosen as the winning entry whose brief was to replace the old boathouse which had been destroyed in an arson attack a few years earlier.

#### Site & General Planning.

Situated on the side of the River Thames in Oxford, this double storey building is made up of two sections with a double volume central foyer. The brick-clad ground floor consists of a boat storage area, gym, boat repair area and changerooms. The timber-clad and glazed first floor consists of four open terraces, communal kitchen, communal lounge, club room, caretaker's flat, and seven athlete rooms.

#### Design Generators.

The design generators for the boathouse are said to draw on two main principles, which were directly inspired by the sport of rowing:

Boats, oars, and water, all of which exhibited unique characteristics, are said to be manifested in the design of the copper roof. *"The goal was to achieve a sort of blade cutting the sky, as the scull cut the river that first day we visited the site."* (www.belsizearchitects.com)

The architects wanted the ground level of the building to appear to be impenetrable by making it *"carry a lot of mass"*. (www.belsizearchitects.com) This as an attempt to 'fortify' the publically accessible outer walls from future vandalism.

#### Structural system & Materials.

The double storey building has a concrete frame which sits on deep concrete piles. The bottom floor is raised 800mm above ground level as the entire site is on a flood plain. The ground floor is clad in dark brown brick chosen for both its resistance to tampering, and as it was the predominate material used in the previous boathouse. The brick is in a stack bond format which emphasises the horizontal theme of the building. The first floor is clad with a combination of timber and glazing, resulting in the top half of the building having an appropriate light weight appearance compared to the 'heavy' ground floor.

27.



Illustration 04.02: The boathouse viewed from the front.

Source: www.belsizearchitects.com



**KEY PLAN 04.03**

- 1 Boat storage
- 2 Gym
- 3 Boat repairs
- 4 Changerooms
- 5 River

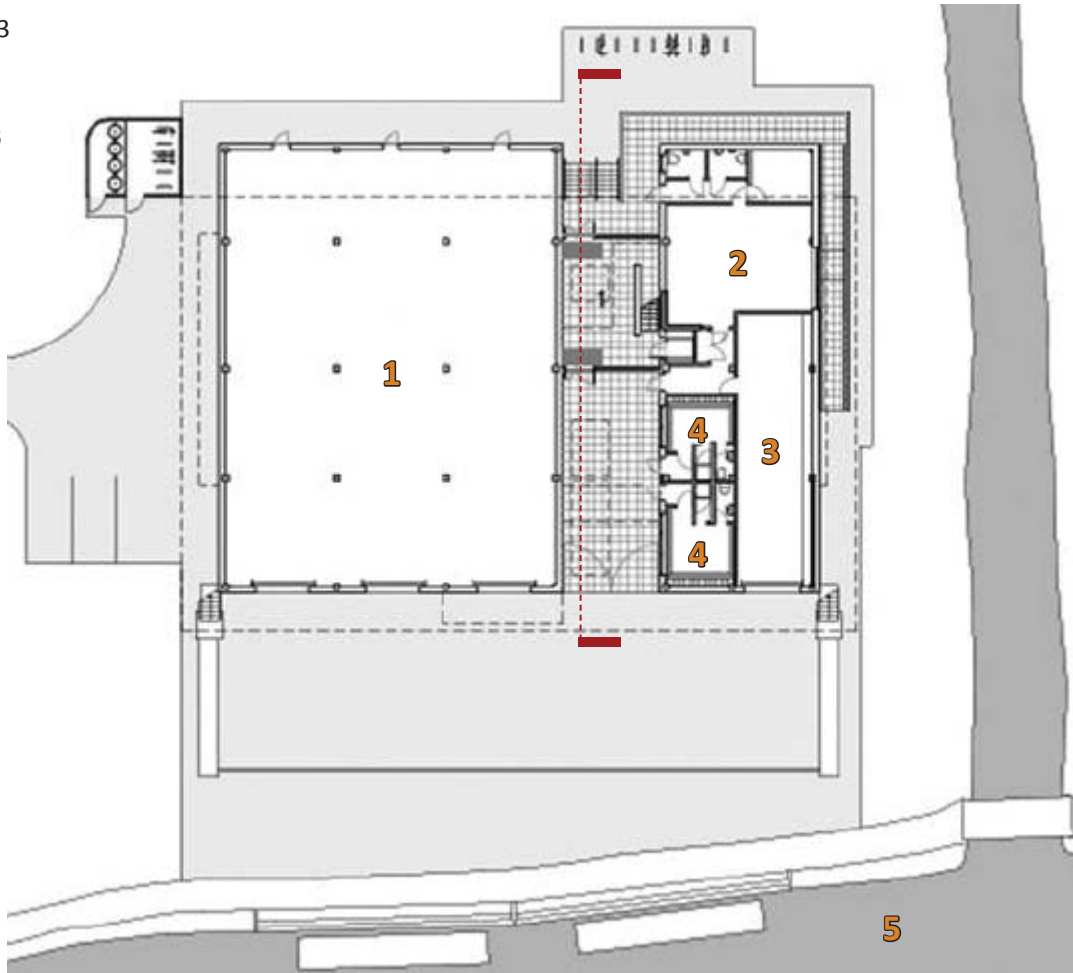


Illustration 04.03: **Ground floor plan.**

Source: [www.belsizearchitects.com](http://www.belsizearchitects.com)

**KEY PLAN 04.04**

- 1 Terrace
- 2 Kitchen / Lounge
- 3 Club room
- 4 Caretaker's flat
- 5 Athlete rooms

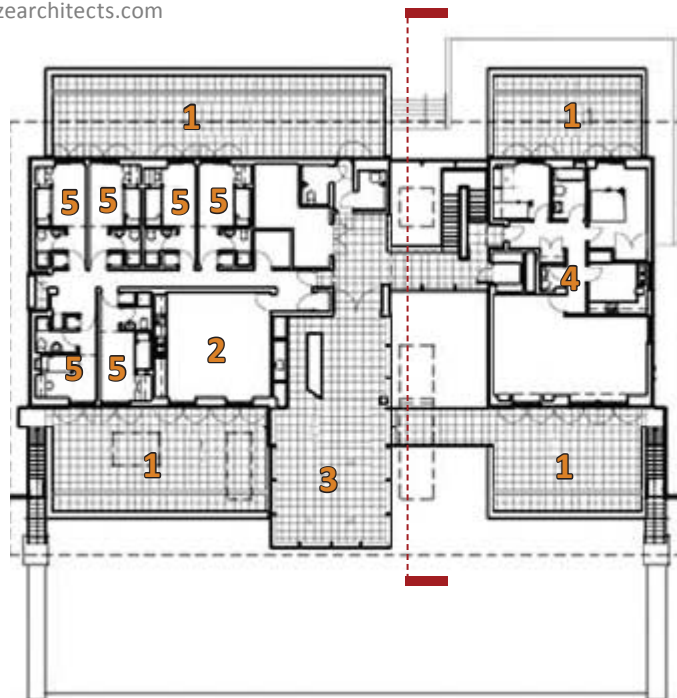


Illustration 04.04: **First floor plan.**

Source: [www.belsizearchitects.com](http://www.belsizearchitects.com)

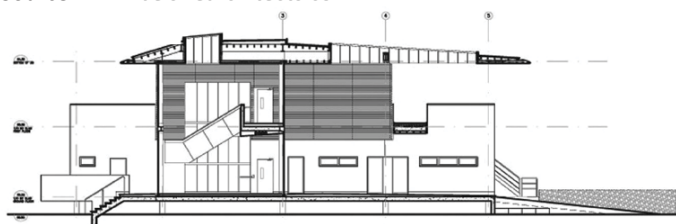


Illustration 04.05: **Boathouse section.**

Source: [www.belsizearchitects.com](http://www.belsizearchitects.com)

## Conclusion.

An analysis of this Boathouse building serves as an introduction to a recently completed international rowing facility. Its inclusion as a precedent, though not a Regatta Centre, highlights the need for a fundamentally different approach to a rowing facility than what is the case with this design.

Here the building is designed especially for its members, and makes little effort to engage with the public. This approach is not unique to this building; rather it has been the design approach of most rowing club buildings in the past, which has led to an 'exclusive stigma' surrounding the sport of rowing.

This traditional European type approach to a rowing club building will need to be challenged by the proposed *Regatta Centre* building, providing similar rowing facilities yet in a far more inclusive environment; whereby participation is openly encouraged instead of being limited to a selected few.

### To comment on the architecture of the boathouse:

For its purposes the building appears to function fine, and is commendable for its very compact design. The architects' subtle references to boats, oars and water in the design are appropriate; however, it does appear that he may have been too preoccupied with these rowing references, neglecting to truly capture the excitement of the sport being housed.

Arguably the largest criticism about this building is the very dark coloured materials that have been used so extensively on the external facades. This combined with the intention to make the building appear to be impenetrable at ground floor level has resulted in a very brutal response. Possibly the architect should have introduced materials that displayed more significant definition from one another, or introduced planting into various areas of the building to soften the buildings appearance.



Illustration 04.07: The front of the boathouse, with glass 'club room' projecting out towards the river.

Source: [www.flickr.com](http://www.flickr.com)



Illustration 04.08: Front of the boathouse from a different angle.

Source: [www.flickr.com](http://www.flickr.com)



Illustration 04.09: The boathouse viewed from the river at night.

Source: [www.flickr.com](http://www.flickr.com)

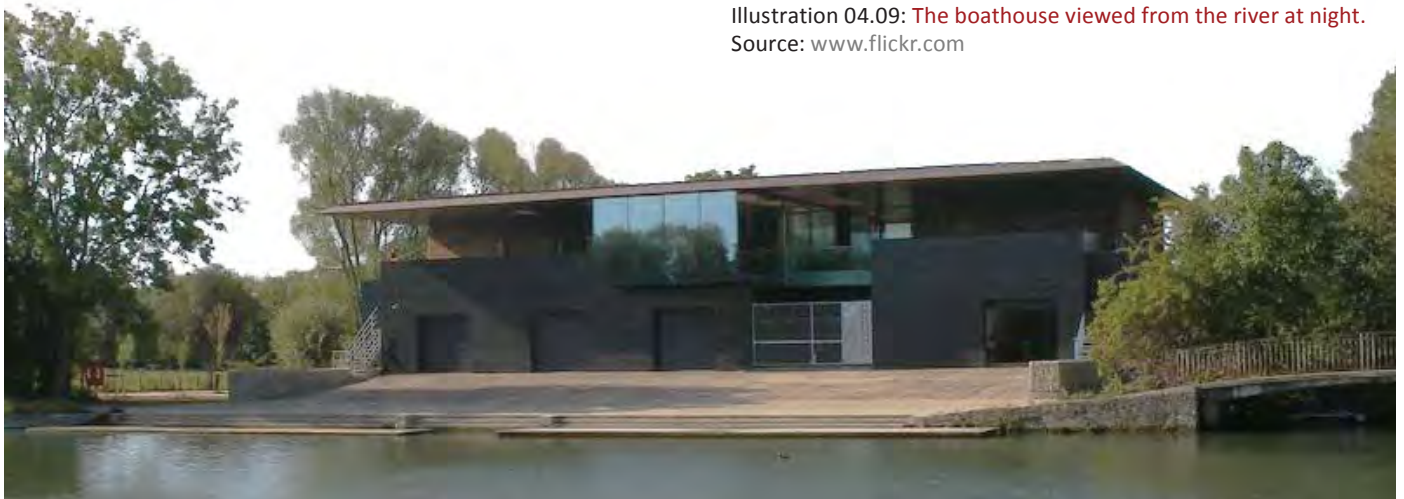


Illustration 04.06: The boathouse viewed from the river, clearly demonstrating the very dark building facade.

Source: [www.belsizearchitects.com](http://www.belsizearchitects.com)

## 04.03 INTERNATIONAL REGATTA CENTRE, SYDNEY, AUSTRALIA.

<b>Location:</b>	Penrith Lake, Sydney, Australia
<b>Architect:</b>	Woods Bagot Architects & Conybeare Morrison Architects
<b>Function:</b>	2000 Olympic Venue for Rowing; Canoeing & Kayaking flatwater events
<b>Completed:</b>	1997 / 1998
<b>Latitude:</b>	33°43'22.78"S
<b>Longitude:</b>	150°40'15.59"E

### Background & Brief.

The Sydney International Regatta Centre is located one hour's drive from Sydney's central business district at Penrith Lakes. The Centre was purpose-built to host the rowing and canoe/kayak flatwater events at the Sydney 2000 Olympic Games, and since then has been re-invented to become a popular sporting, corporate and social venue.

### Site & General Planning.

The Centre boasts both an international-standard regatta course and a warm-up course, with most of the Centre's facilities being located on an island between the two courses. Situated on the island are: a Spectator/Grandstand building; a Competitor/Boathouse building; a Finish Tower building; a large car park; and various regatta course facilities (such as - boat slipways, launching pontoons, presentation pontoon, rigging areas and temporary boat storage area). Along the length of the course there are: Timing Huts, a Starting Tower, an Aligners Hut, various regatta course roads and competition course amenities.

For major events the banks near the finish line on both sides of the competition course are used for temporary spectator grandstands and services. For day-to-day use these grassed areas are very popular for various recreational activities including picnicking and barbecuing.

### Competition Course.

The Sydney International Regatta Course is ranked as one of the top five rowing and sprint canoe/kayak courses in the world. The course is 2300m in length and can accommodate nine (13.5m wide) lanes for rowing or nine (9m wide) lanes for canoe/kayak sprint events. The course is a consistent 5m depth with rock-coated wave-absorbing banks which have indigenous trees planted along their length to limit the effect of cross-winds to ensure fair competition for athletes.

### Warm-Up Course.

A unique feature of the Regatta Centre is the 1500m warm-up course, which allows competitors to warm-up or train while a race is in progress. It also enables competitors to exit the competition course quickly after an event to cool-down, ensuring minimal delays between races. Sydney was the first regatta centre to implement this layout, as traditional artificial courses do not normally have a separate parallel warm-up course. Since Sydney, the same layout has been adopted by many other Regatta Centres.

The water in both the competition and warm-up course is controlled by a series of specifically designed detention basins. These receive water run-off from the local area, with various initiatives to maintain high standards of water quality. The introduction of wetlands, 25 000 indigenous underwater plants and over 70 000 bass to the centre, assists in maintaining the regatta course's ecosystem. (www.regattacentre.nsw.gov.au) 30.



Illustration 04.11: The Sydney 2000 Olympic Games logo.  
Source: www.goodlogo.com



Illustration 04.10: Spectator/Grandstand by Woods Bagot Architects (left) and Finishing Tower by Conybeare Morrison Architects (right).  
Source: BMP Steel brochure, 2003:2



Illustration 04.12: Warm-up course (left), island (middle) and competition course (right).  
 Source: BMP Steel brochure, 2003:2

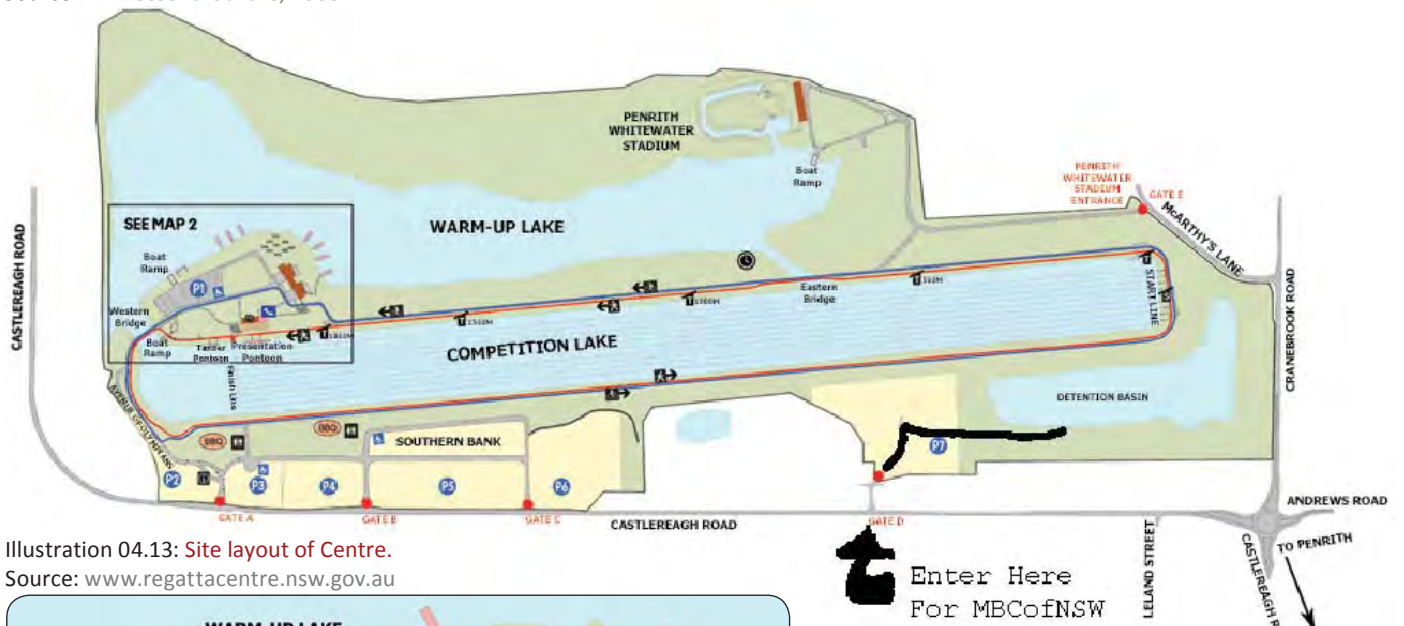
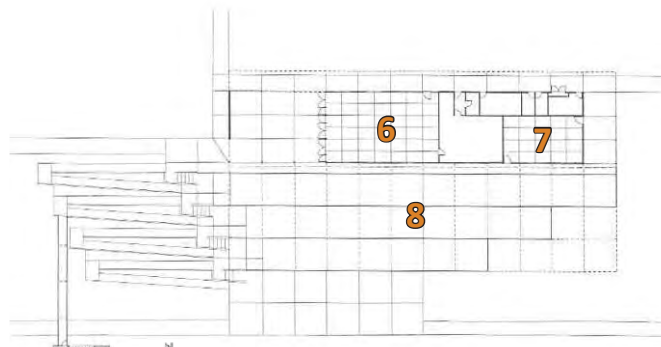


Illustration 04.13: Site layout of Centre.  
 Source: www.regattacentre.nsw.gov.au



Illustration 04.14: Island layout.  
 Source: www.regattacentre.nsw.gov.au



3 Illustration 04.15: Upper level plan of Spectator/Grandstand building.

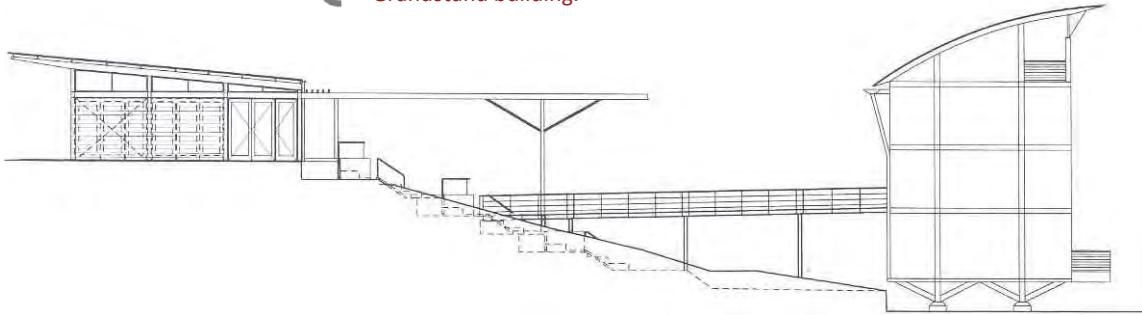


Illustration 04.16: Cross section through Spectator/Grandstand building, (left) and Finish Tower building (right)

**KEY PLAN (04.15,16, 17,18,19)**

- 1 Spectator/Grandstand building
- 2 Competitor/Boathouse building
- 3 Finish Tower building
- 4 Competition Course
- 5 Warm-up lake
- 6. Regatta Kitchen & Bar/Function Room
- 7. Museum
- 8. Spectator Grandstand
- 9. Viewing Terraces
- 10. Seminar Room
- 11. Boatshed Function Room
- 12. Function Room
- 13. Storeroom
- 14. Boathouse (Boatshed)
- 15. Changerooms

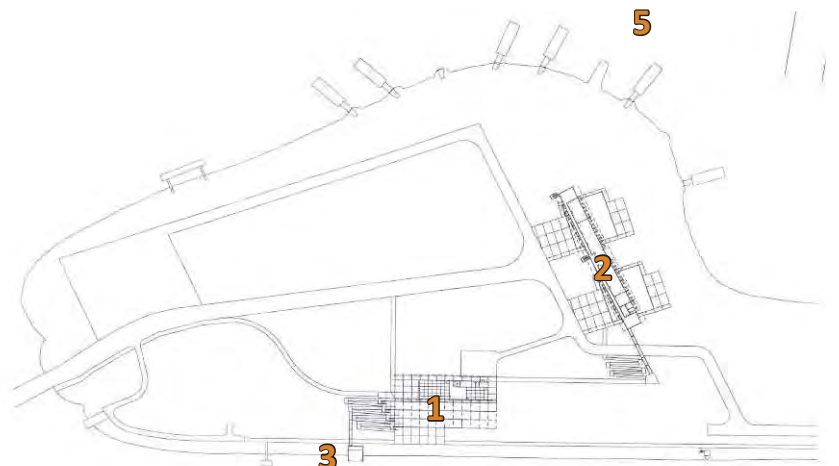


Illustration 04.17: Island layout plan.

32.

Source: Hughes, 2000:58

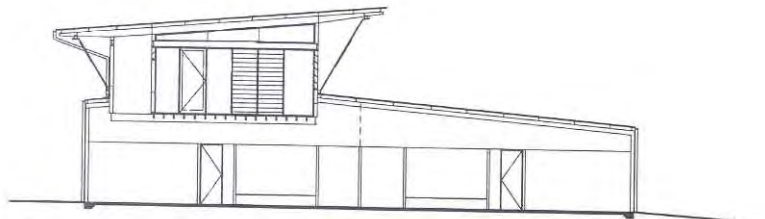


Illustration 04.18: Cross section through Competitor/Boathouse building.

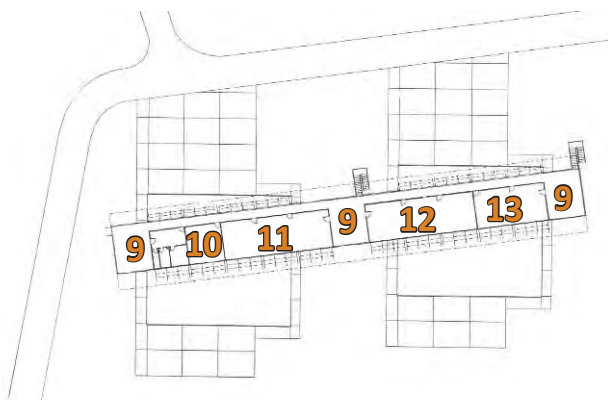


Illustration 04.19: First floor plan of Competitor/Boathouses building.



Illustration 04.20: Ground floor plan of Competitor/Boathouse building with 3 boathouse units on the left and 3 on the right.

**KEY PLAN (04.21)**

- 1 Judges platform
- 2 Commentary room
- 3 Timing area
- 4 Service balcony
- 5 Double volume

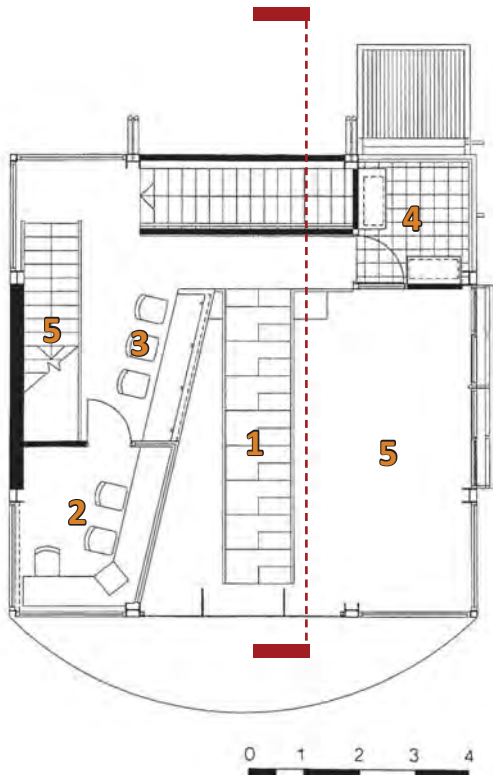


Illustration 04.21: Mezzanine floor plan of Finish Tower building.

Source: Conybeare Morrison Architects

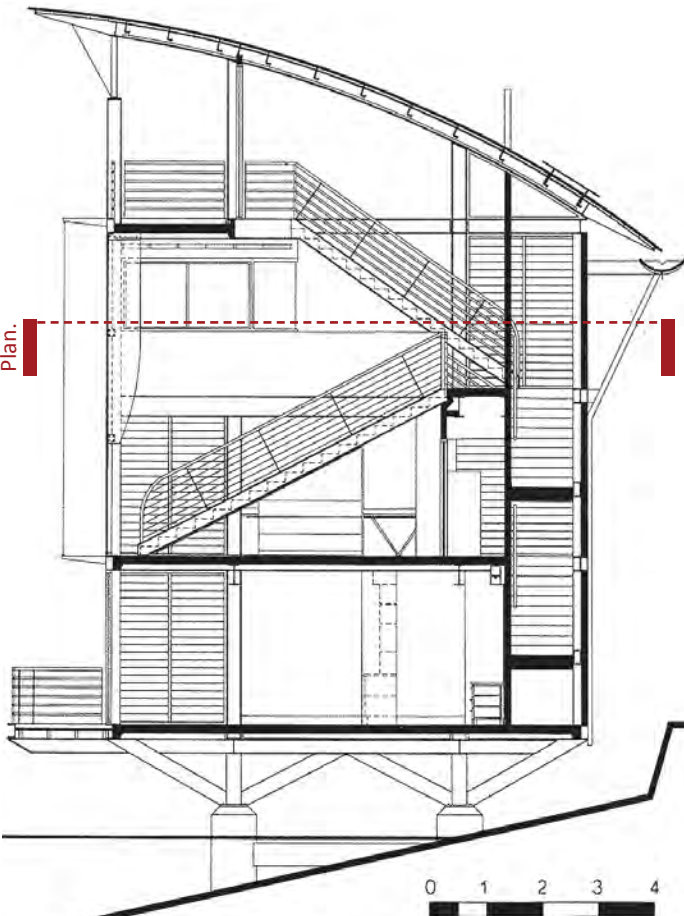


Illustration 04.22: Section of Finish Tower building.

Source: Conybeare Morrison Architects



Illustration 04.23: Finish Tower.

Source: Conybeare Morrison Architects

### **Spectator/Grandstand Building.**

The Spectator/Grandstand building offers views over the competition course with permanent covered seating for 1000 spectators. The grandstand is set into an artificial mound, with the gentle slope providing informal areas for people to picnic and watch races. Function rooms in the grandstand are located above instead of below the terraces. *“This enables passive heating, lighting and cooling to be utilised as well as maximizing natural light and ventilation.”* (Hughes, 2000:57) The building is fully accessible to special needs persons with tactile ground surface indicators, ramps and fully accessible toilets.



Illustration 04.24: **Spectator/Grandstand building.**  
Source: Hughes, 2000:57

### **Competitor/Boathouse Building.**

The Competitor/Boathouse building offers views over the warm-up course. Boathouses on the ground floor are used to store boats and house changeroom amenities. There are six boathouse units each 6.5m x 24m, holding up to 25 boats and equipment, and are leased out to various schools, clubs and associations. The 1<sup>st</sup> floor referred to as the Boathouse Pavilion is described as being *“...a lightweight linear bar slung at an angle between the two blind boxes of the boathouses below...”* (Hughes 2000:58) The Pavilion is basically a steel clad verandah covering: seminar, function, administration and restaurant areas.



Illustration 04.25: **Competitor/Boathouse building.**  
Source: Hughes, 2000:59

### **Finish & Start Towers, Aligner Hut & Timing Huts.**

The Centre features a permanent Finish Tower, Start Towers, Aligners hut and Timing Huts. These buildings provide state of the art facilities for event officials, timing judges, commentators and TV camera crews. The buildings are all modular cubes clad in corrugated steel and glass, topped by curved roofs equipped with

solar panels. These solar panels supply energy for timing equipment with the excess electricity being sent back into the local electricity grid. (Hughes 2000:59)



Illustration 04.26: **Finish Tower building.**  
Source: [www.regattacentre.nsw.gov.au](http://www.regattacentre.nsw.gov.au).

### **Boathouse Function Room.**

The Boathouse Function Room is located in the Competitor/Boathouse building and is an open-plan space which can be set up as required to accommodate up to 50 people for presentations (theatre style), and 30 people for workshops (meeting style). The room has views over the island and warm-up course.



Illustration 04.27: **Boathouse Function Room.**  
Source: [www.regattacentre.nsw.gov.au](http://www.regattacentre.nsw.gov.au).

### **Seminar Room.**

The Seminar Room is located in the Competitor/Boathouse building and seats up to 14 people; used for board meetings, training and small workshops. This room also functions as a break out room for the Boathouse Function Room, and has views of the warm-up course and Lower Blue Mountains.



Illustration 04.28: **Seminar Room.**  
Source: [www.regattacentre.nsw.gov.au](http://www.regattacentre.nsw.gov.au).

### SIRC (Sydney International Regatta Centre) Museum.

The SIRC Museum located in the Spectator/Grandstand building commemorates Australia's place in Olympic Games history through displaying rowing and canoe/kayak memorabilia from the Sydney Olympics. The Museum doubles as both a museum and function room and can accommodate up to 25 people for a range of functions. The room has views over the competition course and the Lower Blue Mountains.



Illustration 04.29: SIRC Museum.  
Source: [www.regattacentre.nsw.gov.au](http://www.regattacentre.nsw.gov.au).

### The Regatta Kitchen & Bar Restaurant.

The Regatta Kitchen and Bar Restaurant located in the Spectator/Grandstand building is used for a variety of corporate and social functions and can be set-up to cater for various requirements. During major events the Regatta Kitchen and Bar staff operate a kiosk on site as well as additional catering vans if there is sufficient demand. The restaurant has views of the competition course and Lower Blue Mountains.



Illustration 04.30: The inside of the 'Regatta Kitchen Restaurant.'  
Source: [www.regattacentre.nsw.gov.au](http://www.regattacentre.nsw.gov.au).

### Day Visitor Facilities.

Set on 196 hectares of indigenous and landscaped parkland with scenic views of the Lower Blue Mountains and the Penrith Courses. The Centre offers unique facilities suitable for all kinds of recreational activities, and with the grounds open to the public seven days a week is a very popular destination for day visitors.



Illustration 04.31: The Centres grounds are a very popular destination for day visitors.  
Source: [www.regattacentre.nsw.gov.au](http://www.regattacentre.nsw.gov.au).

### Structural System & Materials.

Steel roof and wall cladding combined with lightweight steel-framed structures and recycled timber; provide a building solutions to the Centre.

*"Materials are carefully chosen for both their elegance and durability: recycled timber, canvas awnings, polished concrete floors and crispy articulated steel frames allude to the functional expressiveness of traditional boat sheds, here reinterpreted in an intelligent yet festive contemporary synthesis."* (Hughes, 2000:59)



Illustration 04.32: The structure of the Spectator Grandstand under construction.  
Source: [www.regattacentre.nsw.gov.au](http://www.regattacentre.nsw.gov.au).



### Design Concepts.

One of the main concepts of the Centre was in keeping with a sustainable theme. All the buildings of the Centre utilise natural ventilation and natural lighting. Ventilation from cross breezes is achieved by keeping shallow plans; none of the buildings rely on air conditioning. Sun penetration is controlled by sun awnings and sun screens.

Another concept of the centre was, *“Deferring to the dominant presence of water, the new buildings on the site are conceived as modest, functional pavilions, but they also engender something of the festive spirit of a regatta. (Renoir’s The Boating Party depicting picnicking revellers by the Seine conjures up the appropriate mood.)”* (Hughes, 2000:57)



Illustration 04.33: Renoir's, Luncheon of the Boating Party.  
Source: [www.artistsforum.org](http://www.artistsforum.org)

### Conclusion.

Overall, this precedent provides a comprehensive example of a modern International Regatta Centre. The design appears to work well, and based on its popularity and high regard by athletes, is a success.

One of the key factors to the success of the Centre, which is lacking in the previous precedent study is its well balanced multi-functional approach, illustrating that a regatta centre can be far more than just a sporting facility, but can in fact be a place of significance within society.

An overview of the design has highlighted a few important aspects worth considering at this point:

Firstly, Australia has a completely different socio-economic environment to that currently prevailing in South Africa. This very large somewhat elaborate layout may be easily justified in Australia, however such a layout would be very difficult to justify in South Africa.

The design of the proposed *Regatta Centre* will need to strike a balance of providing similar facilities which meets the requirements of an International Regatta Centre, however within a far more compact and less elaborate response.

Secondly, the island layout is an interesting response; this unique layout however has not been done much justice by the architect as parking, roads and buildings on the site seem to be haphazardly placed. The large bare tarred park lot is a very harsh response within the 'park like' setting, the roads on the island seem to slice the island up into awkward shapes and sizes and the buildings especially the two main buildings seem to lack any kind of attempt to acknowledge one another in their layout.

The proposed *Regatta Centre* will need to carefully consider how it will handle parking large amounts of cars in a manner that is suitably appropriate for its immediate environment. Its design will need to carefully consider circulation routes for vehicles so that they do not negatively disturb the integrity of the site and the proposed *Regatta Centre* buildings will need to be well linked to one another so that buildings read as one centre instead of completely separate entities.

Finally the Centres buildings claim to *“engender something of the festive spirit of a regatta.”* The proposed *Regatta Centre* will need to carefully consider how it will capture the 'festive spirit' and celebrate the sports being catered for.

## 04.04 SHUNYI OLYMPIC AQUATIC PARK, BEIJING, CHINA.

**Location:** Shunyi District, Beijing, China  
**Architect:** BlighVollerNield & EDAW (China)  
**Function:** 2008 Olympic Venue for: Rowing;  
flatwater Canoeing & Kayaking;  
Canoe/Kayak slalom; and  
marathon swimming events

**Completed:** 2007  
**Latitude:** 40°10'27.86"N  
**Longitude:** 116°41'8.33"E

### Background & Brief.

The Shunyi Aquatic Park is located 30 minutes drive from the centre of Beijing in the Shunyi District. The Park was purpose-built to host: the rowing and canoe/kayak flatwater events; the canoe/kayak slalom events; and the marathon swimming events at the Beijing 2008 Olympic Games. The Park is now used to serve the people of Beijing, being the largest water sports training base in Asia.

### Site & General Planning.

The Shunyi Aquatic Park was the winning design in an international competition for a regatta centre and whitewater park. The 31 850m<sup>2</sup> facility occupies the largest site of any of the Beijing Olympic Games venues, and was designed to embody the Beijing Games' three Olympic themes: 'the people's Olympics,' 'the high-tech Olympics' and 'the green Olympics.' The venue's design is also said to symbolise Chinese cultural characteristics.

The regatta centre section of the Park has a layout similar to that of the Sydney precedent, also having an artificial competition and warm-up course with an island between the two. There is a Spectator/Grandstand building, a Competitor/Boathouse building, and a Finish Tower building. However, in contrast to Sydney, the Competitor/Boathouse building is situated directly after the finish line and not on the island.



Illustration 04.35: The Beijing 2008 Olympic Games logo.  
Source: [www.goodlogo.com](http://www.goodlogo.com)

37.



Illustration 04.34: The Finish Tower (left), Spectator/Grandstand building (middle), temporary spectator grandstand (right) and video boards (far right)

Source: BlighVollerNield Architects



Illustration 04.36: Aerial photo of the Aquatic Park.  
 Source: BlighVollerNield Architects



Illustration 04.37: Warm-up course (left), island (middle) and competition course (right).  
 Source: BlighVollerNield Architects

### Spectator/Grandstand Building.

The Spectator/Grandstand building is a two storey curved-roofed structure with permanent covered seating for 1200 spectators. Unfortunately the exact functions housed in the building are unclear as there was a lack of information available on the planning of the building. What is clear however from the various photos analysed is that there has been no expense spared in its construction.

The curved form of the building is an exciting shape, appearing to look like a wave or even the underside of a boat. Regrettably the building appears to have been thoughtlessly placed on its site, with very little effort made to appropriately ground the building in the surrounding landscape. This is in stark contrast to the Sydney precedent, where the architects made a conscious effort to nestle their Spectator/Grandstand building into the site. Early ideas of having the building appear to be floating in pools of water, appear to have been completely lost in the final design.

In addition to the permanent seating, the Aquatic Park has the capacity to cater for an additional 15 800 temporary seats and 10 000 standing-room spaces for the purpose of major events. (www.en.beijing2008.cn)



Illustration 04.40: The viewing terrace of the Spectator/Grandstand building overlooking the main grandstand seating, victory ceremony pontoon and competition course.

Source: BlighVollerNield Architects



Illustration 04.41: The interior of the Spectator/Grandstand building, 39.

Source: BlighVollerNield Architects

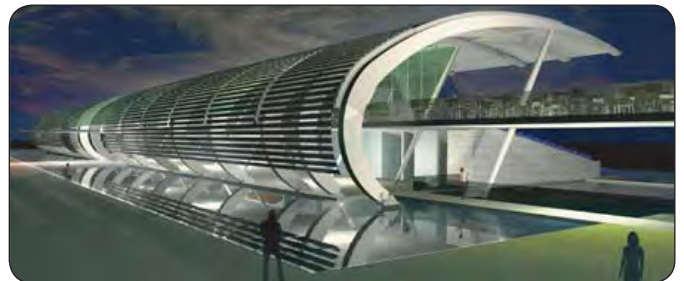


Illustration 04.42: An early artist's impression of the Spectator/Grandstand building showing the building 'floating' in a pool of water.

Source: en.beijing2008.cn



Illustration 04.38: One of the many temporary grandstands set-up for the 2008 Olympics.

Source: BlighVollerNield Architects



Illustration 04.39: The Finish Tower building (left) with the Spectator/Grandstand building (right).

Source: BlighVollerNield Architects

### Competitor/Boathouse Buildings.

The Competitor/Boathouse building is a two storey structure, consisting of two identical curved roofed buildings, connected by a walkway. Like the Spectator/Grandstand building there was limited information available on the functions housed. What is known is that there are twelve boathouse units and changeroom facilities on the ground floor.

From the analysis of photos, the overall appearance of the building is disappointing. The repeated curved modules lack variety and distinction from one another, which has resulted in monotonous facades. Possibly the architect should have been more playful with the elevation treatment.

This building displays a common problem associated with double storey boathouse buildings. The large, duplicated boathouse units on the ground floor define and limit the plan of the level above, which in turn results in the elevation being repetitive and often unexciting.

If the proposed *Regatta Centre* is to have double storey boathouses there will need to be a conscious design decision made in their design to avoid this problem.



Illustration 04.45: Competitor/Boathouse building from the back.  
Source: BlighVollerNield Architects



Illustration 04.46 The walkway connecting the two buildings.  
Source: BlighVollerNield Architects



Illustration 04.43: Competitor/Boathouse building (background), with regatta course road (foreground).  
Source: en.beijing2008.cu



Illustration 04.47: Section of the Competitor/Boathouse building.  
Source: BlighVollerNield Architects

40.



Illustration 04.44: View down the competition course, with Competitor/Boathouse building situated at the end of the course.  
Source: BlighVollerNield Architects

### Finish Tower Building.

The Finish Tower building has five storeys, with rooms in the front and a circulation shaft on the back. From the analysis of photos it is clear that transparency was one of the key design generators of the building, as a large amount of glass has been used. With no external sun control visible the potential heat gain as a result of all this glass is questionable. The rigid rectangular form of the tower seems to work well juxtaposed against the curved form of the Spectator/Grandstand building, however the tower design does seem to lack finesse in its final result.

There are two areas of concern regarding the design of the tower. Firstly, there seems to have been very little effort in gracefully placing the tower onto the site. And secondly the tower ends abruptly at the top floor. This is in stark contrast to the Sydney Regatta Centre where the architects celebrated and expressed the way that the building sits on the site and used the curved roof of the tower to delicately 'meet the sky'.



Illustration 04.50: Spectator/Grandstand building (left) with Finish Tower building (right)

Source: BlighVollerNield Architects



Illustration 04.48: An early artists impression of the Finish Tower.  
Source: en.beijing2008.cn

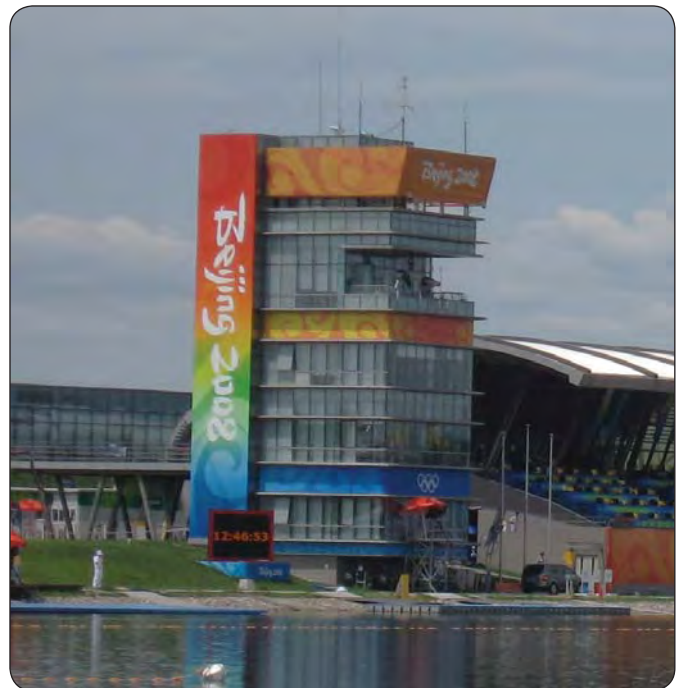


Illustration 04.51: Finish Tower building clad in Olympic banners, during the 2008 Olympics.

Source: BlighVollerNield Architects



Illustration 04.49: Side view of the Finish Tower building.  
Source: BlighVollerNield Architects

### Whitewater Park / Slalom Course.

Unlike the previous two precedents, the Shunyi Aquatic Park has a Whitewater Park as part of its design. The Whitewater Park consists of the following facilities: an Olympic-Standard whitewater canoe/kayak slalom course; public whitewater rafting facilities; community swimming pools; water play areas; administration building; athlete building; boathouse facilities and the capacity to cater for up to 10 000 temporary spectator seats during major events.

An interesting point to mention about the Shunyi Slalom course design is that it relies entirely on mechanically pumped water to service the course. This type of system surely cannot be all that feasible when there are precedents for facilities that rely purely on natural flow of water or even pumped systems that are assisted by naturally flowing water.



Illustration 04.52: The Shunyi Whitewater Park.

Source: BlighVollerNield Archi



Illustration 04.53: Temporary spectator grandstands during the 2008 Olympic events.

Source: BlighVollerNield Architects



Illustration 04.54: Athletes navigating the hanging 'gates'.

Source: BlighVollerNield Architects

### Conclusion.

From the information available on the Park it appears to function well. The Park is still relatively new and only time will tell if it is to be a success. Unfortunately, as plans of the buildings were not available it is difficult to critically comment on the success of the architecture.

An aspect of the architecture which can be commented on is that it appears as though the architect in an attempt to achieve 'high tech' looking buildings has neglected to capture the excitement of the sports being housed. The venue's design also claims to symbolise Chinese cultural characteristics, however these are not apparent.

Like the Sydney Regatta Centre this type of facility would be very difficult to justify in South Africa. The theme park approach, may work in China because of its large population, yet in South Africa with a smaller population is far to elaborate.

On a more practical note, an area which is of concern is the artificially constructed competition, warm-up and slalom courses. All these courses were completely purpose-built for the Park, which would have required a great deal of resources in their construction and future running. It is hard to believe that this was the only option available, surely a more sustainable approach; perhaps linking into an existing water network instead of just creating a completely new one would have been more appropriate.

42.

Finally, even though it is not the intention of this dissertation to design a slalom course and the associated facilities. It does however make logistical sense to have both flatwater and slalom facilities in close proximity to one another. The proposed *Regatta Centre* design should take this into consideration when choosing a site.

## 04.05 ETON COLLEGE ROWING CENTRE, DORNEY LAKE, ENGLAND.

**Location:** Windsor & Maidenhead, England  
**Architect:** Philip Tilbury  
**Function:** 2012 Olympic Venue for Rowing;  
Canoeing & Kayaking flatwater events  
**Completed:** 2000  
**Latitude:** 51°29'14.85"N  
**Longitude:** 0°39'2.89"W

### Background & Brief.

The Eton College Rowing Centre is situated at Dorney Lake, near Windsor, about 80km west of London. The lake was originally constructed to provide a rowing course for Eton College pupils. However, it has subsequently exceeded expectations, becoming a world-class rowing and canoe/kayak venue. Currently the Centre's facilities are being enhanced in preparation for the London 2012 Olympic Games and the London 2012 Paralympic Games, as the venue will be hosting these events.

### Site & General Planning.

Like the Sydney Regatta Centre, the Eton College Rowing Centre is set in a parkland setting, catering for a large variety of functions including: corporate hospitality events, private hospitality events, rowing events, canoe/Kayak events and various other sporting functions.

The venue consists of the following facilities: An international-standard competition course (2200m long, 140m wide, (8 X 13.5m lanes), and 3.5m deep) a parallel warm-up course (2000m long, 80m wide, 5m X 13.5m lanes and 2.5m deep) and various regatta course roads. The main building of the Centre is located after the finish line with: boathouses, changing facilities, function facilities, and training facilities (Training facilities include

a fully-equipped gymnasium, as well as indoor rowing facilities). There are various regatta course buildings along the length of the competition course, including a newly completed Finish Tower building.

In preparation for the 2012 Olympics, there will be various enhancements made to the venue which will include: additional access points to the site; enhancements to the warm-up course; and the construction of temporary spectator facilities to accommodate about 30 000 seats. ([www.london-2012.co.uk](http://www.london-2012.co.uk))



Illustration 04.56: The London 2012 Olympic Games logo.  
Source: [www.goodlogo.com](http://www.goodlogo.com)

43.



Illustration 04.55: Front view of the main building at the rowing centre, with launching pontoons in front.  
Source: [www.architen.com](http://www.architen.com)





Illustration 04.57: An event at the 2006 Rowing World Championships at Eton, with temporary spectator facilities set-up for the event.  
Source: [www.flickr.com](http://www.flickr.com)



44.

Illustration 04.58: The Eton College Rowing Centre site, with the newly constructed; warm-up course (left); competition course (right) and main rowing centre building (foreground).  
Source: [www.construct2012.co.uk](http://www.construct2012.co.uk)

### Conclusion.

There was very limited information available on the design of this facility. There are however a few aspects worth mentioning:

The transformation of an existing venue into an Olympic venue is a responsible approach as an alternative to completely purpose-built facilities like that of the Sydney and Beijing precedents. The proposed *Regatta Centre* design should investigate how it may also possibly re-use existing infrastructure in its design and construction.

The natural park setting of Eton, like that of the Sydney Regatta Centre, has proven to be very popular with athletes as well as the general public. The proposed *Regatta Centre* design should consider how it may provide or enhance a similar 'park-like' setting.

Finally, from the photos available of the Centre's buildings, it appears as though the architecture lacks the excitement of the sports being housed. Rather the primary goal of the aesthetic appearance of the building seems to be in keeping with an old historical looking building.

The architecture of the proposed *Regatta Centre* will need to explore how in its design it may capture the excitement of the sports being catered for, celebrating sport through its architecture.



Illustration 04.60: Temporary grandstand seating set-up for the 2006 Rowing World Championships.

Source: [www.flickr.com](http://www.flickr.com)



Illustration 04.61: The recently completed Finish Tower building which is different to the Sydney and Beijing examples only having two enclosed storeys.

Source: [www.ngarchitectural.co.uk](http://www.ngarchitectural.co.uk)



Illustration 04.59: Front view of the main building at the rowing centre.

Source: [www.flickr.com](http://www.flickr.com)

## 04.06 THE LONDON REGATTA CENTRE, DOCKLANDS, LONDON, ENGLAND.

**Location:** Docklands, East London, England  
**Architect:** Ian Ritchie Architects  
**Function:** Regatta Centre  
**Completed:** 1999  
**Latitude:** 51°30'27.88"N  
**Longitude:** 0°2'32.01"E

### Background & Brief.

The London Regatta Centre provides permanent facilities for local, national and international rowing activities organized by the Royal Albert Dock Trust. Home of the Royal Albert Rowing Club, the Centre's facilities are also extensively used by various other clubs and school teams. The site is located at the north-western corner of the Royal Albert Dock adjacent to the finishing line of the newly extended 2000m long regatta course.

### Site & General Planning.

The design of the Centres building has been planned in response to the shape of its site, and consists of two separate buildings: a Boathouse building with boat storage and ancillary workshop; and a Clubhouse building which houses a variety of club amenities, a gymnasium and restaurant. Both the buildings are defined by freestanding 3.5m high stone-filled gabion walls, and are linked by an access spine which runs the full length of the site.

The site is well located and is easily accessible being near public transport as well as main connection roads. The site is also located near various other sporting facilities and a number of educational institutions.



Illustration 04.63: View of the Royal Albert Dock.  
Source: [www.flickr.com](http://www.flickr.com)

46.



Illustration 04.62: Clubhouse building (left), and gabion wall and roof of the Boathouse building (right).  
Source: [www.ianritchiearchitects.co.uk](http://www.ianritchiearchitects.co.uk)

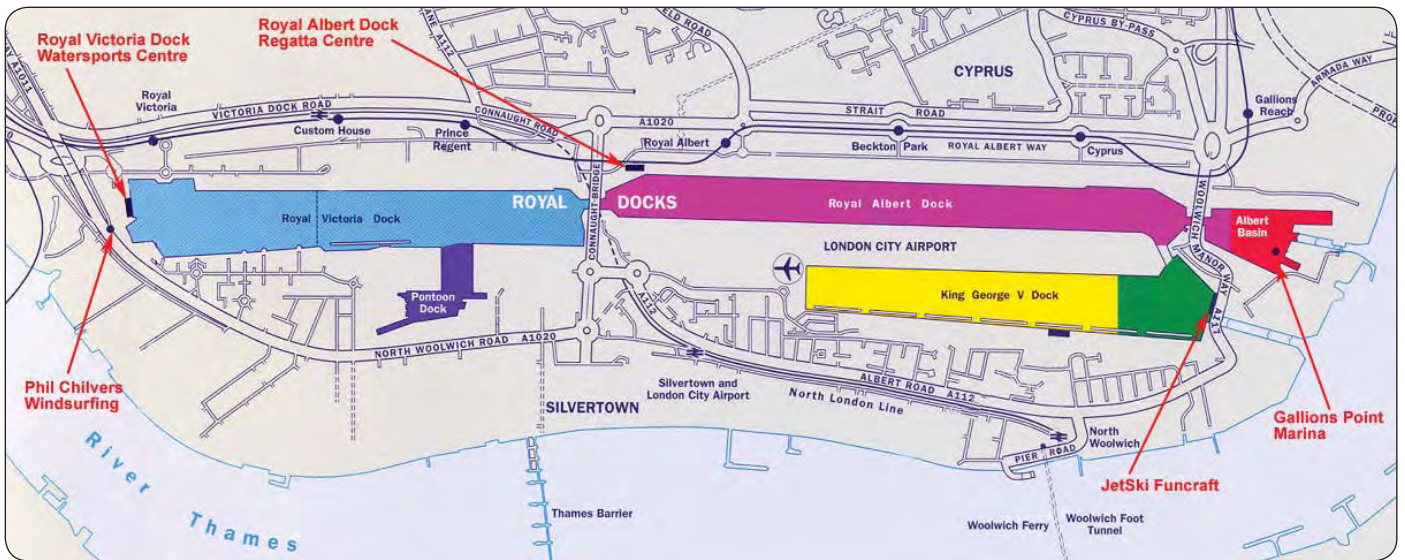


Illustration 04.64: Locality plan showing the three Royal Docks, which are now extensively used for various water sport activities.

Source: www.rowability.com

**KEY PLAN 04.65**

- 1 Clubhouse building
- 2 Boathouse building
- 3 Access spine
- 4 Parking area
- 5 Small train viaduct over site
- 6 Road
- 7 Boardwalk
- 8 Launching pontoons/jetty
- 9 Royal Albert Dock (Regatta Course)

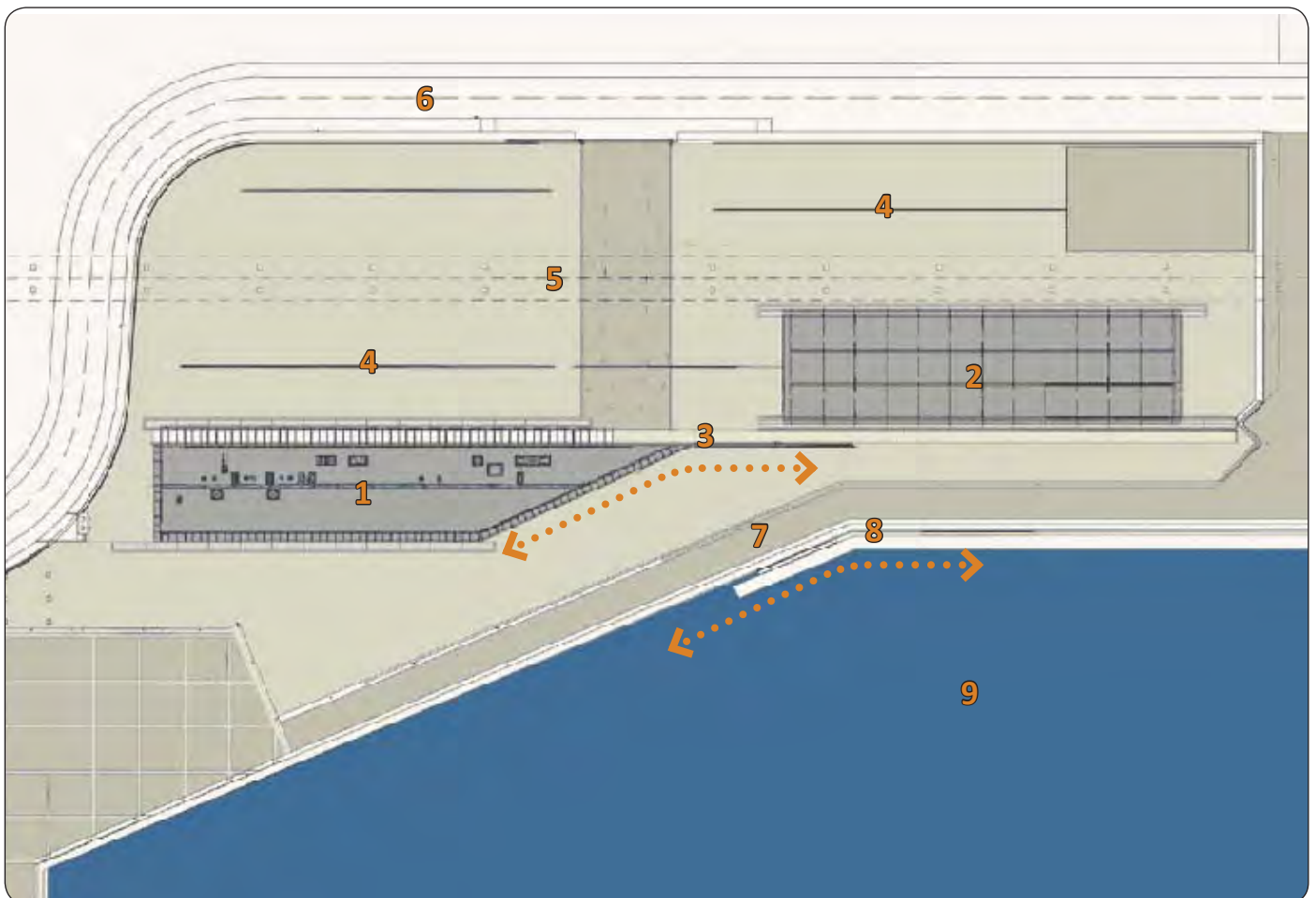


Illustration 04.65: Site plan of the Centre Clubhouse building (left) and the Boathouse building (right).

Source: www.ianritchiearchitects.co.uk

### The Boathouse Building.

The Boathouse building consists of three 6m wide, 4.5m high and 70m long bays totalling an area approximately 1150m<sup>2</sup>. At each end of the building there are metal sliding doors where boats exit and enter the boathouse, with large uninterrupted gabion walls running the full length of the front and back facades. Above the gabion walls there is a wavy shaped roof, which is constructed of stainless steel sheeting suspended from a galvanised steel frame hung in cantenary. The gap between the gabion walls and the roof allow for ventilation and natural lighting of the interior, with the architect successfully using this gap to give the roof an appropriate lightweight floating appearance.



Illustration 04.69: The Boathouse viewed from the one end, with large steel doors where boats exit and enter the boathouse.

Source: [www.ianritchiearchitects.co.uk](http://www.ianritchiearchitects.co.uk)

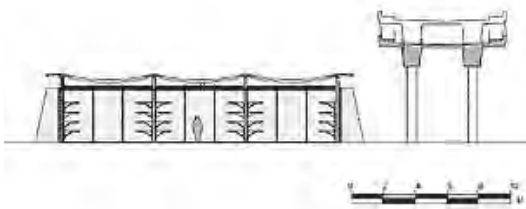


Illustration 04.66: Boathouse section.

Source: [www.ianritchiearchitects.co.uk](http://www.ianritchiearchitects.co.uk)

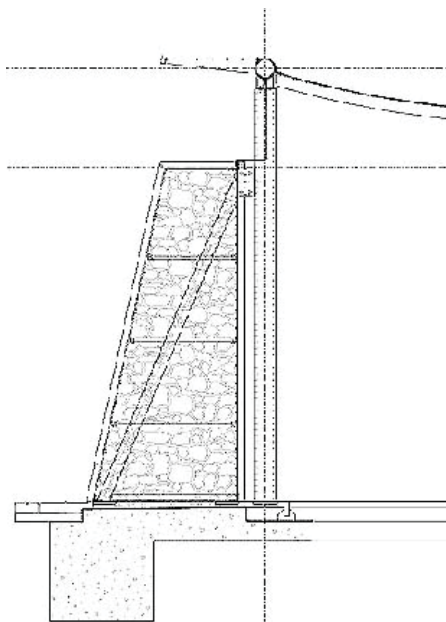


Illustration 04.67: Gabion wall detail. The use of gabion walls is more often associated with civil engineering than architecture, however this is a very appropriate technique regarding the previous industrial nature of the site being a working dock.

Source: [www.ianritchiearchitects.co.uk](http://www.ianritchiearchitects.co.uk)



Illustration 04.70: Interior view of the boathouse with gap between the gabion wall and roof allowing light and ventilation into the space.

Source: [www.ianritchiearchitects.co.uk](http://www.ianritchiearchitects.co.uk)

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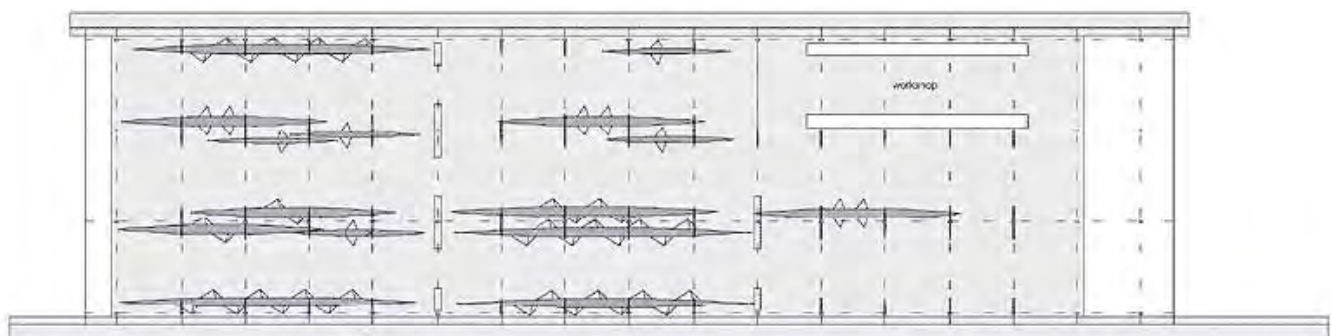
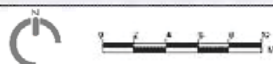


Illustration 04.68: Boathouse plan.

Source: [www.ianritchiearchitects.co.uk](http://www.ianritchiearchitects.co.uk)



### The Clubhouse Building.

The Clubhouse building is a 90m long, 20m wide two storey structure. The ground floor houses: entrance lobby; offices; physiotherapy/massage room; medical room; gymnasium; rowing tank; changing facilities; and plant room. Whilst the first floor contains: upper lobby; bar; viewing balcony; restaurant; kitchen; meeting room; temporary athlete accommodation; and caretaker's flat.

The external envelope of the building is a mix of glazing, metal-clad blockwork and fair-faced concrete walls. The ground, first floor, and roof are all flat concrete slabs of varied thickness. The first floor and roof slab are supported by circular concrete columns, a 90m concrete feature wall to the north and various internal shear walls. On both the south and west faces of the building there are balconies. The south balcony is made of steel and timber which cantilevers from the first floor slab, whilst a steel and glass canopy cantilevers from the north wall, creating an enclosure between the building and the gabion.

The clubhouse building cleverly sits back from the north-side gabion wall moving towards the water, with wall to create an access buffer zone spine running the length of the building. Terraces on the second level sail over the gabion to the south providing viewing areas from the bar and restaurant of racing events and the activities of the London City Airport.



Illustration 04.72: Clubhouse building.  
Source: [www.ianritchiearchitects.co.uk](http://www.ianritchiearchitects.co.uk)

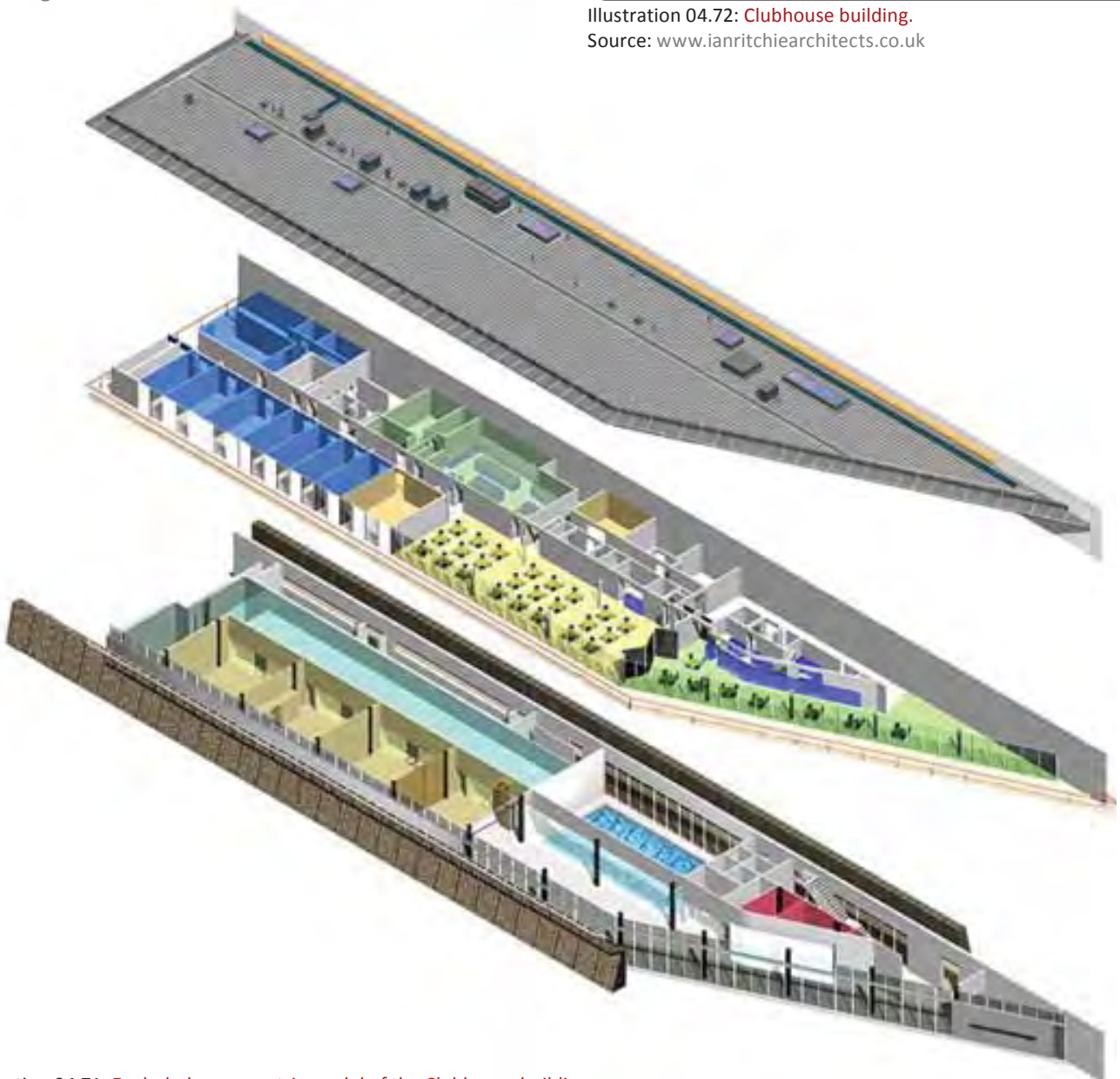


Illustration 04.71: Exploded axonometric model of the Clubhouse building.  
Source: [www.ianritchiearchitects.co.uk](http://www.ianritchiearchitects.co.uk)

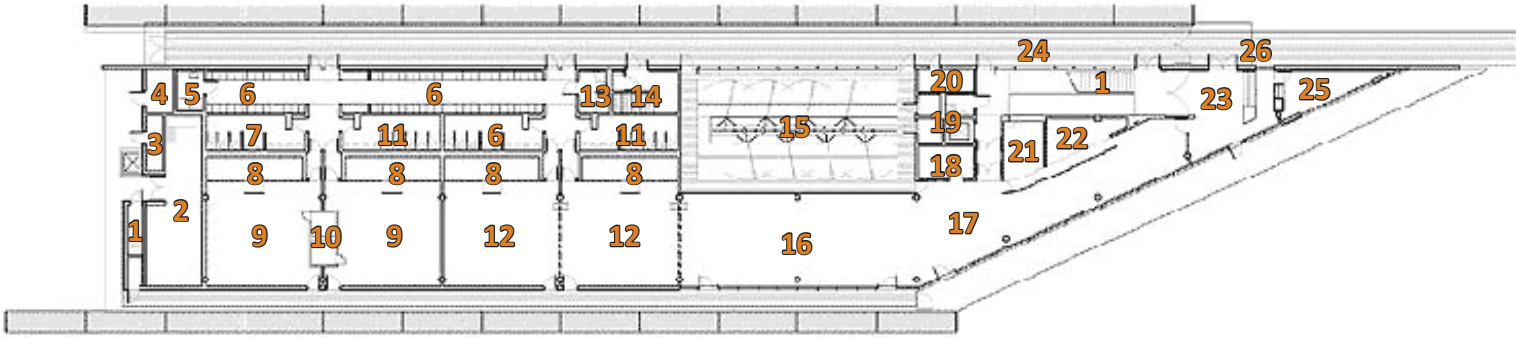


Illustration 04.73: Clubhouse ground floor plan.  
Source: www.ianritchiearchitects.co.uk



**KEY PLAN 04.73**

- |                  |                    |                   |
|------------------|--------------------|-------------------|
| 1 Stair          | 10 Sauna           | 19 Lift           |
| 2 Plant room     | 11 Female WC       | 20 Cellar         |
| 3 Store room     | 12 Gym Changing RM | 21 Medical room   |
| 4 Meter room     | 13 Disabled WC     | 22 Physio room    |
| 5 Laundry room   | 14 Service stair   | 23 Entrance lobby |
| 6 Lockers        | 15 Rowing tank     | 24 Access spine   |
| 7 Male WC        | 16 Gymnasium       | 25 Office         |
| 8 Showers        | 17 Warm-up area    | 26 Main entrance  |
| 9 Changing rooms | 18 Coaches office  |                   |

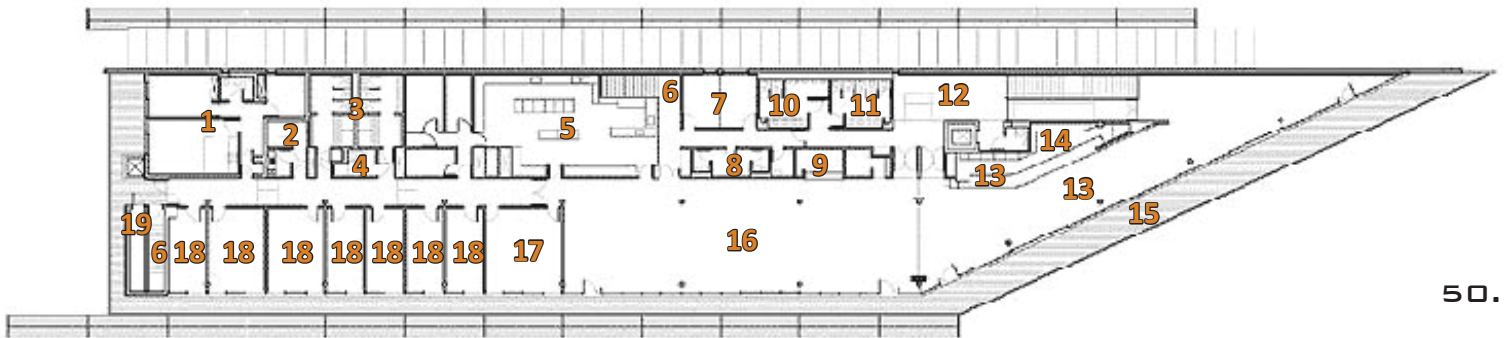


Illustration 04.74: Clubhouse first floor plan.  
Source: www.ianritchiearchitects.co.uk



**KEY PLAN 04.74**

- |                   |                  |                 |
|-------------------|------------------|-----------------|
| 1 Caretakers flat | 7 Offices        | 14 Bar kitchen  |
| 2 Store room      | 8 Staff WC       | 15 Balcony      |
| 3 Bathrooms       | 9 Restaurant bar | 16 Restaurant   |
| 4 Disabled WC     | 10 Male WC       | 17 Meeting room |
| 5 Kitchen         | 11 Female WC     | 18 Bedrooms     |
| 6 Stair           | 12 Upper lobby   | 19 Storage      |
|                   | 13 Bar           |                 |

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Illustration 04.75: Clubhouse building viewed from the one end.  
Source: www.ianritchiearchitects.co.uk



Illustration 04.76: Clubhouse section.

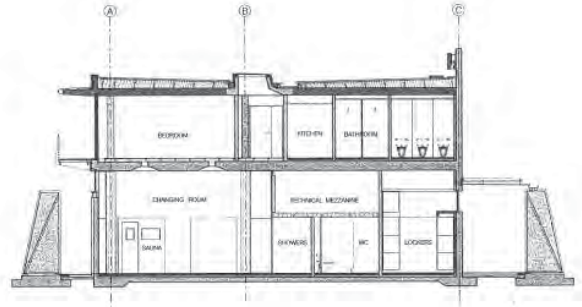


Illustration 04.77: Clubhouse section.

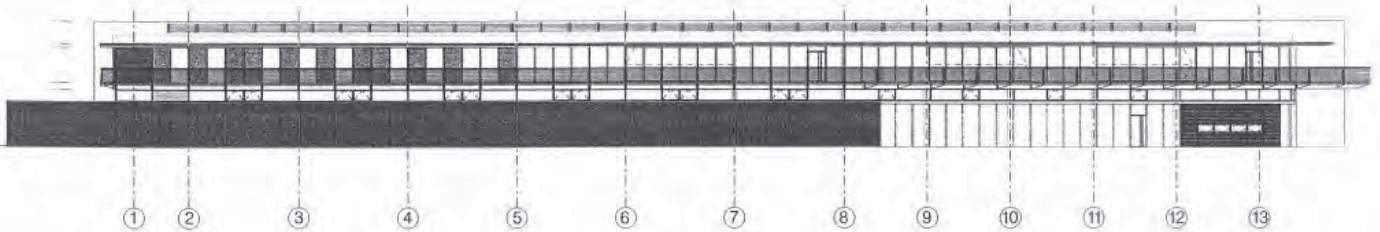


Illustration 04.78: Clubhouse South Elevation.

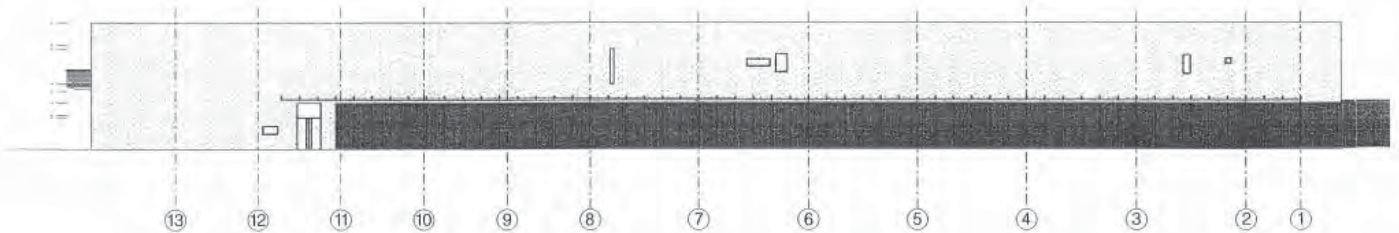


Illustration 04.79: Clubhouse North Elevation.

Source: ianritchiearchitects  
IAN RITCHIE ARCHITECTS



Illustration 04.80: The one end of the Clubhouse building which finishes in a sharp point, mimicking the bow or stern of a boat.  
Source: www.ianritchiearchitects.co.uk



Illustration 04.81: View along access spine.  
Source: www.ianritchiearchitects.co.uk



**Services & Climatic Control.**

The building fabric of the Clubhouse is said to be used to control the internal environment and create a comfortable and energy-efficient design solution. To minimise operation costs of the building, simple, energy-efficient, heating and ventilation systems are used to reduce heat losses in the winter and avoid the need for cooling in summer. Passive design features have been used as part of this strategy to optimise the building performance. External shading to the south-facing restaurant, bar, and gymnasium areas reduce direct solar radiation in summer, but low-angle winter sun is allowed to penetrate the building façade to directly heat areas within. The exposed concrete soffits throughout the building are said to help to reduce sudden temperature swings. The north elevation is virtually solid, to reduce heat loss and protect from northerly winds, with minimal glazed areas. Gabion walls on the lower level are said to provide further protection from the elements and help reduce unwanted infiltration losses by reducing external wind pressures. High levels of CFC-free insulation retain heat in winter, helping to lower the energy consumption of the building by reducing both maximum heat demand and the internal summer temperatures. (McLean, 2002:23)

The primary services of the building are fed from plant rooms in the western end of the building, running within a mezzanine spine above the 'wet areas' of the changing rooms and the gym areas. Perimeter heaters controlled by thermostatic radiator valves beneath the full-height south façade glazing, provide rapid response heating to offset fabric losses and draughts, while an under-floor heating system is used in the changing rooms. Evacuated-tube, hot-water solar collectors, mounted on the roof, provide 60% of the average annual domestic hot water. (McLean, 2002:23)

**Regatta Course.**

The Centre has a 2000m long international-standard regatta course. The course has seven lanes, a return lane and a boardwalk along its length. The dock was previously 1750m long and had to be extended and upgraded to facilitate the regatta course.



Illustration 04.83: The Regatta Course.  
Source: www.ianritchiearchitects.co.uk

**Rowing Tank.**

The Rowing Tank is used to teach rowing to beginners, to improve the technique of more experienced rowers, and for training during bad weather. The London Regatta Centre rowing tank is different to traditional tanks as it uses technology developed by ARUP to more accurately simulate a natural rowing environment.



Illustration 04.84: The rowing tank.  
Source: www.ianritchiearchitects.co.uk

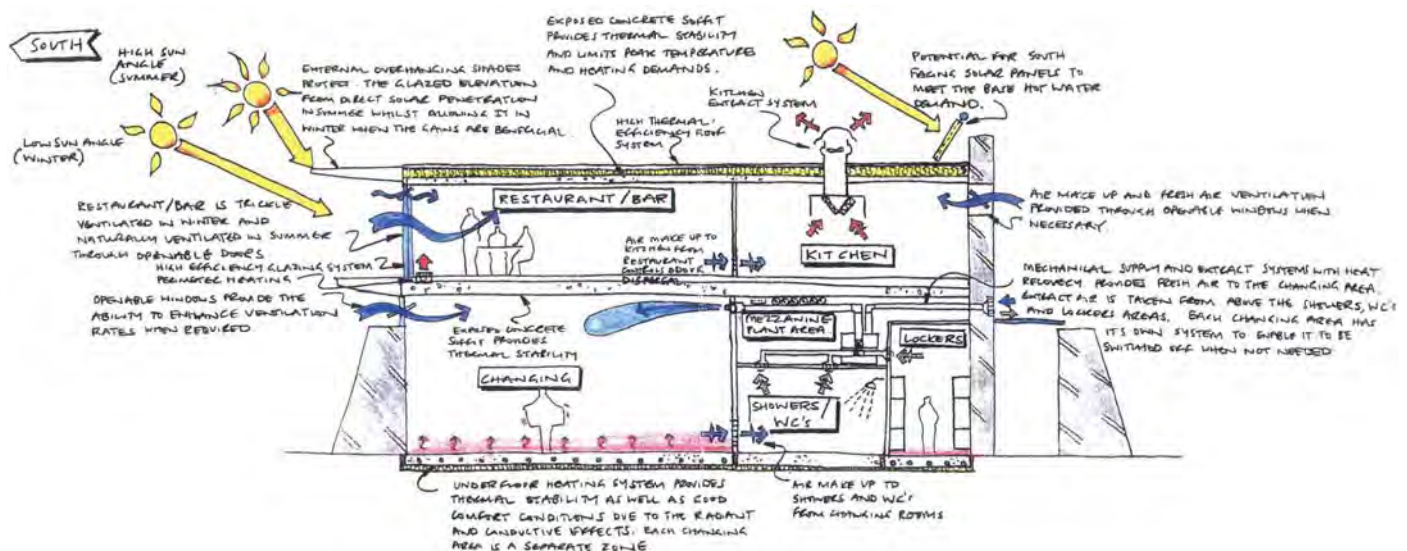


Illustration 04.82: Clubhouse building climatic response diagram.  
Source: ianritchiearchitects

## Gymnasium.

The gym is designed for both able and disabled members, and is operated on behalf of the Royal Albert Dock Trust by the Connaught Health and Fitness Club.



Illustration 04.85: Part of the gymnasium.  
Source: www.ianritchiearchitects.co.uk

## Restaurant & Bar.

The Yi-Ban Chinese Restaurant and Bar seats up to 380 people, and is said to be a very popular destination, with views down the regatta course and the activity of the planes at the London City Airport. The restaurant and bar cater for a variety of hospitality events, which include: weddings, wedding receptions and various other private events. In addition to this there is also a conference room available which is utilised by local companies.

Both the Gymnasium and the Restaurant are a vital source of additional income for the Centre and help to finance the running of the Centre.



Illustration 04.86: The Yi-Ban Chinese Restaurant.  
Source: www.ianritchiearchitects.co.uk

## Conclusion.

An analysis of the design of the London Regatta Centre has highlighted a number of aspects which are useful for interpretation:

The Centre has successfully re-used an existing brownfield site for both the Centres buildings and the regatta course. The design of the proposed *Regatta Centre* should investigate the possibilities of adopting a similar brownfield policy.

The Centre is well located and is easily accessible, near various other sporting facilities and close to educational institutions. The site choice for the proposed *Regatta Centre* should consider these important factors when choosing a site.

The design of the plan of the Centre responds well to its site acknowledging its shape. The Centre also acknowledges the sport being catered for by playing with the imagery of a boats bow or stern. The design of the *Regatta Centre* will need to consider how it will use similar design strategies.

Arguably the most important design aspect of the London Regatta Centre is its approach to a 'sports club' type building. In contrast to the standard, 'members only' stigma, the Centre is actually designed to purposely act as a focus for communal activities, and to encourage public use. The proposed *Regatta Centre* design will need to explore how it too will encourage public use.

53.

Overall the London Regatta Centre seems to work well, however there are a few concerns with its design:

Both the Centre and the regatta course have been built right next to the London City Airport. The airport must create a lot of pollution and noise. This kind of environment is not ideal as there is little that can be done to minimise these interferences.

The Centre in contrast to the other Regatta Centres reviewed is in a built-up area. There is very little space for expansion, especially to increase capacity drastically for the purposes of major events such as the Olympics.

The Centre also does not have a permanent finish tower building or any permanent spectator seating which also limits the venues capacity to hosting larger international events.

If the proposed *Regatta Centre* design is to be serious about potentially facilitating major international events or even Olympic events, space will need to be provided for expansion for additional temporary facilities.

## 04.07 INTERNATIONAL DESIGN TRENDS IN RECENT WATER SPORTS BUILDINGS.

From the examples of prominent international water sports buildings covered in the literature review, three recurring design trends were identified and will now be briefly highlighted:

### Buildings Siting in Relation to Water.

When reviewing water sports buildings it was noticed that Architects approached the siting of their designs in relation to the water in different ways. Some purposely sited buildings away, setback from the water's edge so as to achieve views over both the activity on land and water. Others placed their buildings right up on the water's edge, some even over or on the water. The *Water Activity Centre* in Whitlingham Country Park, Norwich, England designed by Robin Snell is an example of a water sports building which is located right up on the water's edge so as to achieve uninterrupted views over activities on the water.

The design of the proposed *Regatta Centre* will need to consciously consider the manner in which it sites its building in relation to the water.



Illustration 04.87: The Whitlingham Country Park Water Activity Centre.  
Source: [www.tornorfolk.co.uk](http://www.tornorfolk.co.uk)

### Bold Forms.

From the various water sports buildings reviewed, it became apparent that architects with a number of their designs had used very bold expressive forms in their designs. The *Mad River Rafting Centre*, in Jackson, Wyoming, USA, designed by William Bruder is an example of a water sports building which uses and expressed bold forms in its design, taking this a step further by mimicking the form of the immediate environment. *"It is like a rusty rock wedged in the earth above Flat Creek with tumble boulders, driftwood, concrete and native landscape strewn at the base of its eruption from the site: a metaphorical extension of snow king mountain to the east..."* (MacDonald, 1998:67)

The design of the proposed *Regatta Centre* will need to consider how it will express an appropriate building form within its immediate environment.



Illustration 04.88: The Mad River Rafting Centre.  
Source: Macdonald, 1998:67

### Water Sport Imagery.

Another reoccurring design trend seen in almost most of the water sports buildings reviewed was the use of water sports imagery in their design. The *Chesapeake Boathouse* in Oklahoma City, in the USA, designed by architect Rand Elliott is a good example of a water sports building which uses water sports imagery. The buildings entire form claims to have been inspired by water crafts, with various rowing details emerging in the design. *"... exterior columns on the east appear as a rudder; the ridge of the roof recalls the skeg or short fin, along the bottom shell; and the form of the interior, the 1 – inch insulated-glass-storefront system falls across the distance like oars dipping into water."* (Fortmeyer, 2007:182-183)

The design of the proposed *Regatta Centre* will need to consider the inclusion of water sports imagery in its design. Perhaps the whole building form does not need to be inspired by water craft, rather maybe just certain elements of the design need to express and celebrate imagery of some kind.

54.



Illustration 04.89: The Chesapeake Boathouse building.  
Source: Fortmeyer, 2007:180

## 04.08 CONCLUSIONS.

The precedent studies analysed are unique in their own right. Even though information regarding some of the buildings was found to be limited, each one has allowed for unique conclusions to be reached. These conclusions will be reflected on in *Chapter 07: Formulation of Design Brief*.

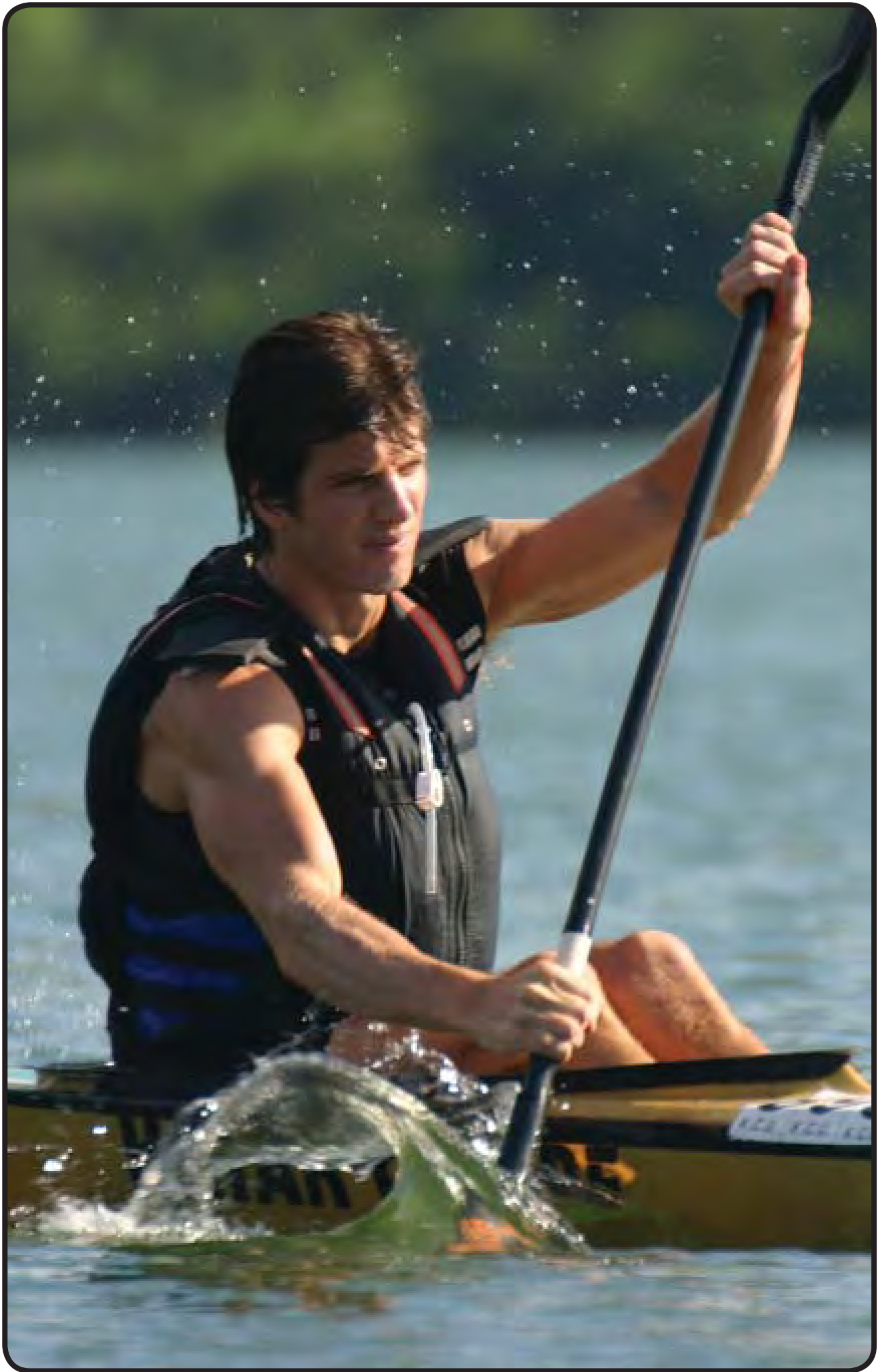


illustration 05.01: Sprint kayaking is already a very popular sport in KwaZulu-Natal\_source: www.flickr.com

## CASE STUDIES 05

## 05. CASE STUDIES.

### 05.01 INTRODUCTION.

As there are no international regatta centres in South Africa, the proposed building typology is locally unprecedented. This led to an analysis of various other local water sports facilities. (see below) Through this analysis only one facility visited was found to have merit for interpretation and will be examined in this chapter.

The case study will be analysed according to the following criteria:

- Background & Brief.
- Site & General Planning.
- Conclusion.



Illustration 05.05: Pietermaritzburg Rowing Club, Camps Drift, PMB.  
Source: Author



Illustration 05.06: Point Yacht Club, Durban Harbour.  
Source: Author



Illustration 05.02: Kingfisher Canoe Club, Blue Lagoon, Durban.  
Source: [www.kingfishercc.co.za](http://www.kingfishercc.co.za)



Illustration 05.03: Umzinyathi Canoe Club, Shongweni Dam, Durban.  
Source: [www.umz.co.za](http://www.umz.co.za)



Illustration 05.04: Durban Rowing Club, Durban Harbour.  
Source: [www.rowingsa.co.za](http://www.rowingsa.co.za)



Illustration 05.07: Royal Natal Yacht Club, Durban Harbour.  
Source: [www.rnyc.org.za](http://www.rnyc.org.za)



Illustration 05.08: Henley Midmar Yacht Club, Howick.  
Source: Author

## 05.02 THE NATAL CANOE CLUB, PMB.

**Architect:** FGG Architects (Alterations by GSP Architects)  
**Location:** Camps Drift, Pietermaritzburg  
**Function:** Canoe Club  
**Completed:** 1992  
**Latitude:** 29°37'14.93"S  
**Longitude:** 30°22'32.47"E

### Background & Brief.

The Natal Canoe Club is located at Camps Drift, in Pietermaritzburg. The Club was built in 1992 and has established itself as being one of the most popular canoeing facilities in the Province. The Club hosts weekly races as well as larger organised events, including the renowned Dusi Canoe Marathon. The Club building, a *KZNIA Journal Award of Merit* winner in 1993, is a double-story pavilion which has undergone numerous alterations over the years as the Clubs requirements have changed and grown.

As the site is susceptible to a 50-year flooding cycle, the building is designed for structural tolerance. The imagery of the architecture draws on the Victorian character of Pietermaritzburg, with the building originally having a curved deck, and curved roof over the deck to represent the shape of a boat.

### Site & General Planning.

The ground floor of the building now consists of: various boathouses/boatsheds; store rooms; a small gym; changeroom facilities and a caretaker room. With the first floor consisting of: function hall; braai area; outdoor and indoor bar; covered balcony; large timber viewing deck; large concrete viewing terrace; administration office and changeroom facilities.

The Club is very well located; being near the Pietermaritzburg CBD, various educational institutions, as well as various other sporting facilities. The site is also easily accessible having two access points from two major roads. The Club building is largely isolated from other buildings, apart from the Pietermaritzburg Rowing Club boathouse which is situated on the site next door.



Illustration 05.10: The club house viewed from across the drift.



Illustration 05.11: Clubhouse viewed for the side (north-east).



Illustration 05.12: Camps Drift Canal with Natal Canoe Club (right).



Illustration 05.09: The Natal Canoe Club viewed from the front (north-west).



58.

Illustration 05.13: Aerial photo of the Camps Drift Canal.  
Source: The Msunduzi Municipality



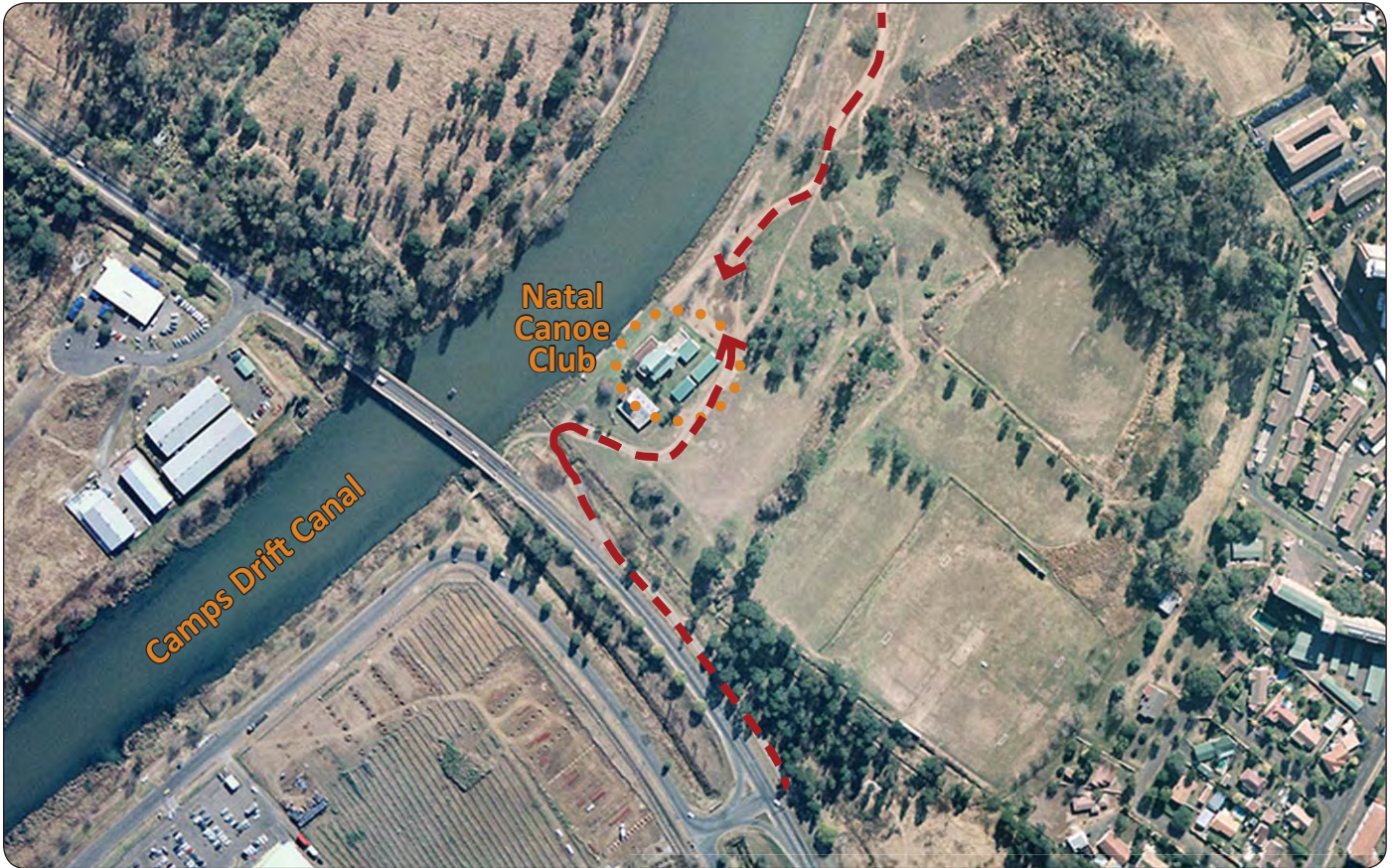
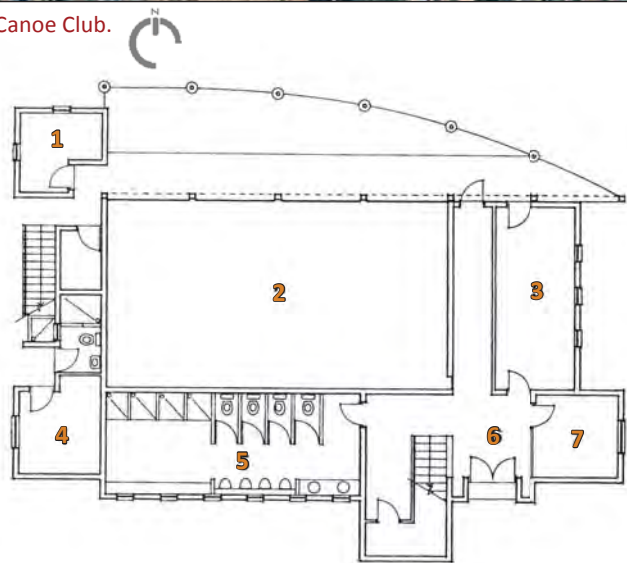


Illustration 05.14: Aerial photo of the Camps Drift Canal and the Natal Canoe Club.  
Source: The Msunduzi Municipality

**KEY PLAN 05.15-16**

- 1 Race Admin
- 2 Boat Store
- 3 General Store
- 4 Caretaker's Quarters
- 5 Male Change Rooms
- 6 Entrance
- 7 Dusi Office
- 8 Bar
- 9 Kitchen
- 10 Store
- 11 Ladies Change Room
- 12 Committee Room
- 13 Hall
- 14 Covered Deck



59.

Illustration 05.15: Original ground floor plan of Natal Canoe Club.  
Source: KZNIA

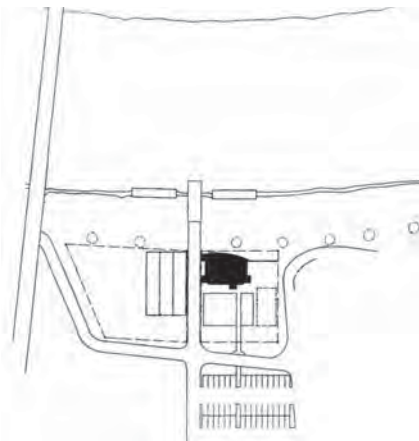


Illustration 05.17: Original site plan of Natal Canoe Club.  
Source: KZNIA

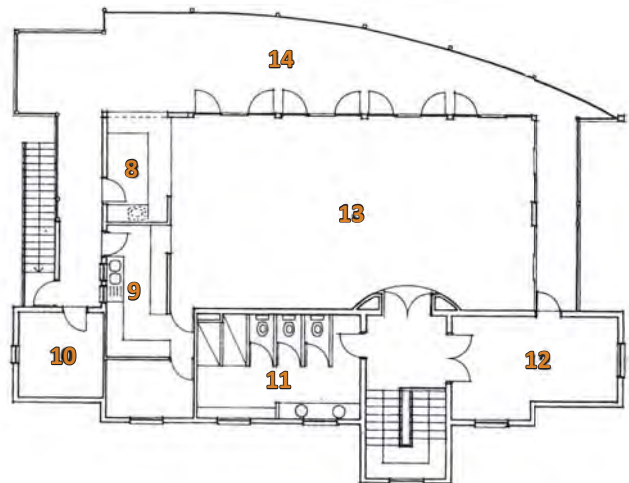


Illustration 05.16: Original first floor plan of Natal Canoe Club.  
Source: KZNIA



**KEY PLAN 05.18**

- 1 Boathouse
- 2 General purpose store room
- 3 Below timber viewing deck
- 4 Boatshed
- 5 Entrance passage
- 6 Gym
- 7 Boathouse
- 8 Lawned courtyard
- 9 Entrance foyer
- 10 Male changeroom
- 11 Caretakers room

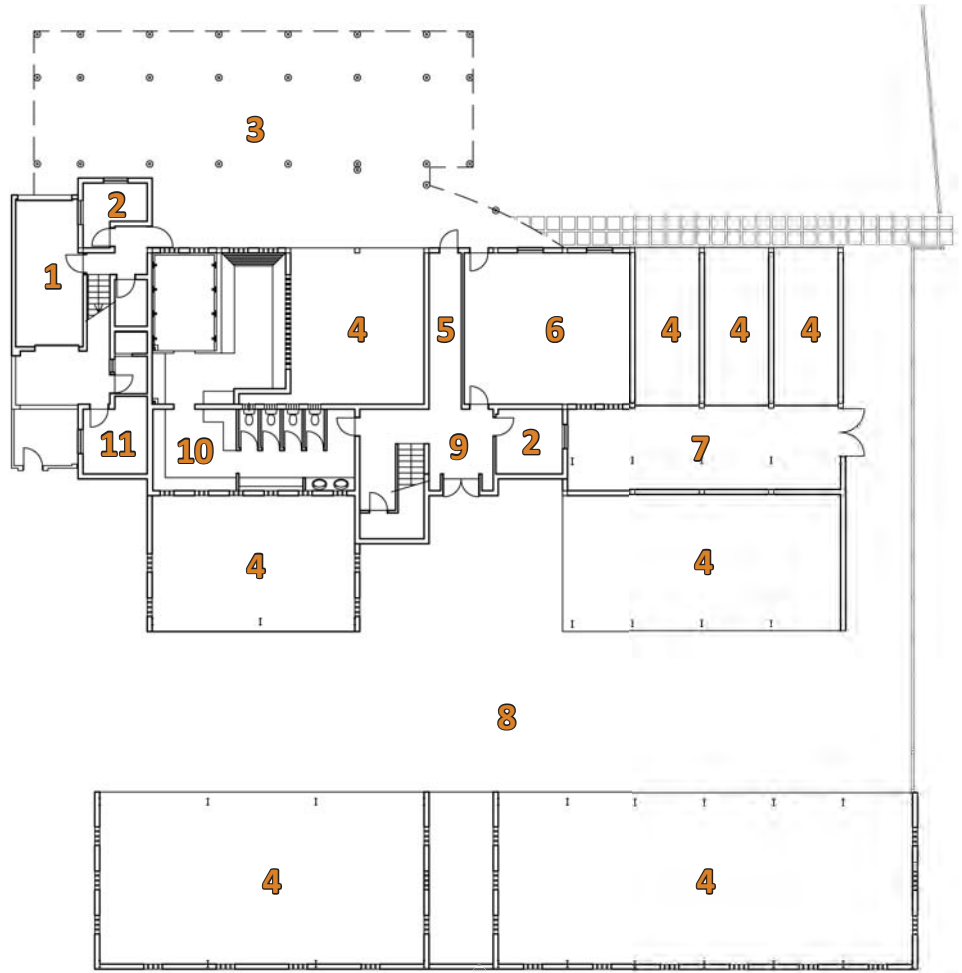


Illustration 05.18: Current ground floor plan.

Source: GSP Architects

**KEY PLAN: 05.19**

- 1 Braai area
- 2 Bar Kitchen
- 3 Outdoor bar
- 4 Indoor bar
- 5 Original curved covered deck
- 6 Timber viewing deck
- 7 Sunken area of timber deck
- 8 Function hall
- 9 Concrete viewing terrace
- 10 Administration office
- 11 Female changeroom
- 12 Store room

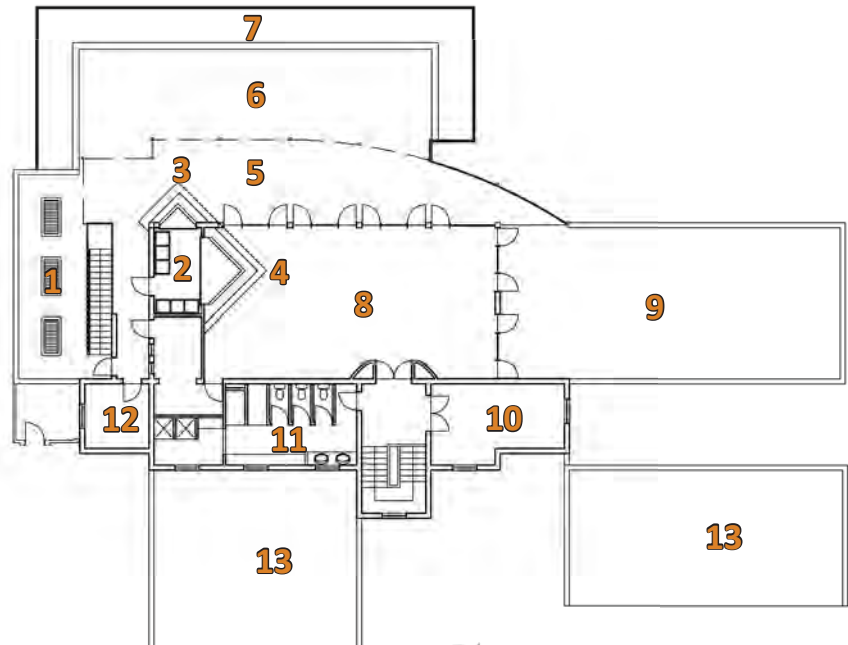


Illustration 05.19: Current first floor plan.

Source: GSP Architects

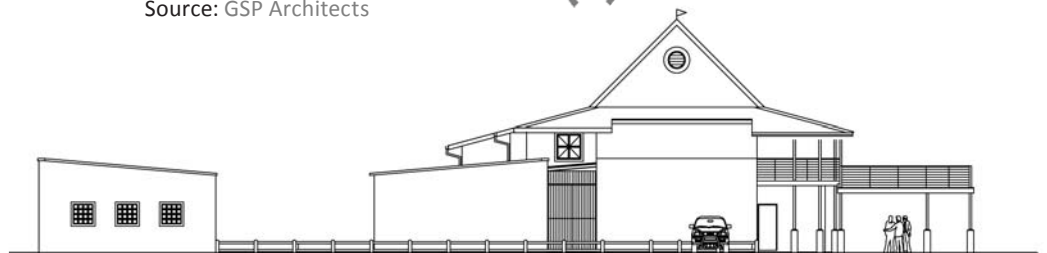


Illustration 05.20: Current north east elevation.

Source: GSP Architects



Illustration 05.21: Natal Canoe Club (left) and Pietermaritzburg Rowing Club Boathouse (right), viewed from the front (north-west).



61.

Illustration 05.22: Natal Canoe Club viewed from the side (north-east), with boatsheds located at the back of the building.



Illustration 05.23: Pietermaritzburg Rowing Club boathouse (left), Natal Canoe Club (right), viewed from the back (south-east).

### Boathouses/Boatsheds.

There are now twenty-two boathouses/boatsheds in comparison to the five originally built. There are basically two kinds of boat storage available at the Club: Lock-up boathouse storage; and open boatshed storage. The lock-up boathouses vary in size and purpose, and are used for a variety of storage needs. Club motor boats, various club equipment as well as K1, K2 and K4 kayaks are stored in these boathouses. The boatsheds on the other hand are used only for storing K1 and K2 kayaks, where boats are stored in boat slots as opposed to boat racks, with boats individually chained and locked.



Illustration 05.24: K1 and K2 boats being stored in boatsheds, packed into boat slots.

### Entrance Passage & Foyer.

Possibly the least attractive and welcoming part of the whole building is its entrance. On arrival the entrance is barricaded with security gates and turnstile. Once through the gate you have to walk down a long narrow passage to get to the foyer and stairwell which is both badly lit and very cramped.



Illustration 05.25: The narrow entrance passage & foyer.

### Changeroom facilities.

The Club has basic changeroom facilities, with male changerooms located on the ground floor and female changerooms located on the first floor. The male changerooms are larger than the females as there are generally more male paddlers than female paddlers. According to members of the Club the capacity of these changeroom facilities are currently insufficient during peak periods. There are also currently no paraplegic changeroom facilities available.



Illustration 05.26: The communal showers in the men's changeroom, which are not very well lit.

### Gym.

The gym is merely a room on the ground floor which was previously two boatsheds. The room houses basic gym equipment, and is very small. This gym is currently rather insignificant because of its size, and there are currently plans for the gym to expand further into the neighbouring boatsheds. The current gym lacks quality machinery, good quality natural light, sufficient space and doesn't capitalise on views of the outdoors.

62.



Illustration 05.27: The gym with basic gym equipment.

### Bar & Kitchen.

Both the bar and kitchen are very compact, and were not part of the original design. The bar opens into the function hall and out onto the timber viewing deck, which is patronised by many Club members. The small kitchen serves mainly as a service kitchen to the bar, with food required outsourced to external caterers.



Illustration 05.28: View from the outside bar looking over the drift.

### Function Hall.

The function hall is located on the first floor and opens up onto the concrete viewing terrace and timber viewing deck. Being elevated the hall has commanding views of the Canal making it a popular venue for hosting small functions. There are three fundamental problems with the current hall design:

Firstly, the hall is too small for the Clubs larger events. During major events a tent has to be set-up on the concrete viewing terrace to compensate for lack of hall space.

Secondly, one has to walk straight through the hall to get to the bar, timber deck and concrete terrace. The hall though compact (120m<sup>2</sup>) is not a very intimate space to have to walk through, and socialised in when empty.

Thirdly, the narrow single doors leading out from the function hall onto the deck and terrace are from the original design when there was only a small deck and thus not a lot of traffic. These doors are now completely inappropriate for the volume of human traffic moving out onto the deck. These doors should be either, double doors or even better sliding folding doors to encourage movement between the deck and hall instead of restricting it.



Illustration 05.29: The function hall.

### Timber Viewing Deck.

The timber viewing deck is an addition to what was originally a small curved shaped deck. This new very generously proportioned deck has views both up and down the Canal, as well of the surrounding area. The deck has a split level which is sunken in the front to assist in uninterrupted views which is an appropriate response. The large scale of the deck however, in proportion to the small function hall and the fact that there is also a large viewing terrace available is somewhat questionable.

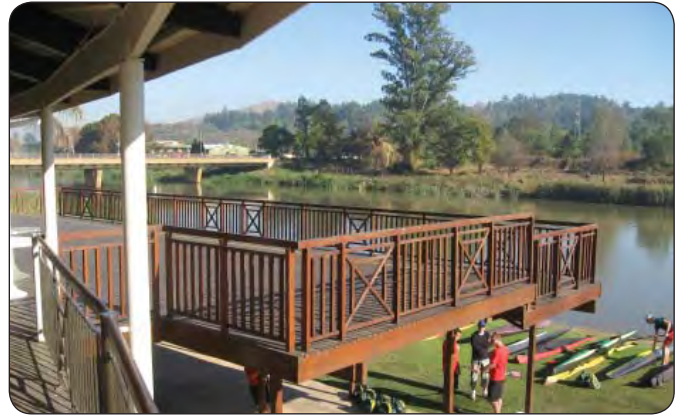


Illustration 05.30: The large timber viewing deck.

### Concrete Viewing Terrace.

The concrete viewing terrace is the flat slab roof over boatsheds below, and is off to the one side of the function hall. The terrace is currently underutilised as people rather use the timber deck as it has better views of the Canal and is closer to the bar. There are current plans to convert this terrace into a room as an extension of the function hall which would extend the hall by an additional 90m<sup>2</sup>. This alteration would much better utilise this space as currently it has very little significance.

63.



Illustration 05.31: The concrete viewing terrace.

### Parking Facilities.

Even though the original drawings of the Club show a formal parking area located at the back of the building, with walkway through the boathouses to the clubhouse, this parking area was never built. Instead, people park to the one side of the Club so that their vehicles are both nearer to the water and visible from the Clubhouse. During peak periods the large grassed areas around the building are used, which is a desirable feature as there is never a problem with finding parking.

### Camps Drift.

The Camps Drift Canal is potentially an ideal venue for recreation, training and competition paddling. Unfortunately, because of poor planning the Drift is currently both a hydrological and environmental disaster, with polluted water and the continual silting of the Drift limiting its current use.

### Conclusion.

An analysis of the Natal Canoe Club has been helpful in gaining an understanding of the functioning of a canoeing facility in KwaZulu-Natal; gaining an understanding of the people that use such facilities; and has contextualised the state of a local paddling venue.

The analysis has highlighted a few issues which will now be briefly discussed:

The functioning and architecture of the Natal Canoe Club is very utilitarian in nature, with some of its facilities being very basic. This Canoe Club is by far the most substantial canoeing facility in the Province, which contextualises the basic nature of local canoeing facilities.

The analysis of the Natal Canoe Clubs many alterations and additions to its original design, has highlighted the nature and functioning of a canoeing facility, in that its building requirements will most likely change over time. The design of the proposed *Regatta Centre* should anticipate future change and possible expansion in the future.

The Natal Canoe Club, even though a very popular and active facility, is limited to the use of its members, their families and friends, with the sole purpose of the Club building being to serve these individuals. The result of this is that the well being of the sport of canoeing is secondary, with only a small limited group of people being exposed to the sport. The traditional structure of a Sports Club, a Sports Club Membership, and the social issues related to this set-up are complex, and it is not the purpose of this dissertation to solve this. What is of concern however is that the architecture does very

little to actively promote the contrary: Canoeing as a sport is not actively promoted and public interest is not keenly welcomed by the architecture. The design of the proposed *Regatta Centre* will need to actively and intuitively consider how it will handle a Sports Club scenario.

The Camps Drift Canal is potentially one of the best paddling venues in the Province, displaying great potential to play a significant part as a recreational precinct. Unfortunately, the Drift is currently both extremely poorly planned and lacks the sufficient maintenance and upkeep it requires. An analysis of the Natal Canoe Club has highlighted that the Canal is a serious contender for being the case study area for the design section of this dissertation.

## 05.03 CONCLUSIONS.

From the case study on the Natal Canoe Club, and the review of various other water sports facilities in KwaZulu-Natal, information has been gathered and will be interpreted into the design of the proposed *Regatta Centre*. The analysis has shown that local buildings examples are very utilitarian in nature with very little emphasis on significant social issues. The conclusion which can be made regarding local rowing, canoeing and kayaking facilities are that their facilities are very basic, inadequate and sub-standard when compared to international precedents, with these buildings doing very little to promote the sports being catered for, promoting professionalism and inspire athletes to success.

64.



Illustration 05.32: Club building viewed from the front (north-west).

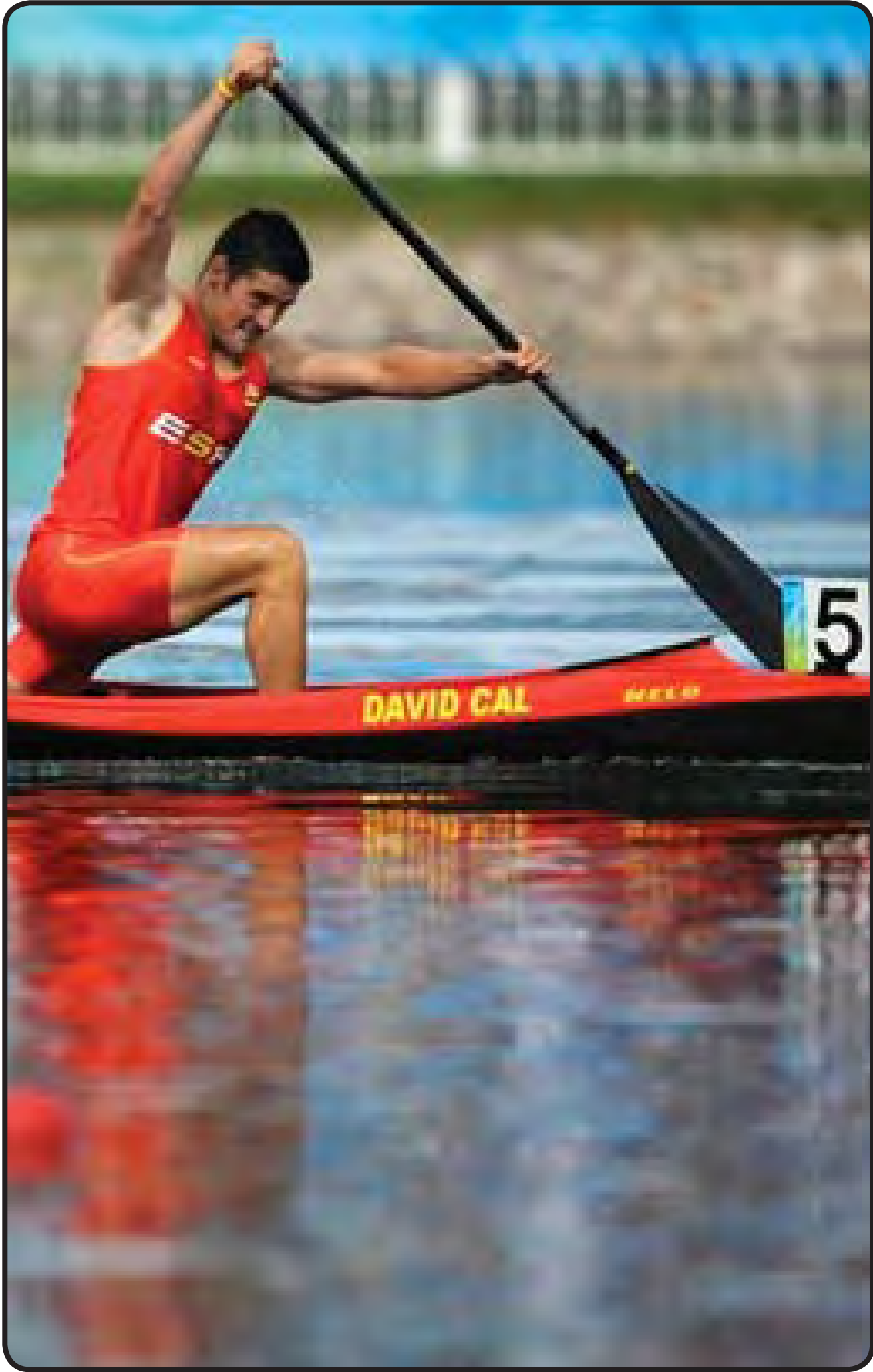


illustration 06.01: A Spanish canoeist competing during an event at the Beijing Olympics\_source: [www.canoesa.org.za](http://www.canoesa.org.za)

# CONTEXT, SITE SELECTION & ANALYSIS 06

## 06. SITE SELECTION & CONTEXT.

### 06.01 INTRODUCTION.

This chapter will briefly explain the site selection criteria and analyse three potential sites. The most appropriate site for the proposed design will then be chosen and subsequently examined further.

### 06.02 SITE ANALYSIS CRITERIA.

There were many factors that led to the selection of potential sites and the formulation of criteria by which to analyse these sites. The following are the criterions that were used to analyse potential sites:

#### Space / Water Suitability.

- Is there sufficient space or water to provide an international-standard regatta course?
- Does this space or water conform to the technical requirements?
- Is there sufficient area to facilitate land based requirements? Is this land suitable for these facilities?

#### Type of Site.

- What type of site is it? Greenfield or brownfield?
- Do sustainable building opportunities exist on this site?

#### Supportive Community.

- Is the site near a large town or well populated area which will ensure that the facility is well used?

#### Access.

- Can the site be easily accessed? Is there good road, rail and/or air service to the site or near the site?
- Is there a public transport service available close to the site?
- Will the existing road infrastructure of the site be able to cope with largely increased vehicle volumes during major events? To what magnitude will this road infrastructure need to be improved?

#### Hydrological & Environmental Impact.

- Will the proposed *Regatta Centre* and its various facilities have a negative or positive hydrological and environmental effect on this site?
- Do sustainable hydrological and environmental opportunities exist on this site?

#### Justification of Investment.

- Is the site appropriate to justify the large financial investment of building an international regatta centre?
- What other sports or activities could be catered for by the Centre to further justify this investment?

#### Proximity to other Sporting Facilities.

- Is the site closely linked to any other sporting facilities?

#### Public Exposure.

- Is the site well situated in order to receive maximum public exposure, for the Centre and the sports being catered for?

#### Accommodation.

- Is there suitable and sufficient accommodation close to the site to house competitors, team management, officials and spectators?

## 06.03 SITE A – King’s Park Precinct, Durban.

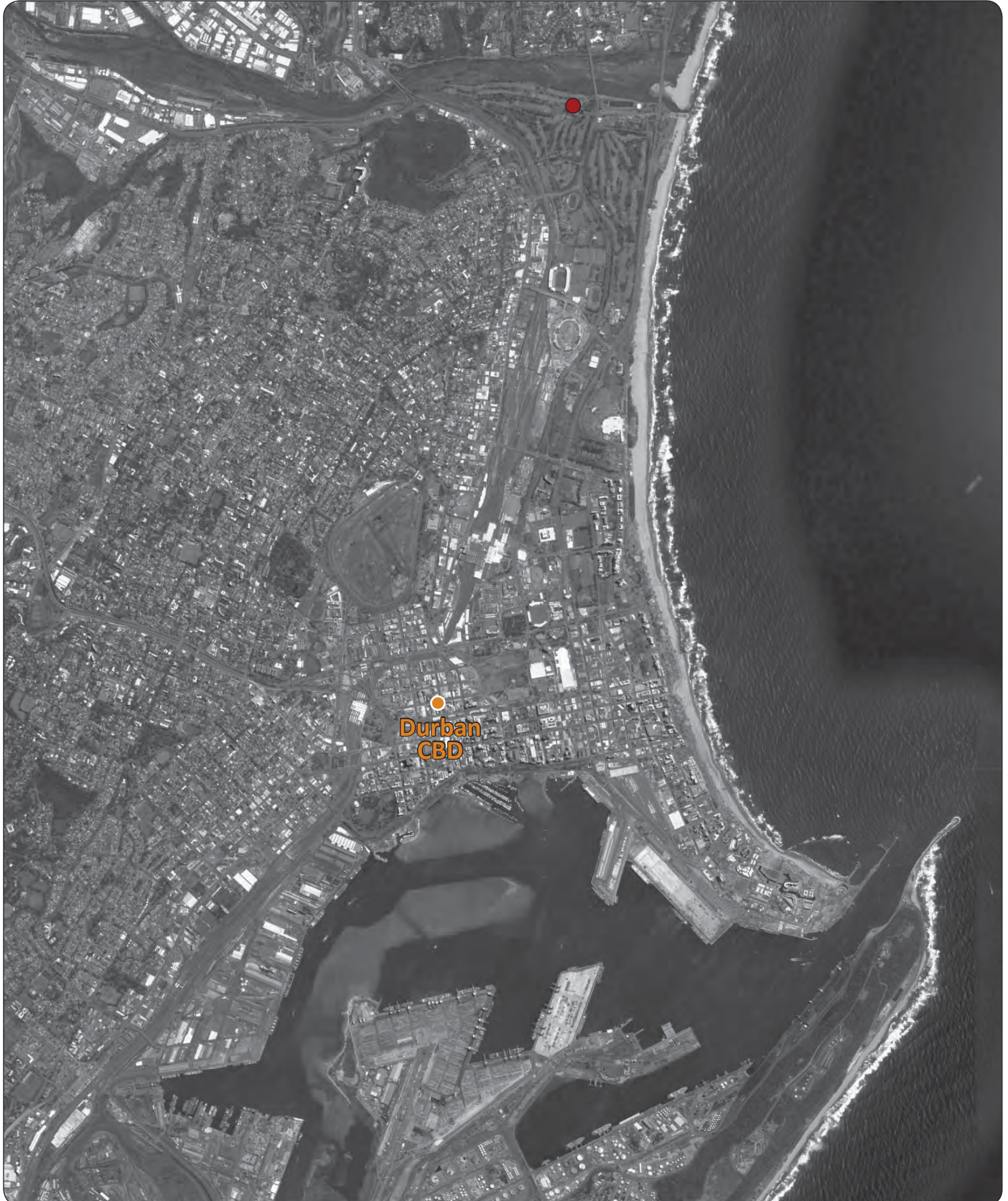
Site description.

Latitude: 29°48'44.14"S  
Longitude: 31° 1'49.87"E

This site is located parallel to the Umgeni River on the South bank of Blue Lagoon. It is currently part of the Windsor Golf Course, the Blue Lagoon recreational area and as already mentioned is part of the Kings Park Sports Precinct.

### KEY PLAN 06.02

- Durban CBD.
- Site A.



67.

Illustration 06.02: Locality plan of site A.  
Source: www.googleearth.com





## KEY PLAN 06.03

- Proposed site.
- Proposed 2200m regatta course.

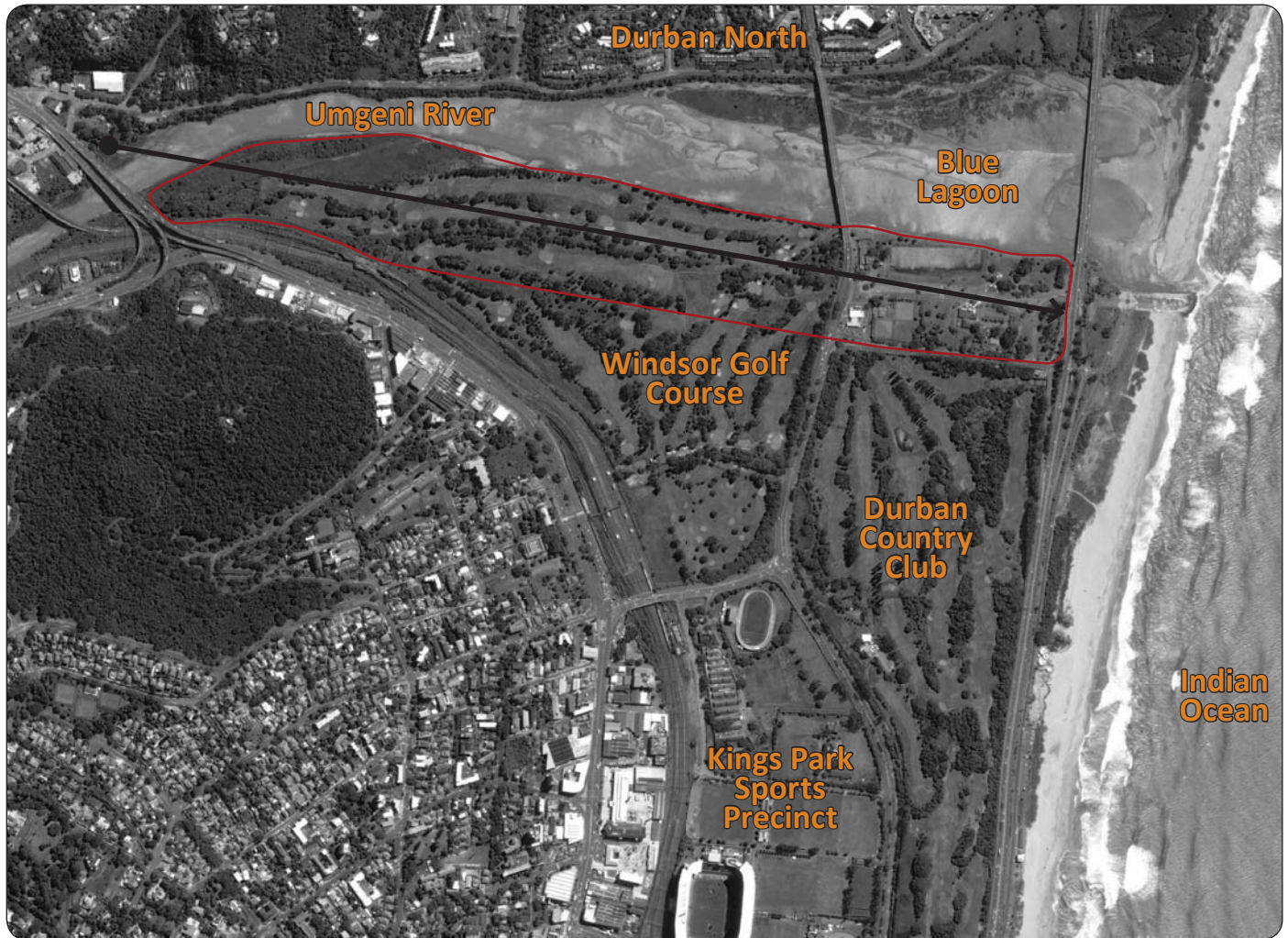


Illustration 06.03: Locality plan of site A.

Source: [www.googleearth.com](http://www.googleearth.com)



### Advantages:

- The site is centrally located in Durban which has a large population, thus having the ability to ensure public service and spectator support.
- There are good road services to and from the site, with a public transport available close to the site.
- The site is highly visible from main roads, and therefore receives good public exposure.
- There is existing accommodation located nearby the site. (In the case of the Olympics the site would be located close to the Olympic village which would be near by the Kings Park Sporting Precinct)
- The site could be utilised for a number of uses and activities because of its central location in Durban.
- The site is part of the Kings Park Sporting Precinct which is already well established, with various international-standards sporting facilities.
- There is already an existing canoeing club on this site (The Kingfisher Canoe Club) meaning that there is already a canoeing culture in the area.

### Disadvantages:

- There is currently not enough space to have an international-standard regatta course on this site.

- A totally new artificial course would have to be constructed which would require a huge amount of new infrastructure. All the water would have to be pumped from the Umgeni River, which would require a great deal of effort.
- Being too close to the ocean there would be a problem with strong coastal winds affecting the equal and fair conditions of the course.
- Most of the Windsor Golf Course and the Blue Lagoon recreational area would be lost, these are currently frequently used by the public.
- The M12 highway dissects the site meaning that a new bridge would have to be constructed to branch across the regatta course.
- The site is part of a flood plain and is prone to flooding.

### Overall Assessment.

From a logistical point of view, having the proposed *Regatta Centre* situated in the Kings Park Sporting Precinct with all the other international-standard sporting facilities makes sense. Unfortunately from analysis there is not enough space anywhere in the Precinct which is suitable.

## 06.04 SITE B – Inanda Dam, Durban.

**Latitude:** 29°41'47.84"S  
**Longitude:** 30°53'10.20"E

Following on from an analysis of the Kings Park Precinct, it was suggested to the author that the best potential site for a regatta course in Durban would be at Inanda Dam. The Dam is the only fresh water venue in the Durban area which has enough water area to cater for an international-standard regatta course. This led to an extensive analysis of the dam and the surrounding area.

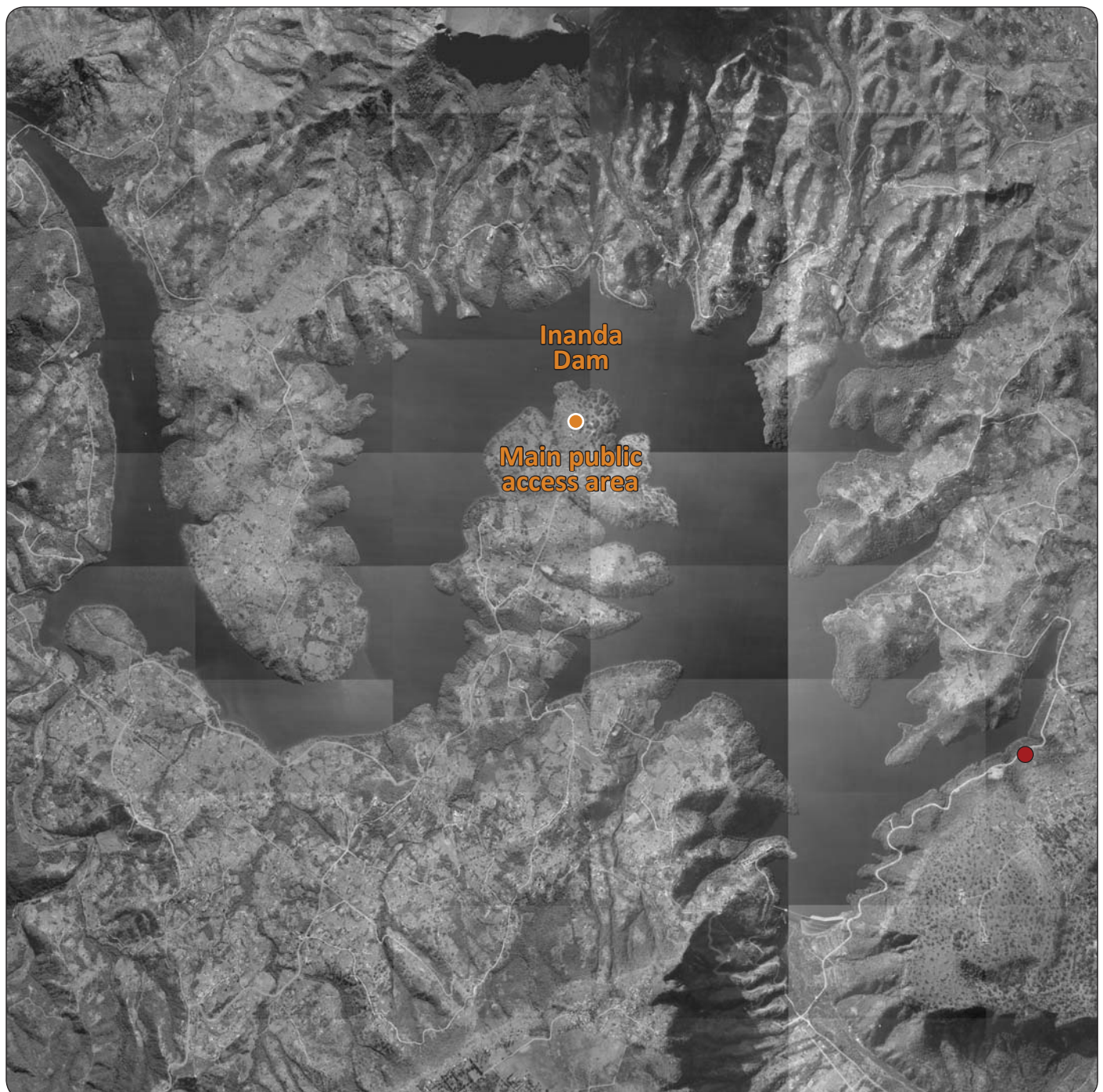
### Site Description.

Inanda Dam is located in the valley of a thousand hills north of Durban. It is 23km long and is part of the eThekweni Municipality. Characterised as being greatly underdeveloped the dam has various rural settlements scattered around its perimeter.

With the feasibility of various site possibilities being investigated, there was one site identified as having merit to be potentially developed as a regatta centre. The site is located on the south east side of the dam not far from the dam wall.

### KEY PLAN 06.04

- Inanda Dam main public area.
- Site B.







69.

Illustration 06.04: Locality plan of site B.  
Source: www.googleearth.com



## KEY PLAN 06.05

-  Water area available.
-  Proposed 2200m course.
-  Proposed warm-up course.
-  Site.

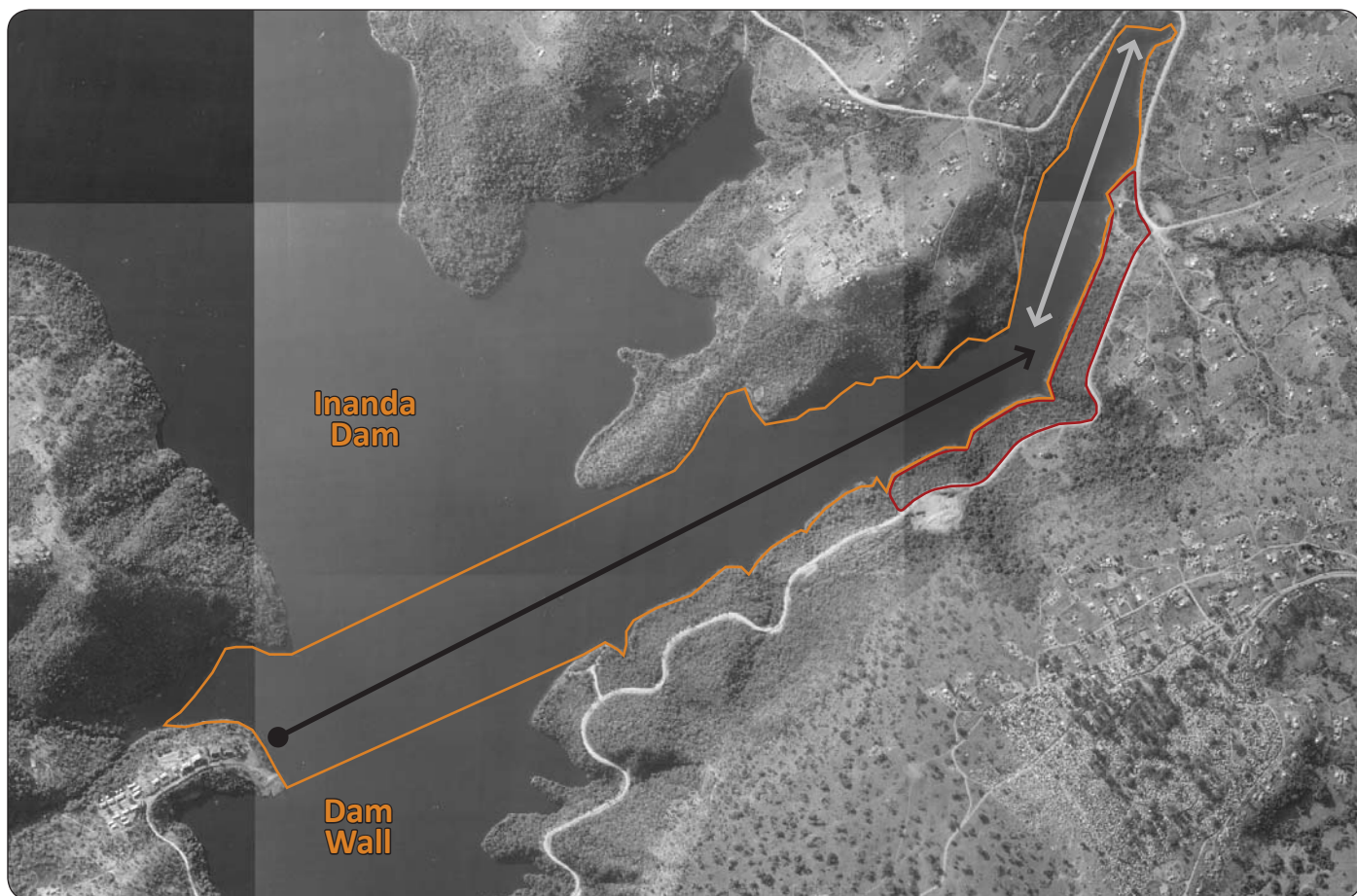


Illustration 06.05: Locality plan of site B.

Source: [www.googleearth.com](http://www.googleearth.com)

### Advantages:

- The site is fairly close to the new airport at La Lucia.
- The site provides the opportunity for a natural regatta course, meaning that there would be very little course construction required.
- The sites location, being in a rural / semi-rural area would demand a community oriented design approach, which could potentially empower the local community.
- There are currently various plans for developing the Inanda Dam area, which include the need for various waters sports facilities.

### Disadvantages:

- Even though Inanda Dam is a rather densely populated area, the site is distanced from the nearest large town, meaning that the public service and spectator support could be limited.
- The road access to the site is adequate however would require improvement; there is no formal public transport to the site.
- The site is isolated from the 'main public access area' of the dam meaning that the facility would not receive maximum public exposure.
- Currently there is no appropriate accommodation in the direct vicinity of the site.

- There is enough water area for a standard regatta course when the dam is full, however there would be a potential problem when the dam level is low as outside lanes would be effected.
- The ability for the course to offer fair and equal conditions in all lanes would be difficult to achieve as wind and waves would potentially be a problem in this area.
- Most of the land in this area is very steep and would require substantial cut and fill, to provide the land based needs of a regatta centre.
- There are currently no substantial existing sporting facilities in the vicinity of the site with which the proposed Regatta Centre could be linked.

### Overall Assessment.

The research conducted on Inanda Dam and the surrounding area has shown that there is currently a requirement for meaningful development in the area, including the need for various water sports facilities. There are great opportunities to develop rowing, canoeing and kayaking facilities at the dam; however these facilities would be of a far smaller scale than what is required for the design of the proposed *Regatta Centre*.

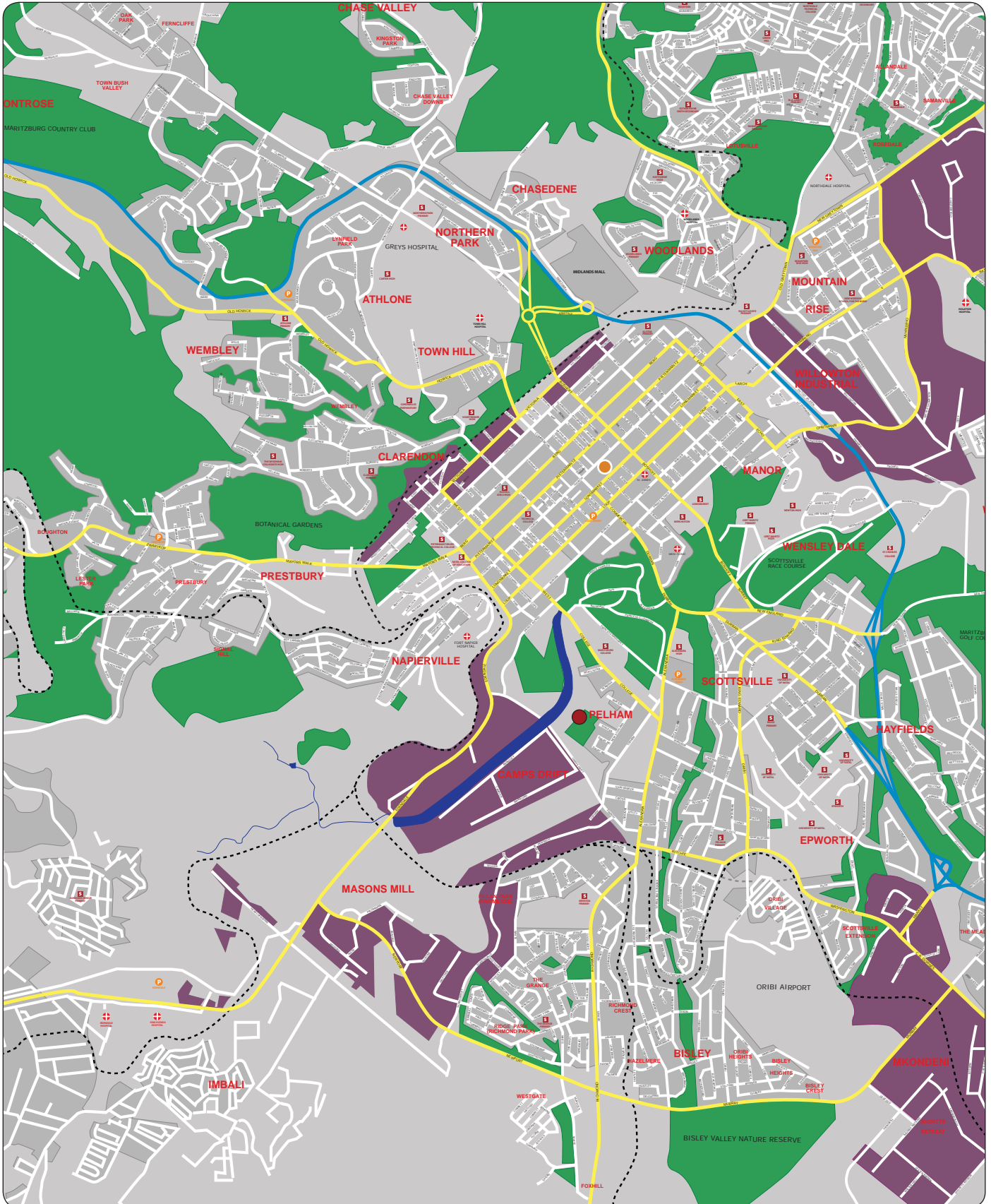
## 06.05 SITE C – Camps Drift Canal, PMB.

**Latitude:** 29°37'14.93"S  
**Longitude:** 30°22'32.47"E

### KEY PLAN 06.06

- Pietermaritzburg CBD.
- Site C

From the analysis of the Kings Park Precinct and Inanda Dam, it became apparent that there were no suitable sites in the Durban area for the design of a regatta centre. The search area for a potential site was then expanded to include the city of Pietermaritzburg, where the Camps Drift Canal site previously identified to have substantial potential in the case study section, was reviewed.







71.

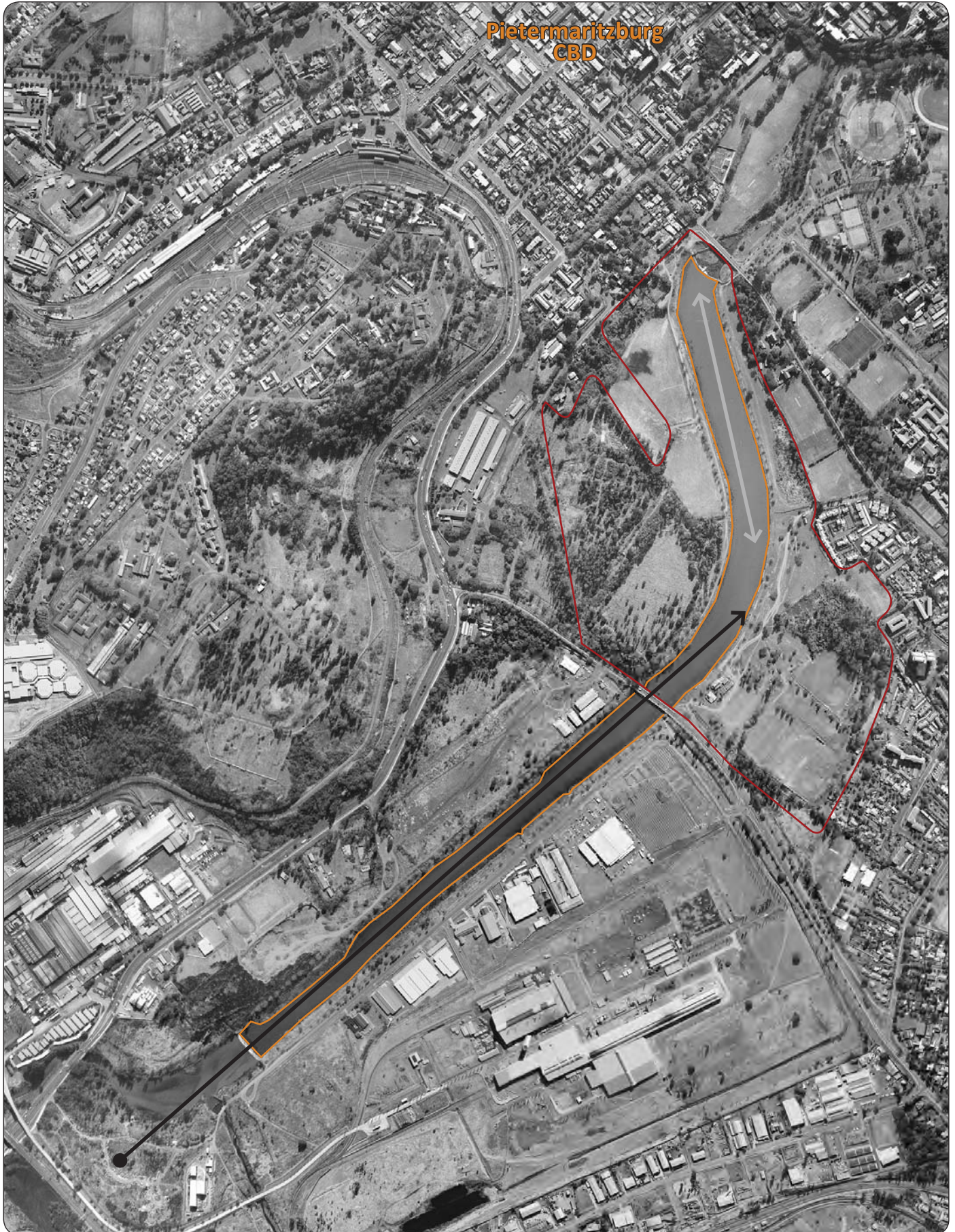
Illustration 06.06: Locality plan of site C.

Source: www. www.remaxmidlands.co.za



KEY PLAN 06.07

-  Water area currently available.
-  Proposed 2200m course
-  Proposed warm-up course.
-  Land available for development.



72.

Illustration 06.07: Locality plan of site C.  
Source: www.googleearth.com



### Site Description.

The site is situated in the Msunduzi Local Municipality of the uMgungundlovu District. Situated between the suburb of Pelham North and Pietermaritzburg central, the site is currently zoned as vacant / unspecified land, characterized by public open space, settling ponds from dredging of the Camps Drift Canal, and disturbed areas as a result of access roads and paths.

### The Camps Drift Canal.

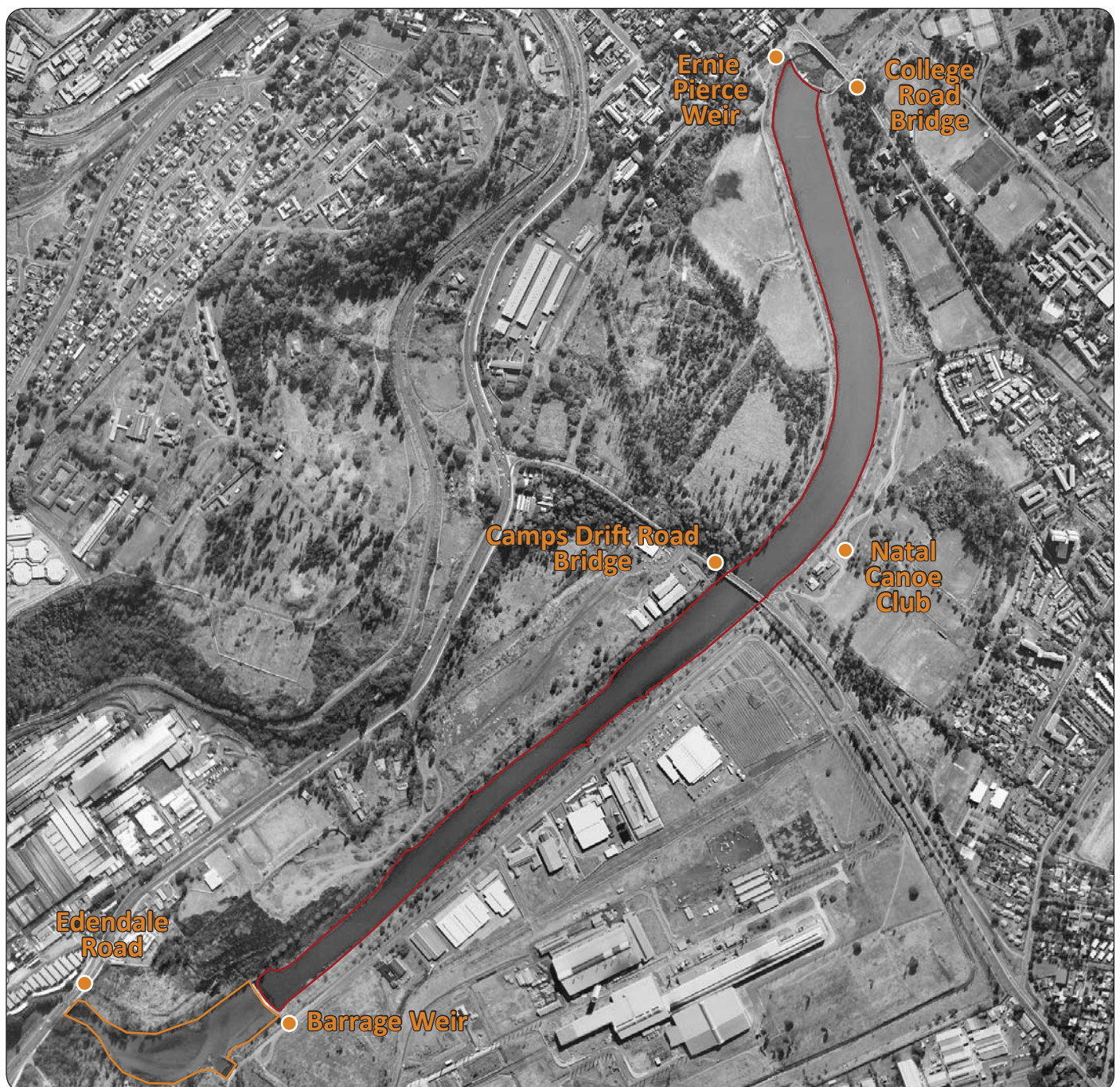
The Camps Drift Canal was completed in 1987 and involved the re-shaping of the flood plain of the meandering Msunduzi River, so that an Industrial estate on the banks of the Canal could be built. The canal was

designed to facilitate the passage of large floods which is meant to reduce the risk of flooding of the estate. The Camps Drift Canal is thus essentially a flood retention facility, its shape and size must conform to and be maintained to specific design parameters in order to reduce the risk of flooding.

The Canal system stretches 2900m downstream from where the Msunduzi River passes beneath Edendale Road, to the Ernie Pierce Weir immediately upstream from the College Road Bridge. The system comprises of two main components, namely, the *Sedimentation Basin*, the weir which is located some 400m downstream from Edendale Road, and the Main Canal which is some 2500m in length.

#### KEY PLAN 06.08

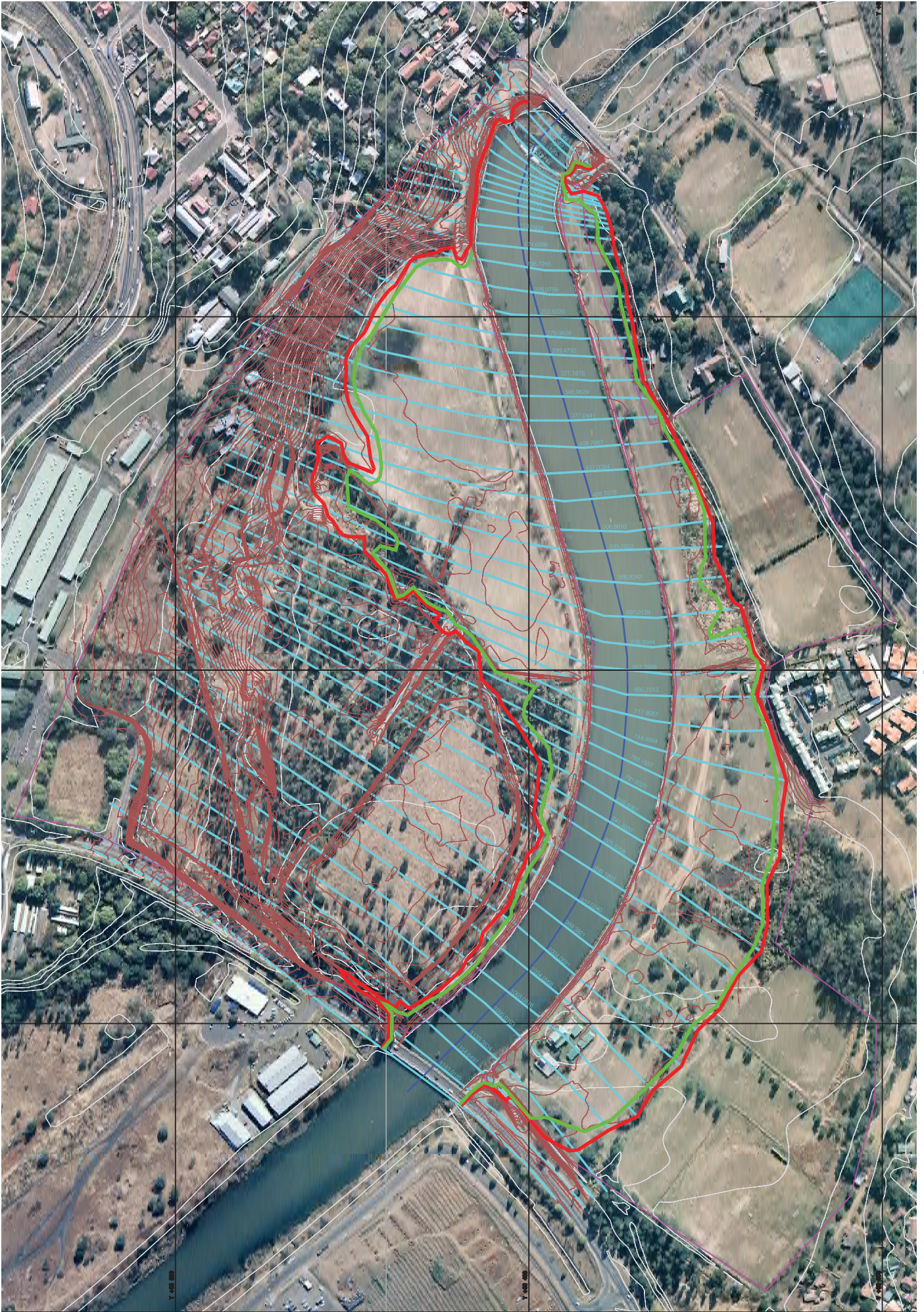
- Sedimentation Basin.
- Main Canal.



73.

Illustration 06.08: Camps Drift Canal.  
Source: www.googleearth.com





74.

Illustration 06.09: 1:50 / 1:100 Year floodline assessment.  
Source: BMK Engineering Consultants



### Advantages:

- The site is centrally located in Pietermaritzburg, which will ensure potential public service and spectator support at the venue.
- The site is centrally located for competitors travelling from around KwaZulu-Natal.
- Access to the venue is easy and quick, with road, rail, air service and public transport nearby.
- With minimal additional road infrastructure, the access points to the site will be able to cope with increased traffic volumes.
- The site has good public exposure as it is clearly visible from major roads.
- There is extensive and various accommodation available in walking distance of the site.
- Even though there is currently not enough water area to provide an international-standard regatta course, there is however enough space for one.
- This course would be able to offer both fair and equal water conditions for competitors.
- The site has already been substantially altered by man and would qualify as a brownfield site.
- There are existing building structures at the site which could potentially be re-used.
- The site has sufficient land area to cater for all the land-based regatta facilities. The land is also mostly flat which is ideal.
- Potentially justifying this site for development would not be a problem as both rowing and kayaking are already very popular at the canal. Also there are various other sporting disciplines and functions which could be catered for.
- The Camps Drift Precinct is currently an underutilised asset of Pietermaritzburg. By building a regatta centre and re-developing the canal the opportunity exists to completely revitalise this area.
- The site is part of land earmarked by the Msunduzi Municipality to be part of a future waterfront development.
- The site is located in close proximity to various other sporting facilities. There is a definite opportunity for the proposed *Regatta Centre* to link into the already existing 'sports and recreational corridor' of the city.
- By altering the shape and design of the canal the hydrological and environmental conditions of the canal could potentially be substantially improved.

### Disadvantages:

- The exiting canal is currently not wide or long enough for an international-standard regatta course. The canal shapes will need to be altered.
- This Canal expansion may require that the existing Camps Drift Road Bridge going over the canal be redesigned.
- The canal currently has a severe silting problem.
- Some areas of the site are susceptible to a 50-year flooding cycle, buildings will need to be designed for tolerance.

### Overall Assessment.

This site, apart from a few issues, is potentially an ideal regatta centre venue. The site performed well against the various criteria.

## 06.06 OTHER SITE OPTIONS.

Various other venues in KwaZulu-Natal were considered including, Albert Falls Dam, Hazelmere Dam, Midmar Dam and the Durban Harbour. These venues were all seen to be unsuitable as they did not meet the basic standards of the site analysis criteria.

A completely purpose built venue was also considered, however there were fundamental sustainability concerns with this approach. Also, there are very few sites of the appropriate nature and magnitude required still remaining near the city centres of Durban and Pietermaritzburg.

## 06.07 CONCLUSIONS.

Through the analysis of the three sites, Site C – Camps Drift in Pietermaritzburg was seen to be the best option for the proposed *Regatta Centre* based on the criterion set out. The unique setting of the site presents many interesting challenges which need to be addressed in the design.



## 06.08 PIETERMARITZBURG.

The City of Pietermaritzburg.

Pietermaritzburg, set amidst forested hills and the rolling countryside of the Natal-Midlands is said to be one of the best-preserved Victorian cities in the world. The city is the administrative capital of the Province of KwaZulu-Natal and is conveniently situated on the main N3 highway between Johannesburg and Durban approximately 80km north of Durban. ([www.pmbtourism.co.za](http://www.pmbtourism.co.za))



Illustration 06.10: The Pietermaritzburg City Hall is one of the cities most iconic landmarks.

Source: [www.flickr.com](http://www.flickr.com)

### Pietermaritzburg Climate.

Pietermaritzburg is a summer rainfall area with most rain falling between October and March. The prevailing winds come from four main directions, although not with equal regularity. During daylight hours the predominant wind is from the east or the south east. At night the predominant wind direction is mainly from the west or north west. Warm berg winds blow between April and September usually from the north west bringing with them substantial temperature rises.

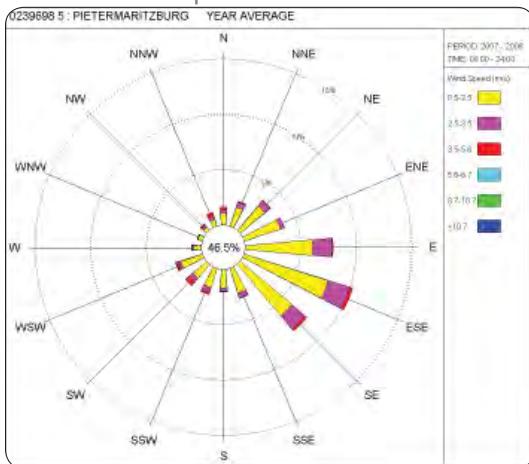


Illustration 06.11: Pietermaritzburg annual wind rose.

Source: South African Weather Service

## 06.09 CAMPS DRIFT WATERFRONT.

Current proposed Development.

The multi-billion rand Camps Drift waterfront development project has been on the cards since 2004, and now in 2010 is going ahead. Ocean Sprays Investments t/a Msunduzi Waterfront have proposed the Camps Drift Development, which is currently in the Scoping Phase with an Environmental Impact Assessments taking place.

The proposed water front development will include several types of infrastructure and land use within the earmarked site. Preliminary designs for the proposed development include the following:

- A Hotel
- Medium density residential areas
- Service yards and parking areas
- High density residential areas
- A shopping centre
- Reserved land
- A convention centre
- Public Open Space
- Internal access roads
- An office park

All of the above activities are proposed for the north west portion of the site and there are currently no development plans for the piece of land on the south east side of the Canal. This is where the proposed *Regatta Centre* would be located.

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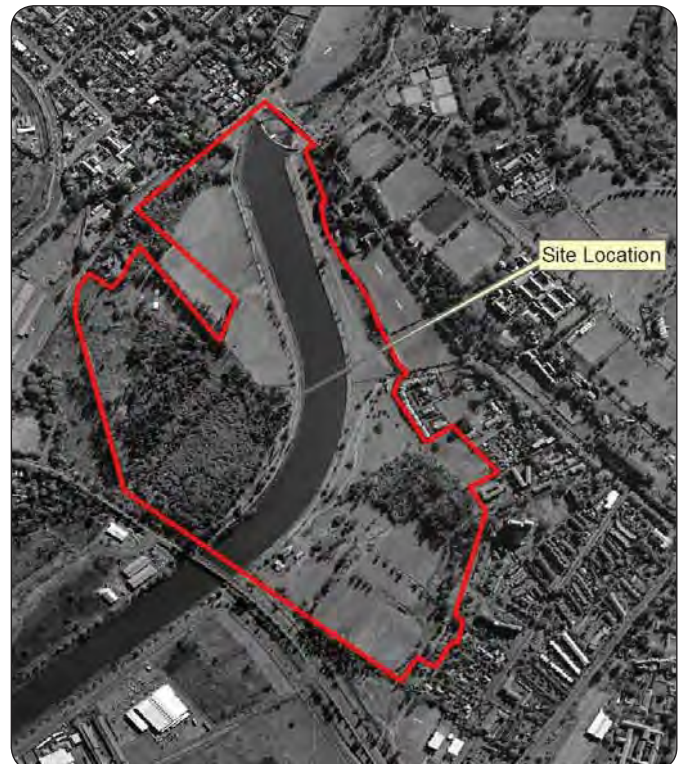


Illustration 06.12: Area available for Waterfront Development.

Source: Miskey, 2009:

PROPOSED FRAMEWORK PLAN AT UMSUNDUZI RIVER IN CAMPSDRIFT-PIETERMARITZBURG



**BULK SCHEDULE TABLE**

Zone	Activity	Height	F.A.R.
Residential	Residential	1-2 Storeys	0.5
Commercial	Commercial	3-4 Storeys	1.0
Public Open Space	Public Open Space	1-2 Storeys	0.5
Regatta Centre	Regatta Centre	3-4 Storeys	1.0

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Illustration 06.13: This is the currently proposed framework plan for the 'Campsdrift Waterfront' by IYER Urban Design Studio showing the intended development on the north west bank of the Drift. Shown in red is a proposed pedestrian bridge linking to the south east bank which is where the Regatta Centre and its associated buildings would be located. Source: IYER Urban Design Studio.



illustration 07.01: Two junior South African kayakers training in their K2 boat. source: [www.flickr.com](http://www.flickr.com)

# FORMULATION OF DESIGN BRIEF & CONCLUSIONS 07

## 07. FORMULATION OF DESIGN BRIEF.

### 07.01 INTRODUCTION.

From the literature reviewed, interviews, precedent studies and case study, certain findings have been made. The outcome of this chapter will be to establish firm guidelines for the design of the proposed *Regatta Centre*.

This chapter will be structured in four major sections, namely:

- Brief derivation.
- The design brief.
- Technical requirements.
- Accommodation schedule.

### 07.02 BRIEF DERIVATION.

#### Introduction.

This section deals primarily with the contextual information regarding the development of the design brief.

#### Funding.

There are three funding options available for the *Centre*: (Gilmore, Interview:2008)

1. Private sector owned and managed, possibly with private finance loan from banking institutions.
2. Public sector owned (municipality) through public capital funding for construction and annual operational budgets for maintenance – ‘communal areas’ can be managed by the municipality or its appointed agent (which can be private sector), and space can be rented out to sport codes.
3. Public-Private-Partnership: Centre jointly funded between private investor and the municipality or government department. Management and maintenance can also be shared.

Option 3 *Public-Private-Partnership* will be the proposed manner in which the *Centre* would be funded.

#### The Client.

For the purpose of this dissertation, Canoeing South Africa, Rowing South Africa and the City of Pietermaritzburg will collaborate to be the client.

#### Users.

The *Centre* will attract a wide variety of people groups including the following:

- Rowing, adaptive rowing, canoeing & kayaking athletes for training, recreation & competition.
- Spectators
- Regatta officials.
- Media – TV & press.
- The general public.

#### Environmental Requirements.

The chosen site borders on the Camps Drift Canal, which is part of the Msunduzi River. The Drift is in desperate need of a re-design, which would be carried out by various specialised professionals. The environmental guidelines set-out by these professionals would need to be strictly adhered to in the design of the *Centre*.

#### Construction Systems & Materials.

As parts of the chosen site are susceptible to flooding, the construction systems and materials specified for the *Centre* will need to be designed and specified accordingly. No facilities that are at risk of being permanently damaged by water can be on the ground floor in these areas. Materials will need to be water resistant, washable materials only.

Flexibility of spaces; use of local materials, knowledge and labour; future maintenance costs; and embodied energy ratings will all need to be well considered.

#### Architectural Form & Massing.

The form and massing of the buildings should be complementary to the sports being catered for, as well as the surrounding landscape.

#### Design Objectives.

The major design objectives of the *Centre* is that the buildings designed be a *relevant* architectural response to the many technical, social, economic, and environmental conditions pertaining to its design.

Technically, the design should:

- Adhere to the technical/functional requirements of an international regatta centre as outlined by FISA and the ICF.

Socially, the design should:

- Encourage community participation.
- Display flexibility through the creation of ‘polyvalent’ spaces.
- Actively promote the connection between man and the environment, and between building and the environment.

### Economically, the design should:

- Consider the idea of total life cycle costing, bearing in mind the future running and maintenance costs of the buildings.
- Actively promote responsible resource management, through attempting to reduce reliance on unreplaceable resources while focusing on harnessing ambient energies and attempting to eradicate wasteful energy use.
- Should consider which spaces should be designed that can serve multiple purposes and adapt in order to achieve maximum utilisation of available space.
- Encourage the use of low-tech/maximum benefit solutions for climate control, lighting and ventilation.
- Actively promote the use of local materials and local labour in its design.

### Environmentally, the design should:

- Consider high temperature in summer; cool temperatures in winter; various prevailing winds; and high summer rainfall as design generators.
- Should actively promote the careful handling of the three elements of sun, wind, and rain in its design.
- Potentially reduce electricity bills and have less impact on the environment by incorporating alternative energy sources.
- Consider various sustainable ways in which to harvest rain water as well as to deal with greywater and black-water.
- Specify materials and construction processes bearing in mind embodied energy ratings, and future maintenance costs.

### **Permanent and Temporary Facilities.**

As the research has shown, an international regatta centre will be required to consist of both permanent and temporary facilities. The scale of permanent facilities should be based on the day-to-day long term use of the *Centre*, with the necessary additional facilities only being provided on a temporary basis during major events.

The design of the *Centre* will therefore need to carefully consider which facilities are to be permanent and which are to be temporary. The design of the permanent facilities will then need to anticipate future temporary infrastructure as being part of its design.

### **Day-to-Day Use.**

Water sports athletes, their families, and the general public will all make use of the *Centre* for day-to-day use, requiring the following facilities:

- A regatta course
- Various Club facilities
- Land based training facilities
- Hospitality / Conference facilities
- General regatta centre infrastructure

These facilities will need to actively promote the sports being catered for, while ensuring the sustained use of the *Centre*.

### **Major Events Use.**

For hosting major events the *Centre* will need to transform to provide many additional facilities, such as:

- An International-standard regatta course
- Various international-standard regatta course facilities
- Spectator facilities
- Competitor facilities
- Additional regatta centre infrastructure

As it is the intention of the *Centre* design to comply with international-standards, these facilities must be suitably catered for so that international-standard grading can be achieved.

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### **Major Events – ‘Zones’.**

According to FISA and the ICF the facilities of an international regatta centre for the purposes of a major event should be capable of splitting up into three specific zones:

- **An ‘Accredited Zone’:** athletes; team management; competition management and officials.
- **A ‘Non-accredited Zone’:** general spectators and media.
- **A ‘Shared Zone’:** athletes; competition management; team management; media; and VIP spectators.

The allocation of facilities into their specific zones will need to be considered early on in the layout of the *Centre*, with all facilities being allocated to their correct zones.

### 07.03 THE BRIEF.

The *Centre* will ultimately cater for a range of people and activities. Precedents have indicated that the design will consist of a number of buildings, including the following:

- Start Tower
- Aligners Hut
- Timing Huts
- Finish Tower Building
- Spectator/Grandstand Building
- Competitor/Boathouse Building

In addition to these buildings there is also a large requirement for various outdoor facilities, which will include the following:

- An International Standard Regatta Course
- Regatta Course infrastructure
- Regatta Centre infrastructure

The design of the various buildings and outdoor facilities will need to be well synchronised, if the centre design is to be a success.

The *Centre* can be divided up into the following facilities:

(For the detailed technical descriptions of the below mentioned facilities see section 07.04 Technical Requirements.)

#### 01 Entrance Facilities.

Site entrance, manner of approach to buildings and actual building entrance points will need to be carefully designed. Entrances should be well defined, welcoming and set the appropriate tone for the venue.

#### 02 Administration Facilities.

There will be administration requirements of the *Centre*, these facilities should be designed with flexibility in mind, and should be grouped together so that communal office amenities can be shared.

#### 03 Social Facilities.

The social facilities of the *Centre* will include the following: a bar / restaurant, function-hall, and various meeting rooms. Spaces should be generously planned, being multi-functional to serve the varied needs of different events. These facilities should, if possible, have views of the Canal and be designed so when used for external functions they have no effect on the day-to-day functioning of the *Centre* for athletes.

#### 04 Training Facilities.

Training for rowing, canoeing and kayaking takes place throughout the year, intensifying in the months prior to the racing season. Training takes place on both the water and on land.

Land based training plays a vital part in a rowing, canoeing and kayaking athletes' training programme, for this reason a fitness centre for athletes will be provided. The fitness centre should seek to promote a professional environment while taking advantage of the views of the Canal and the surrounding area. The fitness centre should cater for both athletes of the associated clubs, as well as the public to promote use of the centre by non-members.

#### 05 Storage Facilities.

Permanent storage facilities for rowing, canoeing and kayaking boats and equipment will need to be catered for at the *Centre*. The various sports have their own particular storage requirements, and should be designed for optimum efficiency. Size of boats and equipment; storage procedure; racking system types; and overall quality of space will all need to be carefully considered. For the purposes of major events additional storage will be required and should be provided on a temporary basis.

#### 06 Spectator Facilities.

Both permanent and temporary spectator facilities will need to be provided, and should be designed to enhance and create a comfortable and exciting spectator environment.

#### 07 Competitor Facilities.

Competitor facilities will need to be of both permanent and temporary construction. Facilities should provide comprehensive back-up for competitors, team management and race officials during major events.

#### 08 Officials Facilities.

Facilities for officials' will need to be provided, and should allow for the appropriate environments to officiate major events.

#### 09 Service Amenities.

Services such as: security room; cleaners' room; meter room; telephone room; switch room and changerooms fall under this category. The changerooms will need to be fairly substantial as they will need to serve both fitness centre and club members.

#### 10 Outdoor Facilities.

As already mentioned, there is a requirement for a variety of outdoor facilities at the *Centre*. These facilities should be designed considering their technical requirements for major events while still remaining relevant to the day-to-day functioning of the *Centre*.

## 07.04 TECHNICAL REQUIREMENTS.

This section covers the technical requirements of the proposed *Regatta Centre* which cover the following facilities:

- Regatta course facilities
- Regatta course buildings
- Spectator/Grandstand building
- Competitor/Boathouse building
- Spectator facilities
- Competitor facilities
- General centre infrastructure

### Regatta Course facilities.

#### An International-Standard Regatta Course.

The key principles when planning a regatta course are:

- A simple, low maintenance course design.
- Provide a fair course for competitors which provides the appropriate conditions for staging major rowing, canoeing and kayaking events, while at the same time ensuring the long-term use of the *Centre*.

The minimum dimensions of an international-standard regatta course are:

- Minimum length = 2122m. (22m behind the start line + 2000m racing course + 100m beyond the finish line). Rowing events take place over 2000m; Adaptive rowing events 1000m; Canoe/kayak events 1000m and 500m.
- Minimum width = 108m. (13.5m gap + 6 lanes x 13.5m + 13.5m gap) (8 lanes are preferred)
- Minimum depth = 3m throughout all racing lanes.

### Warm-up Course.

For major events it is recommended that a second smaller course or water area be provided, used for 'warming up' and 'cooling down'.

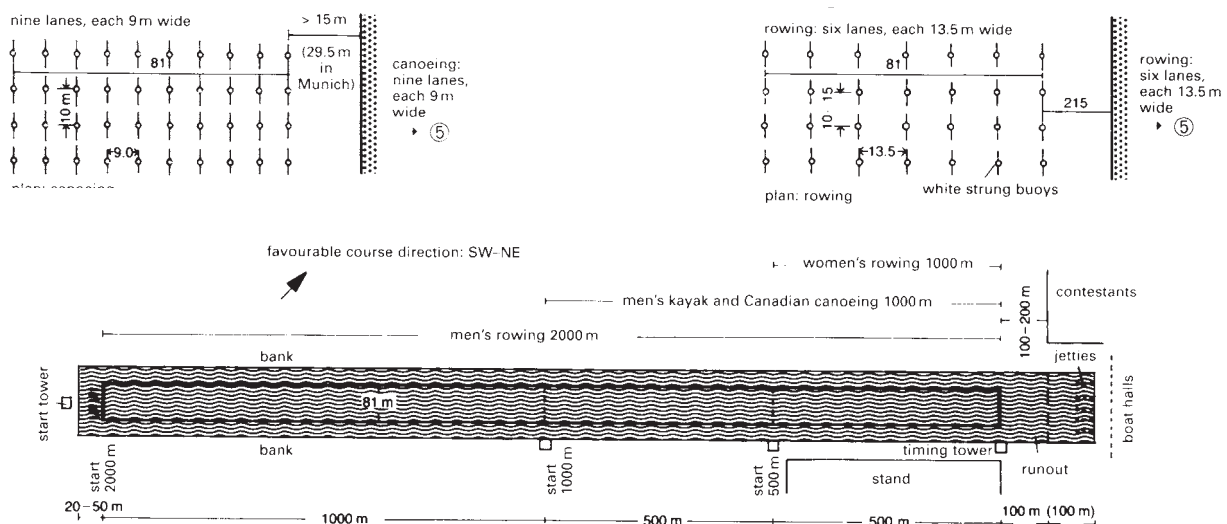


Illustration 07.02-04: Diagram of an international-standard regatta course in Munich used for rowing and canoe/kayak events, also diagrams showing the spacing of rowing lanes compared to the spacing of canoeing/kayaking lanes.

Source: Baiche, 2000: 516.

### Regatta Course Roads.

As a minimum requirement there should be either road access to the start area or a road running the entire length of the regatta course. Ideally for an artificial course a road should be constructed, running around the entire course with a width of 6.5m.

If it is possible to have a road running around the entire course, for major events one road should be dedicated to TV coverage and constructed at a low level as close as possible to the water surface. Turning points should be provided on both sides of the course at the start, at every 500m, approximately 250m before the finish line and beyond the finish line. Along the TV road if it is possible there should be a second road minimum 4m wide provided to be used during racing by the service vehicles, athletes' warming up and by the cyclists.

The roads must be level and straight throughout their length alongside the racing lanes and must be constructed behind the aligner's, but in front of the timing huts and the finish tower.

The roads are used as follows:

- Coaches, with bicycles, for coaching purposes during training and for following races.
- Vehicles for the transportation of equipment, photographers and officials between the start and finish areas during major events.
- Cars for the regatta control, TV coverage and for regatta commentary during major events.
- Minibuses for the coaches to follow the races during major events.
- For day-to-day use, used for various other sports and recreational activities (walkers, joggers, roller-bladers and cyclists) as a waterfront boardwalk.

## Regatta Course Buildings.

### Start Tower.

A start tower should be located 40m – 50m behind the start line, in the centre of the course. It may be of temporary or permanent construction.

- A covered platform approximately 9m<sup>2</sup> - 12m<sup>2</sup> - the floor level must be a minimum of 3m and a maximum of 5m above the water level – there must be a clear view of each of the start pontoons and the aligner's hut.
- Protection against wind and rain must be provided which still allows the Starter to perform their duties without obstruction to the vision or communication with the crews or other officials.
- The front part of the roof or cover (above the Starter) has to be a minimum of 3m above the platform.
- A platform for a TV camera crew above or underneath the Starter's platform must be provided.

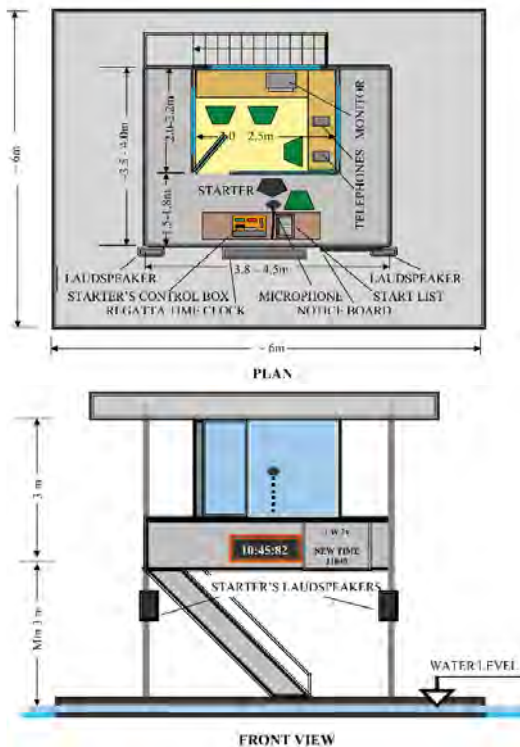


Illustration 07.05-06: **Diagrams of a start tower.**  
Source: FISA Manual, 2008:Appendix B.2.1.1

### Aligners Hut.

An aligners hut should be located on the bank in line with the start line. It may be of temporary or permanent construction.

- A covered platform approximately 9m<sup>2</sup>, 1m – 2m above the water level with a clear view towards the start, the start tower and course.
- Protection against rain, wind and sun must be provided which still allows the officials to perform their duties without obstruction to their vision or communication.
- A platform for a TV camera crew must be provided.

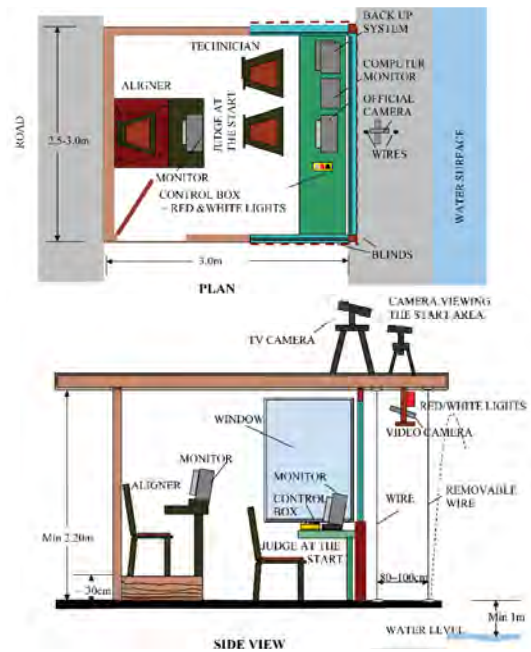


Illustration 07.07-08: **Diagrams of an aligners hut**  
Source: FISA Manual, 2008:Appendix B.2.3.1

### Timing Huts.

Timing huts should be located at 500m, 1000m and 1500m marks along the regatta course. They may be of temporary or permanent construction.

- A covered platform minimum 5m<sup>2</sup> - 6m<sup>2</sup> - the floor must be a minimum of 1.5m above the water.
- For canoeing/kayaking regattas the timing huts at the 1000m and 1500m marks will also serve as start towers they have therefore to be larger.
- A platform for a TV camera crew must be provided on top of the timing huts.

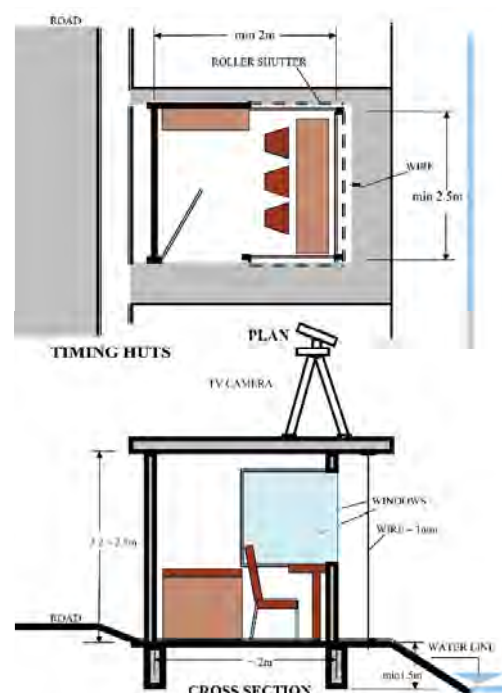


Illustration 07.09-10: **Diagram of a timing hut.**  
Source: FISA Manual, 2008:Appendix B.1.4.1



## The Finish Tower Building.

A finish tower building should be situated on the finish line, as close as possible to the regatta course, but not less than 27m from the racing lanes, and should not obstruct the view from the grandstands towards the finish line. For Olympic Games and FISA events the finish tower must be of a permanent construction.

- Protection against rain, wind and sun must be provided which still allows the officials to perform their duties without obstruction to their vision or communication.
- It is a FISA requirement that the tower be completely air-conditioned.
- There should be large windows facing both the finish line and towards the start, to give the timing and photo-finish officials a clear view of the course and the finish line.
- The finish tower should have a foot print of roughly 50m<sup>2</sup> – 60m<sup>2</sup>, with the longer side parallel to the regatta course.

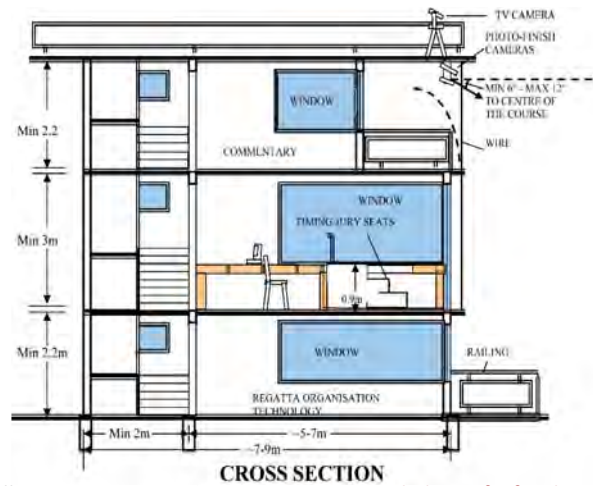


Illustration 07.11-14: Diagram section and plans of a finish tower.  
Source: FISA Manual, 2008:Appendix B.3.3.1

## Spectator/Grandstand Building. Permanent Grandstand.

The permanent grandstand should be positioned as close as possible to the finish line, parallel to the racing lanes and have clear views of the course, scoreboard(s) and video board(s). The grandstand should provide permanent covered seating for roughly 500 spectators, which will be used exclusively by teams, media and VIP spectators during major events. The design of the permanent grandstand should investigate intuitive ways in which it may increase its capacity for the purposes of major events, while its design will also need to anticipate future temporary grandstand structures adjacent to the building.

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## Permanent Spectator Ablutions.

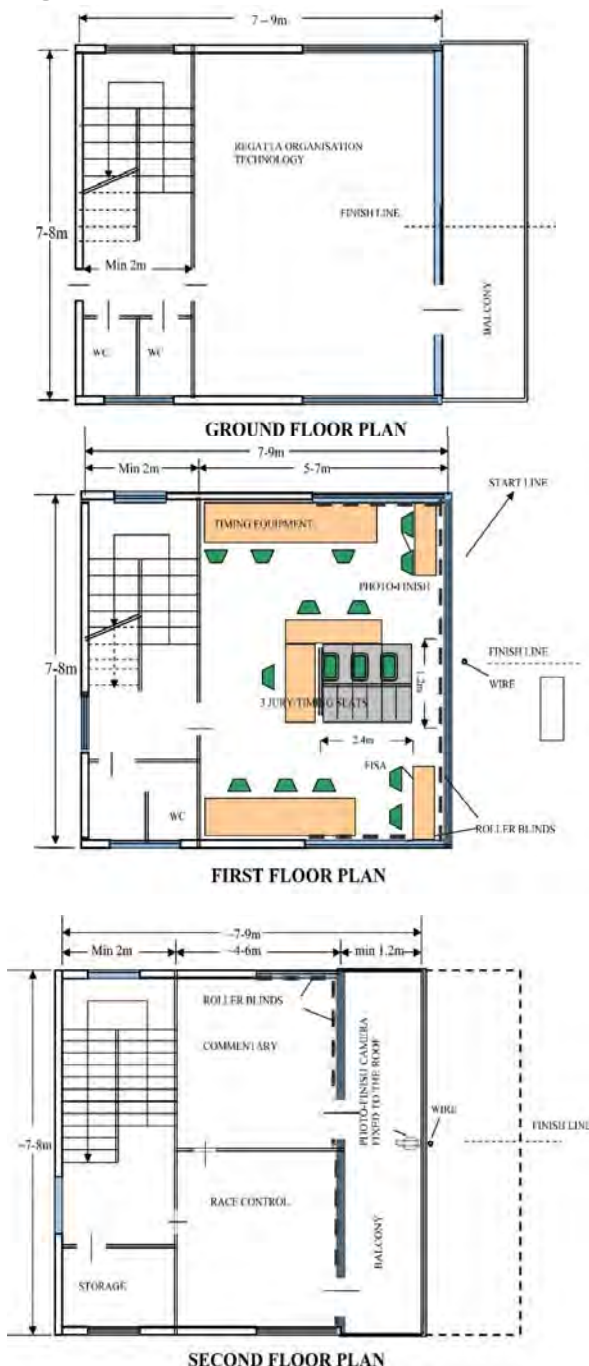
The scale of permanent spectator ablutions should be based on the number of permanent seats provided.

## Bar & Small Restaurant

A bar with a small restaurant component which serves basic meals should be provided for the clubs at the Centre, as well as for the public. The bar and restaurant should be near to the function hall, and should take full advantage of views of the Canal with the option of sitting inside or outside.

## Function Hall & Meeting rooms.

For the purposes of major events a permanent function hall and various meeting rooms are required for a variety of functions. The hall will need to be capable of seating 200 people, with the various meeting rooms varying in size. For day-to-day use these hospitality facilities will be used for both internal and external functions and should be well situated in the Centre, such that the hosting of events does not affect the day-to-day use of the Centre for athletes. The function hall should be near the bar and have spill-out areas for guests to enjoy the outdoors.



## Competitor/Boathouse Building. Permanent Boathouses.

Permanent storage for the protection of rowing, canoeing and kayaking boats and equipment should be provided, based on specific storage requirements.

Boathouse facilities should be provided for the following clubs and teams:

- Pietermaritzburg Rowing Club.
- Natal Canoe Club.
- University of KwaZulu-Natal Rowing Club.
- University of KwaZulu-Natal Canoe Club.
- Various school teams.

Important points to consider when designing boathouses are:

- Access to boathouses for loading and unloading, should be easy, ideally access into a boathouse should be from both sides.
- The terrain surrounding a boathouse should be flat, for ease of movement of boats and athletes.
- The boathouses should be located beyond the finish line, and have direct access to launching pontoons no further than 75m away.
- A level area approximately 400m<sup>2</sup> – 500m<sup>2</sup> must be provided for setting up of boats which should be located near the boathouses.
- As boathouses have very deep floor plans they are often very dark inside, an effort should be made to enhance the quality of light by maximising the use of natural light in their designs.

When defining the dimension of a rowing boathouse the following must be considered:

- The length of the longest rowing boat is 18.9m
- The length of the shortest rowing boat is 8.2m.
- The minimum required space between the axis of boat racks is 6m.
- The minimum height of the door of a rowing boathouse is 2.6m.
- The best spacing for boat racks is 4.2m apart.
- Traditionally oar racks are provided near the doors of a rowing boathouse, which are stored vertically, oars are 3.2m long.

When defining the dimension of a canoe/kayak boathouse the following must be considered:

- The length of the longest canoe/kayak is 11m.
- The length of the shortest canoe/kayak is 5.2m.
- The minimum height of the door of a canoe/kayak boathouse is 2.6m.
- Canoe/Kayak boats can be stored in two ways: on boat racks mounted on walls or in 'boat slots'.

## Boatsheds.

Boatsheds are different to boathouses, in that they are open on the one side. Boatsheds use the 'boat slot' racking system and is a very economical and convenient way to store boats.

## Changeroom Facilities.

Permanent changeroom facilities should be provided for both able and disabled bodied athletes based on the day-to-day, long term use of the *Centre*. Changeroom facilities should be provided with: showers; toilets; urinals; wash hand basins; changing areas; benches; and lockers. Efficient natural lighting and natural ventilation of the changerooms should be a high priority in their design.

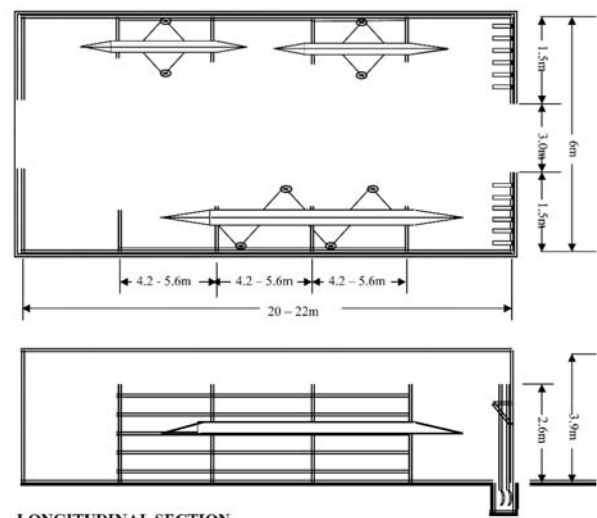
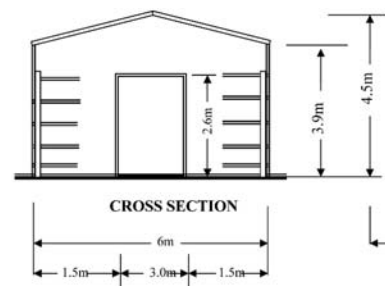


Illustration 07.15-17: Preferred dimensions of a rowing boathouse.  
Source: FISA Manual, Appendix B.7.2.1

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PLAN



Illustration 07.18: Some of the boatsheds at the Natal Canoe Club with K1 & K2 kayaks stored in 'boat slots'.

### Administration Facilities.

Administration facilities for the following must be provided:

- Pietermaritzburg Rowing Club
- Natal Canoe Club.
- Centre administration & Management

### Fitness Centre.

The fitness centre will need to include the following:

- Reception / Administration / Consultant's rooms
- Physiotherapy / Massage rooms
- Gymnasium changeroom facilities
- Various exercise equipment/machines
- A general purpose exercise studio



Illustration 07.19: A fitness centre for athletes to train at the Centre, will create a professional environment.

Source: [www.usl.co.uk](http://www.usl.co.uk)

### Rowing Tank.

The inclusion of a specialised rowing tank at the centre would require a substantial investment. The feasibility of this investment would need to be further investigated; however for the purposes of this dissertation space should be allocated for a rowing tank in the event of one being required. A space approximately 10m X 20m should be provided for this specialised installation.



Illustration 07.20: A rowing tank such as this one could be included into the design of the regatta centre to allow for advanced training.

Source: [www.ianritchiearchitects.co.uk](http://www.ianritchiearchitects.co.uk)

### Regatta Course Facilities.

#### Start Area Facilities.

**Starting Pontoons** - should be located approximately 21m - 22m behind the start line at the start of the course situated in the water. The start pontoons must provide the exact alignment of the bows of the boats on the start line, and must allow for boat types with different lengths. It may be of temporary or permanent construction.

**Repair Pontoon** - approximately 3m x 6m, located near to the aligner's hut. (Only required for major events).

**A tent for Media** - approximately 15m<sup>2</sup> for journalists, photographers and TV personnel. (Only required for major events).

**A tent for the officials** - approximately 15m<sup>2</sup>. (Only required for major events).

**WC** - temporary portable type unit. (Only required for major events).

#### Finish Area Facilities.

**Score & Video Boards** - scoreboards and the video boards must be clearly visible to both the spectators in the grandstands and to the competitors on the water as they cross the finishing line. They may be of permanent or temporary construction: Video boards 40m<sup>2</sup> – 80m<sup>2</sup> and Scoreboards: 35m<sup>2</sup> – 85m<sup>2</sup>. (Only required for major events).

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For the Olympic Games, when there are grandstands on both sides of the course, there should be three scoreboards and two video boards provided as follows:

- A small score board placed beyond the finish tower for the athletes.
- A scoreboard placed against the finish tower for the VIP, media and team grandstand.
- A large score board placed beyond the non-covered grandstands for the general public on the other side of the course.
- A video board placed beyond the non-covered grandstands looking towards the VIP, media and team grandstand.
- A large video board placed beyond the non-covered grandstands for the general public on the other side of the course.

**Distribution Service** - this covers the production and distribution of entry lists; start lists; results lists; and FISA communications during major events. This service needs to be located in a room, in a permanent building. (Only required for major events).

**Victory Ceremony Pontoon** – should be located in front of the VIP, media and team grandstands. The pontoon should be 3m wide and 54m long, attached to the victory ceremony stage. (Only required for major events).

**The Victory Ceremony Stage** - can either be a pontoon - 3m wide and 18m - 20m long attached to the landing pontoon or on land in front of the main grandstand. (Only required for major events).

**Umpires Catamaran Pontoon** – should be located near the finish tower beyond the finish line, 3m wide and 12m long. (Only required for major events).

**Flash Interview Pontoon** – must be located 30m – 40m beyond the finish line - 3m wide and 54m long. (Only required for major events).

**Photographers Pontoon** – must be located immediately beyond the finish line – 6m wide and 12m long. (Only required for major events).

**Flag Poles** - will need to be allocated an area for major events; up to six flagpoles should be visible to both the spectators in the grandstands and to the competitors on the victory ceremony stage.

**Victory Ceremony Preparation** – should be located near to the finish tower or near to the main grandstand. A covered area or rooms with tables and chairs for organising the medals; for changing uniforms; for preparing the flags and for waiting between ceremonies. (Only required for major events)

### **Spectator facilities. Spectator Area.**

**Temporary Grandstands** - should be located on either side of the regatta course as close as possible to the finish line. There will be a large requirement for temporary seating during major events which should be provided using a pre-fabricated temporary grandstand type construction. These grandstands will require large flat areas which will need to be planned into the design of the *Regatta Centre*.

For major events grandstand seating should be provided separately for the following people groups:

- The general public. (non-accredited zone)
- Teams; media; and VIPs. (shared zone)

FISA recommends that the following number of spectators should be catered for at the following events:

- Olympic Games: 14000 – 20000 seats
- World Championships: 4000 – 12000 seats
- Regional Games: 4000 – 10000 seats
- International Events: 3000 – 5000 seats

**Spectator Ablutions** - for major events should be provided based on the number temporary seats catered for at the venue. These services should be portable type sanitary units.

**Food & Drink Services** – should be provided on a temporary basis during major events based on the number of spectators anticipated. Food facilities should be capable of serving simple meals, and drinks. Facilities should be capable of serving drinks both, hot and cold as well as alcoholic and non-alcoholic. The temporary food and drink services should be provided in mobile food vans or temporary food tents located near the grandstands.

**Merchandising and Souvenir Services** – should be provided as temporary facilities available for the selling of merchandise and souvenirs during major events, located near the grandstands.

### **Competitor Facilities. Competitor Area.**

**Boat Launching Pontoons** – should be provided for both major events and day-to-day use. For major events there should be at least four separate pontoons, placed perpendicular to the bank in front of the boathouses/boatsheds. Pontoons must be suitably designed to handle changing water levels and made of wood, steel, polyester or concrete. The pontoons should be a minimum of 4m wide and 18m long, with at least 16m of clear water between each, with sufficient space provided between the regatta course and the pontoons.

87.



Illustration 07.21: One of the launching pontoons at the Sydney International Regatta Centre.

Source: [www.flickr.com](http://www.flickr.com)

**Control Commission** – is a tent near the permanent boathouse area with good visibility over the water, used for race control to base their operation. (Only required for major events)

**Athlete Weighing** – is an area with good visibility over the water, located in one of the permanent boathouses or in a temporary tent near the permanent boathouses. (Only required for major events)

**Boat Weighing** – requires an area approximately 4m x 18m located in one of the permanent boathouses or in a temporary tent near the permanent boathouses. (Only required for major events)

**Ergometers** – for the Olympic Games, World Championships, World Cup regattas and U23 Championships need to be provided. There will need to be 20 - 25 ergometers (rowing machines) available.

**Boat Repair and Washing** – should be provided for in six tents 80m<sup>2</sup> each, placed a minimum of 5m apart, near the permanent boathouses allocated for boat repairs and boat washing. (Only required for major events)

**Major Repairs** – is an area located in one of the permanent boathouses or a temporary structure. (Only required for major events)

**Information Centre** – approximately 40m<sup>2</sup> – 60m<sup>2</sup>, will need to be allocated in a permanent building or a temporary tent used as a communication point providing information and dealing with team managers. (Only required for major events)

**Rest and Relaxation Areas** – will need to be provided, either in a permanent building or in temporary tents for crews to lie down and rest prior to their races. (Only required for major events)

**Open Air Hospitality Area** – is used as a meeting point for athletes, their families and friends during major events. This area should be located just outside the accredited zone between the Competitor/Boathouse building and the Spectator/Grandstand building.

**Athlete Lounge** – is a requirement for the Olympic Games, located in the competitor area, in a tent approximately 10m x 20m.

**Medical Centre Facilities** - for major events should be provided, with the following making up the centre:

- One waiting room 12m<sup>2</sup> – 15m<sup>2</sup>
- Two treatment room (four beds) 12m<sup>2</sup> – 15m<sup>2</sup>
- One Doctor's room 10m<sup>2</sup> – 15m<sup>2</sup>
- wc & whb

**Doping Control Facilities** – will need to be provided and should be located in either a permanent building or in an air-conditioned container located in the accredited zone. (Only required for major events)

**Physiotherapy and Massage Facilities** – for major events either located in the medical centre or in the accredited zone. Basic physiotherapy and massage facilities with positions for 3 curtained areas in a room of 20m<sup>2</sup> will need to be provided.



Illustration 07.22: Having permanent physiotherapy / massage facilities at the Centre, will further contribute to the professional environment of the centre.

Source: [www.teambath.com](http://www.teambath.com)

**Competitor Eating Area** – located in the accredited zone in either mobile food vans or tents. (Only required for major events)

**Temporary Boat Storage Facilities** - for major events will need to be provided. The entire boathouse area including permanent and temporary facilities should be approximately 10 000m<sup>2</sup>. This area will include both indoor and outdoor storage facilities made up of both permanent and temporary infrastructure.

### Centre Infrastructure. 88. Site Entrance Points.

For major events there must be a minimum of three separate entrance points to the site: a spectator entrance; a competitor entrance; and an emergency entrance.

#### Parking.

The scale of permanent parking facilities should be based on the day-to-day, long term use of the Centre. Parking should be well defined and preferably overlooked by human activity, for passive surveillance purposes. For major events large parking areas will be required for the following: shuttle buses; team buses; media; VIPs; boat trailers; and spectators. For large events a 'park and ride' parking system should be used to alleviate congestion around the Centre.

## 07.05 ACCOMMODATION SCHEDULE.

This is the accommodation schedule for the design section of this dissertation. Size requirements of the different space functions were determined through literature reviewed, analysis of precedent and case studies as well as information gathered through interviews.

**ACCOMMODATION SCHEDULE** - An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal.

Facility	Zone	Area	No.	Total	Requirements	
permanent facilities						
temporary facilities						
<b>zones</b>						
zones for major events						
accredited zone					athletes; team management; competition management; officials.	
non-accredited zone					general spectators; media.	
shared zone					athletes; competition management; team	
<b>buildings</b>						
start tower						
aligners hut						
timing huts						
finish tower building						
spectator/grandstand building						
competitor/boathouse building						
<b>regatta course buildings</b>						
start area						
start tower			24	1	24	located 40m - 50m behind the start line, in the centre of the course on a covered platform approx. 9m <sup>2</sup> -
aligners hut			24	1	24	located on the start line on a covered platform approx. 9m <sup>2</sup> - 12m <sup>2</sup> ; floor level to be a min. of 1m above water
intermediate area (along the course)						
timing huts			6	3	18	at 500m, 1000m & 1500m marks; 1.5m above water; a min. 2m x 2.5m.
finish area						
finish tower			200	1	200	located on the finish line; not less than 27m from the racing lanes; air-conditioned; four levels (1) regatta organisation (2) timing (3) commentary (4) TV camera
<b>spectator/grandstand building</b>						
permanent grandstand						
permanent covered seating			450	1	450	approx. 450 covered seats; parallel to racing lanes.
spectator ablutions						
male ablutions			35	1	35	4 wc; 3 ur; 5 whb .
female ablutions			35	1	35	5 wc; 4 whb.
disabled ablutions			4	1	4	1 wc; 1 whb.
bar / small restaurant						
bar / small restaurant			20	1	20	bar serving drinks and basic meals.
indoor & outdoor seating			100	1	100	informal seating with views of camps drift.
kitchen amenities						
• basic kitchen			25	1	25	small kitchen for basic food preparation
• drinks storeroom			6	1	6	secure lockable room.
• food storeroom			6	1	6	secure lockable room.
bin area			9	1	9	well ventilated; easily accessible.
function hall						
function hall			250	1	250	multi-purpose hall, must seat approx. 200 people with views of camps drift.
function hall storeroom			15	1	15	secure lockable room for storage of tables, chairs & other function equipment.
external caterers area			30	1	30	for external caterers to use during events.
seminar room			40	1	40	seminar room for holding small meetings
function hall verandah			50	1	50	verandah with views of camps drift.
<b>TOTAL PERMANENT</b>				<b>1075</b>		
<b>TOTAL TEMPORARY</b>				<b>66</b>		

**ACCOMMODATION SCHEDULE - An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal.**

Facility	Zone	Area	No.	Total	Requirements
<b>permanent boathouses &amp; boatsheds</b>					
boathouses (rowing)		125	3	375	6m (w); 21m (l); direct access to the launching pontoons; should be situated at a distance of approx. 50m (minimum 30m) from the water edge; both ends opening to allow access for boats from two sides; oar racks located close to door; boathouse should be a minimum of 100m beyond finish line.
boathouses (canoe/kayak)		125	3	375	same spec as rowing boathouse
canoe/kayak boatsheds		20	18	360	boat slots; 3.2m (w); 7.5m (l); 2.6m (h)
general purpose storage		125	1	125	same spec as rowing boathouse.
rigging areas					400m <sup>2</sup> - 500m <sup>2</sup> of flat area near water, preferably grassed.
<b>change room facilities</b>					
male change room		150	1	150	6wc; 6whb; 4ur; 10sh; lockers; changing area; must be well ventilated and lit.
female change room		150	1	150	6wc; 6whb; 10sh; lockers; changing area; must be well ventilated and lit.
disabled change rooms		15	2	30	male and female disabled change room facilities
<b>administration facilities</b>					
reception / waiting area		20	1	20	reception and waiting area.
• office space		15	4	60	flexible office space.
• boardroom		20	1	20	boardroom table seating max. 12 people.
• staff kitchen		8	1	8	microwave; fridge; sink.
<b>fitness centre / gymnasium</b>					
reception / foyer		30	1	30	reception with turnstile & access control.
gym administration office		12	1	12	flexible office space.
gym managers office		12	1	12	flexible office space.
main exercise floor		200	1	200	stretching area; cardiovascular circuit; exercise machines; free weights.
multi purpose exercise studio		80	1	80	general purpose exercise studio used for various exercise classes.
spinning studio		30	1	30	small studio used for spinning classes.
consultants rooms		8	2	16	small space with views of the gym; couches and small table for computer.
physiotherapy / massage rooms		15	2	30	multi-purpose physiotherapy / massage rooms; massage bed; whb.
rowing tank		180	1	180	rowing tank as per specialists design.
<b>auxiliary services</b>					
security room		10	1	10	
cleaners room		5	1	5	room for cleaners to change and store cleaning equipment.
meter, switch & telephone room				24	meter room - 2m X 3.5m; switch room - 3.5m X 3m; telephone room - 2m X 1.5m.
<b>TOTAL PERMANENT</b>				<b>2302</b>	
<b>TOTAL TEMPORARY</b>				<b>0</b>	

competitor/boathouse building

**ACCOMMODATION SCHEDULE - An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal.**

Facility	Zone	Area	No.	Total	Requirements
<b>regatta course facilities</b>					
<b>courses</b>					
international-standard regatta course			1		min. 2178m (l); 108m (w); 3m (d); min. 6 lanes X 13.5m (rowing).
warm-up course (optional)			1		min. 500m (l); 64m (w); 2m (d); min. 4 lanes X 13.5m.
<b>regatta roads (major events)</b>					
coaching road (optional)			1		along the entire course; 6.5m (w); with turning points at every 500m.
TV camera road (optional)			1		along the entire course; 6.5m (w); with various turning points at every 500m; an additional 4m road parallel to
<b>start area facilities (major events)</b>					
starting installation / pontoon					located 21m - 22m behind the start line.
repair pontoon					approx. 3m X 6m located near aligners hut
media tent		15	1	15	for journalists, photographers, tv personnel
officials tent		15	1	15	tent for the sole use of officials
start area wc		5	1	5	1wc; 1whb
<b>finish area facilities (major events)</b>					
scoreboard(s) & video board(s)			1		scoreboard: 35m <sup>2</sup> – 85m <sup>2</sup> ; video board: 40m <sup>2</sup> – 80m <sup>2</sup> .
distribution service		20	1	20	in a room in a permanent building. (only for major events)
victory ceremony pontoon			1		located in front of the main grandstand; 3m (w), 54m
victory ceremony stage			1		located in front of the main grandstand; 3m (w), 18m (l)
umpires catamaran pontoon			1		located near to the finish tower beyond the finish line; 3m wide, 12m long.
flash interview pontoon			1		located 30m - 40 beyond the finish line; 6m (w); 12 (l)
photographers pontoon			1		located beyond the finish line; 6m (w); 12m (l).
flag poles			1		an area for flagpoles; must be visible to both spectators and competitors.
victory ceremony preparation			1		located near finish tower.
<b>spectator facilities</b>					
<b>temporary grandstands (major events)</b>					
<ul style="list-style-type: none"> <li>olympic games – 14,000 – 20,000 seats</li> <li>world championships– 4,000 – 12,000 seats</li> <li>international events – 3,000 – 5,000 seats</li> </ul>					as per event requirements; to be of prefabricated construction.
<b>spectator facilities (major events)</b>					
temporary spectator ablutions					as per event; portable type sanitary service.
temporary food facilities					as per event; mobile type food facilities.
merchandising & souvenirs					as per event; temporary facilities.
temporary medical facilities					as per event; mobile type facilities.
<b>TOTAL PERMANENT</b>			<b>0</b>		
<b>TOTAL TEMPORARY</b>			<b>55</b>		



**ACCOMMODATION SCHEDULE - An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal.**

Facility	Zone	Area	No.	Total	Requirements
<b>competitor facilities</b>					
<b>competitors area (major events)</b>					
boat launching pontoons			4		placed perpendicular to the bank in front of the boathouses/boatsheds; 4m (w); 18m (l); with 16m
control commission		20	1	20	good visibility over the water.
athlete weighing		125	1	125	good visibility over the water; located in one of the permanent boathouses or a temporary structure.
boat weighing		125	1	125	located in one of the permanent boathouses or a
ergometers					20 - 25 ergometers. (only for major events)
boat repair & washing		80	6	480	temporary structures used for boat repairs and boat washing.
major repairs		125	1	125	in a boathouse or a temporary structure.
information centre		40	1	40	in a building or temporary structure.
rest and relaxation areas		100	1	100	in a building or temporary structure.
open air hospitality area			1		an area in the shared zone.
athlete lounge		100	1	100	for the olympic games; located in permanent building
medical centre					to use gyms facilities
• waiting room					
• treatment room					
• doctors room					
doping control		50	1	50	in a building or a temporary structure.
physiotherapy and massage		20	1	20	3 X curtained rooms
competitor eating areas		100	1	100	
temporary boat storage facilities					10 000m <sup>2</sup> of indoor and outdoor storage.
<b>TOTAL PERMANENT</b>				<b>70</b>	
<b>TOTAL TEMPORARY</b>				<b>1265</b>	

<b>centre infrastructure</b>					
<b>site entrance points (major events)</b>					
spectator entrance			1		
competitor entrance			1		
service /emergency entrance			1		
<b>parking facilities</b>					
permanent parking					approx. 150 parking bays.
temporary event parking					designated grassed area used during peak periods and during events.
bus parking (major events)					designated area used for bus parking.
trailer parking (major events)					designated area for boat trailer parking.
major events parking					park and ride parking system; as per event

<b>totals</b>	<b>GRAND TOTAL PERMANENT</b>	<b>5597</b>
	<b>GRAND TOTAL TEMPORARY</b>	<b>1386</b>
	<b>GRAND TOTAL</b>	<b>6983</b>

(these area calculations exclude circulation space)



illustration 08.01: A canoe slalom athlete seen here negotiating a rapid\_ source: www.flickr.com

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**CHAPMAN**, Warrick. (President of Kwazulu-Natal Rowing) 19<sup>th</sup> November 2008, Durban.

**COX**, Richard. (General Manager PYC) 6<sup>th</sup> March 2008, Durban.

**DUVENAGE**, Andre. (Architect at Architects Collaborative) 2<sup>nd</sup> June 2010, Pietermaritzburg.

**GILMORE**, Peter. (Development Planning & Land Usage Manager - eThekweni Municipality) 19<sup>th</sup> Feb 2008, Durban.

**HARRINSON**, Gavin. (Engineer, Infrastructure Planning & Survey Department, Msunduzi Municipality) interviewed by author, 7<sup>th</sup> November 2008, Pietermaritzburg.

**MACINTOSH**, Robin. (Commodore HYMC) 7<sup>th</sup> March 2008, Pietermaritzburg.

**MATHEWS**, Keith. (Inanda Dam Resort Manager) 7<sup>th</sup> March 2008, Durban.

**NDLOVU**, Fundani. (KZN Development Canoeing) 10<sup>th</sup> April 2008, Durban.

**OLIVER**, John. (KZN Canoe Union) interviewed by author, 6<sup>th</sup> November 2008, Howick.

**RENNIE**, Alec. (Hydrological Engineer, MBB Engineering Pietermaritzburg) 7<sup>th</sup> November 2008, Pietermaritzburg.

**RUGBEER**, Kamesh. (Engineer, BMK Engineering Consultants) 2<sup>nd</sup> June 2010, Pietermaritzburg.

**WANG**, Derek. (Building Science Lecturer at UKZN) 21<sup>th</sup> November 2008, Durban.

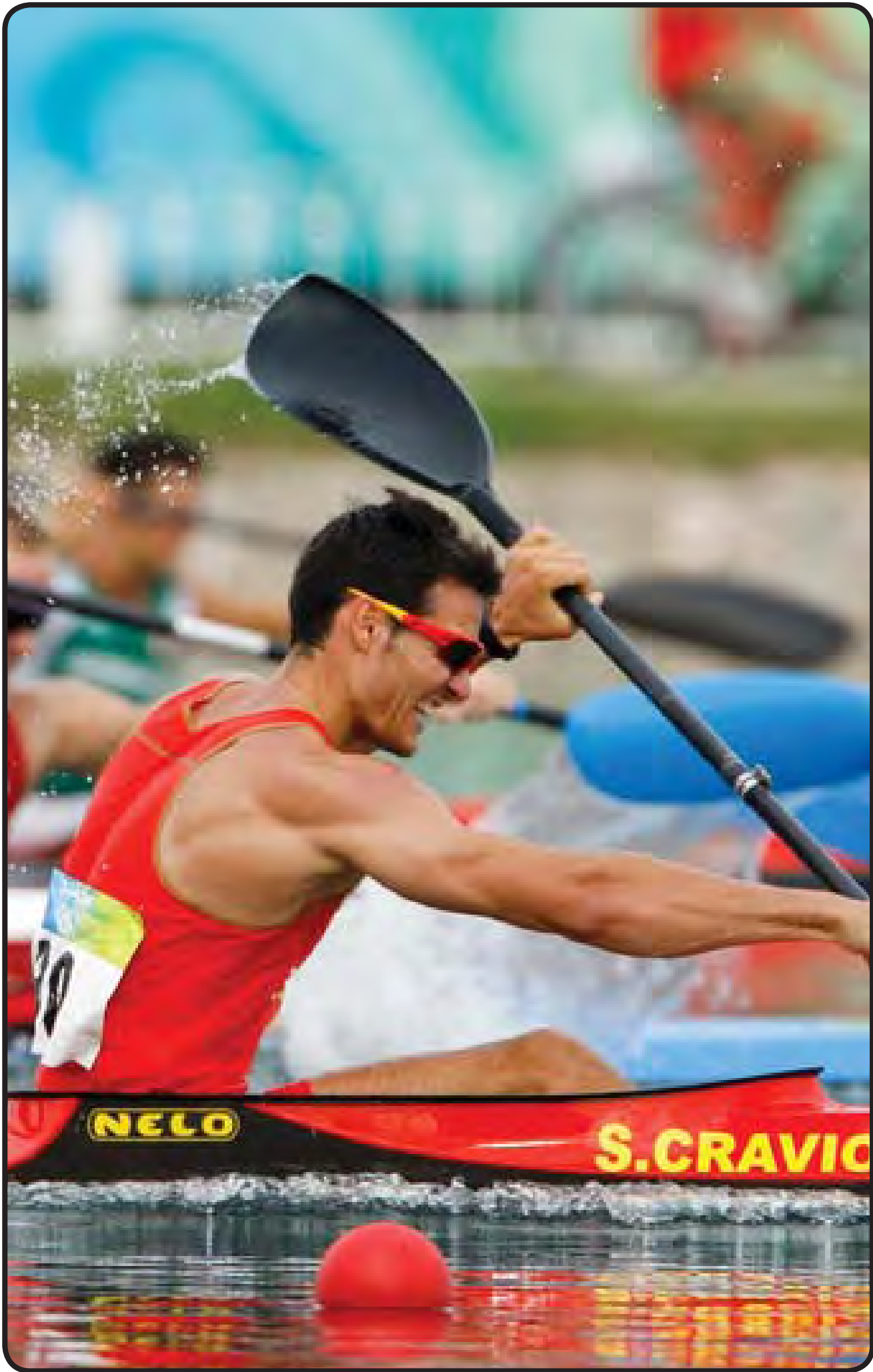


illustration 09.01: Kayakers competing during an event at the Beijing Olympics \_ source: [www.flickr.com](http://www.flickr.com)

## APPENDICES 09



**09. APPENDICES.**  
**09.01 DESIGN DRAWINGS.**

# TOWARDS A RELEVANT ARCHITECTURE

**An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal, South Africa.**

**Craig John Howie**

I.

**DISSERTATION DESIGN REPORT.**

**January 2011**

A dissertation design report submitted to the School of Architecture, University of KwaZulu-Natal, Durban, in partial fulfilment of the requirements for the degree of Master of Architecture.

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**Note:** All illustrations by author, unless otherwise indicated.



1.

illustration 00.01: \_source: www.flickr.com

# INTRODUCTION 00

## 00. INTRODUCTION.

This report documents the key elements considered during the process of designing an *International Rowing & Canoeing Regatta Centre for KwaZulu-Natal*. The need does currently exist for a *Regatta Centre* in KwaZulu-Natal as there are currently no formal regatta facilities in the province, and with future aspirations of hosting major sporting events including the Commonwealth Games and the Olympic Games; specialised sporting facilities such as an international regatta centre will need to be built.

The design of the proposed *Centre* sets out to provide an environment to accommodate the needs of water sports athletes, spectators and officials as well as providing an interface where families and the public can engage with the *Centre*. Thereby, creating a space that adds more value to its context than just another sports facility.

This is achieved by designing a *Centre* which is technically sound and on the cutting edge of developments for athletes, yet creates opportunities where the larger community can engage with the *Centre* in a beneficial and recreational way. The design's integration into an already established recreational area and the effective use of an existing resource are added advantages in producing a *Centre* that will not only add value to KwaZulu Natal but to South Africa as a whole.

2.





illustration 01.01: \_source: www.flickr.com

# THEORETICAL 01

## 01. THEORETICAL.

Currently, many buildings in South Africa are irrelevant to the context that they are designed and built in. Water sports facilities, as a building typology, are frequently guilty of this. Often insular and purely utilitarian, they seem to only serve the needs of a limited number of people.

It is in response to this situation and, with the need in mind for an international regatta centre, that the theoretical underpinning for this dissertation be that of an endeavour towards a *relevant architecture*.

Architects need to consider the specific: social, economic and environmental conditions currently prevailing in South Africa. In addition, the technical requirements of the specific building type need to also be taken into account to create a building that is of an international standard.

With relevant architecture as the theoretical framework, the design of the *Centre* will strive towards creating a building that is both appropriate to its context while also meeting the strict criteria of an international complex of its type.

4.





illustration 02.01: \_source: [www.flickr.com](http://www.flickr.com)

# DESIGN CONCEPTS 02



## 02. DESIGN CONCEPTS.

The design concepts are developed out of the research conducted during the course of this dissertation. This research highlighted the need for certain key principles to be present in the design of such a water sports facility. These are *polyvalent space*, *light-weight structures*, *multi-use approach*, *recreational precinct* and *outward looking response*.

### 02.01 POLYVALENT SPACE.

The *Centre* must be designed in such a way that it can fulfil a variety of purposes and meet the changing needs of its users – without having to undergo change itself. A minimal amount of flexibility must still be able to produce an optimal solution.

As the day-to-day requirements of the *Centre* will vary greatly from the requirements for major events, the concept of polyvalent space is an essential tool in managing these varied requirements. The design must take into consideration the placement of permanent structures with the anticipation of temporary infrastructure. The 'transition' between day-to-day and major events must be achieved with relative ease.

### 02.02 LIGHTWEIGHT STRUCTURES.

Today's rowing boats, canoes and kayaks are high-tech, lightweight crafts that are designed and built for maximum efficiency. The buildings of the *Centre* respond to these characteristics through the creation of lightweight, efficient structures which mimic the essence of the watercraft that are used at the facility. These light-weight structures are juxtaposed against 'heavier' forms to further highlight their light-weight nature.

### 02.03 MULTI-USE APPROACH.

To justify the investment in a facility of this nature, maximum use and exposure of the *Centre* must be ensured. The *Centre* should be conceptualised as a multi-functional facility where: various sports are catered for; hospitality facilities are provided and recreational/lifestyle activities can take place.

### 02.04 RECREATIONAL PRECINCT.

The *Centre* should take in to consideration the part that it plays within the larger recreational precinct that it is located in. The design must contribute to, and facilitate the overall improvement of the precinct.

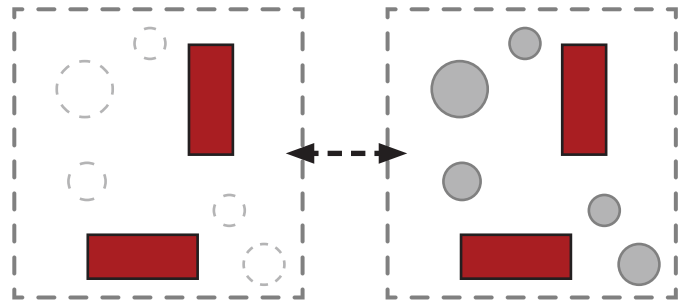


Diagram illustrating polyvalent space. The building meets two different needs with minimal change creating an optimal solution.

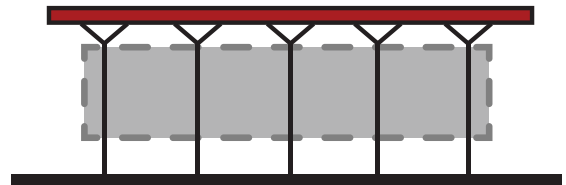
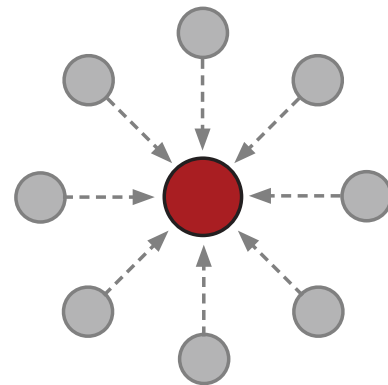


Diagram illustrating the characteristics of water craft being expressed in the lightweight structures of the Centre.



6.

Diagram illustrating the multi-use approach of an object to perform different functions.

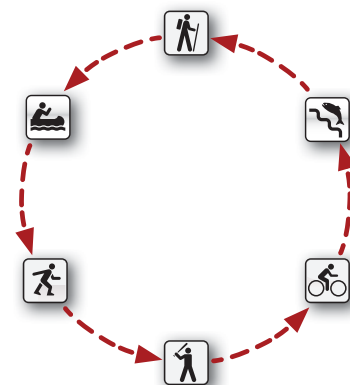


Diagram illustrating the inter-connectedness of the various sporting/recreational facilities to create a larger precinct.



illustration 03.01: \_source: www.flickr.com

# BRIEF & ACCOMMODATION SCHEDULE 03

### 03. THE CLIENT & BRIEF.

#### 03.01 CLIENT & FUNDING.

For the purpose of this dissertation, Canoeing South Africa, Rowing South Africa, and the City of Pietermaritzburg will collaborate to be the client. *Public-Private-Partnership* will be the proposed manner in which the *Centre* would be funded.

#### 03.02 USERS.

The *Centre* will attract a wide variety of people groups including the following:

- Rowing, adaptive rowing, canoeing & kayaking athletes for training, recreation & competition.
- Spectators
- Regatta officials.
- Media – TV & press.
- The general public.

#### 03.03 FUNCTIONS OF THE BUILDINGS.

Functions will be split into three main buildings: a building for spectators; a building for officials; and a building for competitors is a requirement.

The Spectator Building will have athlete changerooms and boat storage (canoeing & kayaking) on the ground floor, with permanent covered grandstand facilities, function facilities, ablutions, and restaurant on the first floor.

The Finish Tower Building will cater for officials during major events with each separate floor having its own dedicated function. Ground floor for storage; First floor for Regatta Organisation Technology; 2<sup>nd</sup> floor for Jury and Timing; 3<sup>rd</sup> floor for Race Control; 4<sup>th</sup> floor for Commentary; and a 5<sup>th</sup> open floor for TV cameras.

The Competitor Building will have boat storage (Rowing), an indoor rowing tank and a small cafe on the ground floor. On the 1st floor there will be a training centre and changeroom facilities, and on the 2<sup>nd</sup> floor an administration wing and a mezzanine area of the training centre.

#### 03.04 CONSTRUCTION SYSTEMS.

As the site is susceptible to flooding, being within the 100-year flooding zone, buildings are raised above the flooding level. Flexibility of spaces; use of local materials, knowledge and labour; future maintenance costs; and embodied energy ratings have all been considered.



### 03.05 SITE REQUIREMENTS.

#### **An International-Standard Regatta Course.**

- Is there sufficient space or water surface area to provide an international-standard regatta course? Does this space or water conform to the technical requirements?
- Is there sufficient area to facilitate land based requirements? Is this land suitable for these facilities?

#### **Type of Site.**

- What type of site is it? Greenfield or brownfield?
- Do sustainable building opportunities exist on this site?

#### **Supportive Community.**

- Is the site near a large town or well populated area which will ensure that the facility is well used?

#### **Access.**

- Can the site be easily accessed? Is there good road, rail and/or air service to the site or near the site?
- Is there a public transport service available close to the site?
- Will the existing road infrastructure of the site be able to cope with largely increased vehicle volumes during major events? To what magnitude will this road infrastructure need to be improved?

#### **Hydrological & Environmental Impact.**

- Will the proposed *Regatta Centre* and its various facilities have a negative or positive hydrological and environmental effect on this site? Do sustainable hydrological and environmental opportunities exist on this site?

#### **Justification of Investment.**

- Is the site appropriate to justify the large financial investment of building an international regatta centre?
- What other sports or activities could be catered for by the Centre to further justify this investment?

#### **Proximity to other Sporting Facilities.**

- Is the site closely linked to any other sporting facilities?

#### **Public Exposure.**

- Is the site well situated in order to receive maximum public exposure, for the Centre and the sports being catered for?

#### **Accommodation.**

- Is there suitable and sufficient accommodation close to the site to house competitors, team management, officials and spectators?



## ACCOMMODATION SCHEDULE - An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal.

Facility	Zone	Area	No.	Total	Requirements	
permanent facilities						
temporary facilities						
<b>zones</b>						
zones for major events						
accredited zone					athletes; team management; competition management; officials.	
non-accredited zone					general spectators; media.	
shared zone					athletes; competition management; team	
<b>buildings</b>						
start tower						
aligners hut						
timing huts						
finish tower building						
spectator/grandstand building						
competitor/boathouse building						
<b>regatta course buildings</b>						
start area						
start tower			24	1	24	located 40m - 50m behind the start line, in the centre of the course on a covered platform approx. 9m <sup>2</sup> -
aligners hut			24	1	24	located on the start line on a covered platform approx. 9m <sup>2</sup> - 12m <sup>2</sup> ; floor level to be a min. of 1m above water
intermediate area (along the course)						
timing huts			6	3	18	at 500m, 1000m & 1500m marks; 1.5m above water; a min. 2m x 2.5m.
finish area						
finish tower			200	1	200	located on the finish line; not less than 27m from the racing lanes; air-conditioned; four levels (1) regatta organisation (2) timing (3) commentary (4) TV camera
<b>spectator/grandstand building</b>						
permanent grandstand						
permanent covered seating			450	1	450	approx. 450 covered seats; parallel to racing lanes.
spectator ablutions						
male ablutions			35	1	35	4 wc; 3 ur; 5 whb .
female ablutions			35	1	35	5 wc; 4 whb.
disabled ablutions			4	1	4	1 wc; 1 whb.
bar / small restaurant						
bar / small restaurant			20	1	20	bar serving drinks and basic meals.
indoor & outdoor seating			100	1	100	informal seating with views of camps drift.
kitchen amenities						
• basic kitchen			25	1	25	small kitchen for basic food preparation
• drinks storeroom			6	1	6	secure lockable room.
• food storeroom			6	1	6	secure lockable room.
bin area			9	1	9	well ventilated; easily accessible.
function hall						
function hall			250	1	250	multi-purpose hall, must seat approx. 200 people with views of camps drift.
function hall storeroom			15	1	15	secure lockable room for storage of tables, chairs & other function equipment.
external caterers area			30	1	30	for external caterers to use during events.
seminar room			40	1	40	seminar room for holding small meetings
function hall verandah			50	1	50	verandah with views of camps drift.
<b>TOTAL PERMANENT</b>					<b>1075</b>	
<b>TOTAL TEMPORARY</b>					<b>66</b>	

**ACCOMMODATION SCHEDULE - An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal.**

Facility	Zone	Area	No.	Total	Requirements
<b>permanent boathouses &amp; boatsheds</b>					
boathouses (rowing)		125	3	375	6m (w); 21m (l); direct access to the launching pontoons; should be situated at a distance of approx. 50m (minimum 30m) from the water edge; both ends opening to allow access for boats from two sides; oar racks located close to door; boathouse should be a minimum of 100m beyond finish line.
boathouses (canoe/kayak)		125	3	375	same spec as rowing boathouse
canoe/kayak boatsheds		20	18	360	boat slots; 3.2m (w); 7.5m (l); 2.6m (h)
general purpose storage		125	1	125	same spec as rowing boathouse.
rigging areas					400m <sup>2</sup> - 500m <sup>2</sup> of flat area near water, preferably grassed.
<b>change room facilities</b>					
male change room		150	1	150	6wc; 6whb; 4ur; 10sh; lockers; changing area; must be well ventilated and lit.
female change room		150	1	150	6wc; 6whb; 10sh; lockers; changing area; must be well ventilated and lit.
disabled change rooms		15	2	30	male and female disabled change room facilities
<b>administration facilities</b>					
reception / waiting area		20	1	20	reception and waiting area.
• office space		15	4	60	flexible office space.
• boardroom		20	1	20	boardroom table seating max. 12 people.
• staff kitchen		8	1	8	microwave; fridge; sink.
<b>fitness centre / gymnasium</b>					
reception / foyer		30	1	30	reception with turnstile & access control.
gym administration office		12	1	12	flexible office space.
gym managers office		12	1	12	flexible office space.
main exercise floor		200	1	200	stretching area; cardiovascular circuit; exercise machines; free weights.
multi purpose exercise studio		80	1	80	general purpose exercise studio used for various exercise classes.
spinning studio		30	1	30	small studio used for spinning classes.
consultants rooms		8	2	16	small space with views of the gym; couches and small table for computer.
physiotherapy / massage rooms		15	2	30	multi-purpose physiotherapy / massage rooms; massage bed; whb.
rowing tank		180	1	180	rowing tank as per specialists design.
<b>auxiliary services</b>					
security room		10	1	10	
cleaners room		5	1	5	room for cleaners to change and store cleaning equipment.
meter, switch & telephone room				24	meter room - 2m X 3.5m; switch room - 3.5m X 3m; telephone room - 2m X 1.5m.
<b>TOTAL PERMANENT</b>				<b>2302</b>	
<b>TOTAL TEMPORARY</b>				<b>0</b>	

competitor/boathouse building

**ACCOMMODATION SCHEDULE - An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal.**

Facility	Zone	Area	No.	Total	Requirements
<b>courses</b>					
international-standard regatta course			1		min. 2178m (l); 108m (w); 3m (d); min. 6 lanes X 13.5m (rowing).
warm-up course (optional)			1		min. 500m (l); 64m (w); 2m (d); min. 4 lanes X 13.5m.
<b>regatta roads (major events)</b>					
coaching road (optional)			1		along the entire course; 6.5m (w); with turning points at every 500m.
TV camera road (optional)			1		along the entire course; 6.5m (w); with various turning points at every 500m; an additional 4m road parallel to
<b>start area facilities (major events)</b>					
starting installation / pontoon					located 21m - 22m behind the start line.
repair pontoon					approx. 3m X 6m located near aligners hut
media tent		15	1	15	for journalists, photographers, tv personnel
officials tent		15	1	15	tent for the sole use of officials
start area wc		5	1	5	1wc; 1whb
<b>finish area facilities (major events)</b>					
scoreboard(s) & video board(s)			1		scoreboard: 35m <sup>2</sup> – 85m <sup>2</sup> ; video board: 40m <sup>2</sup> – 80m <sup>2</sup> .
distribution service		20	1	20	in a room in a permanent building. (only for major events)
victory ceremony pontoon			1		located in front of the main grandstand; 3m (w), 54m
victory ceremony stage			1		located in front of the main grandstand; 3m (w), 18m (l)
umpires catamaran pontoon			1		located near to the finish tower beyond the finish line; 3m wide, 12m long.
flash interview pontoon			1		located 30m - 40 beyond the finish line; 6m (w); 12 (l)
photographers pontoon			1		located beyond the finish line; 6m (w); 12m (l).
flag poles			1		an area for flagpoles; must be visible to both spectators and competitors.
victory ceremony preparation			1		located near finish tower.
<b>temporary grandstands (major events)</b>					
<ul style="list-style-type: none"> <li>olympic games – 14,000 – 20,000 seats</li> <li>world championships– 4,000 – 12,000 seats</li> <li>international events – 3,000 – 5,000 seats</li> </ul>					as per event requirements; to be of prefabricated construction.
<b>spectator facilities (major events)</b>					
temporary spectator ablutions					as per event; portable type sanitary service.
temporary food facilities					as per event; mobile type food facilities.
merchandising & souvenirs					as per event; temporary facilities.
temporary medical facilities					as per event; mobile type facilities.
<b>TOTAL PERMANENT</b>			<b>0</b>		
<b>TOTAL TEMPORARY</b>			<b>55</b>		

**ACCOMMODATION SCHEDULE - An International Rowing & Canoeing Regatta Centre for KwaZulu-Natal.**

Facility	Zone	Area	No.	Total	Requirements
<b>competitor facilities</b>					
<b>competitors area (major events)</b>					
boat launching pontoons			4		placed perpendicular to the bank in front of the boathouses/boatsheds; 4m (w); 18m (l); with 16m
control commission		20	1	20	good visibility over the water.
athlete weighing		125	1	125	good visibility over the water; located in one of the permanent boathouses or a temporary structure.
boat weighing		125	1	125	located in one of the permanent boathouses or a
ergometers					20 - 25 ergometers. (only for major events)
boat repair & washing		80	6	480	temporary structures used for boat repairs and boat washing.
major repairs		125	1	125	in a boathouse or a temporary structure.
information centre		40	1	40	in a building or temporary structure.
rest and relaxation areas		100	1	100	in a building or temporary structure.
open air hospitality area			1		an area in the shared zone.
athlete lounge		100	1	100	for the olympic games; located in permanent building
medical centre					to use gyms facilities
• waiting room					
• treatment room					
• doctors room					
doping control		50	1	50	in a building or a temporary structure.
physiotherapy and massage		20	1	20	3 X curtained rooms
competitor eating areas		100	1	100	
temporary boat storage facilities					10 000m <sup>2</sup> of indoor and outdoor storage.
<b>TOTAL PERMANENT</b>				<b>70</b>	
<b>TOTAL TEMPORARY</b>				<b>1265</b>	

<b>site entrance points (major events)</b>					
spectator entrance			1		
competitor entrance			1		
service /emergency entrance			1		
<b>parking facilities</b>					
permanent parking					approx. 150 parking bays.
temporary event parking					designated grassed area used during peak periods and during events.
bus parking (major events)					designated area used for bus parking.
trailer parking (major events)					designated area for boat trailer parking.
major events parking					park and ride parking system; as per event

<b>totals</b>	<b>GRAND TOTAL PERMANENT</b>	<b>5597</b>
	<b>GRAND TOTAL TEMPORARY</b>	<b>1386</b>
	<b>GRAND TOTAL</b>	<b>6983</b>

(these area calculations exclude circulation space)





illustration 04.01: \_source: www.flickr.com

# ENVIRONMENTAL STRATEGIES 04

## 04. ENVIRONMENTAL STRATEGIES.

### 04.01 SHADING & ILLUMINATION.

Solar shading and large over-sailing roofs have been incorporated where required to prevent excessive solar gain on the facades of the buildings. Summer sun is prevented from penetrating the building directly, while winter sun is allowed in during the cooler months. The majority of room depths are kept below 8 - 12m deep, thereby maximising the positive effects of natural daylighting and reducing the need for artificial light.

### 04.02 VENTILATION.

Where possible, fenestrations have been located to harness prevailing winds. This allows for effective cross-ventilation of spaces, thereby reducing running cost and the need for continual artificial ventilation. High level operable windows are provided in most spaces to allow for ventilation of the roof spaces, thereby reducing heat build-up during the day.

### 04.03 SOLAR WATER HEATING.

Solar water heating systems will be used for the heating of water for changerooms. Flat plate solar panels will be used as these were seen to be the most robust and least visually obtrusive option available.

### 04.04 RAIN WATER HARVESTING.

Rain water off roofs will be collected using gutters feeding rainwater tanks. This water will then be used for washing of boats, flushing of toilets and watering of gardens, while substantially reducing storm water run away during peak periods.

### 04.05 MATERIALS.

Use of local materials, knowledge and labour; future maintenance costs; and embodied energy ratings were all considered when choosing materials.

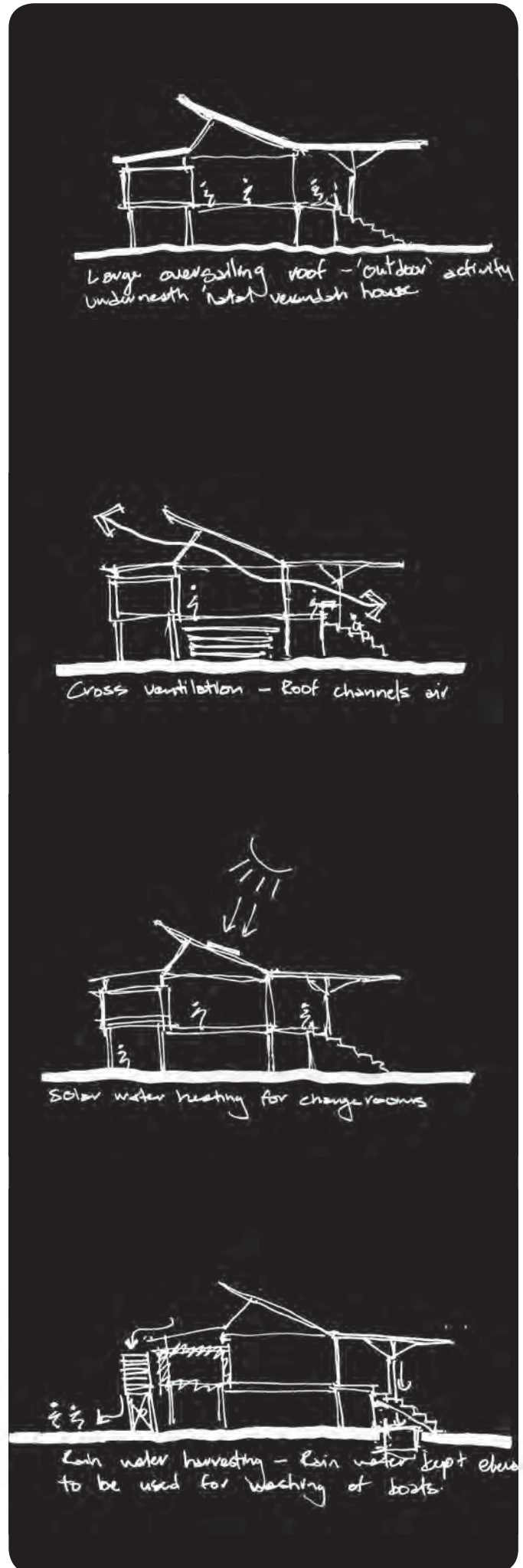




illustration 05.01: \_source: www.flickr.com

# TECHNICAL RESOLUTION 05

## 05. TECHNICAL RESOLUTION.

### 05.01 FLOODING.

The site is currently part of the 100-year flooding cycle, however as the holding capacity of the drift will be substantially increased by the proposed reshaping of the drift the areas surrounding the buildings will be above the flood level. Furthermore the spaces surrounding the buildings tapers up to them to ensure that the buildings do not flood. The resulting Ground Floor Level is roughly 1m above the 100 year flood level.

### 05.02 STRUCTURAL.

In terms of construction systems, the general requirements are that the systems allow for flexibility of the spaces created and also allows for change in use of the *Centre*. These requirements suggested a frame and infill system, which has been used. A requirement that the buildings respond to the 'lightweight nature' of the water craft being catered for has been achieved using composite structures of concrete and steel.

The geotechnical environment is expected to be of a classic riverine type, being river sand, with weather basalt at approximately 10m. Foundations would therefore possibly be shallow augured piles.

### Spectator Building.

Initially it was the intention of the design of the spectator building to re-use the existing structure of the Natal Canoe Club. The column grid layout 3.2m X 7.2m defined the building's structure. As the project evolved the position of the finish line shifted resulting in the building moving further down the course, meaning that the initial intention to re-use the existing structure of the Club could not be achieved. The result however, meant that the existing column grid remained.

### Finish Tower Building.

For the finish tower building the minimal dimensions required of a finish tower define the column grid.

### Competitor Building.

With the Competitor Building the optimum dimensions for storing rowing boats defined the boathouse column grid structure 4m x 6m, with the grid structure changing at the one end to facilitate the minimum size required for an indoor rowing tank. The upper floors are designed to facilitate open plan functions.

### 05.03 MECHANICAL.

All spaces are designed to be completely naturally ventilated. Mechanical ventilation is however provided to areas that necessitate its use.

### Spectator Building.

The function hall and restaurant spaces have the option of being air-conditioned during peak use with split-unit systems. Mid-wall units will be mounted in these spaces with condensers in a dedicated area venting through louvered screens so as not to be seen directly from the outside.

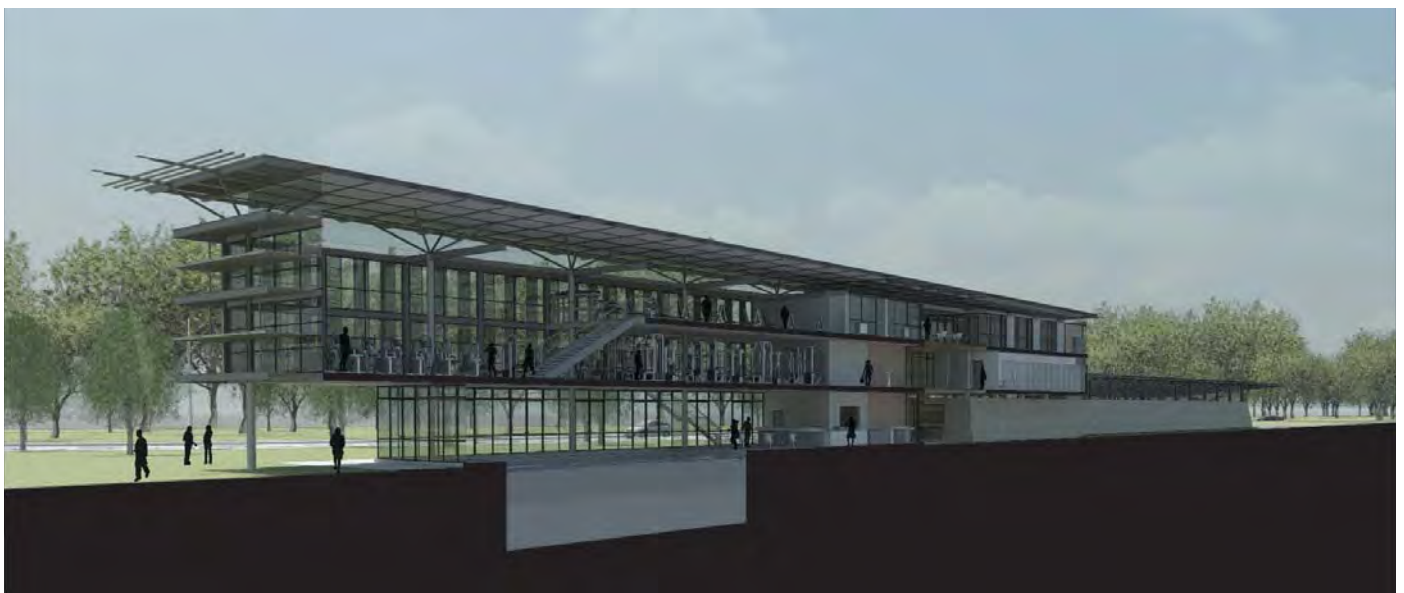
### Finish Tower Building.

All rooms are air-conditioned with each level having its own split-unit, with a mid-wall unit in the room, and condensers in a dedicated area venting through louvered screens so as to not be seen directly from the outside.

### Competitor Building.

The Cafe will have its own split-unit, with mid-wall units. The Indoor Rowing Tank will be naturally ventilated, with specialist pumps for tank being provided. The Training Centre will have a 'package unit' system, with air distribution ducts. Condensers are at an external wall screened from the outside. Office spaces will have split-units, with mid-wall units.

17.



#### **05.04 PARKING AREA.**

The intention of the design of the parking is to create a relaxed parking atmosphere which complements the surrounding park without dominating it. The parking design purposely opposes the large characterless tarred parking lots that seem to be the current norm used in larger developments.

The location of the parking on the south east and north east of the site is to free up the water's edge of parked cars. The parking areas are purposely conceptualized as being well structured yet suitably informal, with indigenous trees, grass block and paving.

Mountable kerbs are provided in various areas so that specific grassed areas are accessible, especially during larger events when the parking requirements of the *Centre* will increase substantially. The majority of the parking spaces are visible from the buildings and surroundings with the intension of promoting passive surveillance of vehicles.

#### **05.05 ILLUMINATION.**

Fluorescent light fittings throughout buildings, with suspended mercury vapour fittings in the Training Centre and other large areas. Monitored group switching for energy efficiency should be used.

#### **05.06 DISABLED ACCESS.**

As the venue will cater for adaptive athletes, facilities are design to be disabled-friendly. Paraplegic toilets, disabled parking, a ramp and a lift are all provided so that all areas of the Centre are accessible.

#### **05.07 SECURITY / ACCESS CONTROL.**

As the *Centre* is within a 'public park', security is a concern. Spaces are purposely designed to encourage maximum passive surveillance, with facilities such as offices with valuable equipment deliberately located on the upper floors to be less accessible. 24 hour security will need to be facilitated, as well as the possible inclusion of a CCTV surveillance system.

For major events, where there will be a need for crowd control and controlled access, temporary events fencing will need to be erected during these periods.





## 06. CONCLUSION.

The design approach has resulted in the design of a series of buildings which aim to address those issues inherent in water sports buildings in South Africa which are typically ignored or insufficiently addressed. This has resulted in a *Centre* which maintains links to its context and encourages use, while creating an appropriate environment for staging international standard events; thereby allowing athletes to prepare and compete in a suitable environment.

The *Centre* provides a public amenity in the form of accessible recreational spaces which can be enjoyed by the greater community. In addition, the varied use of the facility generates supplementary sources of income which are essential to the running of the *Centre* ensuring athlete have access to facilities of a higher standard than was previously possible.

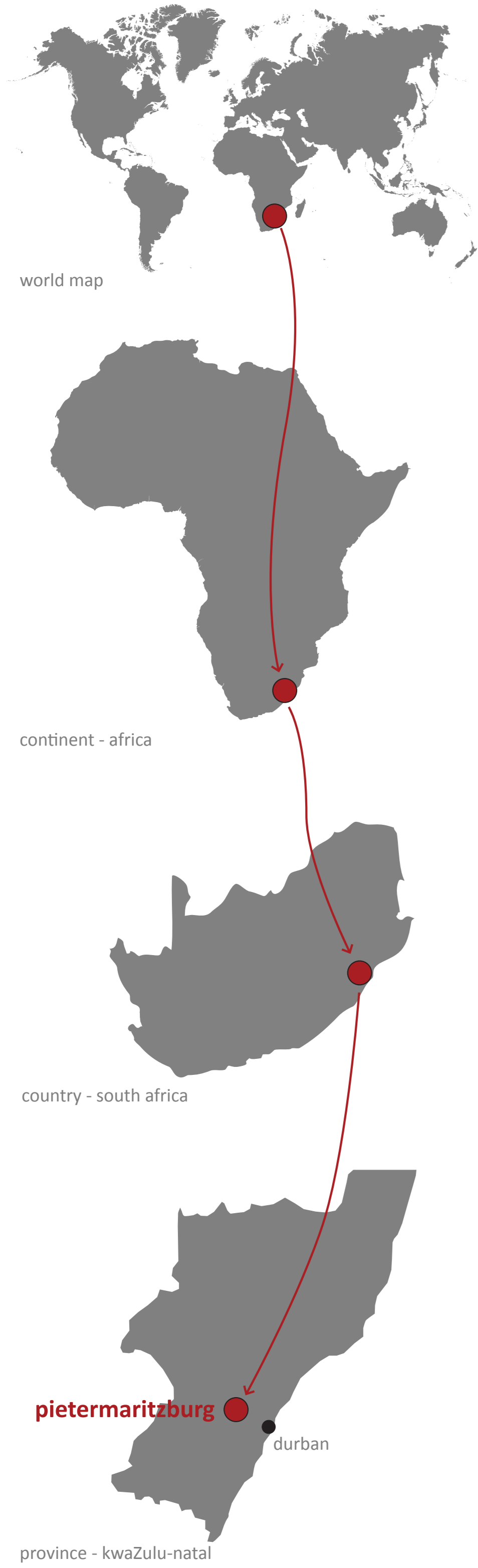
Overall, by considering the site and the context in conjunction with the users of such a *Centre*, the design process has resulted in a positive sporting and recreational environment where both sportsmen and the public are free to mix; where the changing needs of the sports and society can be accommodated, and where the sports of rowing, canoeing and kayaking can be brought to the community in a way that is appropriate and accessible.

20.









**pietermaritzburg**  
 Pietermaritzburg, set amidst forested hills and the rolling countryside of the Natal-Midlands is said to be one of the best-preserved Victorian cities in the world. The city is the administrative capital of the Province of KwaZulu-Natal and is conveniently situated on the main N3 highway between Johannesburg and Durban approximately 80km north of Durban.

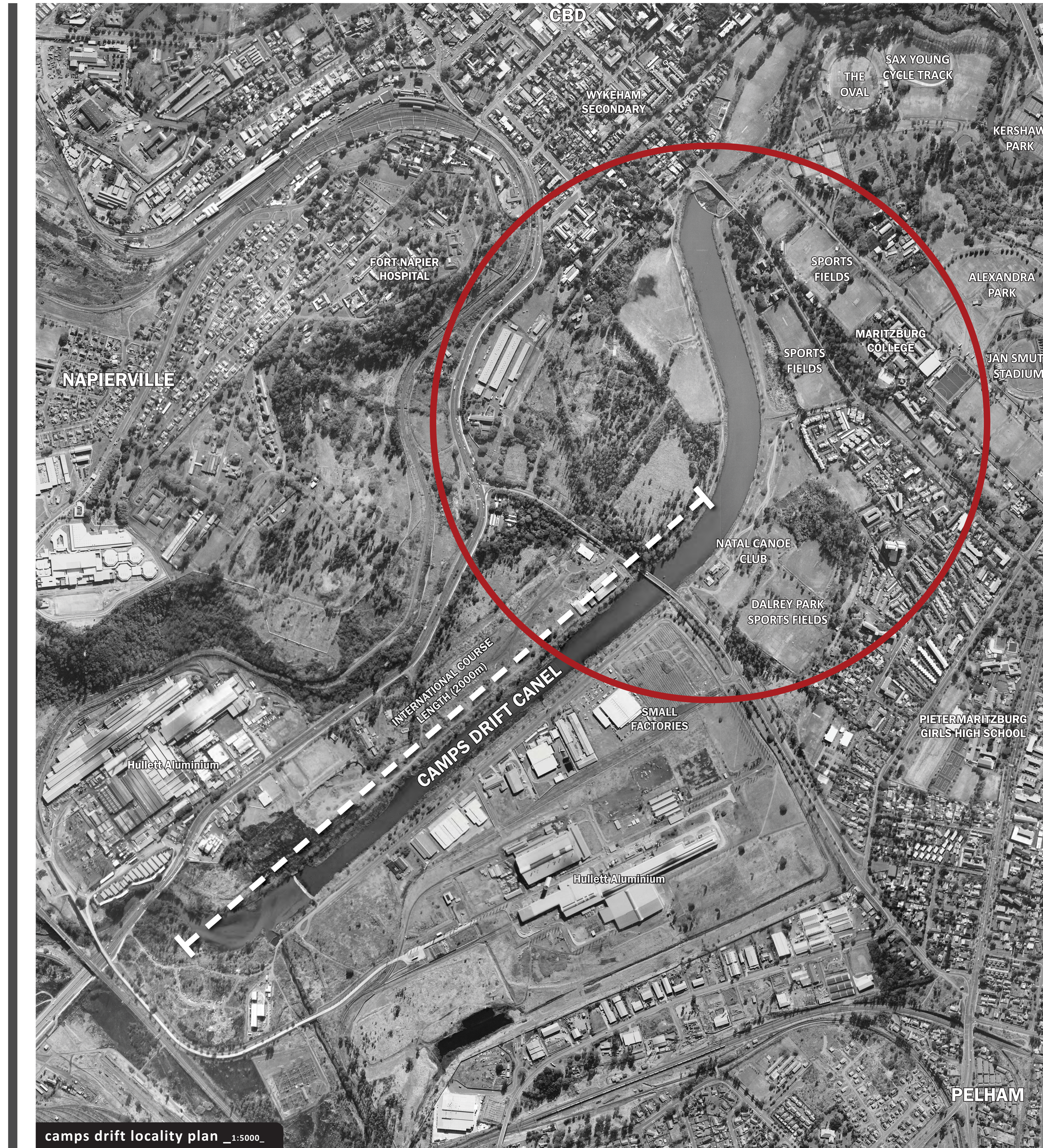
**msunduzi municipality**  
 Pietermaritzburg is part of the Msunduzi Municipality which covers an area of 630 km<sup>2</sup> and a population of some 650 000 people. This City is the economic hub of the Midlands region, accounting for 90% of the turnover in the area. The aluminium, leather and furniture industries are its main employers. The City is also the commercial and shopping hub of the area with a 40 000m<sup>2</sup> regional shopping centre and a number of supporting local shopping centres.

**site - camps drift**  
 The site is situated in the Msunduzi Municipality of the uMgungundlovu District. Situated between the suburb of Pelham North and Pietermaritzburg central, the site is currently zoned as vacant / unspecified land, characterized by public open space, settling ponds from dredging of the Camps Drift Canal, and disturbed areas as a result of access roads and paths.

site locality\_



pietermaritzburg locality plan \_1:10 000\_



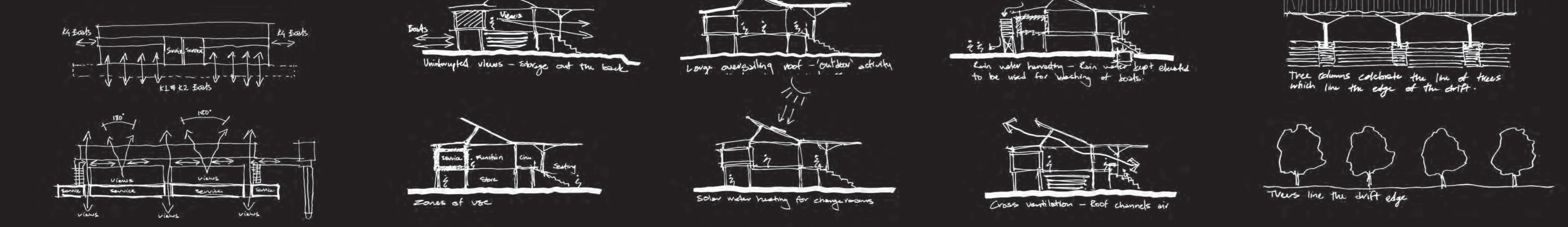
camps drift locality plan \_1:5000\_



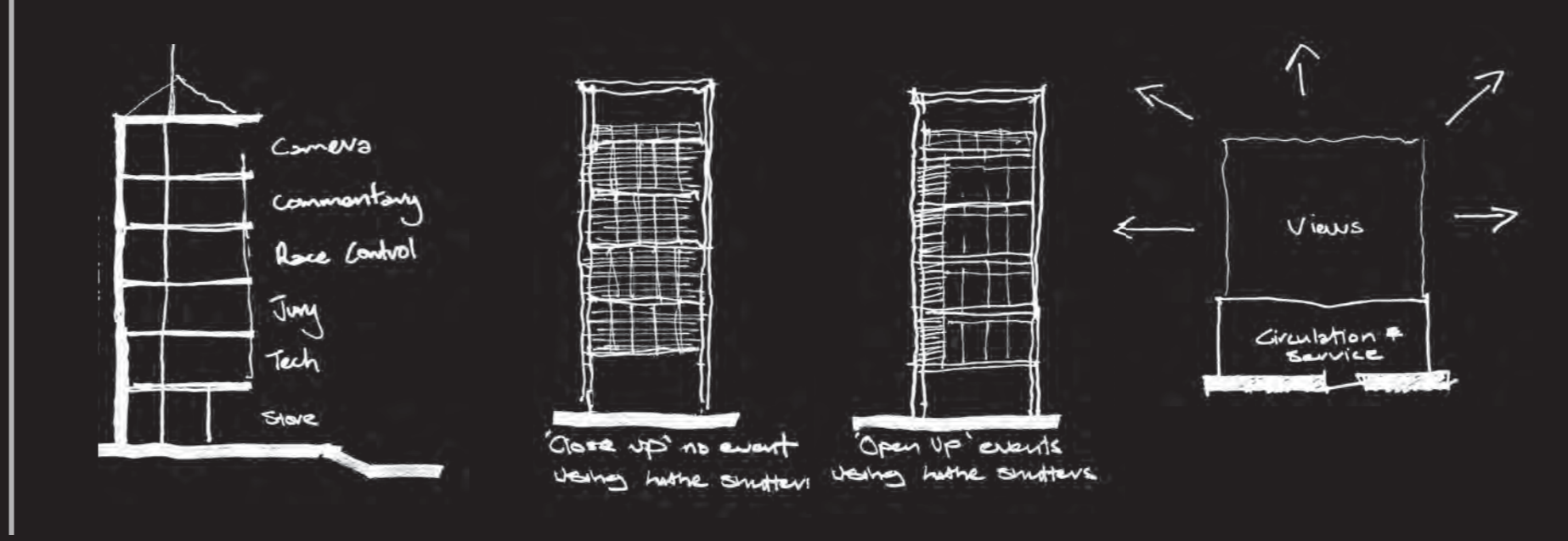




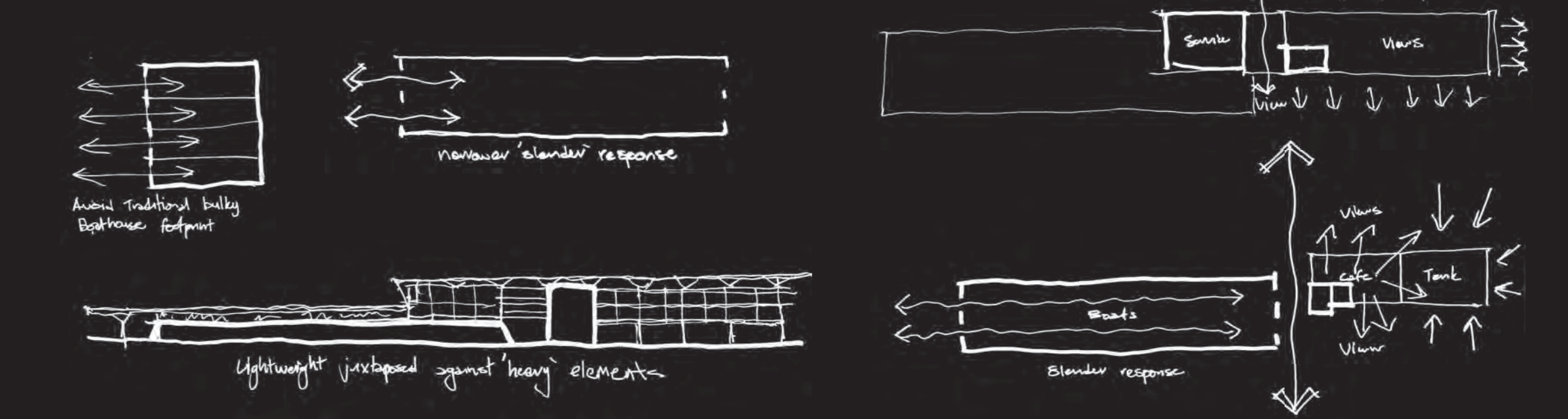
spectator building

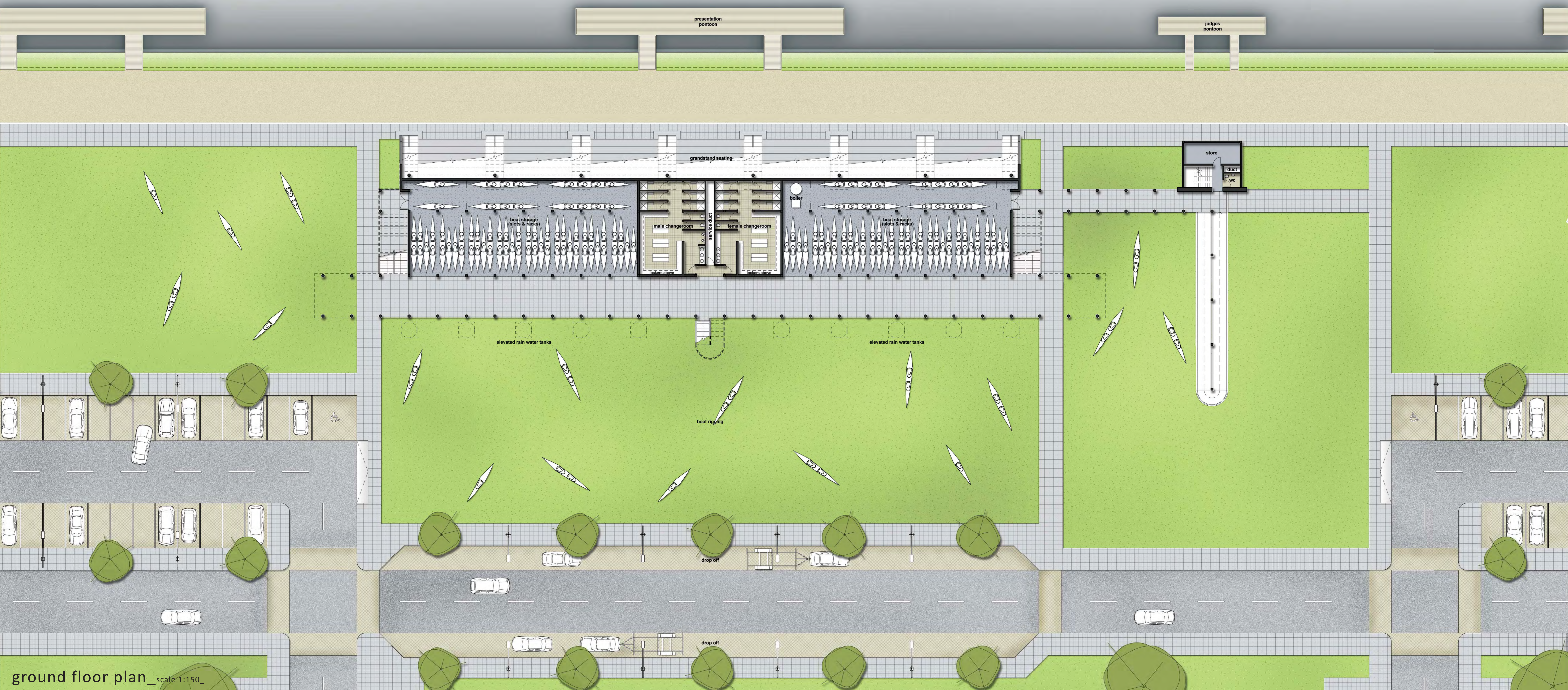
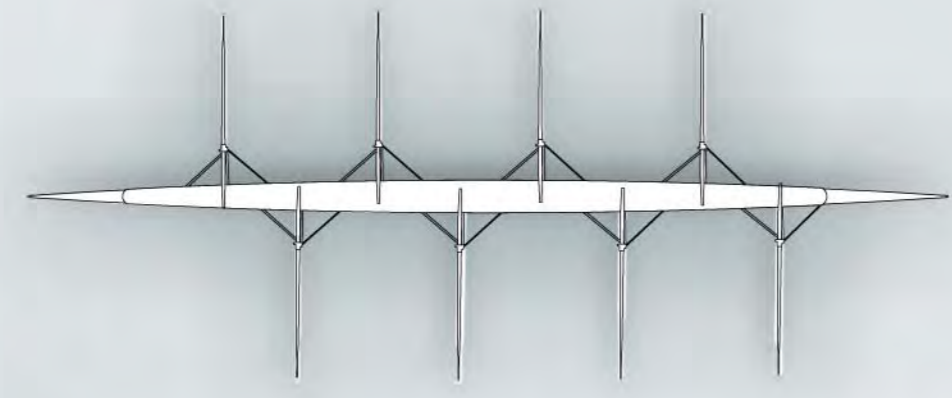


finish tower building



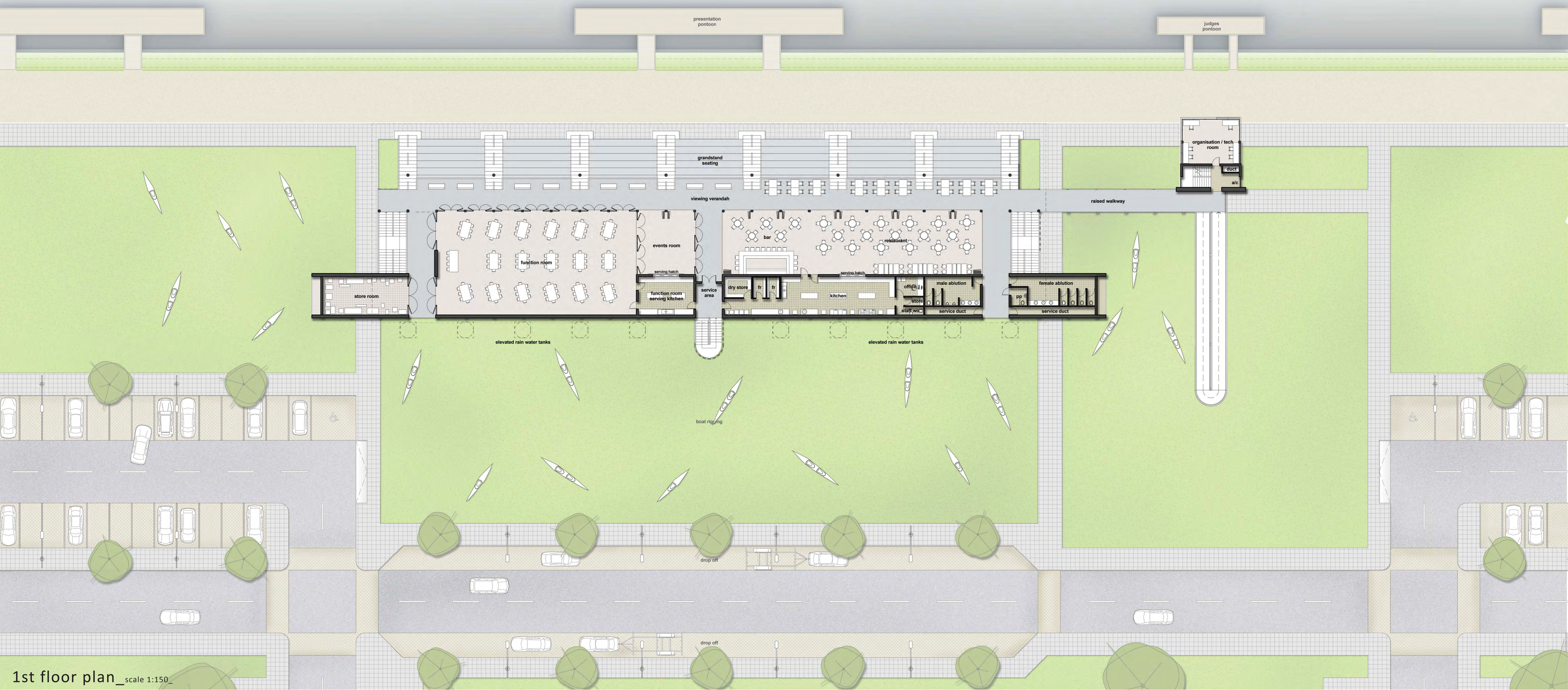
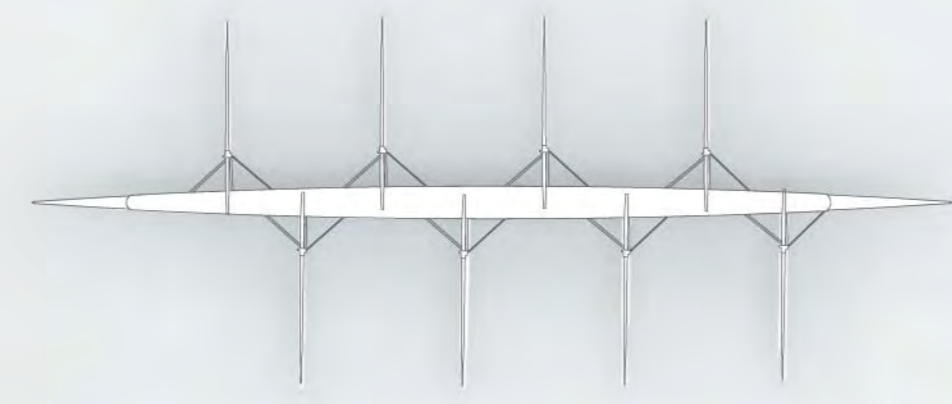
competitor building





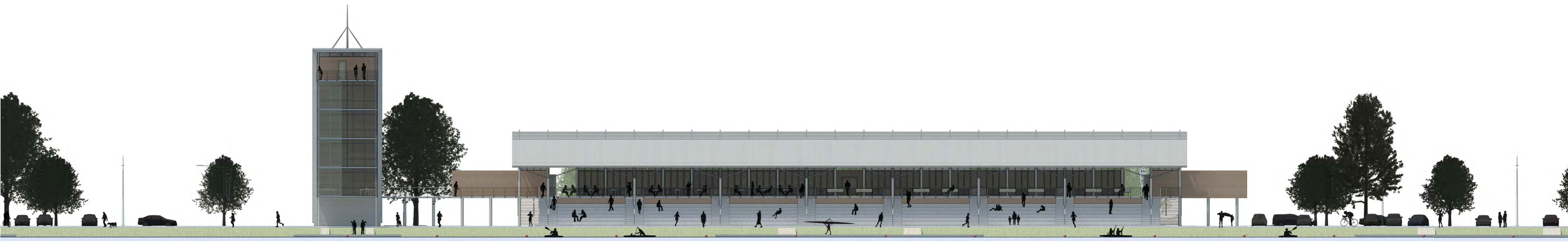
ground floor plan\_scale 1:150





1st floor plan\_scale 1:150\_





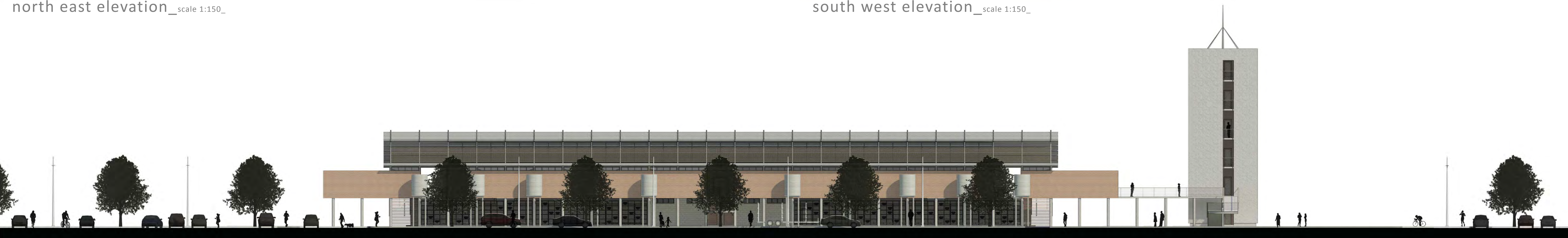
north west elevation \_scale 1:150\_



north east elevation \_scale 1:150\_



south west elevation \_scale 1:150\_



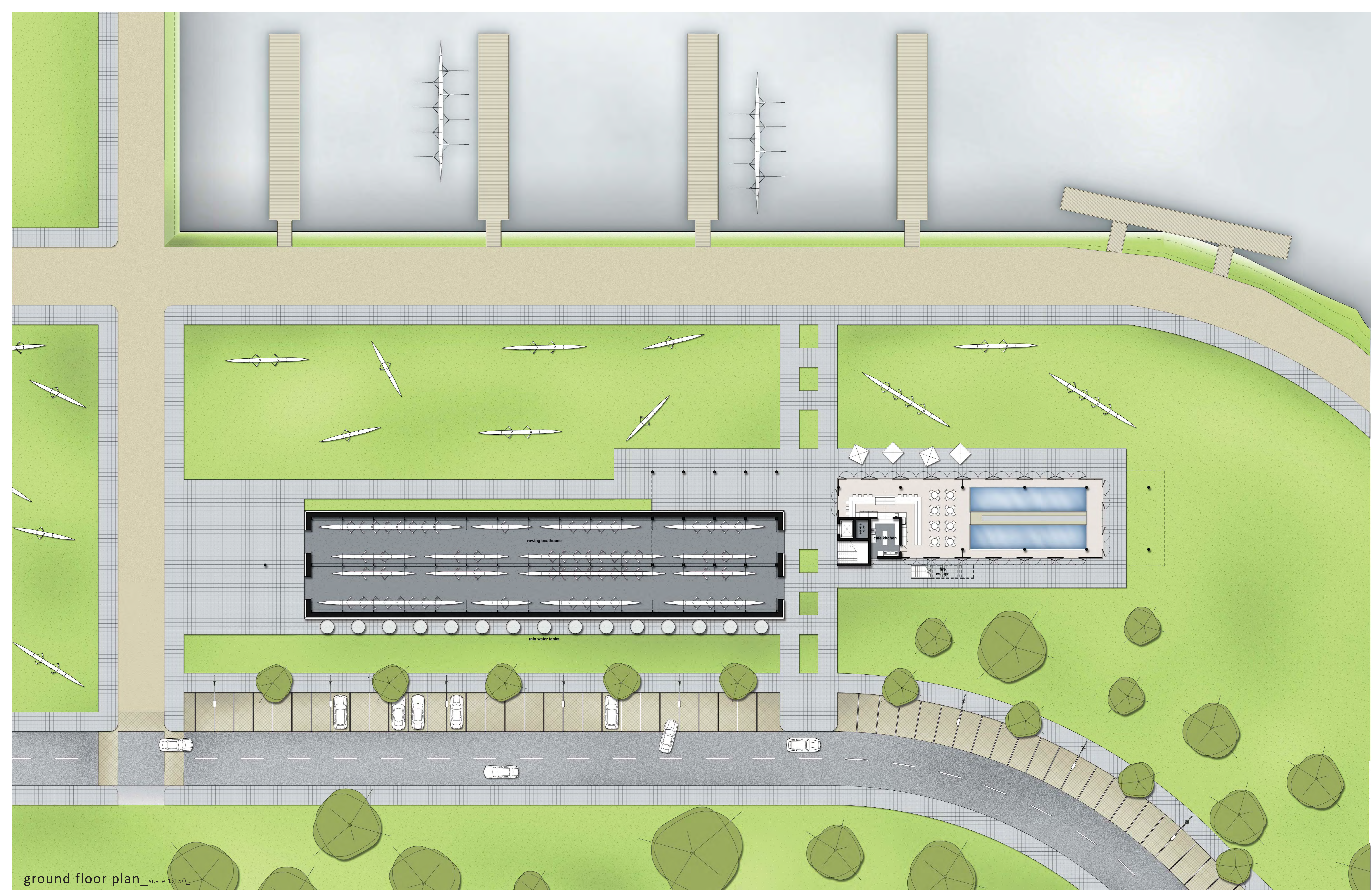
south east elevation \_scale 1:150\_



finish tower design section \_scale 1:150\_

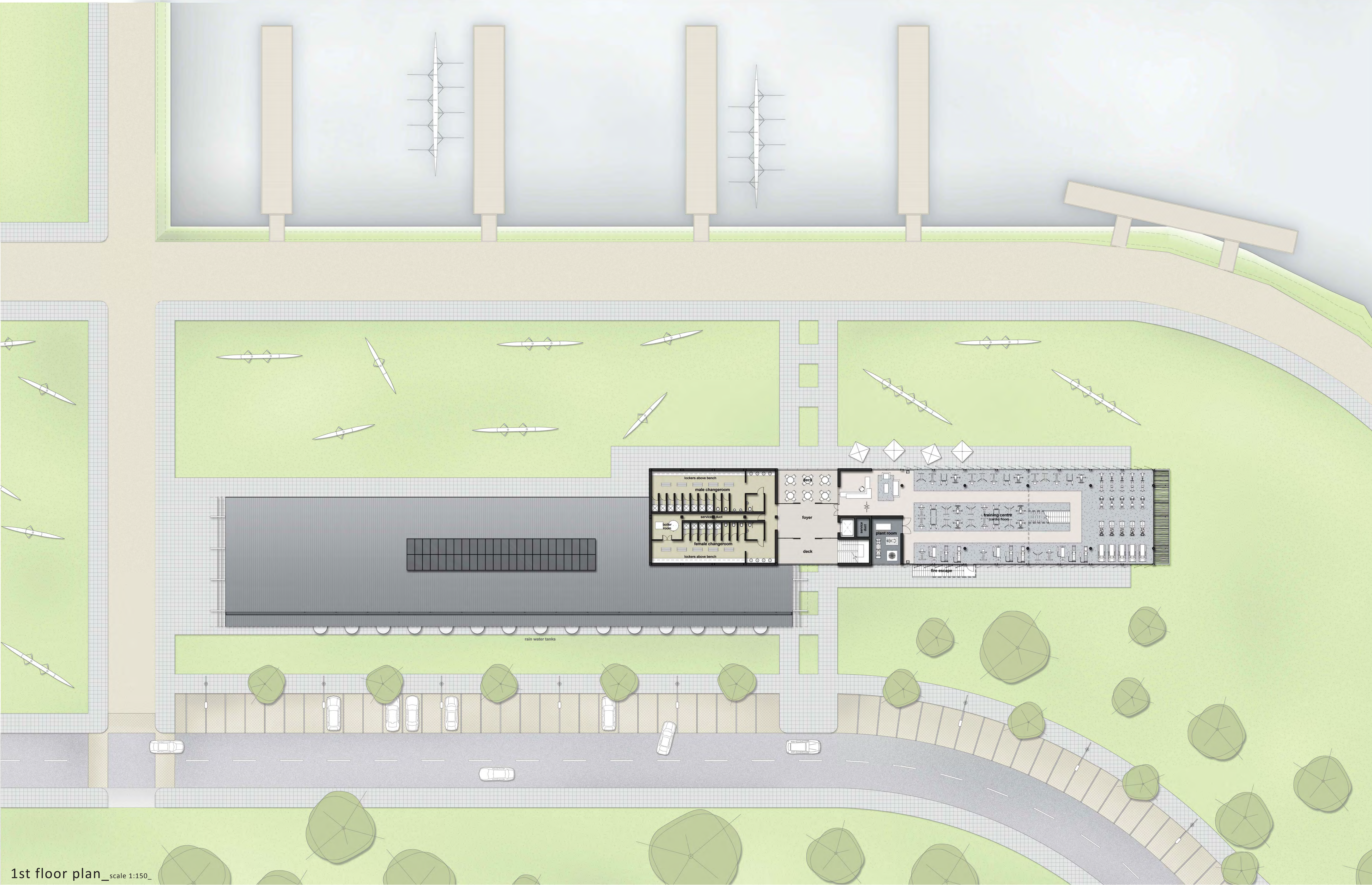


spectator building design section \_scale 1:150\_



ground floor plan\_scale 1:150

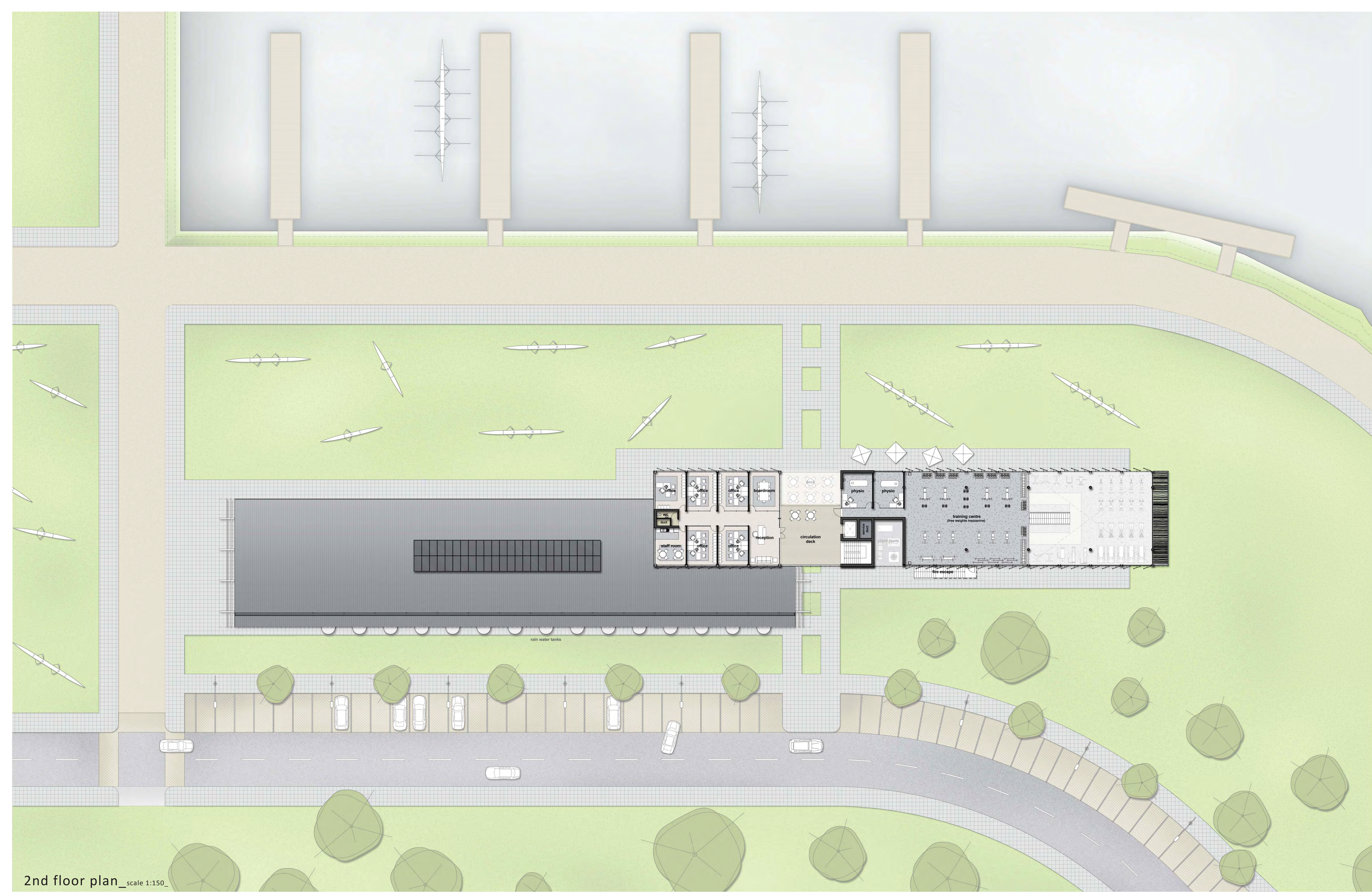




1st floor plan \_scale 1:150\_







2nd floor plan\_scale 1:150\_





south west elevation \_scale 1:150\_



north west elevation \_scale 1:150\_



south east elevation \_scale 1:150\_



north east elevation \_scale 1:150\_



design section C-C \_scale 1:150\_