

University of Pretoria etd - Scheepers, J (2003)

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*University of Pretoria  
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*reverberating architecture*  
*Outdoor Recreational Equipment Centre*

## executive summary

### *REVERBERATING ARCHITECTURE*

*Outdoor Recreational Equipment Centre*

*mentor: Prof. S.W. Le Roux*

*Reverberating architecture exists through the echoes of its creative or architectural image. It is an architecture where the being of that architectural image reverberates and is felt throughout the whole transformative process until its echoes engage with the inner experience of the onlooker. These reverberations might impact the onlooker in such a way that it provokes a new architectural image within him or her.*

*My design thinking was very much influenced by this thesis theme, as well as the concept of an indoor-outdoor system that intertwines.*

*The concept is to design an outdoor recreational equipment centre with speciality shops for mountain biking, kayaking and canoeing, hiking and climbing. This retail complex varies from conventional retail centres in that it is an interactive retail store. This implies that the equipment can be tried before purchasing it. The architecture and the extreme sport activities [climbing, the mountain bike track and the kayak and canoe channel] would be used as communicating devices for specific brands.*

*A precarious balance was needed between the plan, the architecture and the extreme sports existing within the architecture. Therefore a language was developed where by architecture not only responded to the site, but also with the movement happening in and around the site.*

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## prologue

*At the end of 1825, Mziligazi arrived in a valley between the Magaliesberg and Daspoortrand. The river that sustained them, was called Enzwabuhlungu or "river which hurts:" so named because of the action of its sharp dolomites on the bare feet of the woman drawing water from it. In the elbow of this river, the city of Pretoria evolved.*

*Ironically today the Apies River has reverted to being a "river that hurts". Somewhere along the line, as the pace of life quickened and the demands of transportation and a growing economy increased, the Apies were forgotten. The valley became a corridor and the river became the city's biggest drainage ditch.*

*The route of the Apies River not only determined the pattern of urban development in the inner city, but the river also creates continuity and enhances the legibility of the urban structure. In the same way, the river should be used to blend ecology and urbanity in order to create a living, stimulating and economically viable spine for the inner city. It should become a place of public engagement: where once developments turned their backs to the river, developments should front the river and embrace the river in its architecture, social and economic activities.*

*Throughout history, public space has formed the backdrop to public life, for commercial transactions, social exchange, entertainment and*

*contemplation. The Apies River must be rehabilitated to such a place that is filled with energy and a sense of enjoyment that is derived from spending time in such a lively public setting. It should become a place of enrichment to human lives.*

*The concept is to design an outdoor recreational equipment centre with speciality shops for mountain biking, kayaking and canoeing, hiking and climbing. This retail complex varies from conventional retail centres in that it is an interactive retail store. This implies that the equipment can be tried before purchasing it. The architecture and the extreme sport activities [climbing, the mountain bike track and the kayak and canoe channel] would be used as communicating devices for specific brands. A broad layout, study and analysis of the functions and systems in the design were carried out in the brief, baseline and technical documents, which serve as addenda to this final document. It is important to see these documents as part of the design development process, therefore ideas and concepts have evolved and developed into the final product.*



## reverberating architecture

*Whenever I am exposed to architecture that touches and engages with my inner experience, I stand in awe at the thought that it all originated with an architectural image a human being perceived, who then simply picked up a pencil, pen or even a stone and conveyed that creative image onto some sort of surface. This "image has touched the depths before it stirs the surface". [Bachelard 1964]*

*In his book, *The Poetics of Space*, Bachelard [1964] states that "for a poetic image (I call it the architectural image), there is no project; a flicker of the soul is all that is needed". Sadly today it seems as if architects' souls have died, for the "mainstream high-tech architects seek technical refinement" and the young blood of architecture look to procedural models with an emphasis on diagramming and mapping". [Van Schaik 2002] They see no need to engage with the inner experience of people, the ones they design for.*

*Bachelard asks how the new poetic image can react on minds other than that of the poet who coined it. For architects there is a bridge between the architectural image and built form to cross. There is a transformative process, from the architectural image to the built form, during which this architectural image has to be kept alive in order to engage with the inner experience of people. "Architecture has to find its way to a different form, with its own modulations, technics and ethics. Besides this there is a clash between the abstract, institutional knowledge and embedded human knowledge". [Van Schaik 2002]*

*Bachelard's answer lies in an in-depth look at the poetic image [1964]: "The poetic image is not subject to an inner thrust. It is not an echo of the past. On the contrary: through the brilliance of an image, the distant past resounds with echoes, and it is hard to know to what depth these echoes will reverberate and die away. Because of its novelty and its action, the poetic image has an entity and a dynamism of its own, it is referable to a direct ontology". He says that it is in reverberation that we find the real measure of the being of the poetic image. Therefore, in order to determine the being of the image, we shall have to experience its reverberation.*

*Bachelard [1964] refers to Minkowski's explanation of reverberation: "It is as though a well-spring existed in a sealed vase and its waves repeatedly echoing against the sides of this vase, filled it with their sonority. Or again it is as though the sound of a hunting horn, reverberating everywhere through its echo, made the tiniest leaf, the tiniest wisp of moss shudder in a common movement and transformed the whole forest, filling it to its limits, into a vibrating sonorous world..." Reverberating architecture is architecture where the being of that architectural image reverberates and is felt throughout the whole transformative process until its echoes engage with the inner experience of the onlooker. These reverberations might impact the onlooker in such a way that it provokes a new architectural image within him or her.*

*Contemplating Reverberating Architecture...*

*Reverberating architecture exists through the echoes of its creative or architectural image. As Minkowski explained: it is the sound, not the hunting horn itself, which make the tiniest leaf and tiniest wisp of moss shudder and through it transforms the whole forest. Although the echoes are dependent on the creative image, the full power of reverberating architecture does not rely only on the image but rather on the dialogue between image and concept, visuality and tactility, artistic invention and tectonic acts.*

*The architecture of today, like our culture, aspires to power and domination and this has led to the quest for a powerful image and impact. In his essay, *Hapticity and Time*, Juhani Pallasmaa [1999] states that this kind of architecture “desires to impress through an outstanding singular image and consistent articulation of form”. It attempts to “conquer the foreground instead of creating a supportive*

*background for human activities and perceptions". It is architecture that dominates our sense of vision; even our culture today makes us visionary beings: the high-tech media do not allow us to perceive the world with our whole being, but deprive us of a multi-sensory experience.*

*However, "Every significant experience of architecture is multi-sensory; qualities of matter, space and scale are measured by the eye, ear, nose, skin, tongue, skeleton and muscle". [Pallasmaa 1999]*

*What the architects of today do not know is that we need multi-sensory experiences. One cannot isolate or stimulate only one of the senses. Flat surfaces and materials as well as the elimination of micro-climatic differences reinforce uniformity of experience. The tendency of our technological culture to standardise environmental conditions and make the environment entirely predictable is causing a serious sensory impoverishment. We perceive with our whole beings: an experience speaks to all our senses at once. All the senses, including vision, are extensions of the sense of touch. Pallasmaa states that it is medically proved that senses are specialisations of the skin and that all sensory experiences are related to tactility. Francis D.K. Ching [1996] confirms this: "...our senses of touch and sight are closely intertwined. As our eyes read the visual texture of a surface, we often respond to its apparent tactile quality without*

*actually touching it. The visual texture prompts memories of past experiences. We base these physical reactions on the textural qualities of similar materials we have experienced in the past". Touch is the sensory mode, which integrates our experience of the world and of ourselves.*

*Pallasmaa [1999] states that the task of architecture is to make visible how the world touches us. Architecture concretises and frames human existence in the flesh of the world. In his view, genuine architectural works evoke tactile sensations that enhance our experience of ourselves. Our culture of control and speed has favoured the architecture of the eye, with its instantaneous imagery and distant impact, whereas haptic architecture promotes slowness and intimacy, appreciated and comprehended gradually as images of body and the skin.*

*Just as the sound of the hunting horn engages the whole forest with its echoes, reverberating architecture engages and unites, whilst architecture of the eye (as Pallasmaa calls it) detaches and controls, it places us in the present tense. Reverberating architecture seeks to accommodate rather than impress, evoke comfort rather than admiration and awe.*

*In his creative act, the architect himself is stirred by a tactile experi-*

*ence from which the creative image is born. Gaston Bachelard [1964] makes a distinction between "formal imagination" and "material imagination". He considers that images arising from material imagination evoke unconscious images and emotions, whilst modernity at large has been primarily concerned with form. Although, in reverberating architecture, form is not considered to be unimportant, it rather develops from experiential situations towards an architectural form. As drawings, these images might appear vague, fragmentary or incomplete and not formalistic, as the design aims to bring out the reverberations of the architect's experience in the material and construction of the building. As Pallasmaa says, "... the visual image of a door is not an architectural image, for instance, whereas entering and exiting through a door are architectural experiences. Similarly, the window frame is not an architectural unit, whereas looking through the window or daylight coming through it, are authentic architectural encounters".*

*In describing this architecture as one which does not seek a powerful image and impact, it might be perceived as weak or fragile, without a strong structure and image. I think it is more an architecture that desires not to impress through an outstanding singular image and articulation of form, but rather one that is responsive and contextual and concerned with sensory interaction. "This architecture grows and opens up, instead of the reverse process of closing down from*

*concept to detail". [Pallasmaa 1999]*

*This kind of architecture reminds me of the power of a weak force in nature. According to an article in Science News, 21 January 1995, none of the man-made metals or high-strength fibers of today can even come close to the combined strength and energy- absorbing elasticity of a spider dragline. The line spun by the spider is five times stronger than steel and a web resembling a normal fishing net in its thickness of thread and the scale of the mesh could catch a passenger plane in flight,*

*" This is the strength of weakness; that strength which art and architecture are capable of producing precisely when they adopt a posture that is not aggressive and dominating, but tangential and weak". [Pallasmaa 1999]*

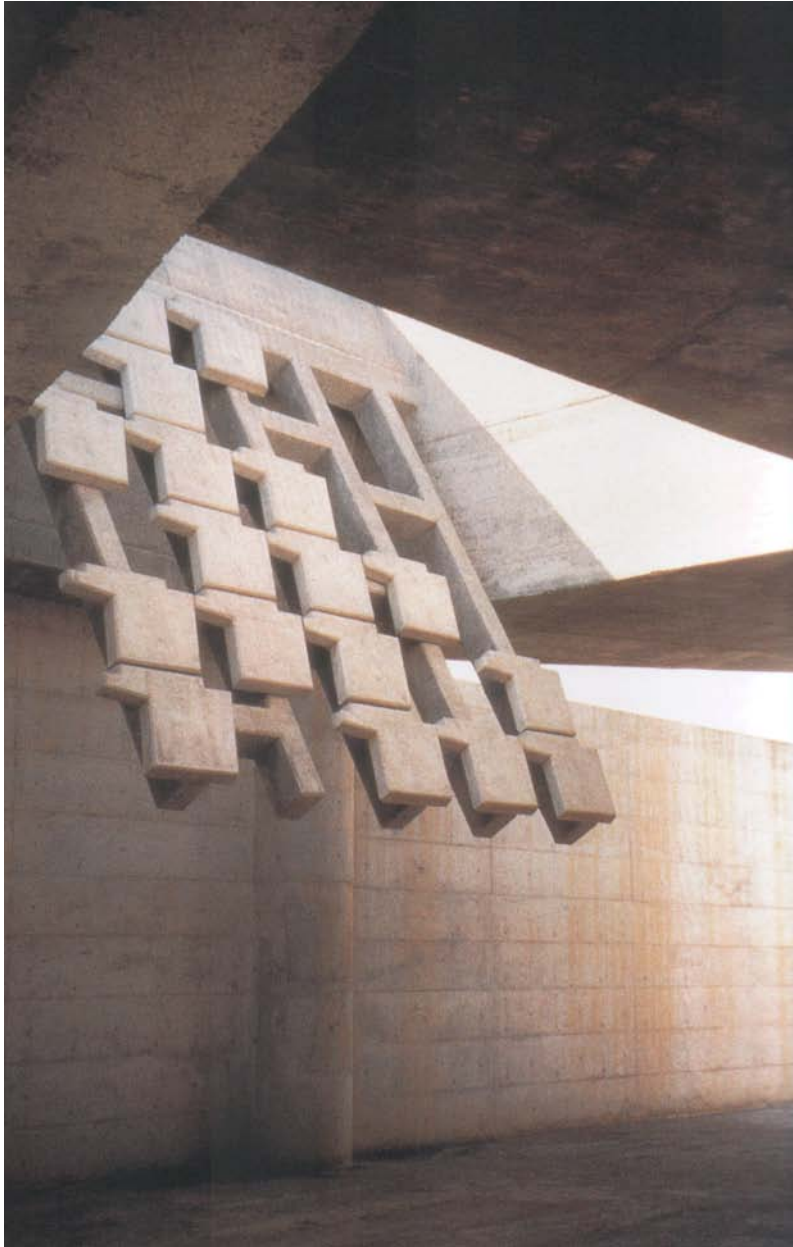


fig. 001 Igualada cemetery [Enric Miralles]



## the scene

*A once vibrant sport and social club, Berea Park tennis club now lies dormant. Situated on the corner of Willow Street and Nelson Mandela Drive. Van der Walt Street and Clara Street form the northern and western boundaries respectively. The Apies River Forms the eastern boundary.*

*The site lies on the city edge and is the connection point between the northern urban activities and the southern natural activities.*



fig. 002 site photo from the south



fig. 003 aerial photo of Pretoria inner city

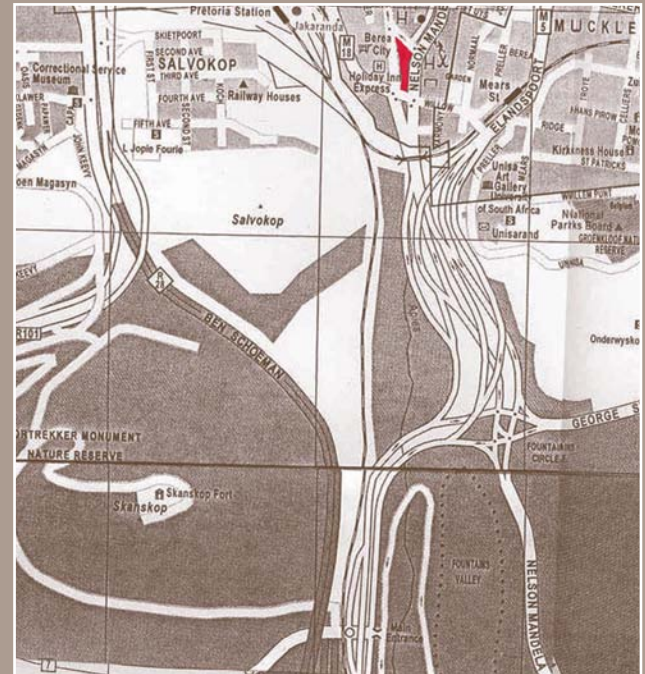


fig. 004 map of Pretoria inner city

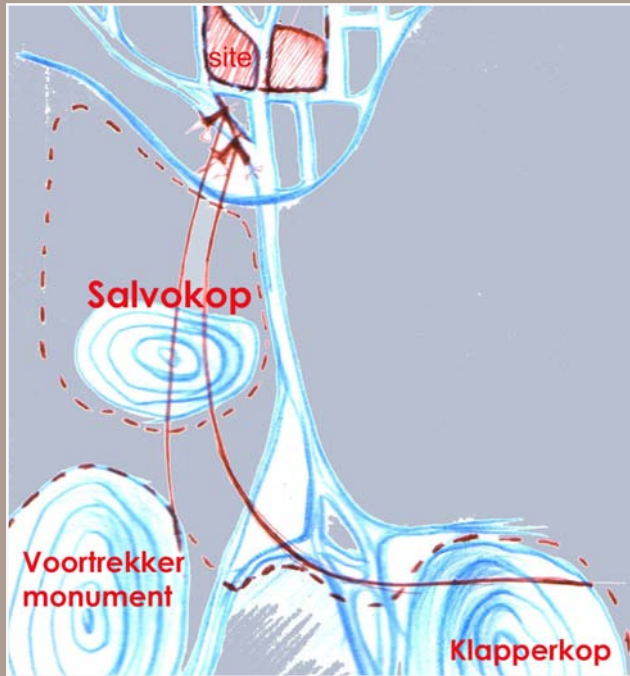


fig. 005 diagrammatic sketch of the city edge



fig. 006 Pretoria inner city

## concepts

*The site offers the opportunity to become a generator of movement. Connecting the urban pedestrian and cycling routes with the natural routes located on Salvokop, Voortrekker Monument, Fort Skanskop and Fort Klapperekop. The idea is not to create a setting where the presence of the city is lost or ignored, but rather to create a lively public setting in the heart of the city.*

*Buildings are fragmented and elongated on the north-south axis to allow for the filtration of public movement, either passing by or lingering through the site. It also serves to counteract the fast moving N-S spine of Nelson Mandela Drive adjacent to the site. The site clips onto the green belt leading to the Fountains Valley and the idea is that it becomes a destination point on this green belt route.*

*Models were used to explore with the pedestrian movement on site, the fragmentation of the buildings and the spaces that evolved due to the fragmentation.*



fig. 007 concept sketch

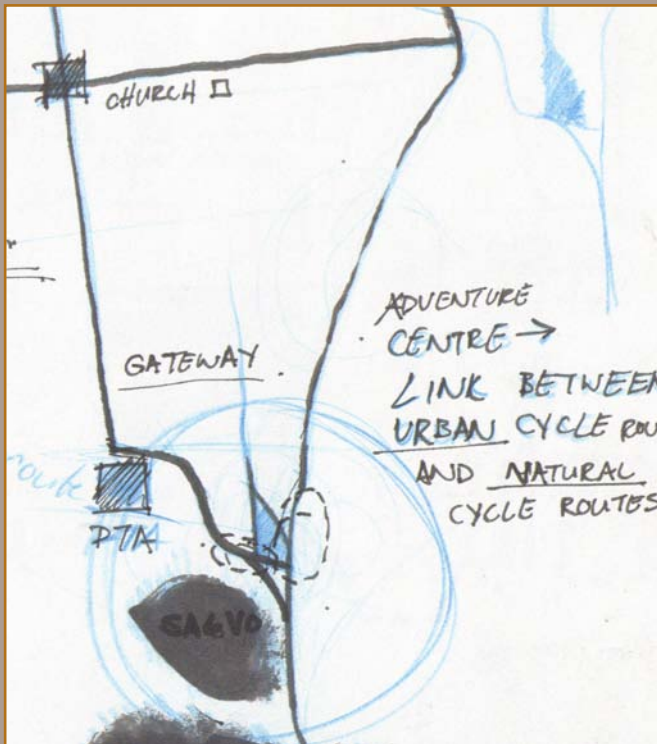


fig. 008

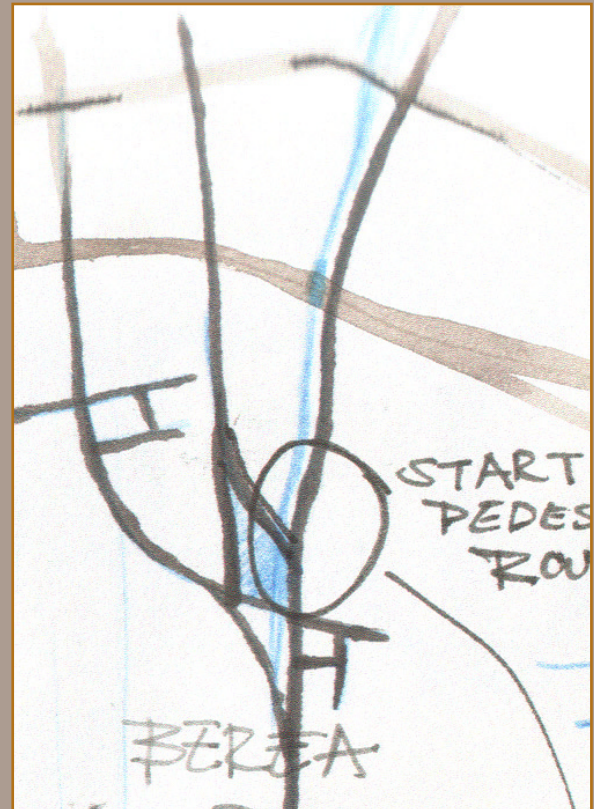


fig. 009

fig. 008, 009, 010, 011 Concept sketches of the development of pedestrian and cycling routes.



fig. 010

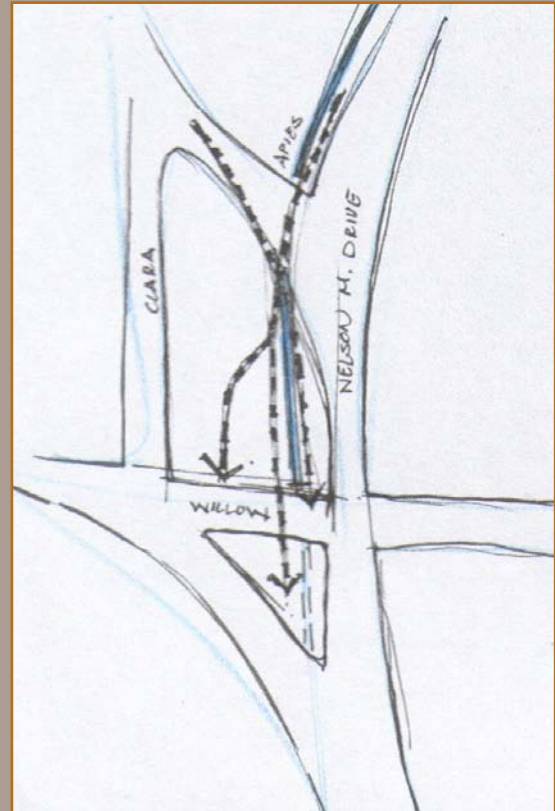


fig. 011



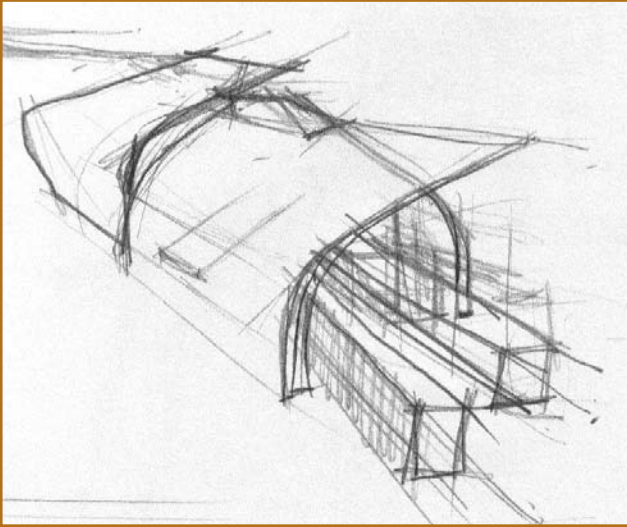


fig. 012 concept sketch of unfolding planes

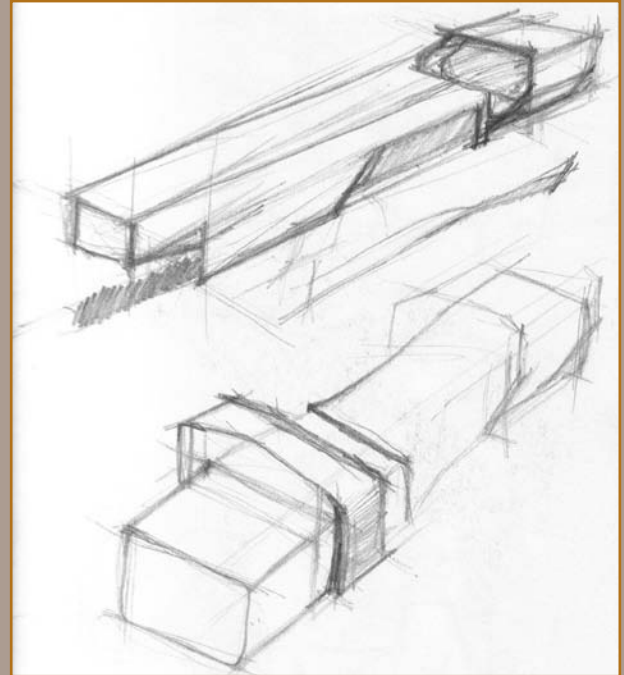


fig. 013 concept sketch of forms

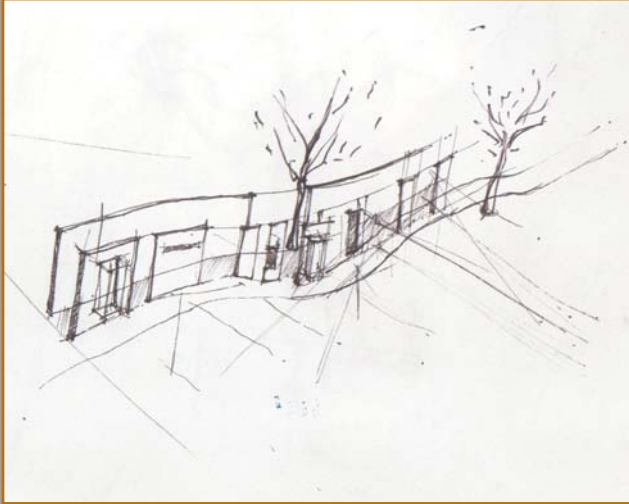


fig. 014 concept sketch of the exhibition wall

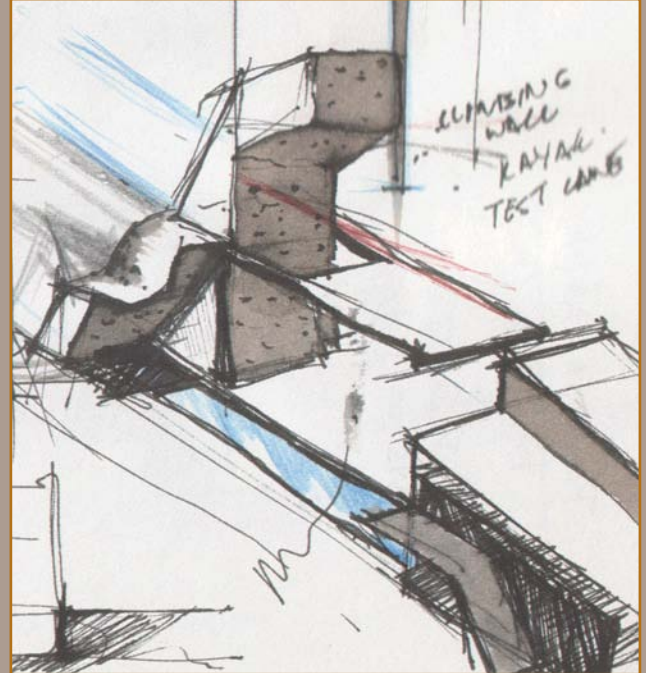


fig. 015 concept sketch of the climbing wall

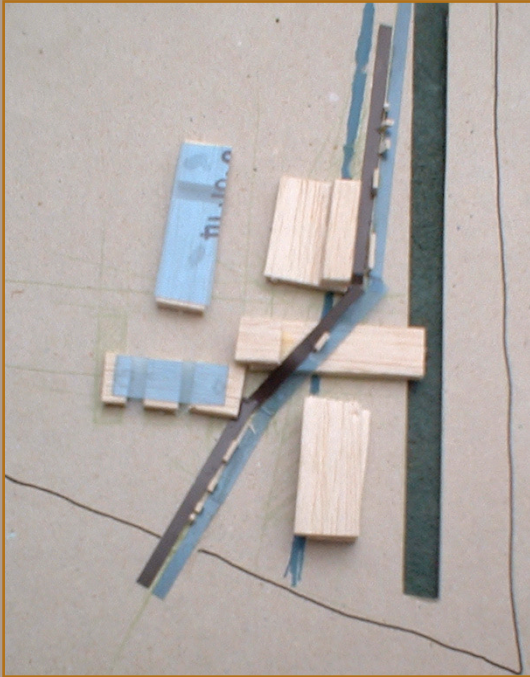


fig. 016 concept model

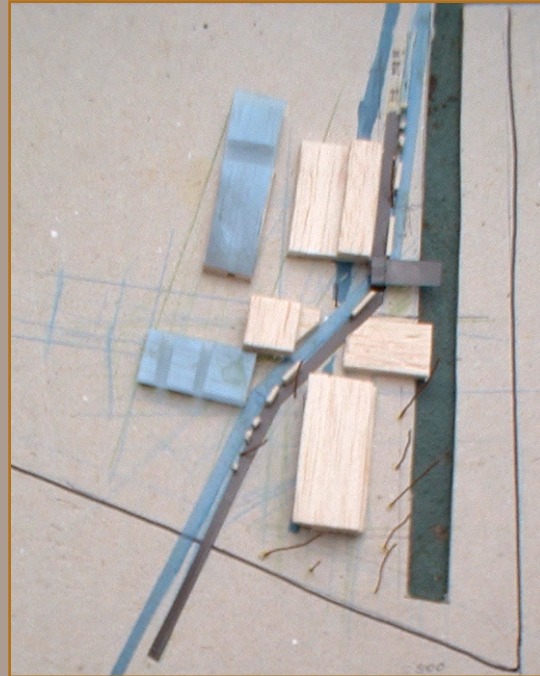


fig. 017 concept model

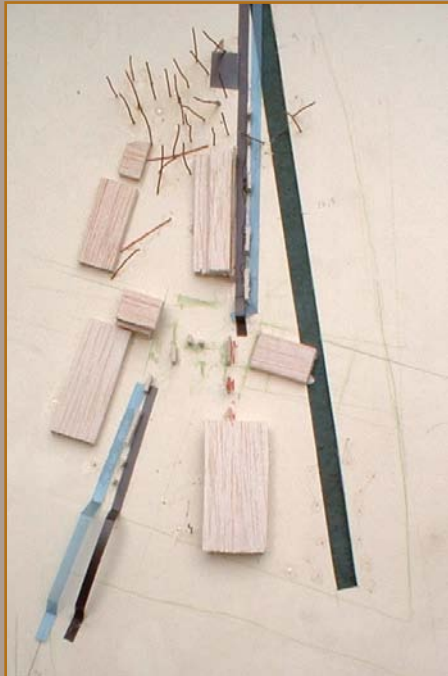


fig. 018 concept model



fig. 019 concept model

## conceiving a creative image

*Kengo Kuma once wrote [JA, 2000]: "A rainbow is not an actual object, and that is what makes it attractive. A certain relationship established between particles of water vapor, the sun and the observer (i.e. the subject) generates the phenomenon we call a rainbow..." I like to believe that the creative or architectural image a designer constructs in the mind is also a phenomenon that is created due to a certain relationship established between imagination, sensory experiences and the designer himself. This image is dependent upon that relationship and cannot exist without it. The image alters due to the influences on these three variables in the relationship. Imagination is influenced by the designer's inspiration and embedded human knowledge that, in its turn, is influenced by the designer's experience of the world around him or her. Sensory experiences are influenced by the designer's ability to use the senses. Lastly his or her design philosophy and outlook on life influence the designer. To study or describe the process, by which a creative image is conceived, is thus an intricate and complex act. Pallasmaa says, "...in creative work, the scientist and the artist are directly engaged with their body and it is an existential experience rather than an external logistic problem".*

*"... when you look at a wall spotted with stains, you may discover a resemblance to various landscapes, beautified with mountains, rivers, rocks, trees...Or again you may see battles and figures in action, or strange faces and costumes and an endless variety of objects which you could reduce to complete and well-known forms. And these appear on such walls confusedly, like the sound of bells in whose jangle you may find any name or word you choose to imagine."- [Leonardo da Vinci.]*

*To explain how the "image-making" power of a designer works, one has to study the threefold nature of the person. According to C. Larkin [1921] a person consists of body, soul and spirit or what Paul calls the carnal [1 Cor. 3:1-3], the natural [1 Cor. 2:14] and the Spiritual parts [1 Cor. 3:1] of the human being.*

*In the outer circle the body is touching the material world through the five senses of sight, smell, touch, hearing and taste. The gates to the soul are imagination, conscience, memory, reason and affections. The spirit receives impressions and material images through the soul.*

*We see from this concept that the designer needs sensory experiences, be it bodily senses, or sensory experiences of the mind and spirit, for example a sense of place, space and form, culture and spiritual power, to be in touch with the material world.*

## response

*Motion through space. Space that is defined by architecture that reveals poetry and a greater being within me. These were images and thoughts that stirred me.*

*I remember the first image that came to my mind: that of a mountain biker racing through the heart of a building, playing with the emotions of the visitors in the building and setting the boundaries of the spaces. Images of climbers moving over and under buildings washed over me and as they climbed, space, walls and architecture formed in my mind.*

*A precarious balance was needed between the architecture and the extreme sports existing within the*

*architecture. Therefore a language was developed where architecture not only responded to the site, but also to the movement happening in and around the site.*

*The buildings were fragmented on site to allow for this movement to happen and in this process of fragmentation quiet, more serene spaces evolved.*

*Perfect examples of this balance are the climbing walls that exist over and around the retail programme. The climbing walls open up towards the north and under them the mountain bike centre extrudes itself into existence.*

*Throughout the history of humankind one finds that creativity was usually related to or originated from a higher deity or spiritual realm. To substantiate this I will explain the philosophy of the arts of three ancient civilizations, as outlined by Todd Farley [2002].*

*Egyptian art was a manifestation of power and strength. The artists were seen as magicians, manipulators of powers and the forces of the cosmos. They would draw pictures of wheat or of a bird to capture part of the power that was being drawn or sculpted. The magic of their art was to make and capture the essence of God, to capture the communications of their gods. "Art was used to capture and make the gods submit to the magician who is manipulating the power of the gods; it was used to capture the essence of life and then use that to give prolonged life to an individual. It was also used to capture the essence of death and bring death to an individual ". [Farley 2002]*

*The Graeco-Roman philosophy of art is based on the concept of Mimesis. Mimesis means a copy of life. It is not an expression of life, but rather a reflection of life. They believed that a created object must be less than its creator; therefore if the creator is real, then the created object must be less, in other words less than real.*

*We as the created objects are the game of the gods. We are the actors on the stage of life and the gods manipulate us as the story unfolds. As Caesar Augustus said on his deathbed: "Dismiss me from the stage of life if I have played my mime well. Dismiss me with applause". [Farley 2002] Creativity in this civilisation was used to teach people moral truths, to help provide a culture; an identity.*

*The Hebrew-Christian use of art strongly contrasts with the Egyptian or Graeco-Roman. They viewed art as an expression of life. It was not life itself, but an expression of who we are and what we are in God. Here creativity was an expression of human emotion and feeling. Creativity is given life and vitality by the emotion's vitality. As we see in Ecclesiastes 3:3-4: There is "...a time to weep, a time to laugh, a time to mourn and a time to dance...". Dance is used as the opposite of mourn, to express joy. The internal joy was expressed or manifested through the external manifestation of dance. Physical gestures were used to communicate that emotion which was inside.*

*In the of understanding the psychology of the creative unconscious it became clear to me that in order to be creative one has to acknowledge or engage with the Creator.*

## response

*The spirited work of Mecanoo and the theme of duality between carved and constructed space in the works of Enric Miralles inspired my design thinking. The buildings on the edge of the Apies River were designed to receive passers-by. In this process carved and constructed space were played off against each other to form this intricate eastern wing of the design. The eastern façade of the Kayak centre simply folds away to form viewpoints and seating for passers-by and the northern restaurant wall carves into the rising walkway to form private space along the Apies.*

*The roofs of the buildings become secondary in order to emphasise the walls and the strong, clear language of the plan. This may have been unconsciously influenced by*

*the phenomenon in extreme sports where the vertical plane is always the defying force.*



fig. 020 faculty of economics and management [Mecanoo]



fig. 021 Igualada cemetery [Enric Miralles]



## **sam's story**

*" I am not a stranger to hard times, but for these I'll come back anytime..."*

*On the streets you become part of the system, a loss to society, but after POPUP took me in and enrolled me in the youth programs at that new adventure centre down the street, I can pick up my head again, feel proud about myself..."*



fig. 022 petzl catalogue [1999]

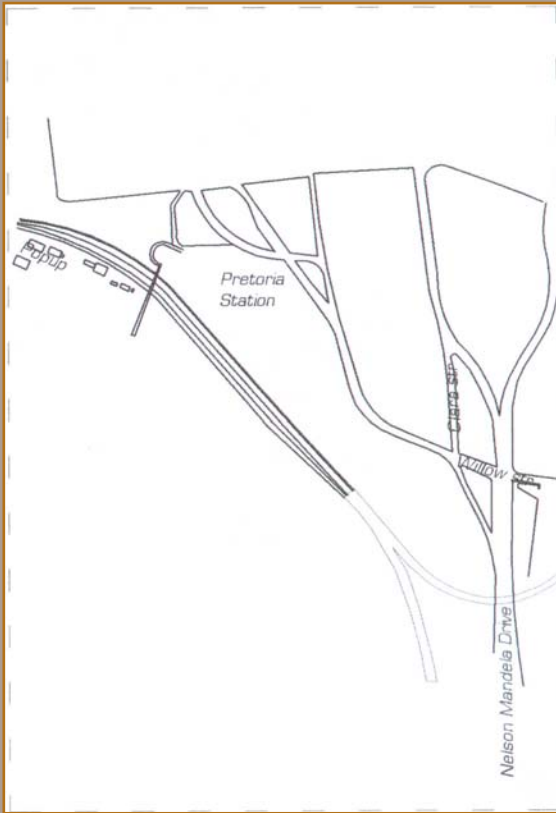


fig. 023 plan of Pretoria station and surroundings

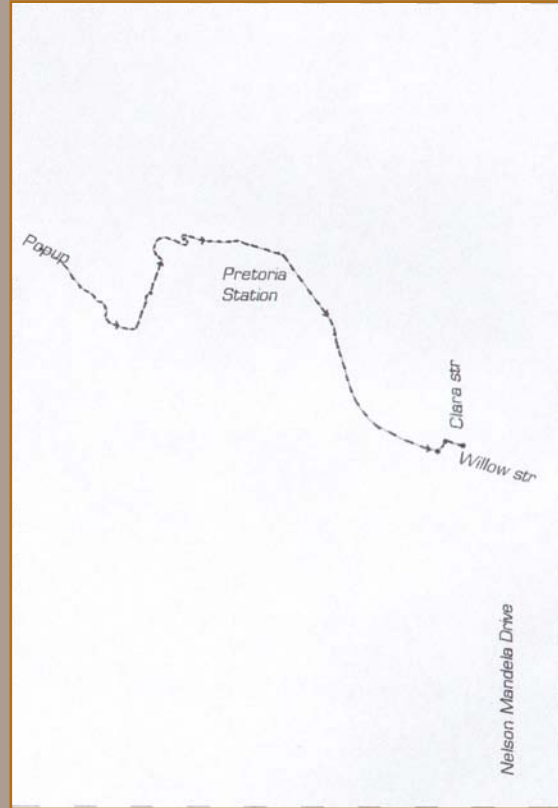


fig. 024 Sam's route from Popup to the site



fig. 025 petzl catalodue [1999]

▫ *the blind square*

▫ *the electric maize*

▫ *high rope activities*

▫ *basic skills of*

*mountain biking*

▫ *climbing and rope techniques*

▫ *paddling*

## the perceptual realm

*“All types of vertical sports have a link with childhood. Because the memories of the games of skill we played high above the ground are among our deepest original memories. The memory of our first poised, self-confident actions. The memory of the pleasures and fears we experienced with those first challenges. We all have at one time, climbed higher than we would have even dared to imagine. We have all, at one time, cried for joy, filled with complex emotions, but in a single unrestricted moment of clarity, certain that we are experiencing something unique” [Petzl catalogue 1999]*

### *The sensory world*

*The sensory world consists of the ever-changing events or stimuli that surround us and the responses that we make to them. It is characterised by a fluctuating array of lights, colours, shapes, sounds, smells, tastes and touch sensations. We thrive in this sensory world; it is a world of sensation and perception, where sensation is the means by which sensory information is relayed to the brain and perception is the way in which we experience our sensory world.*

*Perception is dependent on our arousal or alertness, on our attention to incoming stimulation and on our ability to extract information from stimulation.*

## response

*Tactile architecture has a physical relationship with the observer. One has to be able to reach, to touch, to see through and stir up childhood memories. In this sense there is a definite parallel between tactile architecture and extreme sports where one is exposed as a human being and the sensory world is stretched to the limit.*

*In the design these extreme activities are employed to further enhance the sensory experience of visitors, where they are faced with sounds, motions and even their own fears, while doing their shopping.*

*Another parallel has been drawn between what one experiences in nature, or the imperfections of the real, and the landscape. The activity systems are used to strengthen the concept of an exterior and interior system that intertwines. The idea is that these systems*

*simply run through the buildings, changing old and setting new boundaries, while the retail programme evolves around them. All the roof drainage is sloped towards purpose made concrete spouts and water spills off into a spill basin. In the kayak centre, runoff water is sloped towards 5000 fiber cement drainage pipes, that are utilized as down pipes, and water is drained internally in the kayak water channel.*

*Vegetation is used to bring life, softness and seasonal rhythm into the urban surroundings. All alien vegetation is eradicated and replaced with vegetation from the Rocky Highveld grassland biome and the Savannah biome to enhance this parallel. For this reason a strip of Red Autumn Grass runs along the two main pedestrian entrance routes. At the southern pedestrian entrance a sloped grass bank has been constructed to serve as a viewpoint. All access*

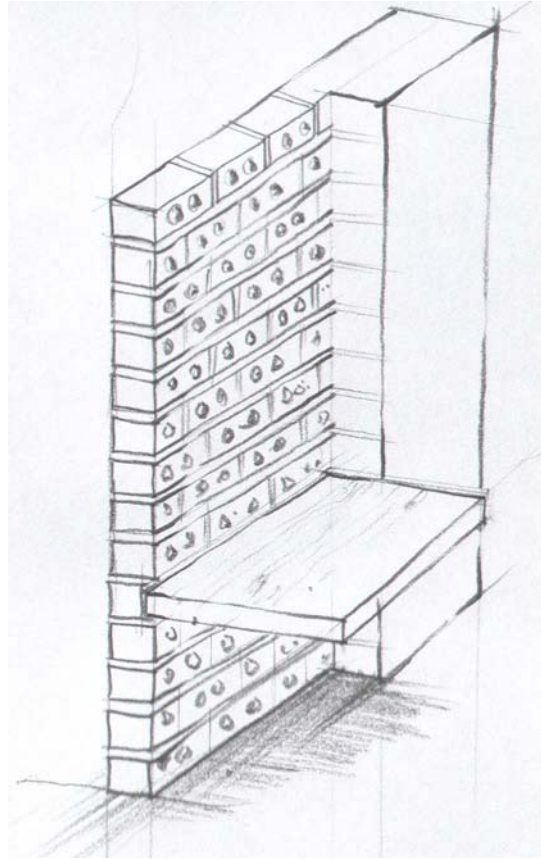


fig. 026 concept sketch of landscape seating

points to the site lead to a central square, therefore meticulous care has been taken with the surface. Face bricks are used as pavers and the extruded holes are planted with groundcover. Areas between the pavers are filled with fine gravel. This pattern sometimes extends into a building; this was carefully done to connect these spaces with the central square space. Three areas of woodlands are established. In two of the woodlands elevated mountain bike tracks are constructed while the third is employed as the parking area with no definite ordered parking system, covered with gravel. This area will be minimally maintained in order to establish and keep the natural woodland.

The exhibition wall not only serves as a connection spine into the site, but is also simultaneously employed as an information system to inform

passers-by and visitors of the rich heritage of the site and of extreme sports. Some of the concrete display panels fold horizontally to become seating.

The fenestration was specifically designed to frame and direct views. Alternative means of light entry were also employed in the design to ensure enough natural light in the retail spaces and the horizontal strips cast into the concrete climbing walls not only ensure the penetration of natural light, but also create shadow patterns on the ground. Minimised fenestration on the eastern and western facades prevents excessive solar heat gain. Conventional façade treatments of retail buildings have a high percentage of glazing ratio, however the nature of this retail complex has a high level of outdoor activities which enable the products to be displayed in this



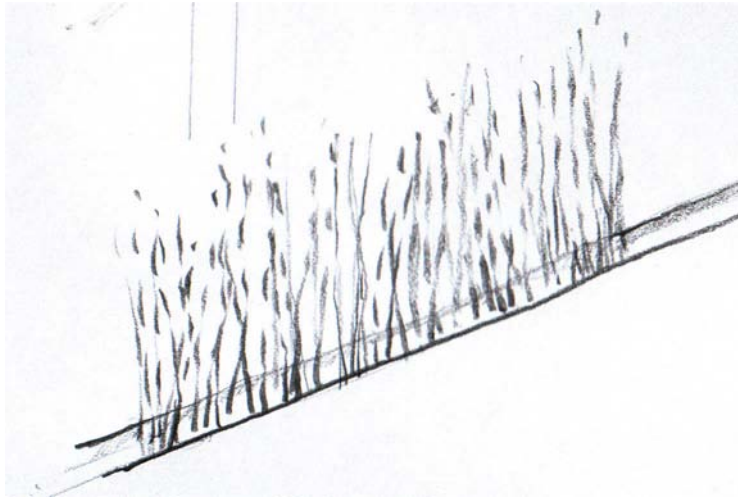


fig. 027 concept sketch of rooigras strip

*manner.*

*What is also crucial in this exposition is the way the design is represented and perceived; the way it is expressed in this document. For this is inevitably part of architecture. The way my creative images are expressed strengthens the reverberations not merely keeping them alive. By employing a narrative it is hoped that the meaning of architecture and not only its appearance is expressed.*

## hiking and climbing centre

*"Motion. Space. All my energy focussed on one movement. Everything flowed together perfectly as far as this crucial move of the pitch. The moment becomes a whole universe. There is the wall, the perspective of rock. The flight of my vision as it passes over the rope in a hundredth of a second, the last protection far below me. And then, there is the move. The very action of making this move and the precision of motion in space. All thought of strength or difficulty forgotten. I lock onto the hold. I didn't know that such a perfect moment could exist."*  
*[extracted from the Petzl catalogue, 1999]*



fig. 028 beal catalogue [2003]

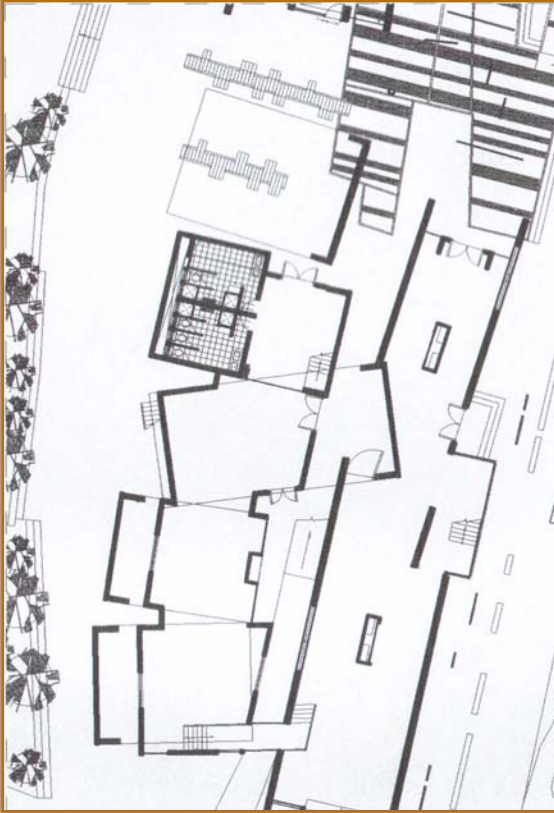


fig. 029 plan of the climbing walls

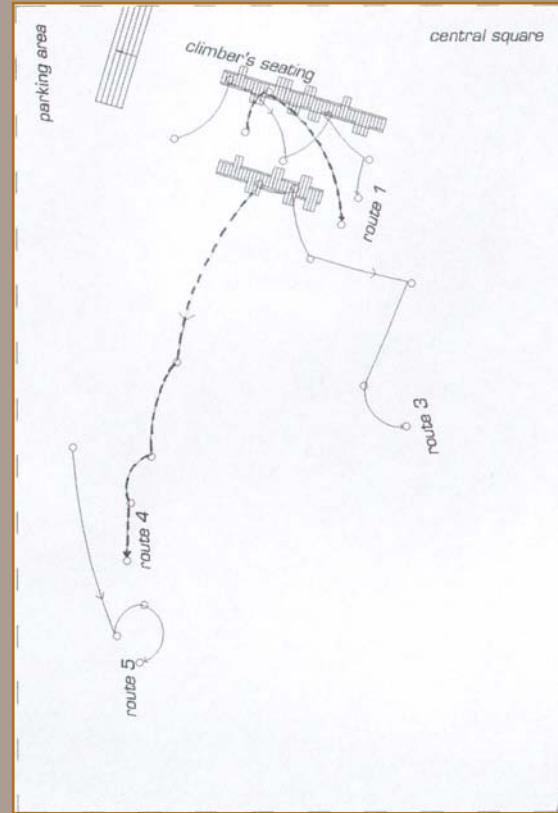


fig. 030 movement of climbers



fig. 031 model of the climbing and hiking centre

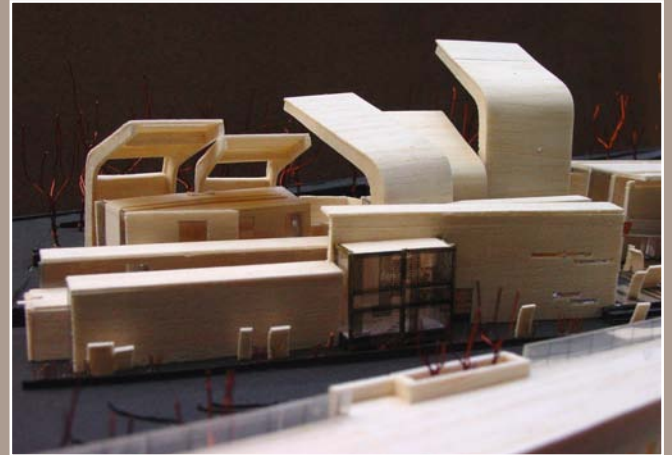


fig. 032 eastern view

## mountain bike centre

*“ There is no substitute for the experience. There is no substitute for finding out for one’s own self, for the personal revelation, for knowing firsthand. When I ride, that happens. The body and the spirit become one. Mountain biking becomes prayer and praise and applause for me and my Creator. When I am on my bike, I am filled with confidence and the faith that word contains. I can face unanswerable questions, certain that there are answers... The religious experience, you see, is too important to be confined to church. It must be available to me at every moment. When it is absent I am, in that sense, no longer living. I exist. I am on life supports, outside of life, like a patient in a coma. I am unconscious, unaware of what being human means. One way to come out of that coma is to be a climber.” [Adapted from Seeham, G. 1981]*



fig. 033 [www.adventurezone.co.za](http://www.adventurezone.co.za)





fig. 034 plan of site

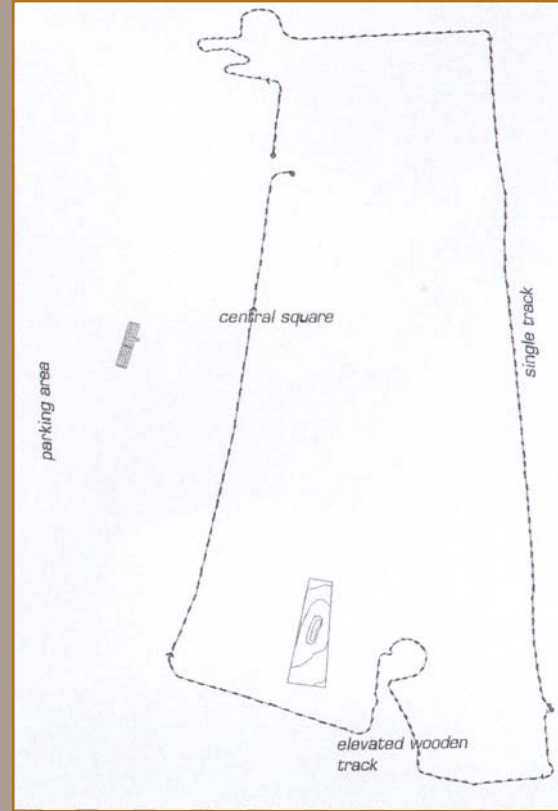


fig. 035 movement of mountain bikers

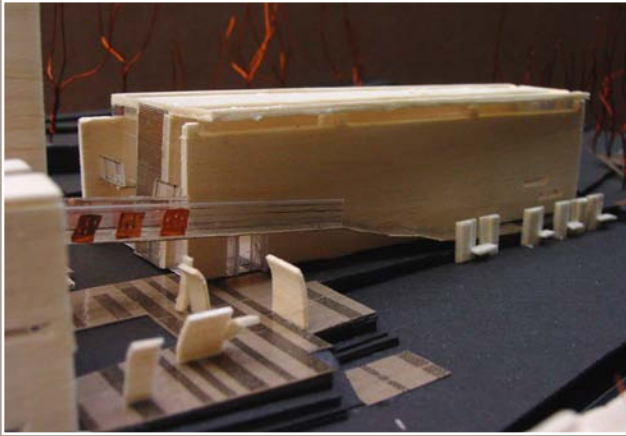


fig. 036 east elevation of the mountain bike centre



fig. 037 north elevation

## kayak and canoe centre

*"I do not remember much about it. About the magnificence of our camping site lit by the dawn, about the roaring white water. All my sensations seemed to have been filtered, slowed down by the greatness of the Zambezi. Jeff was just behind me, but he could just as easily have been miles away, it would have made no difference. The only thing that linked us together was his rhythmic breathing as we ventured down the river. All the rest was a dream."*

*[adapted from the Petzl catalogue,1999].*



fig. 038 Getaway magazine [2003]

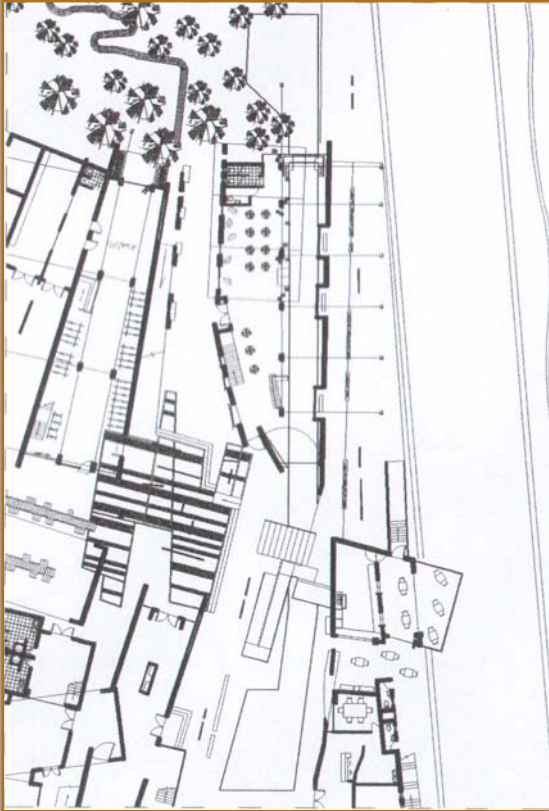


fig. 039 plan of kayak and canoe centre

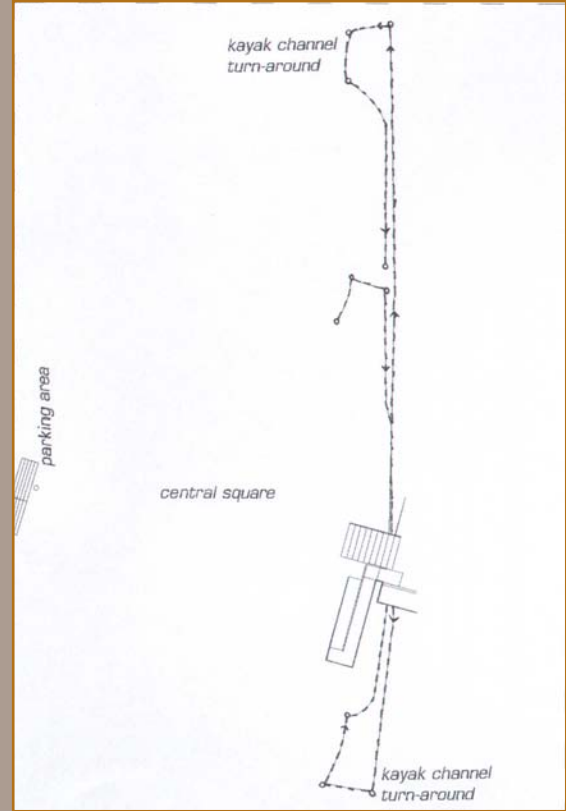


fig. 040 movement of paddlers



fig. 041 east elevation

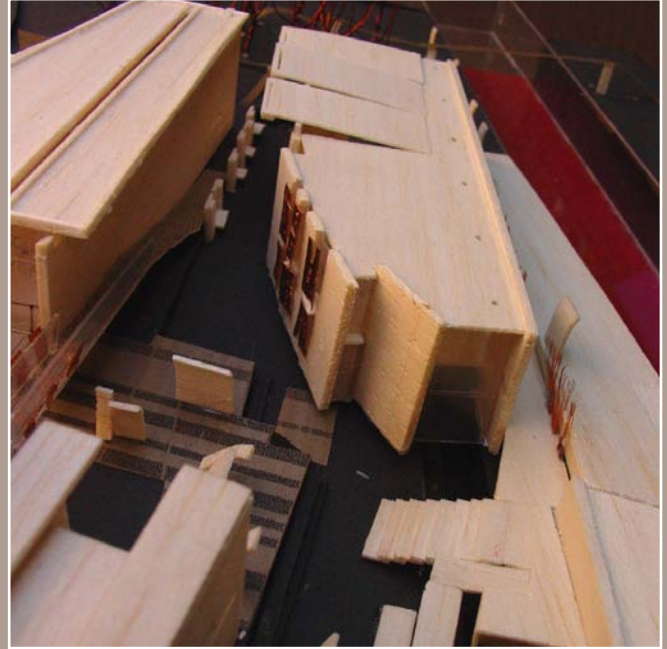


fig. 042 south elevation

## pedestrian routes

*"People need people... I remember back in the village, when we use to gather by the river to wash our clothes. Even if you had no washing to do you would go along, to listen to the stories of the elders and, you know, to be with the people.."*



fig. 043 Time magazine [2001]



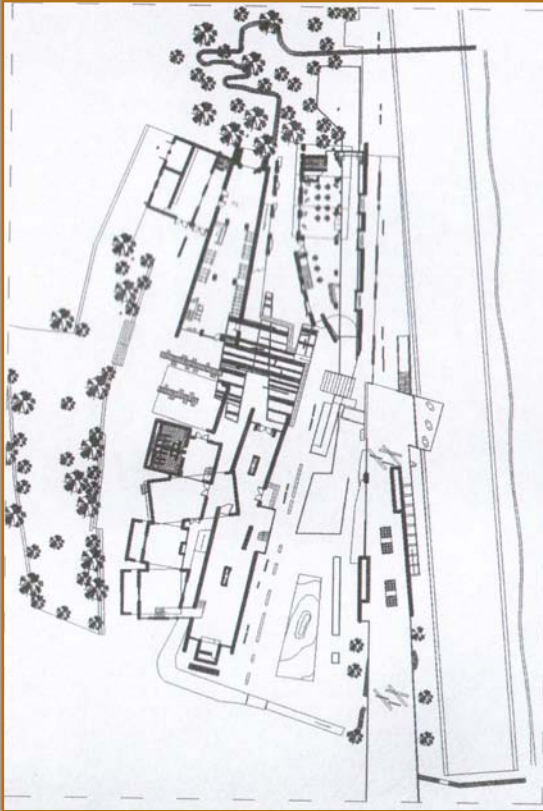


fig. 044 site plan

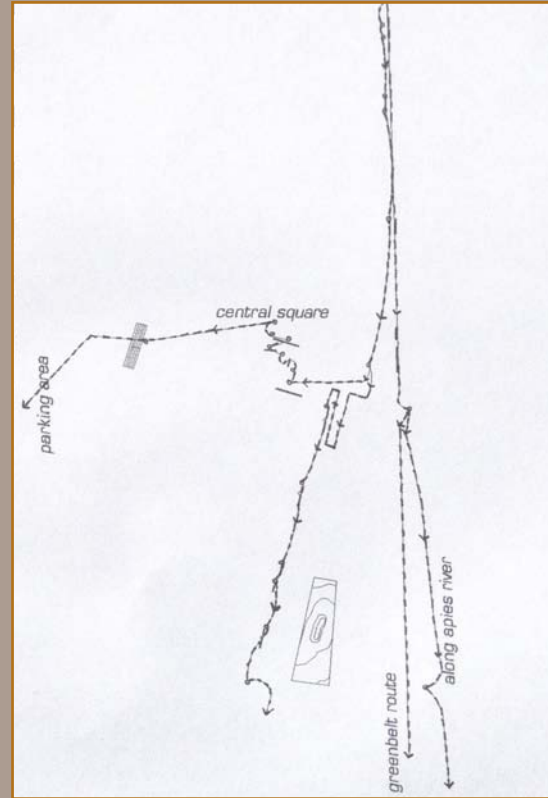


fig. 045 pedestrian movement

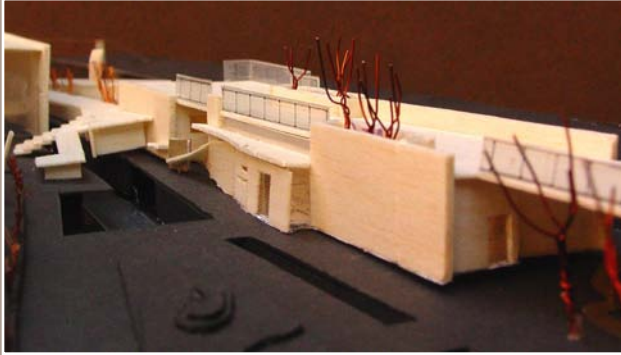


fig. 046 west facade of the administrative building

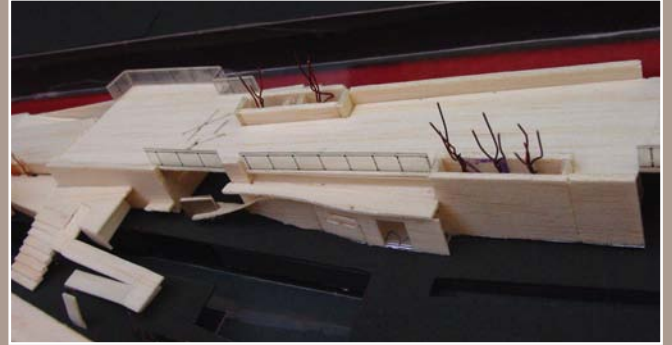


fig. 047 pedestrian walkway

## material exploration

*“Tectonic signifies the fusion of technique with art, of construction with poetry... The radical tectonic finds its expression in the physical and material attributes of construction, enhancing the body’s experience of space and incorporating sophisticated and sustainable technologies”. [Le Cuyet 2001]*

*“I see the rustic metal of the door, the blue of the hills in the background, the shimmer of the air over the asphalt...Everything I see, the cement slabs that hold the earth, the wires of the trellis, the chiseled balusters on the terrace, the plastered arch over the passage way - they all show traces of wear, of use, of dwelling. And when I look more carefully, the things I see start to tell me something about how, why and for what purpose they were made. All this comes to light, or is concealed within their form or presence... I like the idea that the house I build contributes to the atmospheric density of a place, a place which its inhabitants and passers-by will remember with pleasure”. [Peter Zumthor. 1998]*

*Employing materials to their best use involves an appreciation of their sensory qualities as well as of their technical potential. Materials are endowed with meaning, can evoke feelings, trigger connotations and address the deeper levels of our understanding.*

*Sadly the building culture of today has impoverished the sensate quality of materials. To create reverberating architecture one needs to “challenge the commodification and standardisation of building production” and define a way of building that “finds its expression in the physical and material attributes of construction, enhancing the body’s experience of space and incorporating sophisticated and sustainable technologies”. [Day, 1990]*  
*This can be done by using materials as much for their sensate qualities as for economy and utility: Like using raw materials, the juxtaposition of rough and smooth, heavy and light and employing prefabricated elements in a creative way.*  
*The fragmentation of the buildings on site allows for the phasing of construction. Finished buildings can start operating and generating money, whilst the rest of the buildings will be under construction.*

*By implication, architecture does not need a new style, but merely a sensibility in the work and construction. It calls for a way of working with many possible manifestations. Design does not end at the construction phase of a project, but continues right through this phase, where decisions, materials and construction solutions are weighed up until the right sensory qualities are achieved.*

*Another aspect which standardisation in building production ignores is that humans experience*

## response

*Materials were chosen that gives a raw feeling and leaves a blunt physical presence of construction.*

### CONCRETE

*This material is used in most structural and envelope construction. The choice of this material is justified by its appearance, flexibility and thermal performance.*

*Almost all external walls are off-shutter concrete walls, using 2.4 x 1.2 m steel formwork panels to achieve a smooth finish. The walls are constructed to appear as if they are free standing and become the transfiguring elements that express the plan and generate movement and a sense of surprise and intrigue, guiding visitors through the site.*

*A lowered extension of the pedestrian walkway, that functions as public seating, twists 90° to become the entrance façade of the administrative building. This wall and all other applications are cast in-situ and finished off.*

*The roofs become horizontal extensions of the walls, magnifying the intentions of the walls. Outer roofs are sloped inward, with suitable drips at the slab edges, where the inner roofs receive the runoff water. Inner roofs are constructed with parapet walls in such a*

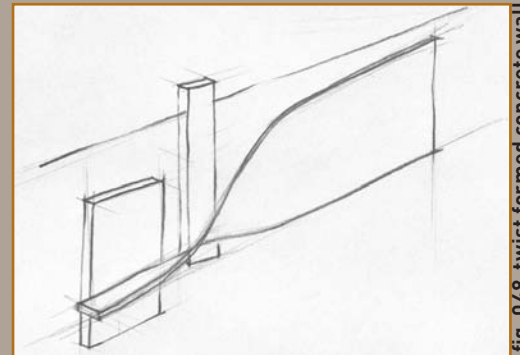


fig. 0.48 twist formed concrete wall

*dimensions anthropometrically. Our main concern is how many body heights something is, how much above one's eye level or how many paces away. Small measurements in relation to eye level are critical to views and privacy and a few centimetres in the height of a wall profoundly alters our spatial experience. This type of construction can be achieved if the design process can be continued right through the construction phase. This, though, depends on hands-on construction. Although the mechanical construction system will still be used in the construction of the buildings, hand construction will come into play where sufficient flexibility in the construction is needed. This type of construction not only gives textural scale, but also suits our socio-economic situation where intensive labour is needed to create work opportunities and to learn new skills. Builders have the opportunities to become artistically involved in their work. Such buildings have a distinct soul even before they are occupied. The spirit of the place can develop because of, and not in spite of, the buildings.*

## response

*way that the roofs still appear to be continuous, flat concrete slabs. The roofs are finished off with 25mm inward-sloped screed, which is waterproofed, and runoff water is drained to a purpose made precast concrete spout.*

*Most floors are finished with 25mm concrete screed tinted with red-oxide and finished with a layer of 6mm clear epoxy, mimicking the earth found in this region and further blurring the boundaries between the interior and exterior.*

*The climbing walls are constructed with in-situ cast rib columns, laterally supported by concrete rib beams @ 3m centres. This structure supports a 150mm concrete slab.*

### FACE BRICK

*Walls that are designed for functional purposes only are constructed with Corobrick silhouette satin face bricks, flush jointed. Where a visual link is necessary these bricks are turned on their edges to expose the extruded holes of the bricks.*

### STEEL

*The decision to use corten steel was made due to the fact that this material*

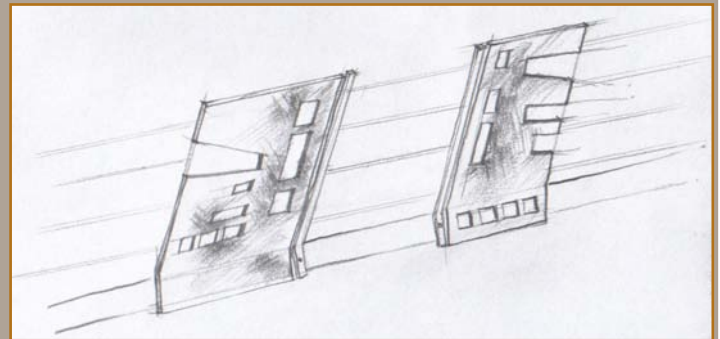


fig. 049 corten steel panels of mountain bike bridge



*alters its appearance over time and finds its application to the decorative panels on the mountain biking bridge crossing the central square and the shading devices on the western façade of the kayak and canoe centre. These panels are patterned for both structural and aesthetic purposes, creating changing shadow lines and patterns.*

#### *GLASS*

*Glass is used throughout the building: frameless glass is applied to the horizontal strip windows in the eastern and western facades. Larger fenestration comprises a designed glazing system, consisting of a 120 x 60 x 6 GS angle iron to which GS flat bars are welded to form the louvres. A framed glass window is fixed to the interior of this frame and can either be openable or rigid depending on its location.*

*Frosted glass is employed in longitudinal openings in the pedestrian walkway to provide light to the functions below.*

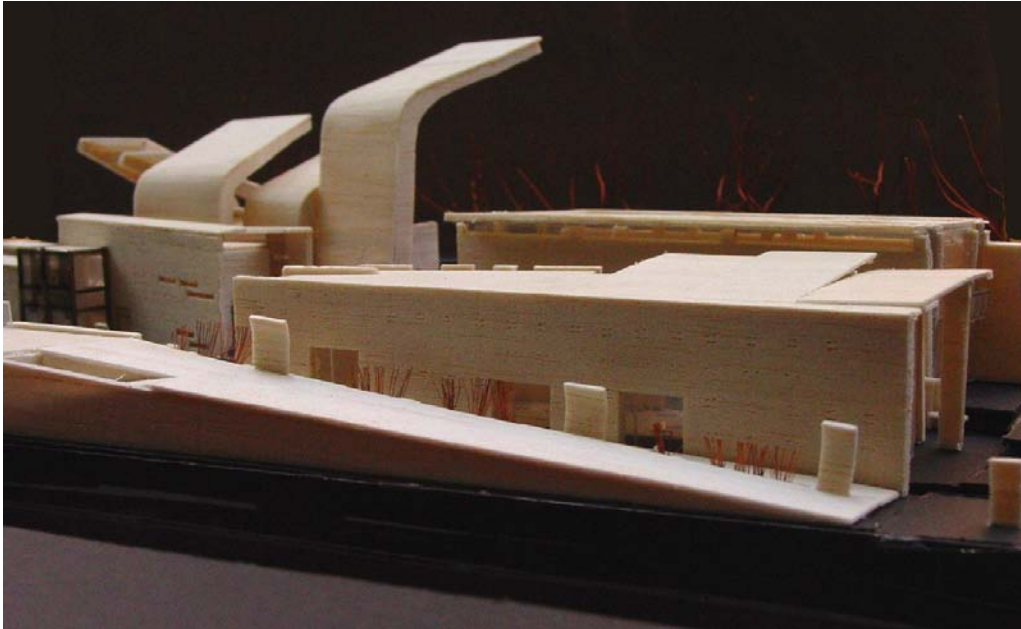


fig. 050 corten steel panels





**fig. 051** climbing wall structures



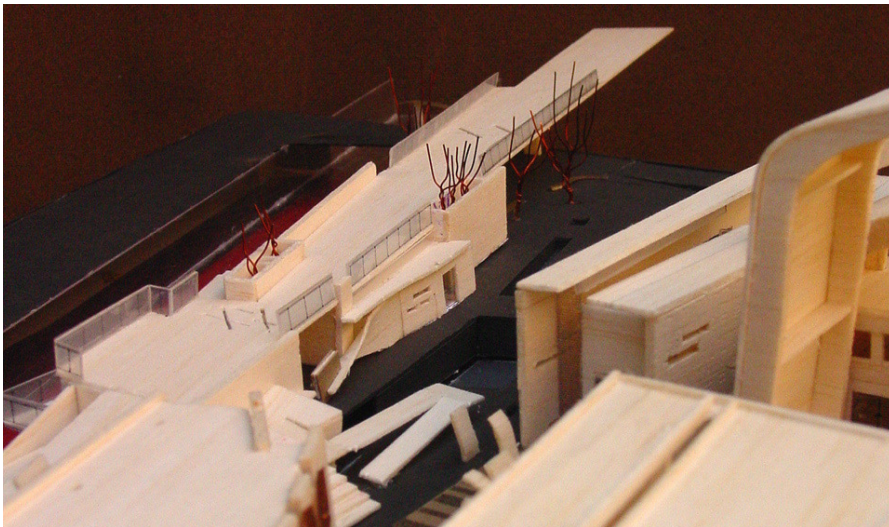
**fig. 052 eastern view**



fig. 053 view from the south-east



fig. 054 southern view over the site



**fig. 055 view of the administrative building and the pedestrian walkway above**



fig. 056 pedestrian walkway









**addendum**

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*At the end of 1825, Mziligazi arrived in a valley between the Magaliesberg and Daspoortrand. The river that sustained them, was called Enzwabuhlungu or "river which hurts:" so named because of the action of its sharp dolomites on the bare feet of the woman drawing water from it. In the elbow of this river, the city of Pretoria evolved.*

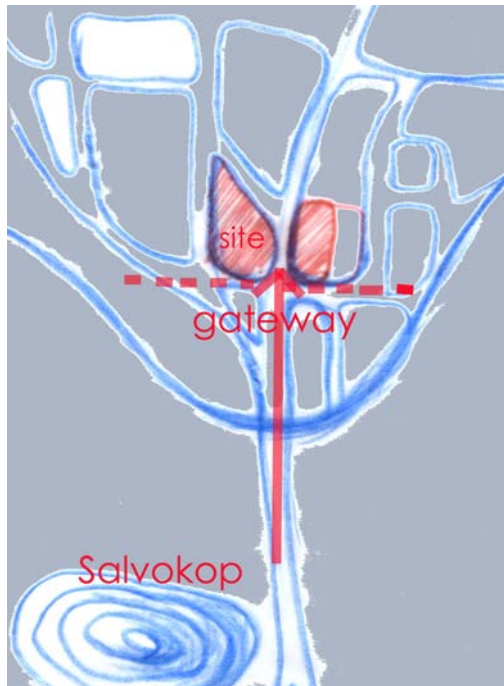
*Ironically today the Apies River has reverted to being a "river which hurts". Somewhere along the line, as the pace of life quickened and the demands of transportation and a growing economy increased, the Apies were forgotten. The valley became a corridor and the river became the city's biggest drainage ditch.*

*The route of the Apies River not only determined the pattern of urban development in the inner city, but the river also creates continuity and enhances the legibility of the urban structure. In the same way, the river should be used to blend ecology and urbanity in order to create a living, stimulating and economically viable spine for the inner city. It should become a place of public engagement: where once developments turned their backs to the river, developments should front the river and embrace the river in its architecture, social and economic activities.*

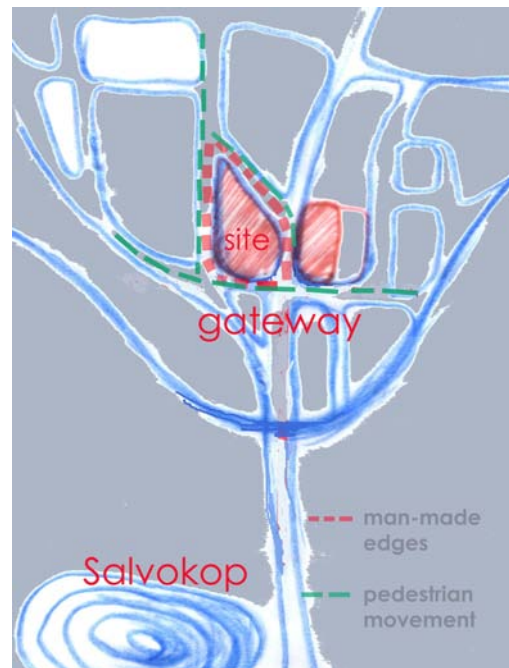
*Throughout history, public space has formed the backdrop to public life, for commercial transactions, social exchange, entertainment and contemplation. The Apies River must be rehabilitated to such a place that is filled with energy and a sense of enjoyment that is derived from spending time in such a lively public setting. It should become a place of enrichment to human lives.*

*"Architects have a special role of leadership to play in changing our views on prosperity, productivity and quality of life. The new ethical standard for the profession of architecture is based on the respect for human life as part of the natural world and its complex processes."*  
[William McDonough]

*According to the Apies River Urban Design Framework, Berea should function as a gateway to the inner city from the south. To my view buildings worthy of a gateway setting are public buildings, like for example the Pretoria Train Station, and buildings that promote and enhance public engagement and public life. Historically, Berea Park functioned as a place of the social gathering and as the place where sport developed in Pretoria. On the mind maps of every citizen then, Berea Park was clearly located along with Church Square and the Train Station. As one enters Berea today, however, you are confronted by vast, green open spaces*



**Fig. 001** Berea as a gateway setting



**Fig. 002** Pedestrian movement & man-made edges

that are inaccessible and neglected. These spaces should be developed in such a way that they would regain an important place on the mind maps of people living in Pretoria.

The current land uses of Berea are mainly residential with retail and office developments on the western side of the river, towards the station. The figure ground study clearly shows that the area needs to be densified in order to change its character from a suburban to urban character and to create a feeling of containment. I propose that the open spaces should be reevaluated as to which are still necessary as sport fields [keeping in mind that the Caledonian Sport Stadium is in close proximity] and develop public parks and public buildings, for example a library, in these open spaces that are not used. The Berea Park Sport Club [dating back to 1907] should be restored as well as residential houses dating back to that same era in the precinct. This sport club is currently functioning as a high school and this needs to be upgraded and developed for its function, as well as the sport fields adjacent to it. The site on the corner of Nelson Mandela Drive and Willow Street, on the eastern side of Nelson Mandela, should be developed in order to enhance the feeling of a gateway.

On the southern boundary of the chosen site there is east-west pedestrian movement due to the fact that it is between two train stations [Pretoria and Mears]; whilst on the eastern boundary there is a north-south movement to and from the inner city. This pedestrian movement should be enhanced as well as utilized in the design to create public engagement with the building and the activities of the building. The site is isolated from the adjacent sites by man-made edges, an obstacle to overcome in the design.

"The existence of public life is a prerequisite to the development of public space, Public space is the stage upon which

*the drama of communal life unfolds. The streets, squares, parks and public buildings of towns and cities give form to the ebb and flow of human exchange... The relationship of public life to public space is dynamic and reciprocal and made up of many strands. The task of architects and urban designers is to weave these diverse elements into a sustainable, integrated fabric that takes account of the spatial, social and technical system that constitute the private and public life of the city." [Slessor, C. 2001]*

*The aim of the design of an Adventure Center in the inner city is to create a building that not only supports the vision of the urban design framework, but a building that uplifts the precinct and the lives of people living there, even though the majority of users will not be from the area and in the above-medium to high-income class. It should become a place of meaning through its function: like a river in rural areas used for washing clothes becomes a place for exchanging information. This can be done not only economically through the functioning of the building, but also by incorporating human activities in the natural system the building is surrounded by. In close proximity of the site, the Voortrekker Monument and the Fort Klapperkop hills are used almost everyday by mountain bikers. There are a lot of opportunities in and around the site that will enable mountain bikers to ride in the heart of the city. Workshops and group events, leadership, team building and youth programs at the outdoor adventure center will also play a major role in the upliftment of the precinct, even taking it back to its historical role of developing a sporting or active lifestyle for the people in Berea. In creating an appropriate interface with the river, it is important that*

Fig. 003 Mountain bike tracks in close proximity of the inner city

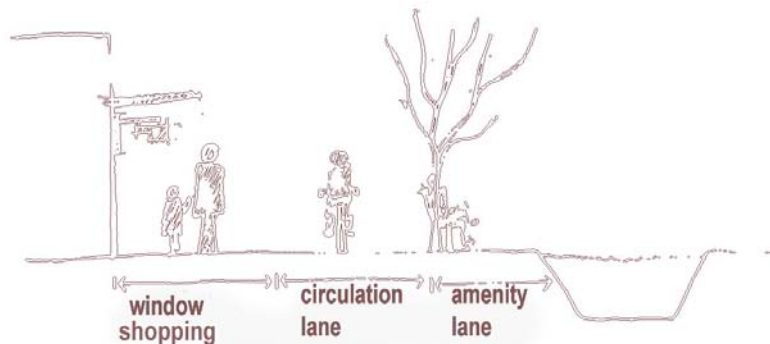


Fig. 004 Boundary interface with river



*the boundary interface with the river shouldn't be fenced off, creating a dead space next to the river. The river itself should be used as the site boundary and the boundary interface should be filled with activities. Spaces should be defined by the building itself. Screening should only be used for privacy purposes. The building should interact with the river activities as well. The riverside views should be taken advantage of by utilizing glazed facades or glazed openings. This will also allow for indoor/outdoor connection. Passerby connection should be multi-sensory; this can be achieved by designing the elements in contact with pedestrians on a human scale. The height of the building should be relevant to its gateway function and in context with its surroundings, whilst the coverage and the distance from the river should be determined by the specifications of the urban design framework.*

*This design will use the Apies River in the integration of natural and technological systems, by diverting some of the river water through the building and using it as a test canal for canoes and kayaks. By incorporating the river into the design, it not only supports the urban design framework, but also takes the river to its natural state before it was channeled. Stored rainwater will be used in the "rain room" to test the wet weather equipment. Obviously the hydrology, in terms of pumping water into the Apies [from the springs at Fountain Valley] again, should be restored or changed. This can be done easily due to the fact that the pumping station and reservoirs for this kind of operation, is in close proximity of the site. This will flow life into the Apies River again, returning it from a drainage ditch in to a natural river system.*



**Fig. 005**The heart of the city

*As the initiator of this project, Mazda will also fund this project. The following information explains their position and their intentions with this outdoor recreational equipment centre.*

*Mazda is entering a new era. An era that will be led by its new "Zoom-Zoom" global brand positioning philosophy, possibly the most radical brand development project in the history of the Mazda brand.*

*"Zoom-Zoom is the sheer joy of motion that everyone experiences as a child", explains Mazda Marketing Manager, Rob Crause. "It's that childlike fascination which children have when they experience motion. It's that first feeling of excitement and independence. The difference is that some adults never lose that feeling - and they're our target customers. They remember their childlike feelings and driving is always an experience for them. They never lost the spark."*

*The Mazda Drifter Adventure TV program was born out of Mazda Drifter's involvement in Adventure Racing in 2001. During 2002 the show evolved into an 'adventure lifestyle' program that broadcasts anything adventure related i.e. Adventure Racing, Mountain Biking, Trail Running and International adventure sport events. In 2002 they got involved in mountain biking by sponsoring the national endurance series.*

*A further development for them is an outdoor adventure center, where everything that is needed for this lifestyle can be bought. This will also function as the TV studios for the Mazda Drifter Adventure Zone television program.*

*Mazda Drifter are heavily involved in grassroots development of adventure sports and with this center they want to play an active role in the development of outdoor sports in the community by organizing workshops and group events, leadership and team building programs and youth programs - teaching our children to come out and play.*

*This initiative is vital to the success of positioning South Africa as an adventure haven - an eco-tourism initiative that Mazda Drifter has embarked on in conjunction with SA Tourism.*



Fig. 006 Mazda Drifter marketing logo





Fig. 007 Mazda Zoom-Zoom logo

*Workshops and group events:*

*Experienced staff will hold workshops ranging from mountain bike techniques to tent care. The group events would entail for example a group of riders meeting at the center and riding together in the city and in the adjacent nature reserves or climbers coming together to train on the climbing wall.*

*Leadership and teambuilding program:*

*This gives corporate companies the opportunity to enhance their work force:*

*Sample program:*

*9h00 Welcome, registration and introduction*

*9h30 Experiential team building exercises:*

*THE BLIND SQUARE- task vs. process, participation, leadership and decision-making.*

*THE ELECTRIC MAZE- collaboration, teamwork and communication.*

*12h00 Break for lunch.*

*13h00 Introduction to the high adventure rope course.*

*Safety guidelines, harnessing, technical introduction to equipment.*

*13h15 THE CLIMBING WALL*

*KAYAK AND CANOE TEST RUNS*

*MTB TRACK*

*Youth program:*

*With this program the mission is to enrich the lives of young people, in particular those from disadvantaged backgrounds, through outdoor adventure and educational events.*

*This entails day events where the program will provide challenge, reassurance and inspiration; the individual provides enthusiasm. It's a recipe for achievement and reward: increasing self-esteem, personal confidence and respect for self, others and the environment.*

*"Keep close to Nature's heart... and break clear away, once in awhile, ... climb a mountain or spend a week in the woods. Wash your spirit clean." [Muir, J. 2000]*

*Due to the fact that this building will house five specialty shops, this adventure center will have a wide spectrum of users, ranging from the outdoor enthusiast to the pro outdoor athlete. Socially these users will fall in the medium to high-income bracket because these kinds of sports are relatively expensive to practice. The fact that the center will also involve the surrounding community, with the youth, leadership and team building programs as well as the annual sponsored competitions, will attract the medium to low-income bracket user.*

*The outdoor enthusiast is mentally a different breed: they're the kind that are haunted by some obsession to be the best, climb the highest, row the wildest and ride the unthinkable. They're the kind who would race 36 hours non-stop in an adventure race, climb Everest or race across the Alps with their bikes, just to say that they did it. There is something more to them than the ordinary homo urbanitas, the dweller in the city: they stretch the limits of living, seeking the answer of what being human really means.*

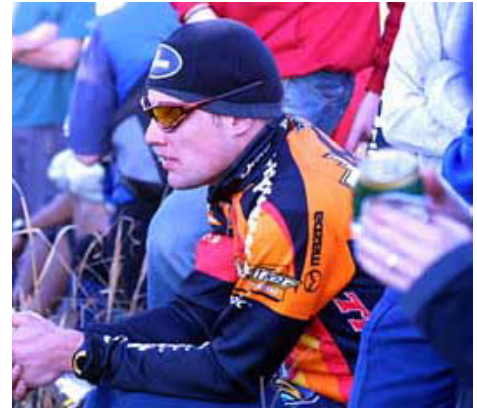
*" There is no substitute for the experience. There is no substitute for finding out for one's own self, for the personal revelation, for knowing firsthand. When I climb, that happens. The body and the spirit become one. Climbing becomes prayer and praise and applause for me and my Creator. When I climb I am filled with confidence and the faith that word contains. I can face unanswerable questions, certain that there are answers...*

*The religious experience, you see, is too important to be confined to church. It must be available to me at every moment. When it is absent I am, in that sense, no longer living. I exist. I am on life supports, outside of life, like a patient in a coma. I am unconscious, unaware of what being human means. One way to come out of that coma is to be a climber." [Adapted from Seeham, G. 1981]*



*Affected parties:*

*The development will effect the surrounding developments by bringing activity in to the area. This will lead to the increase of vehicles in the area as well as the increase of feet and cyclists, this being the worst on competition or training days. Seeing that the surrounding developments are retail developments and a hotel, this increase of people will only benefit them. The only possible negative effect of the development might be the increase of noise pollution in the area, especially on competition and training days.*



**Fig. 008 Fritz Pienaar**



**Fig. 009 Trans Alp**

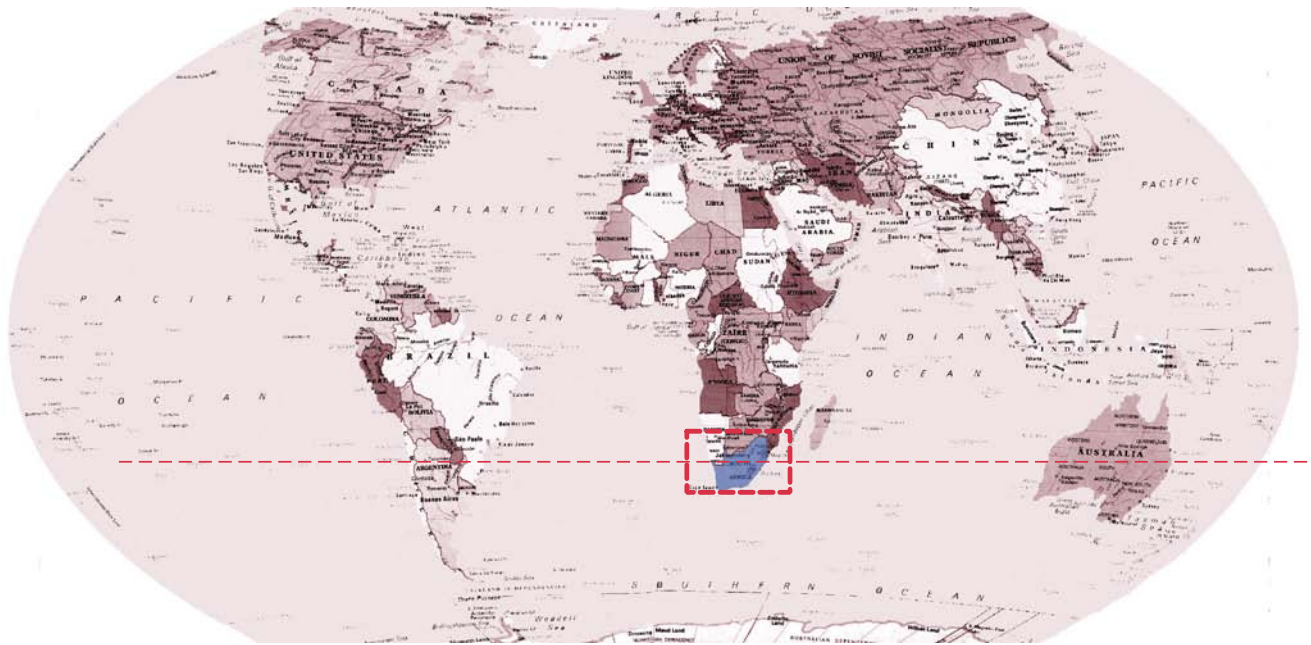
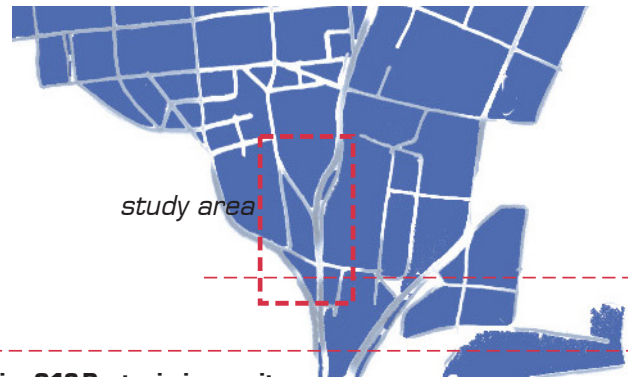


Fig. 010 World map



**Fig. 012 Pretoria inner city**



**Fig. 011 SA map**

INTRODUCTION

*Berea is the most southern part of the Inner City. Even though it is considered to be the southern gateway to the city, this area has been neglected. This important area has only been dealt with in the Apies River Urban Design Framework on a broad scale.*

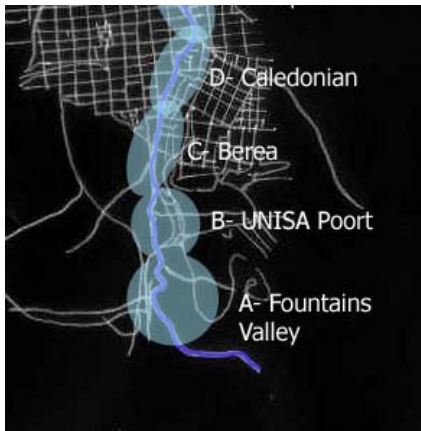


Fig. 013 Precincts in close proximity of Berea

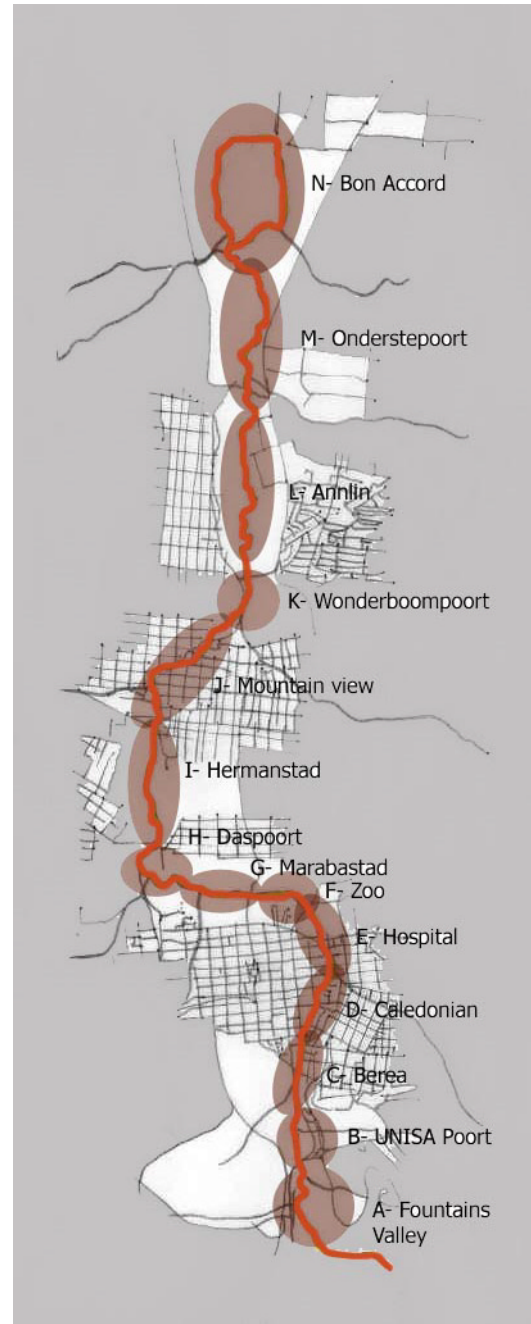


Fig. 014 Apies River and its precincts

locality

brief: context study



Fig. 015 Locality of Berea

context study locality

brief:

brief: context study  
character category

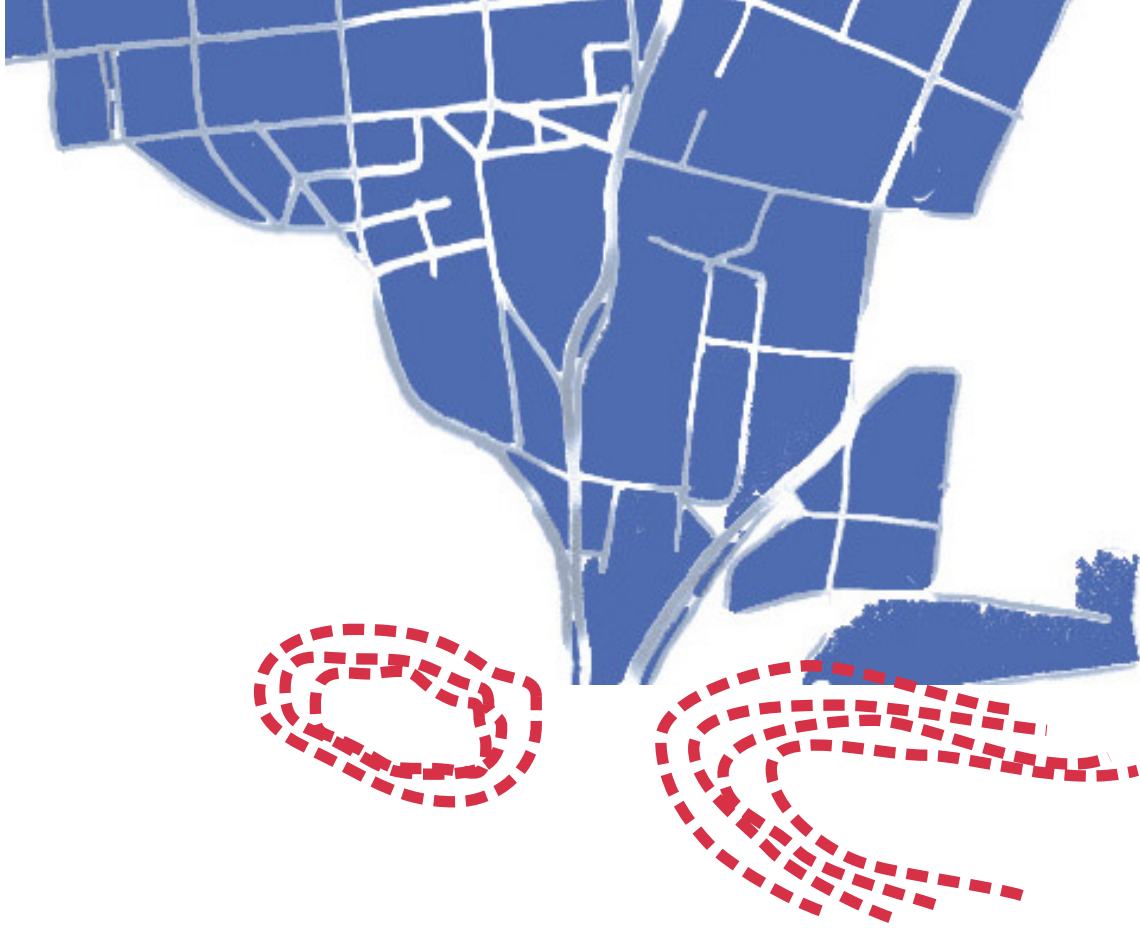


Fig. 016 Character category of precincts





Fig. 017 Open space network of the inner city



*Unlike the rest of the inner city, the main structural elements of Berea creates a unique urban grain.*

**Fig. 018** Main structural elements of the study



Fig. 019 Transport and movement

context study transport & movement

brief:

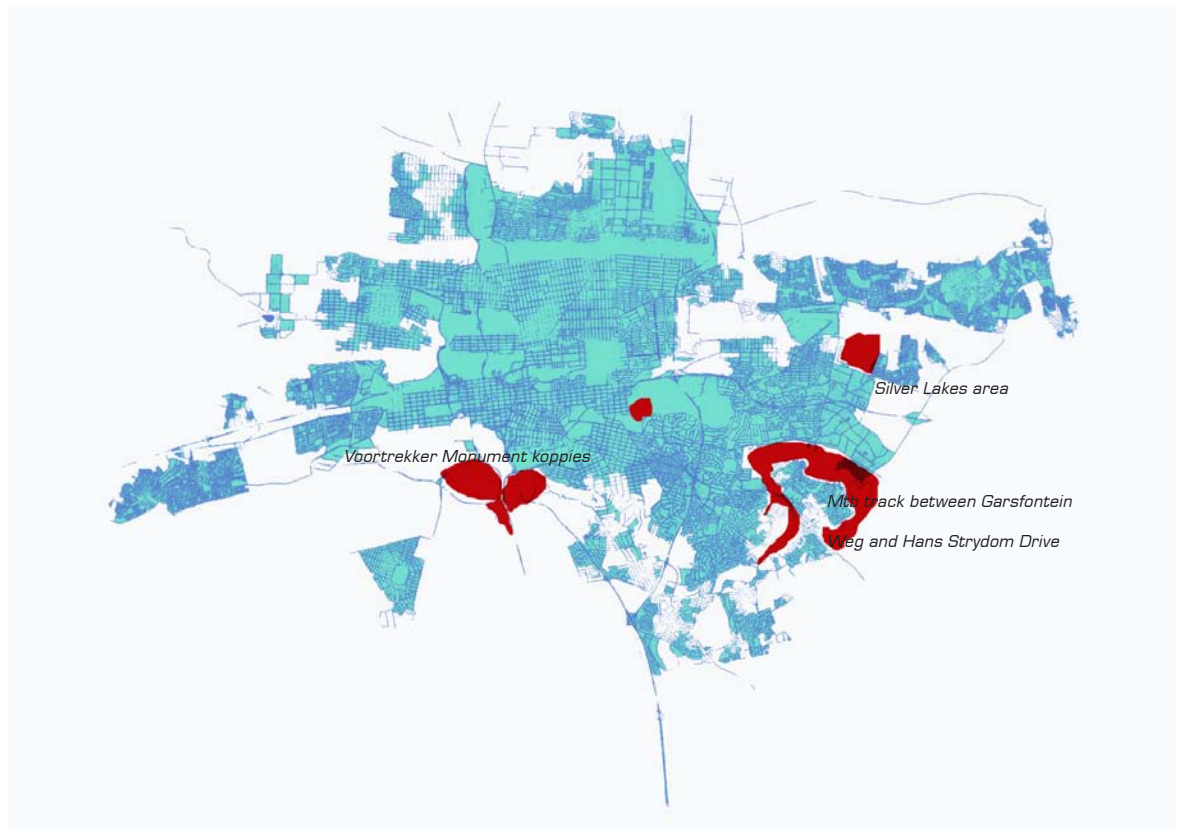
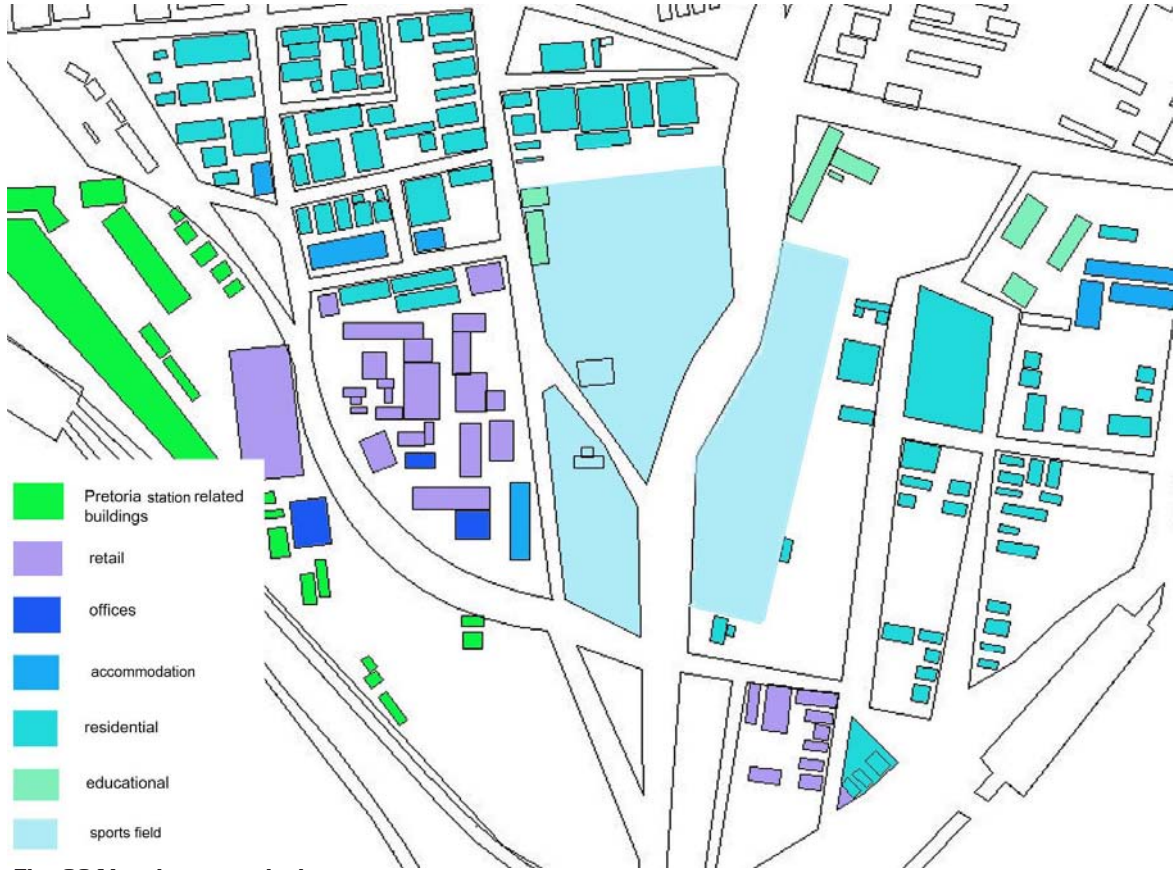


Fig. 020 Location of adventure sports in PTA

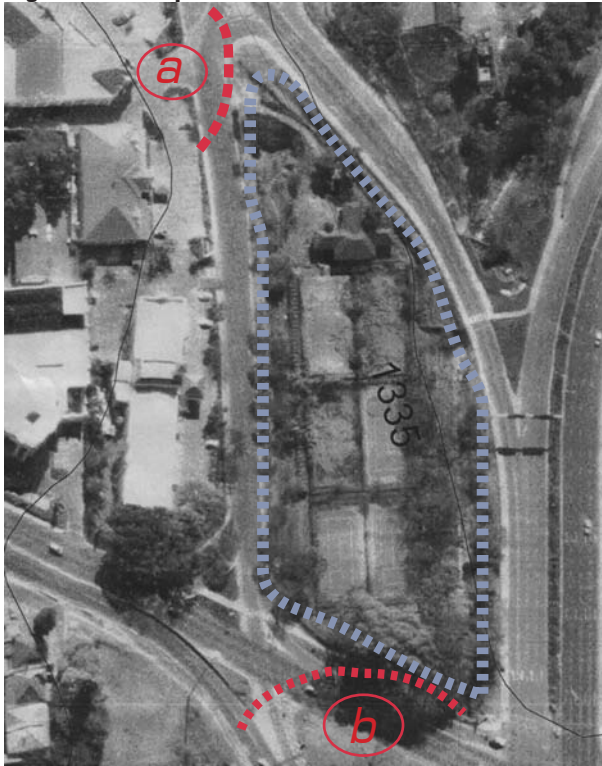


**Fig. 021** Land use typologies

context study land use typologieis

brief:

Fig. 022 Aerial photo of site



#### SITE CONTEXT

##### LOCATION:

The chosen site is situated on the corner of Willow Street and Nelson Mandela Drive, in the Berea precinct. Van der Walt Street and Clara Street form the northern and western boundary of the site respectively. The site falls in the green belt development due to the fact that the Apies River runs through the site.

##### MICROCLIMATE:

Due to the fact that the site is situated on the riverbank, the area will have extensive evaporation and transpiration areas, which means that the site will have a slightly cooler climate and smaller temperature fluctuations than areas not in close proximity of the river.

##### VEGETATION:

The vegetation on site is more of a moist biome than the rest of the city (which is a transition from grass to

“bosveld” biome), due to location on the banks of the Apies River. Species like *Celtis Africana* (white stinkwood), *Kiggelaria Africana* (Wild peach), *Halleria Lucida*, *Leucasida sercea* is found in this area.

##### VISUAL CHARACTERISTICS:

Topographically the site is situated in the floodplains of the Apies River. The direct surroundings are built up with structures that vary in height. Salvokop and UNisa ridge forms the main south view of the site, whilst Berea Sports Park and Nelson Mandela Drive forms the north-western view. The views to the east are obstructed by the Berea park development and high-rise buildings form the northern horizon.



Fig. 024 Panoramic view of the site from the north



**Fig. 023** Panoramic view of the site from the south

**HYDROLOGY:**

*Pretoria falls in the Limpopo-Olifants drainage region and in the Apies/Piensaars river catchment area. This area falls in the Upper Limpopo River Catchment system and consists of the following rivers: Apies River, Piensaars River, Moretele River, Kutswane River, Tolwane River and the Plat River.*

*Fed by a huge system of dolomitic caverns south of the city centre, the Apies River originates at two fountains consistently delivering about 26 megalitres per day. The lower part of the Apies river is named Tswane River. Tswane river joins the Piensaars river beyond Makapanstad. At the confluence the river is named the moretele River which joins the Crocodile River and which eventually runs into the Limpopo River.*

**TOPOGRAPY:**

*The river cuts in a north-south direction through the east-west running ridges (Salvokop and UNISA, Witwatersberg at Daspoort and Magaliesberg at Wonderboompoort). Due to the topography the urban grain and structure is orientated in an east-west direction.*

**GEOLOGY:**

*It consists of Andesitic lava [T3dL] that weathers normally into a deep red loamy soil. This can be covered or mixed with silt that originated from sedimentations from the Apies River [purnell 1994]. Shale [T3dS] that weathers into clay also occurs on the riverbeds. This shale rock is usually encountered at a depth of 2m. At this depth the rock is soft, becoming harder with depth, being medium hard at a depth of 4m. This implies suitable founding conditions for minor and major structures as regards bearing capacity. The impermeable nature of shale creates problems in the operation of French drains in peri-urban and rural areas in the Pretoria district [Brink 1997].*

*CLIMATE:***Climatic Zone:**

*Pretoria falls in the Northern Steppe Climatic zone.*

*Description of the zone*

*Distinct rainy and dry seasons exist with a large daily temperature variation and strong solar radiation. Humidity levels are moderate.*

**Temperature:**

*The maximum diurnal variation occurs in July. The average monthly diurnal variation is 13K.*

*Summer: average max. 28,6°C January*

*[Extreme 42°C]*

*Average min. 17,4°C*

*[Extreme 8°C]*

*Winter: average max. 19,6°C July*

*[Extreme 31°C]*

*Average min. 4,5°C*

*[Extreme -7°C]*

*Relative humidity: dry winter months: 20-55%*

*Vapour pressure: 1.3 - 1.6kPa*

*Humid summer months: 55-95%*

*Vapour pressure: 2.0 - 2.5kPa*

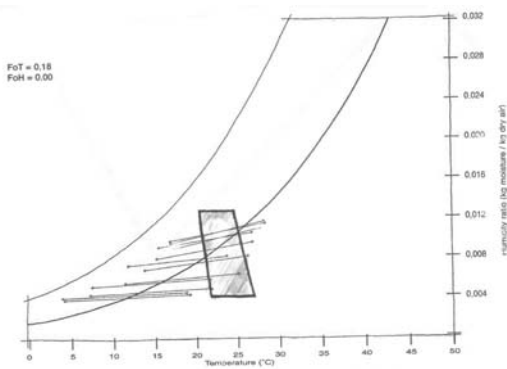
*The average monthly relative humidity level is 59%*

**Climatic data for Pretoria**

Jan	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
Maximum average monthly temperature (°c)	28,6	28	27	24,1	21,9	19,1	19,6	22,2	25,5	26,6	27,1	28	24,81
Minimum average monthly temperature (°c)	17,4	17,2	16	12,2	7,8	4,5	4,5	7,6	11,7	14,2	15,7	16,8	12,13
Average monthly amplitude (K)	11,2	10,8	11	11,9	14,1	14,6	15,1	14,6	13,8	12,4	11,4	11,2	12,68
Average monthly relative humidity (%)	58,0	59,5	60,0	59,5	55,0	53,0	50,0	46,0	45,0	49,5	54,0	56,5	53,83
Average monthly rainfall (mm)	136	75	82	51	13	7	3	6	22	71	98	110	56,17
Rham 72	74	76	78	76	75	71	64	61	64	68	70	75	70,75
Rhpm 44	45	44	41	34	31	29	28	29	35	40	43	44	36,92

**Fig. 025 Climatic data for Pretoria**





**Fig. 026 Psychrometric chart showing the comfort zone's position relative to the climatic lines**

### Sunshine:

Pretoria experience intense sunshine in the summer with 60% of the days being sunny. In the winter the intensity is less but 80% of the days are sunny.

Sun angles: summer extreme 89° [05h14 - 18h45]

Winter extreme 41.7° [06h53 - 17h19]

### Wind:

Summer winds are predominantly east-north-easterly to

east-south-easterly. Winter winds are predominantly south-westerly with a fair amount originating from the north-east.

It is persistent towards the end of the dry season [August]. Very dusty during dry winter months.

### COMFORT ZONE

#### Temperature

Summer temperatures extend approximately 3K above the comfort zone. Winter temperatures extend to approximately 15K below the comfort zone.

#### Humidity

Humidity levels are moderate and are not considered problematic.

### PLANNING

#### Urban

Protection of pedestrians by trees, arcades or canopies. South facades of street receive high radiation during summer and should be tree lined.

#### Plan form

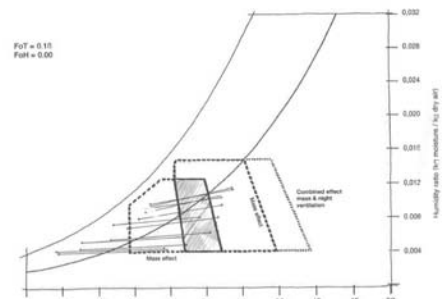
Winter and summer requirements differ. The winter demands include a compact plan form, a well-insulated envelope, and solar gain is desirable.

#### Position of functions

External spaces should provide shade in summer for outdoor activities. Place buffer zones west and south.

#### Rain protection

It will be convenient to shield entrances from sporadic thunderstorms.



**Fig. 027 Psychrometric chart showing the enlarged comfort zone obtained by supplying thermal mass to the structure. The combined effect of ventilation and thermal mass is also shown.**

## *BUILDING ENVELOPE*

### **Mass**

*Thermal mass is effective for approximately half of the under heated period and the entire overheated period. Thermal mass is also advisable especially in inland areas where the daily temperature swing is larger than 13K. It can be provided by massive floors, roofs and internal partitions. It is effective for approximately half of the under heated period and for the entire overheated period.*

### **Insulation**

*Lightweight insulated roofs are feasible in this region provided that walls and floors give thermal mass.*

### **Properties of materials**

*External surfaces should be light coloured or reflective to minimize solar heat gain in the overheated period.*

## *SOLAR CONTROL*

### *Sun angles*

*It is recommended that summer sun be screened and winter sun be allowed to penetrate.*

## *VENTILATION*

*Ventilation is effective for the overheated period. Night ventilation can be used to compensate insufficient mass.*

## *MANAGEMENT:*

*Opening of windows if night ventilation is feasible.*

## *SYSTEMS:*

### *Evaporative cooling:*

*Direct evaporative cooling is effective for most of the overheated period.*

### *Active:*

*Air-conditioning is not a necessity, but the building function may require it.*

### *Mechanical:*

*Mechanical ventilation may be necessary to achieve the required ventilation rates.*

**Up to 200 000  
years ago**

*Early, Middle and Late Stone Age communities inhabited the Pretoria region. They manufactured stone tools and weapons from quartzite rocks of the Magaliesberg and obtained water from the Apies River.*

**AD 1200**

*Earliest evidence of settlement by black communities in Pretoria. They grew crops, kept domesticated animals, made pottery and smelted iron*

**1825-1826**

*The Matabele tribe conquered the Bakwena tribe and, led by their chief Mzilikazi, settled along the Magaliesberg (the Cashane).*

**Late 1830s/  
early 1840s**

*First Voortrekkers (such as the families of Lukas and Johannes Bronkhorst and Andries van der Walt) settled along the Apies River. Pretoria established, Church Square laid out on higher ground in the elbow of the Apies River.*

**1857**

*First appearance of the name Apies River on a map - then named Aap River, referring to the thousands of vervets (*Cercopithecus aethiops*) on the banks.*

**1858**

*Water furrow taken from the Fountains to central Pretoria with furrows running along the main streets.*

**1870s**

*First large plots established on the banks of the Apies River, east of Du Toit Street and north of Boom Street.*

# brief: site analysis heritage

**1894** *Completion of Lion Bridge at Church Street crossing.*

**1899** *Winston Churchill, then special correspondent to the British newspaper The Morning Post to cover the Anglo-Boer War, crossed the Apies River on the Skinner Street footbridge in the night of 12 December, after his famous escape from the Staatsmodel School.*

**1909** *Huge damage of property and loss of life when the Apies River is transformed into a raging torrent after a heavy rainstorm in January. Work started on the canalisation of the river, beginning at Proes Street and working upwards to the south. The work lasted until the late 1930s.*

**1912** *Row of date palms planted along Apies River.*

**1923** *Bon Accord Dam completed.*

**1937** *Wall of the Bon Accord Dam nearly collapsed after heavy rain.*

**1994** *Magaliesberg Protected Natural Environment established with Apies River running through Wonderboom Poort (known during the 19th century as Tweede Poort).*

**1995** *Action Apies River (AAR) established as a forum for the revitalisation of the Apies River.*

**1999** *Five informative plaques erected at historic bridges over the Apies River.*

*[Barbir 1999]*

*Site:*

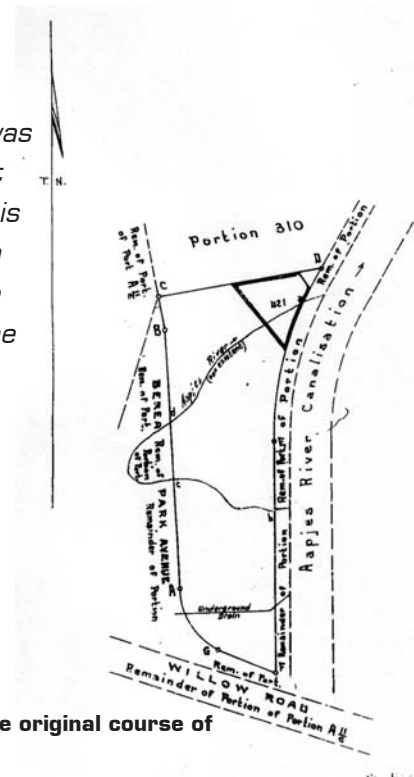
The sport field and social club, Berea Park, was established as a direct result of the development of sport in Pretoria. Originally Church Square was the first place where sport enthusiasts played ruby and cricket, but time and again they were interrupted by the Communion tents who would camp for weeks on Church Square. The solution closest to Church Square was Burgers Park, but after redevelopment, the fields allocated for rugby and cricket were only the size of about two tennis courts.

They then allocated a piece of ground next to the Apies River for sport fields. Cricket matches were played here even before the first English team visited Pretoria in 1888. Soon it became one of the biggest sport fields in the city, even though Caledonian sport stadium also existed by then. With the English's second visit in 1892, the locals were allowed to have a 22-man team; this didn't help because they lost the game by an innings and 29 runs.

Berea Park was also the social gathering place of the time. The first South African motorcar, a Benz with 1,5 horsepower, was displayed here in 1894.

It became the South African Railways club in 1902. The current building was erected in 1907 and additions took place in 1926 and 1937. Today it houses the Berea park high School.

In recent years Berea Park was divided into two parts when a slipway was constructed to give access from Nelson Mandela Drive to Van der Walt Street. This southern portion [the chosen site] was used as Berea tennis club. In 1890 this southern portion was a watermill and later became a lemonade factory. Today it stands desolate and unattended. The course of the Apies River was changed from a sharp elbow, running through the site, to a straight line running through the right edge of the site, when it was channelled in 1908.



**Fig. 028 Site plan showing the original course of the Apies River**

**FACULTY OF ECONOMICS AND MANAGEMENT, UTRECHT, THE NETHERLANDS.**

*Two orders of space - large public facilities and repetitive ranks of classrooms and offices - are laid out to form a series of quadrangles in this academic building. Within this framework, material and formal manipulations transform the typology, resulting in a building that is far from traditional.*

*The rich material character of this building is highly articulated in the facades that are frequently layered to reconcile the conflicting demands of internal programme and external context. The cladding of the building is economically achieved by a simple, regular curtain wall, which provides the weather tight enclosure. Visual and tactile richness is found in an outer layer that, liberated from the obligations of plan, section and weather, is freely configured and ambiguous in scale.*

*The public functions of the building are displayed by the two-storey bar along the street, whilst the lecture halls are clad in different materials, ranging from ordinary expanded metal mesh to finely finished wood.*

*In other areas of the building, form and material are deployed to enhance sensory experience. The courtyards are tactile spaces, where architecture and landscape combine to create spirited, open-air public rooms of great character. The Zen court, inspired by Japanese meditation gardens, is static in nature. In contrast, the water courts reflect changing weather and seasons and are in a state of flux. The plans of the quadrangles are distorted, a particularly effective device in the exaggerated perspective of the water court, which tapers virtually to a single viewpoint at its north end while opening to the south. The preoccupation with landscape is internalised by ramped corridors of classrooms and dramatic stairways that shoot obliquely across voids to from an unexpected interior topography.*

Architect: Mecanoo  
[Le Cuyet, 1995]



**Fig. 029**



**Fig. 030**



**Fig. 031**

**Fig. 029, 030, 031 Faculty of Economics and Management, Utrecht, Netherlands**

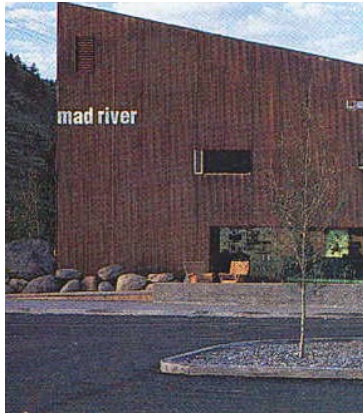


Fig. 032

### RAFTING CENTRE, JACKSON, WYOMING, USA

*Using elemental simplicity with tectonic inventiveness the architect designed a rafting centre that runs rafting tours of the Snake River. It is designed to house the company and its associated activities. A menacing wedge-like form clad in rusted steel, the building recalls the vernacular ranch and services structures of the Wyoming landscape and create a totemic landmark in an ordinary commercial highway strip.*

*Arranged within in this volume are a warehouse for clothing and equipment storage, retail space, a small museum documenting the history of the river and a bunkhouse for the guides who supervise the expeditions.*

*Basic timber-frame technology and functional materials were used in the construction of the building. The tall east end of the building is fully glazed, exposing the shop's wares and the museum's collection, rafts and canoes, which are slung from the ceiling. Meticulously detailed timber and steel trusses support this tall glass wall.*

*The architect's concern for users and context can be seen in his use of materials: walls and roof are wrapped in a skin of rusted corrugated steel sheeting, which gives the building a monolithic industrial quality.*

*Architect: William P. Bruder  
[Architectural Review, April 1997]*

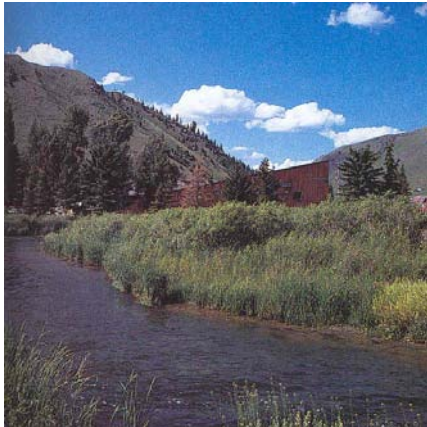


Fig. 033



Fig. 034

**Fig. 032, 033, 034 Mad River Rafting Centre, Wyoming  
[Architectural Review, October 1998 pg. 66-67]**

**RECREATIONAL EQUIPMENT INC., SEATTLE, WASHINGTON.**

*The sound of knobbly tires slicing across gravel breaks the silence as a mountain biker cuts through the grove of cedars, brakes to manoeuvre a hairpin curve, crosses a series of hard bumps, and shifts gears to climb a steep hill.*

*Normally this weekend activity is not an unusual event in Seattle, but this mountain biker is traversing no ordinary mountain biking course: this one is in the heart of the city.*

*REI has not only taken the concept of interactive retail to the limit, but by doing so they have revived the city by bringing outdoor sports and nature back to the city centre. The space is filled with energy and a sense of enjoyment to be derived from spending time in such a lively public setting.*

*The mountain bike test track and the 21 000-square-foot urban forest that embraces it where designed to be some type of street corner wilderness. It was not an easy task; trying to invent a new aesthetic and reconciling the tenuous relationship created by taking plants from fragile habitats and placing them in a dense urban environment. The outdoor space was placed on the southwest corner of the site to provide the plants with good sunlight and to protect them on the side of the building opposite a busy highway. Here is also a visual connection to the city. The basement is designed is such a way that the shoppers don't emerge from it through tunnels or holes, as they would in many retail spaces, but they are immersed in the outdoor space as they enter the building.*

*The landscape architects sought to achieve a spirit of adventure and discovery on the site. The site's most prominent element is a waterfall that funnels rainwater from six drains on the building roof and recirculates it. The water crashing down acts as a white noise masking the freeway noise next to the site.*

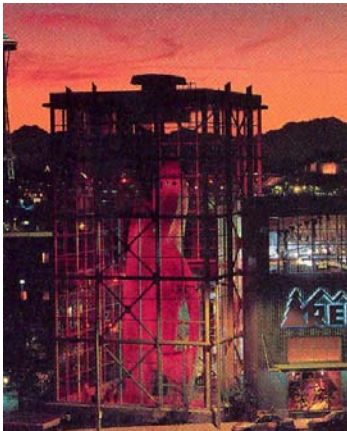
*The store is organised to reflect REI's evolving emphasis on five 'speciality' shops: camping, mountaineering, skiing, kayak and canoeing and bicycling. The concept of this store is that the shoppers can have a hand-on experience. So rock climbing shoes can be tested on a 65ft climbing pinnacle, boots and mountain bikes on a 470-ft outdoor trail; rain gear in a glass-enclosed room that mimics Seattle's infamously wet weather; and camp stoves on a laboratory-like vented hood.*





**Fig. 035**

*In keeping with REI's green goals, about 75% of the demolition debris was reused in the new building, recycled or sold for salvage. Retail-area countertops were made of recycled newspaper and soybean composite; bathroom countertops of waste wood composite. To meet energy consumption considerations, the interior temperature is permitted to vary by as much as 5° throughout the store [most retailers seek a 1° variance]. The stack effect draws excess heat out the top of the building; both techniques allow a lower HVAC system. The clerestory windows are clear glass, rather than low-emissivity glass, to help heating the space. Shades prevent heating on sunny days.*



**Fig. 036**

*Workshops, ranging from tent care to climbing techniques, are held in a space designed as a place of escape where a person can also come and enjoy a quiet lunch. In selecting the plants and their placement, the architect sought to achieve a balance between enclosing the spaces and creating a penetrable edge.*

*Architect: Mithun Partners  
[Architectural Record, March 1997].*



**Fig. 037**

**Fig. 035, 036, 037**  
**Recreational Equipment Incorporated**  
**[Architectural Record March 1997,**  
**pg. 96-98]**

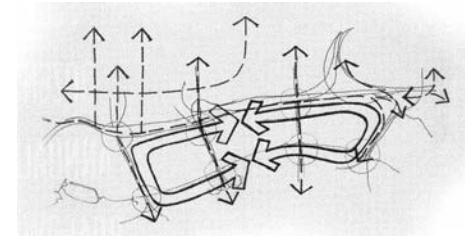
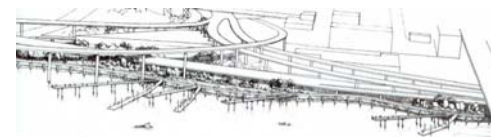
**RIVER IN THE CITY, PORTLAND, OREGON.**

*The new Eastbank Esplanade in Portland is situated on an abandoned and neglected industrial site across the Willamette River from downtown Portland, adjacent to a still active industrial area. The development is squeezed in between the river and the noisy interstate.*

*In 1993, a design team was commissioned to develop a master plan for the entire east bank of the river. The planning included numerous state and local agencies, as well as many citizen and community organisations. The plan advocated a number of key ideas, many of which have since been implemented. The park connects two major attractions: the Oregon State Convention Centre at the north end and the Oregon Museum of Science and Industry at the south end. A continuous pedestrian/bicycle loop around both sides of the downtown riverfront, with connections into adjacent neighbourhoods was proposed. It would place people in close contact with the water and its riparian environment and it would restore the natural habitat.*

*A major aspect of the Eastbank design embraces the notion of environment education. Along the esplanade distinctive urban markers were placed at intervals corresponding with the city street grid. Constructed of tapered steel with exposed rivets, the pylons are topped with flared caps. The base of each incorporates a large plaque with photographs and text that tell stories about the aspects of the history and ecology of the river.*

*The design offers a continuous, meandering esplanade for jogging, strolling and biking. According to the landscape architects, Mayer-Reed, Eastbank Park is really more of an urban trail, but one that has park-like elements along it. The experience of walking along it is both visual and visceral. It offers a constantly shifting spectacle of urban and natural forces - contrasting the economy of the city with the ecology of the river. The panoramic sweep of buildings and bridges, trains and ships and shoreline and habitat presents a new way to see the city, imparting ideas about both culture and nature.*

**Fig. 038****Fig. 039****Fig. 040**

**Fig. 038, 039, 040 River in the City, Portland, Oregon  
[Landscape Architecture, October 2001, pg. 68, 71]**

*The design of the building in terms of its context, function, form and materials must enhance the sensory experience of the place and create tactile spaces. The outdoors must be expressed indoors. The visual will become a reminder; therefore the design must focus on creating, directing and anticipating views.*

*By integrating the design with its context and site, the abandoned and neglected natural elements will be enhanced and used as a connection point between urbanity and ecology, contrasting the hard landscape of the city with the ecology of the green belt.*

<b>09. Accommodation schedule</b>			
	Type of area	Name of area	Reference
09.a.1	Public area:	Entrance & reception	09.c.1
		Retail: Cycling	09.c.2
		Retail: climbing&outdoors	09.c.3
		Retail: kayak & canoes	09.c.4
		Workshops	09.c.5
		Exhibition space	09.c.6
		Coffee shop	09.c.7
09.a.2	Semi-public area :	Changing room, showers & toilets	09.c.8
09.a.3	Semi-private area :	Adventure Zone TV studios	09.c.9
		Deliveries & storage	09.c.10
		workshop for fitment and fixing of bikes	09.c.11
09.a.4	Private area:	Offices & meeting room	09.c.12

<b>Class of occupation of building</b>		
	Class of occupation	Occupation
09.b.1	A1	Entertainment & public assembly
09.b.2	C1	Exhibition hall
09.b.3	F1	Large shop
09.b.4	G1	Offices
09.b.5	B2	Commercial services, medium risk

<b>Name of area:</b>	<b>RETAIL: CYCLING</b>	
<b>Area needed</b>	Workshop	50m <sup>2</sup>
	Retail & filament	250m <sup>2</sup>
<b>Description</b>	Area required for the display of the latest cycling equipment, especially the displaying of bicycles. For flexibility the main structural grid is likely to be between 5.4m- 6m, with 5.4m considered to be the optimum [ Adler 1999: 133].	
<b>Fire regulations</b>	According to part T137.5 of the National building regulations [SABS 0400: 1990: 193]the number of portable fire extinguishers relative to the floor area in retail space must be 1 per 200m <sup>2</sup> . Any building including an opening occupied by a stairway or escalator not forming part of an escape route, shall not connect more than two storeys if such building is not protected by a sprinkler system. The need for wide open spaces conflicts with the requirement for fire compartmentation. Max. compartment sizes: 2000m <sup>2</sup> , with twice these figures if an automatic sprinkler system is installed.[ Adler 1999: 133]	
<b>Lighting and ventilation</b>	According to part 007[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 7,5 l/s per person. The daylight requirements of this area is 200 lux.[According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required:</b>	<b>Norms and standards</b>	<b>Performance criteria</b>
Media projector	According to specific needs	This equipment will be used to play continuous video clips of mountain biking or other relevant media. It will be used as a marketing tool for the specific speciality retail area.
TV screens	According to specific needs	
Hi-Fi system	According to specific needs	
Mountain bike test track	Min. width: 1000-1500mm. According to specialist's specifications.	This track must be designed to cater for all types of mountain bikers, from the beginner to the pro. It will be used to create spectator value, in the building, as well as pedestrians passing by the site. Will also be used to promote the sport by having annual sponsored races or time trials.
Storage and display racks for clothing	Max. height: 1350mm ; max. width: 600mm; 2600-3600mm radius. [Adler 1999:132]	Due to the nature of the sports wear special designed racks will be needed.
Shelving	Max. height: 1150mm ; max width: 800mm. [Adler 1999:132]	Due to the nature of cycling accessories special designed shelving will be needed.

<b>Name of area:</b>	<b>RETAIL:CLIMBING &amp; OUTDOORS</b>	
<b>Area needed</b>	Retail and display	250m <sup>2</sup>
	Rain room	6m <sup>2</sup>
	Cold room	6m <sup>2</sup>
	Climbing wall	144m <sup>2</sup>
<b>Description</b>	Area required for the display of the latest climbing, hiking and camping equipment, especially the display of tents and climbing ropes. For flexibility the main structural grid is likely to be between 5.4m- 6m, with 5.4m considered to be the optimum [ Adler 1999: 133].	
<b>Fire regulations</b>	According to part T137.5 of the National building regulations [SABS 0400: 1990: 193]the number of portable fire extinguishers relative to the floor area in retail space must be 1 per 200m <sup>2</sup> . Any building including an opening occupied by a stairway or escalator not forming part of an escape route, shall not connect more than two storeys if such building is not protected by a sprinkler system.The need for wide open spaces conflicts with the requirement for fire compartmentation. Max. compartment sizes: 2000m <sup>2</sup> , with twice these figures if an automatic sprinkler system is installed.	
<b>Lighting and ventilation</b>	According to part O07[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 7,5 l/s per person. The daylight requirements of this area is 200 lux.[According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required:</b>	<b>Norms and standards</b>	<b>Performance criteria</b>
Media projector	According to specific needs	This equipment will be used to play continuous video clips of adventure races, climbing or other relevant media. It will be used as a marketing tool for the specific speciality retail area.
TV screens	According to specific needs	
Hi-Fi system	According to specific needs	
Rain room	According to specialist's specifications	Will have a specialised system that recycles rainwater to create the effect of rain in this room.
Cold room	According to specialist's specifications	Will have a specialised system to create temperatures of below 0°C.
Climbing wall	According to specialist's specifications	This Climbing wall must be designed to cater for all types of climbers, from the beginner to the pro. It will be used as an architectural element in the design of the building and to create spectator value, in the building, as well as pedestrians passing by the site. It will also be used to promote the sport by having annual sponsored climbing events and it will be used in the leadership and youth programs.
Storage and display racks for	Max. height: 1350mm ; max. width: 600mm; 2600-3600mm reference [Adler 1999:129]	

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<b>Name of area:</b>	<b>RETAIL: KAYAK &amp; CANOES</b>	
<b>Area needed</b>	Display and retail	250m <sup>2</sup>
	Kayak test run	120m <sup>2</sup>
	Canoe test run	150m <sup>2</sup>
<b>Description</b>	Area required for the display of the latest rowing equipment, especially the display of kayaks and canoes. For flexibility the main structural grid is likely to be between 5.4m- 6m, with 5.4m considered to be the optimum [ Adler 1999: 133].	
<b>Fire regulations</b>	According to part T137.5 of the National building regulations [SABS 0400: 1990: 193]the number of portable fire extinguishers relative to the floor area in retail space must be 1 per 200m <sup>2</sup> . Any building including an opening occupied by a stairway or escalator not forming part of an escape route, shall not connect more than two storeys if such building is not protected by a sprinkler system.The need for wide open spaces conflicts with the requirement for fire compartmentation. Max. compartment sizes: 2000m <sup>2</sup> , with twice these figures if an automatic sprinkler system is installed.	
<b>Lighting and ventilation</b>	According to part 007[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 7,5 l/s per person. The daylight requirements of this area is 200 lux.[According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required:</b>	<b>Norms and standards</b>	<b>Performance criteria</b>
Media projector	According to specific needs	This equipment will be used to play continuous video clips of kayaking and canoeing or other relevant media. It will be used as a marketing tool for the specific speciality retail area.
TV screens	According to specific needs	
Hi-Fi system	According to specific needs	
Kayak test run	According to specialist's specifications. Allow space for the wave machine. Length of pool: 25-100m to accommodate for a 0.5-1.5m high wave. [Adler 1999:206]	The test runs must be designed to cater for all types of rowers, from the beginner to the pro. It will be used as an architectural element in the design of the building by diverting water from the Apies River and running the canal through the building. Also to create spectator value, in the building, as well as for pedestrians passing by the site. It will also be used to promote the sport by having annual sponsored rowing time trials and using it in the youth programs.
Canoe test run	According to specialist's specifications. Allow space for the wave machine. Length of pool: 25-100m to accommodate for a 0.5-1.5m high wave. [Adler 1999:206]	
Storage and display racks for clothing	Max. height: 1350mm ; max. width: 600mm; 2600-3600mm radius. [Adler 1999:132]	Due to the nature of the sports wear special designed racks will be needed.
shelving	Max. height: 1150mm ; max width: 800mm. [Adler 1999:132]	Due to the nature of rowing accessories special designed shelving will be needed.

<b>Name of area:</b>	<b>WORKSHOPS/EDUCATIONAL PROGRAMS FACILITIES</b>	
<b>Area needed</b>	50m <sup>2</sup>	
<b>Description</b>	Situating on ground floor, in close proximity of the climbing wall as it will be part of the activities.	
<b>Fire regulations</b>	According to part T137.5 of the National building regulations [SABS 0400: 1990: 193] the number of portable fire extinguishers relative to the floor area in a space must be 1 per 200m <sup>2</sup> . Any building including an opening occupied by a stairway or escalator not forming part of an escape route, shall not connect more than two storeys if such building is not protected by a sprinkler system.	
<b>Lighting and ventilation</b>	According to part O07 [b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 7,5 l/s per person. The daylight requirements of this area is 200 lux.[According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required:</b>	<b>Norms and Standards</b>	<b>Performance criteria</b>
Media projector	According to specific needs	This media will be used in the training and educational programs.
TV screens	According to specific needs	
Hi-Fi system	According to specific needs	
<b>Name of area:</b>	<b>EXHIBITION SPACE</b>	
<b>Area needed</b>	50m <sup>2</sup>	
<b>Description</b>	The space will consist of 5 or 6 different areas: an area for each speciality shop and an area for the reception area.	
<b>Fire regulations</b>	According to part T129.1 of the National Building Regulations [SABS 0400 1990:198], escape routes in a building should be clearly marked. Any portal of foyer forming part of an escape route, must be the combined width of all escape routes that end in that foyer, or 33% wider than the basis of the population that must pass through it, whichever one is the biggest. Any exhibition that might take place in such a foyer must be fixed and should not protrude more than 150mm into the foyer.	
<b>Lighting and ventilation</b>	The source should be isolated from the exhibit so that maintenance can be carried out without breaching security. The exhibits should also be protected from the heat of the lighting. According to part O07 [b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 6,5 l/s per person.	
<b>Facilities required:</b>	<b>Norms and Standards</b>	<b>Performance criteria</b>
Media projector	According to specific needs	This media will be used to screen video clips of relevant historical events. The sound and media system must be designed in such a way that it won't cause a disturbance to the rest of the retail space. The daylight requirements of this area is 300 lux.[According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]
TV screens	According to specific needs	
Hi-Fi system	According to specific needs	



Showcases and/or plinths and/or panels to display objects	Max. height: 1900-2000mm [showcase]; max. height: 750-950mm [plinth].	Adequate space should be provided for people to view the exhibits. Text and captions should be of a type size relative to the distance from the viewer.
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<b>Name of area:</b>	<b>COFFEE SHOP</b>	
<b>Area needed</b>	50m <sup>2</sup>	
<b>Description</b>	On ground floor, connecting the retail space, reception and outdoor activity area.	
<b>Fire regulations</b>	According to part T137.5 of the National building regulations [SABS 0400: 1990: 193]the number of portable fire extinguishers relative to the floor area in a area must be 1 per 200m <sup>2</sup> .	
<b>Lighting and ventilation</b>	According to part O07[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 7,5 l/s per person. The daylight requirement of this area is 200 lux.[According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required:</b>	<b>Norms and Standards</b>	<b>Performance criteria</b>
Media projector	According to specific needs	This media will be used to screen live television broadcasts. The sound and media system must be designed in such a way that it won't cause a disturbance to the rest of the retail space.
TV screens	According to specific needs	
Hi-Fi system	According to specific needs	
Work area	Min. width [two people working back to back]: 1200mm. [Adler 1999: 171]	N/A
Service counter	Min. width: 700mm. [Adler 1999: 171]	
Seating	Min. spacing between tables: 900mm. [Adler 1999: 166]	

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brief: accommodation schedule

<b>Name of area:</b>	<b>OFFICES</b>	
<b>Area needed</b>	Manager	8m <sup>2</sup>
	Secretary	6m <sup>2</sup>
	Assistant manager: cycling	6m <sup>2</sup>
	Assistant manager: climbing and outdoors	6m <sup>2</sup>
	Assistant manager: kayak & canoes	6m <sup>2</sup>
	Meeting room	6m <sup>2</sup>
	Cleaning staff & storage	6m <sup>2</sup>
	WC's	4.5m <sup>2</sup>
<b>Description</b>	Situated on the top floor, location of offices should be separated from retail activities.	
<b>Fire regulations</b>	According to part T137.5 of the National building regulations [SABS 0400: 1990: 193] the number of portable fire extinguishers relative to the floor area in a area must be 1 per 200m <sup>2</sup> .	
<b>Lighting and ventilation</b>	According to part O07[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 5 l/s per person. The daylight requirements of this area is 200 lux.[According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required per office:</b>	<b>Norms and Standards</b>	<b>Performance criteria</b>
Personal computer	According to specific needs	N/A
modern point	According to specific needs	
telephone	Private automatic branch exchange [PABX] system. All incoming calls via operator, outgoing calls direct dialled.	

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<b>Name of area:</b>	<b>ADVENTURE ZONE TV STUDIOS</b>	
<b>Area needed</b>	Equipment area	20m <sup>2</sup>
	Master control room	
	Storage	
<b>Description</b>	Should be accessible for public for viewing. This won't be a broadcasting studio, but only a production studio.	
<b>Lighting and ventilation</b>	According to part 007[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 5 l/s per person. The daylight requirement of this area is 200 lux.[According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required:</b>	<b>Norms and Standards</b>	<b>Performance criteria</b>
	Sound proof rooms  The acoustic standards to be achieved should be identified by the specialist consultant and agreed with the client at the outset. Permissible background noise level: 25-8 dB.[ National Noise regulations SABS 0103]	Specific designed walls, doors, windows and floors to accommodate the acoustic needs of the space.

<b>Name of area:</b>	<b>DELIVERIES AND STORAGE</b>	
<b>Area needed</b>	200m <sup>2</sup>	
<b>Description</b>	Situating away from public activities, easy access from road.	
<b>Lighting and ventilation</b>	According to part 007[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 5 l/s per person. The daylight requirement of this area is 100 lux.[According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required:</b>	<b>Norms and Standards</b>	<b>Performance criteria</b>
	Refuse area  According to part U1 of the National Building Regulations [SABS 0400 1990:221], a storage place for refuse bins must be provided. This storage space must be accessible from the road.	Sufficient area for the sorting of refuse into glass, paper, tin and other categories must be provided.

<b>Name of area:</b>	<b>Workshop for the fitment and fixing of bikes</b>	
<b>Area needed</b>	50m <sup>2</sup>	
<b>Description</b>	Situated away from public activities, in close proximity of the mountain bike speciality shop.	
<b>Lighting and ventilation</b>	According to part 007[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 5 l/s per person. The daylight requirements of this area is 1000 lux [Setting/assembly/fitting]. [According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required:</b>	<b>Norms and Standards</b>	<b>Performance criteria</b>
Worktops	Max. height: 1150mm ; max width: 800mm. [Adler 1999:132]	N/A
Shelving	Min. height: 1150mm ; Min. width: 300mm [Adler 1999: 20-38]	Designed to accommodate manual and electrical tools.
Work space		Area must be able to store bicycles, canoes and kayaks.

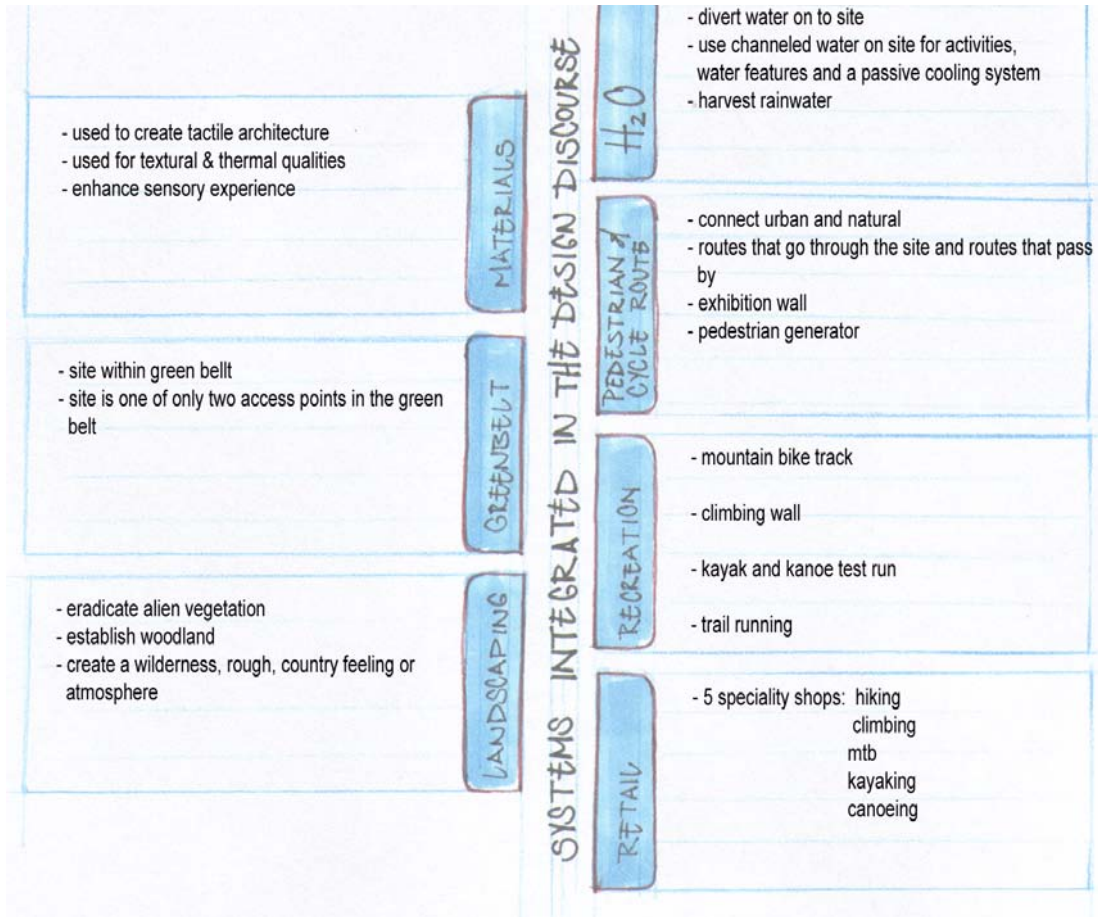
<b>Name of area:</b>	<b>CHANGING ROOMS, TOILETS AND SHOWERS</b>						
<b>Area needed</b>	60m <sup>2</sup>						
<b>Description</b>	Situated on ground floor, easy accessible from outdoor activities						
<b>Lighting and ventilation</b>	According to part OO7[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 20 l/s per shower, wc pan, urinal or 600mm- urinal space.						
<b>Facilities required:</b>	<b>Males</b>				<b>Females</b>		
	WC pans	urinals	Washbasins	Showers	Wc pans	Washbasins	Showers
	4	5	5	5	9	5	5
<b>Provision for the disabled</b>	According to part SS 5.1[b] of the National Building Regulations [SABS 0400 1990:154], separate toilet facilities must be provided; 5.1 [c] states that the disabled person will not have to travel more than 200m in order to reach the facilities. According to part SS 5.2 [b] the minimum required area for the facilities is 2,9m <sup>2</sup> and a minimumplan dimension of 1,6m.						

Building analysis: Accommodation schedule		
<b>Name of area:</b>	RECEPTION	
<b>Area needed</b>	60m <sup>2</sup>	
<b>Description</b>	60m <sup>2</sup>	
<b>Fire regulations</b>	According to part IT29.1 of the National Building Regulations [SABS 0400 1990:198], escape routes in a building should be clearly marked. Any portal of foyer forming part of an escape route, must be the combined width of all escape routes that end in that foyer, or 33% wider than the basis of the population that must pass through it, whichever one is the biggest. Any exhibition that might take place in such a foyer must be fixed and should not protrude more than 150mm into the foyer. According to part IT 16.2 the max. distance to an escape route in the building must be 45m; if the distance is more than that two escape routes must be provided with emergency exits as part thereof.	
<b>Lighting and ventilation</b>	According to part 007[b] of the National Building Regulations [SABS 0400 1990:112], the ventilation required for this type of occupancy is 5 l/s per person. The daylight requirements of this area is 200 lux. [According to Van Rensburg, Department of Architecture University of Pretoria, Earth Sciences 320 Study Guide, 2001]	
<b>Facilities required:</b>	<b>Norms and standards</b>	<b>Performance criteria</b>
Counter, suitable for writing.	Min. height: 1150mm ; Min. width: 300mm [Adler 1999: 20-38]	Should be visible to clients immediately on entry, should also serve as an information desk.
Accounting equipment and computer	According to specific needs	N/A
Telephone system	Private automatic branch exchange [PABX] system. All incoming calls via operator, outgoing calls direct dialled.	N/A



The concept of an indoor-outdoor system that intertwines and a design discourse that investigates tactility in architecture will guide the design thinking. The view that sustainable environmental design nourishes the senses will also influence the design decisions. The document should be read with this methodology in mind.

Integrated in these concepts are systems on which the design will focus:





## 01.1 OCCUPANT COMFORT

*All buildings modify the human environment. It is not only the characteristics of buildings as inert solids that effect their occupants. How they are designed, what they are built of, how they are built, maintained, furnished, cleaned and ventilated are significant and involve the owners, builders and users.*

### 01.1a LIGHTING

*For proven physiological reasons, people can feel ill if they work all day in artificial light. Inadequate light can cause disorders associated with depression. Yet too much light in a room requires it to be too open, unprotected. The design will incorporate a combination of daylight and artificial light to ensure that the environments are well lit. Windows will be screened to minimise daylight glare.*

*Required lighting:*

*Retail and reception area: 200 lux*

*Changing rooms and toilets: 150 lux*

*TV studios: 200 lux*

*Deliveries and storage: 100 lux*

*Workshop for bikes: 1000 lux*

### 01.1b VENTILATION

*Buildings will be designed so as to enable natural ventilation except for the showers, toilets and changing rooms where mechanical ventilation will be used, as well as the TV studios where suitable acoustics is required.*

*Ventilation requirements:*

*Changing rooms and toilets: 20 l/s per shower, wc pan or urinal*

*TV studios: 5 l/s per person*

*Deliveries and storage: 5 l/s per person*

*Workshop for bikes: 5 l/s/ person*

*Retail 5 l/s per person*

*Offices and reception 7,5 l/s per person*

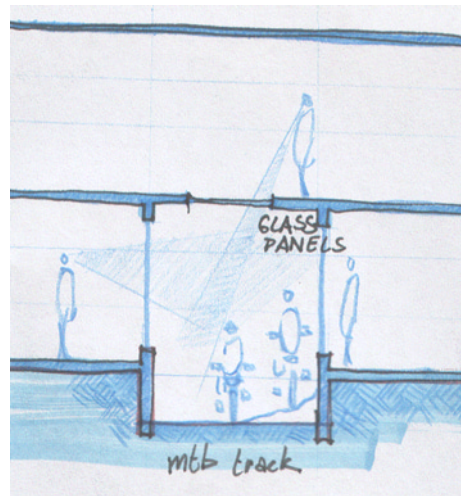
### 01.1c NOISE

*Anything that reduces noise improves the urban environment, especially those reductions which shift the focus from mechanical to human sounds. Cyclists racing on gravel, dust roads and elevated*

*wooden paths; water features; birds in the woodlands; climbers expressing themselves exuberantly and the sounds of kayakers rowing on the rapids will enhance the sensory experience of visitors and reduce the noise to human scale.*

#### 01.1d VIEWS

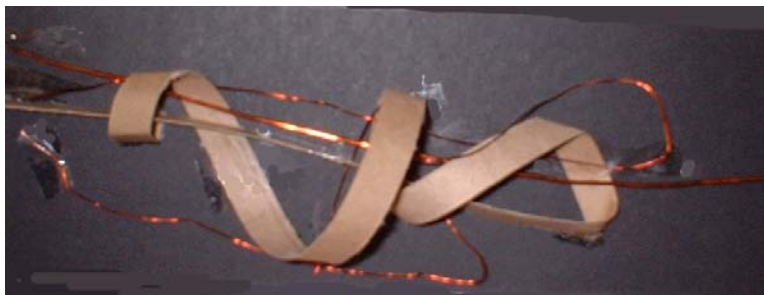
*Buildings will be designed to enable visitors of the centre to have views on the cyclists racing through the building, climbers and kayakers, look-out points will enable pedestrians passing by to have a scope of the activities on site. Quiet, more serene places, with a view into the woodlands, will also give a place of rest and calmness to the visitors and pedestrians.*



**Fig. 041 Views of activities from out the building**

#### 01.1e ACCESS TO GREEN OUTSIDE

*The concept of the design is that of an indoor/outdoor connection, where visitors will be confronted with the outdoors while shopping. The indoors and outdoors will be intertwined.*



## 01.2 INCLUSIVE ENVIRONMENTS

### 01.2a PUBLIC TRANSPORT

The Pretoria Station is within 800m from the site and a proposed tourist and public bus stop is just across the street from the site. New pedestrian and cycle routes will be incorporated in the design and connected with the existing inner city routes. There will be pedestrian routes that linger through the site as well as pedestrian routes for passing by.

### 01.2b ROUTES

Routes will be designed to be a civic investment, places of rejuvenation, places for people. This can be achieved if they are of appropriate materials, colours and textures [under foot as well as on the wall], small in scale, varied as one passes along and never quite straight, also easily accessible for disabled people. The routes from the city will split into 3 levels where these routes meet the site boundary:

A route to the surrounding neighbourhood

A route to the Fountains Valley green belt

A route through the site

### 01.2c CHANGES IN LEVEL

In order to enhance the sensory experience of the visitors, they will be faced with bursting activity, sound and views. One of the ways to achieve this is by sudden changes in level inside and around the building. These changes in level, however, will be designed to be apparent and accessible for the disabled.

### 01.2d TOILETS

The design enables the centre to have a central changing room, toilets and showers, with separate toilets for the employees. Public toilets will be provided at the tourist and public bus stop across the street.



Fig. 043 Pedestrian routes through the site

### 01.3 ACCESS TO FACILITIES

Visitors and employees will have access to banking and other retail facilities at Berea Retail Park that is adjacent to the site. Communication facilities [postal, telephone and e-mail facilities] will be available in the reception building.

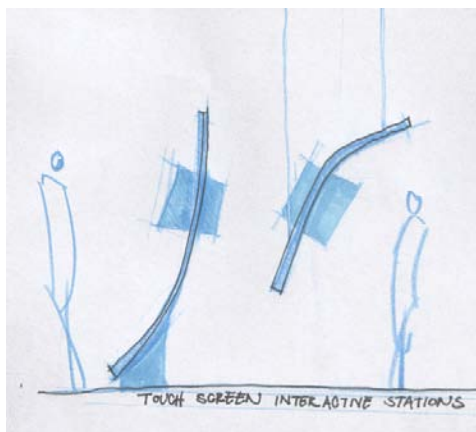
### 01.4 PARTICIPATION AND CONTROL

The social spaces in the building must be life enhancing and -supporting. It must be places, like a widening in a corridor with a window seat, that induce casual social meetings, and places, like stairs, that stifle such interplay. Social spaces will be invitingly textured and well lit to welcome social interaction; it must offer interest, activity, durability and views. Pedestrian routes that linger through the site will have seating, lookout points and more serene spaces. A restaurant, next to the reception building, will be situated where public and private meet, over looking the Apies.

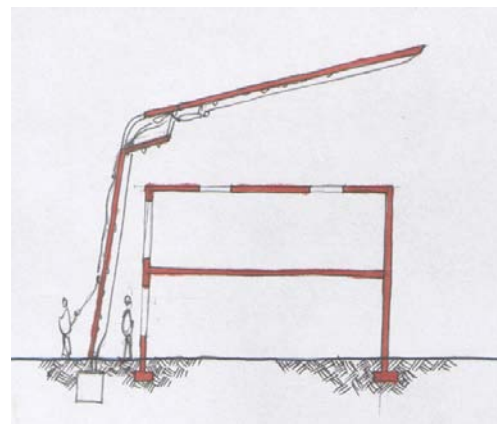
*"If we look at the world around us, the places which are most rich in life are meeting places. In nature, life is the most vigorous where the elements meet - we are drawn to these places."* [Day, 1990].

The design system will enable users to open and close windows in order to control their environment. Offices and retail spaces are designed to allow for rearrangement, especially of retail displays.

The concept that site activity and building activity must intertwine enables the visitor to participate in the outside activity through sound or by views. At the touch screen interactive stations visitors will be able to search the web and to find out about the architecture of this centre.



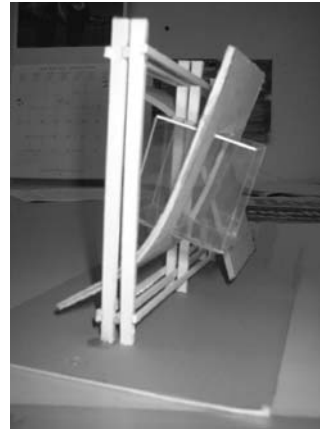
**Fig. 044** Concept sketch of touch screen interactive stations



**Fig. 045** Concept section through the climbing centre

*The exhibition space [which will exhibit information on the history of sport in Pretoria and on adventure sport in general] are extended to the outdoors space where it will take on the form of an exhibition wall along the pedestrian route.*

*This centre will also play an active role in the development of outdoor sports in the local community by organising workshops and group events, leadership and teambuilding programs as well as youth programs. [Refer to brief document]*



**Fig. 046** Concept of exhibition wall panels

### **01.5 EDUCATION, HEALTH AND SAFETY**

*Day and night activities on site will assist in the safety and security of the centre. Due to the fact that the buildings are fragmented, to enclose public space, each building will have its own security system. The pedestrian route that moves through the site will be closed off at night, leaving the route that passes by open for pedestrians, to ensure the security of the buildings on site. All spaces between buildings will be well lit, using solar power generated street lights. All outdoor activities will have safety precautions and these areas of activity will also be well lit by solar generated lights.*

*Training in an Outdoor Adventure Guide courses [from institutions like ETA and Reebok] will be held monthly for employees as well as the local community, using the centre's facilities.*

### **01.6 CULTURAL DIFFERENTIATION**

*Although outdoor adventure related activities are mostly considered to be a westernised sport, this centre will give ample opportunity to expose a large part of our society to this sport and to the concept of an active lifestyle.*

### **02.1 LOCAL ECONOMY**

*Due to our topographical location and climatic conditions, there are a magnitude specialists to assist in the construction of an outdoor adventure centre. Local specialists on kayaking, canoeing, mountain biking and climbing are highly trained and are of the best in the world. Because the outdoor adventure society is relatively small and elite, the opportunity to have the latest and best equipment and training is readily available. Materials to construct these activities are also locally available. Local specialists also give the opportunity for easy and regular repair and maintenance.*

### **02.2 EFFICIENCY OF USE**

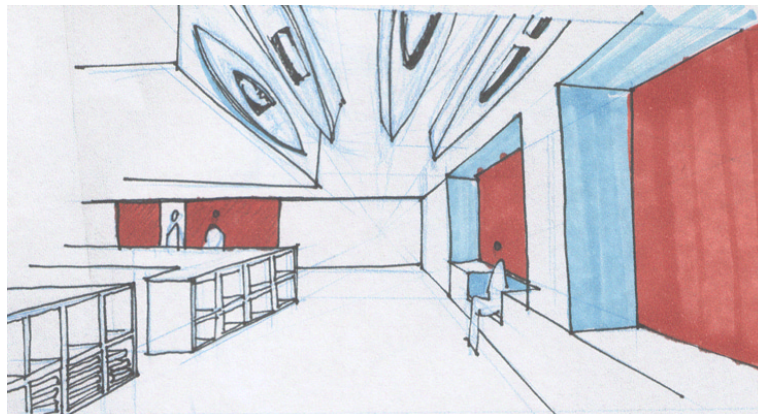
*Because of the functions of this building and the fact that this centre incorporates public spaces, working and activity spaces will be occupied frequently.*

*The usage of space in retail buildings are normally very high due to the fact that floor space equals money, thus every possible floor space will be used for the display of stock.*

*The retail industry is dependent on a number of socio-economic factors like the aging of the population, retirement rates; mail, phone and online sales; concern for health and fitness and an increase in the multicultural society. These factors force the retail industry to have a space management system that will alter seasonally.*

### **02.3 ADAPTABILITY AND FLEXIBILITY**

*The retail and display needs of an outdoor centre are quite specific. To make the display and retail space as adaptable and flexible as possible the minimum floor to floor height will be 3m. This will also allow for*



**Fig. 047** Concept sketch of overhead display space

*the overhead display of larger recreational equipment.*

*Due to the fact that this type of building requires specific design needs, like for instance a climbing wall, the challenge will be to design this building adaptable and flexible for future other usages.*

## **02.4 CAPITAL COSTS**

### *02.4a CONSTRUCTION AND BUILD-ABILITY*

*The design approach of creating a tactile and multi sensory space and the construction of an outdoor centre with specific needs will lead to high capital costs. This can be argued by the fact that a tactile, multi-sensory building with circulation of people, colours, spatial aesthetics and inspiring construction detailing, gives more to society than a cheaply built building that only fulfils its function.*

*To create such architecture one needs to challenge the "commodification and standardisation of building production" [Day, 1990] and find a way of building construction that "finds its expression in the physical and material attributes of construction, enhancing the body's experience of space and incorporating sophisticated and sustainable technologies". [Day, 1990]*

*This can be done by using materials as much for their senate qualities as for economy and utility. Like using raw materials, the juxtaposition of rough and smooth, heavy and light and using prefabricated elements in a creative way.*

*The fragmentation of the buildings on site allows for the phasing of construction. Finished buildings can start operating and generating money, whilst the rest of the buildings will be under construction.*

*Another aspect which standardisation in construction ignores is the fact that humans experience dimension anthropometrically. "Our main concern is how many body heights something is, how much above the eye level or how many paces away. Small measurements in relation to eye level are critical to views and privacy and a few centimetres in the height of a wall profoundly alters our spatial experience". [Day, 1990]*

*This type of "sensitive" construction can be achieved if the design process can be continued right through the construction phase. This though depends on hands-on construction. Although the mechanical construction system will still be used in the construction of the buildings, hand construction will come into play where sufficient flexibility in the construction is needed. This type of construction not only gives textural scale, but also suits our socio-economic situation where intensive labour is needed to create work opportunities and to learn new skills. Builders have the opportunities to become artistically involved in their work. Such buildings have a distinct soul even before they are occupied. The spirit of the place can develop because of, and not in spite of, the buildings.*

**03.1 GREEN BELT**

*Due to the locality of the site, the design will become the link between urban pedestrian and cycle routes and the natural mountain bike routes, as well serving as an activity generator for the rest of the Nelson Mandela corridor development. The green space just south of the site was identified as the only access point into the historical greenbelt of the Fountains Valley and the rest of the Groenkloof Nature reserve, other than the access point at the Fountains Valley Resort. This green belt with its cultural resources like the indigenous vegetation, archaeological sites and the remains of the first pioneer dwelling in the Pretoria area is a major focal point.*

**03.2 WATER**

*The design supports the idea of reinstating the Apies River to its original form of an active river that runs through the city. Water will be channelled from the river into the site's own water channel that will be used and re-used as kayak and canoe test runs as well as landscape features on site. Rainwater will also be harvested [on site and from the roofs], stored and used for irrigation and for the "rain room" of the climbing & outdoor speciality shop. Wheathertight gear will be tested in this room.*

*Grey water will also be recycled for the same reasons as above and will service wc and urinal flushing. Landscape surfaces will as far as possible be designed to be absorbent to minimise rainwater runoff and water efficient devices will be specified.*

*Water usage per day [estimated]:*

*Visitors/day [users & public]: 150 people*

*Female: 150 x 45% = 67.5*

*[3 x 6l(flush) + 3 x 1.36l(wash hands) x 67.5 = 1485l]*

*Male: 82 [55% of 150]*

*[3 x 6l(flush) + 3 x 1.36l(wash hands) x 82 = 1804l]*

*Total: 3289l water = 3.2m<sup>3</sup>*

**03.3 ENERGY**

*The design will not only encourage and enable walking and cycling in the urban surroundings, but also create an awareness of the importance of an active lifestyle for the people living in the precinct. The site is situated in close proximity of the Pretoria station and it is also situated within a green belt that will be developed as an active spine through the city.*



*The aim of the design is that the building climate systems should be simple but effective, maintaining a comfortable working environment; showing that by using a "best practice" design approach the end product will be sustainable. The buildings should merge with their environment by analysing the possibilities on site for passive designs. By modifying the indoor climate in using optimum solar orientation and by using relevant planning and form, one can achieve this. In the Pretoria climatic zone typical plans should include "buildings arranged around courtyards with small openings on outer walls and large openings in the courtyard". [Holm, 1996]*

*"Passive solar design means achieving indoor comfort by designing with nature, using wind, sunshine and night cooling together with the building materials. Energy flows naturally while the building responds passively, needing a minimum of imported energy." [Holm, 1996]*

*The design approach will concentrate on 3 systems:*

*Solar control*

*Thermal massing*

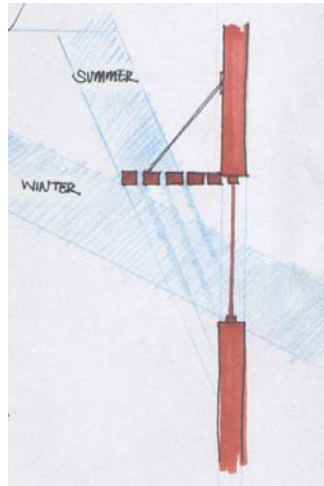
*Natural ventilation*

### *O3.3a SOLAR CONTROL*

*In order to use solar energy to a maximum the building orientation, on site, must be analysed and utilised. In the proposed design the site is elongated in a north-south direction, leaving the building's most exposed facades on the east-west sides of the building. These facades will be screened from summer sun, but will use the winter sun to generate heat. External solar control devices will be used instead of internal solar control devices as they cause a green house effect between the glazing and the interior sun control devices. These solar control devices will be designed according to the sun angles. They will be just wide enough to screen summer sunrays, but still let the winter rays through.*

*Shading devices should have low thermal capacity so that they cool down rapidly at night. Shading devices placed at window head level will render the top portion of the window, an energy loser in winter because it is shaded during the period of maximum sunshine. A better strategy will be to place the shading device outside the maximum winter noon angle. [Holm, 1996]*

*The pedestrian and cycle routes will be protected from solar rays by tree canopies. Building facades that line/embrace hard or dark surfaces will be tree lined to protect them from high solar radiation during summer. Due to the fact that the south elevation of a building in Pretoria receives more radiation during a typical summer day than the north elevation, deciduous trees will line and protect these southern facades.*



**Fig. 048 Solar control devices**

### *03.3b THERMAL SYSTEM*

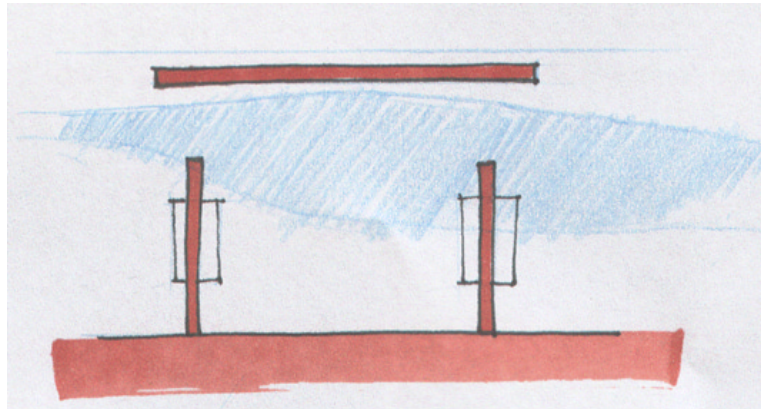
*In this climatic region the design will utilise the combined effect of thermal massing and night ventilation to enlarge the comfort zone in a building. Roofs, walls and floors should have large thermal capacity [mass], for example materials like brick and concrete, to utilise the large daily temperature variation, this implies that massing will be considered with night cooling and solar heating. Internal heat gain, derived from lighting, appliances and heat given off by humans, will be countered by directing lighting systems towards the ceiling, making use of reflected light in the interior space. Insulation placed on the interior face of walls, ceilings and floors destroys the mass effect and will be avoided.*

*It is important to realise that solar radiation is not influenced by ventilation. Objects absorb radiation; the object's temperature rises and emits radiation and warms the adjacent air. Another way in which intense radiation can be countered is the water channel - that runs through the site and the kayak and canoe building - which will absorb radiation due to the fact that water's absorption ability is higher than concrete and bricks. On winter nights the emitted radiation will heat the air, but on summer nights the air will be cooled by ventilation.*

### *03.3c VENTILATION*

*The main function of ventilation will be to cool warm air and to provide the building with sufficient fresh air. Night ventilation will be used to cool off the structure in summer times.*

*The buildings in proximity of the Apies River will automatically have a cooler microclimate that will*



**Fig. 049 Concept of ventilation**

*help cool the structure at night.*

### *03.3d RENEWABLE ENERGY*

*All street lights for the pedestrian and cycle routes will be powered by solar generated energy, as well as the spot lights for the climbing wall and the other outdoor activities.*

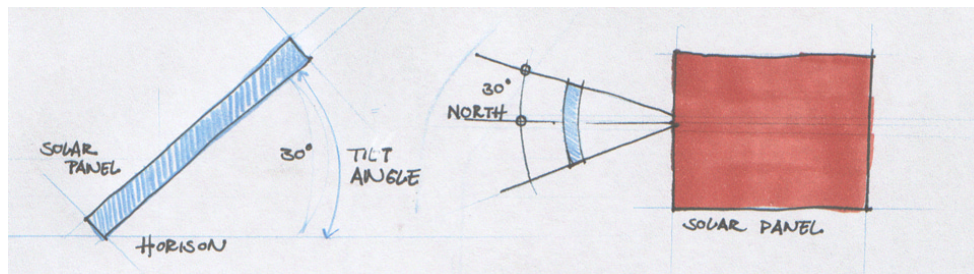
*Calculation:*

*0.5m<sup>2</sup> of photovoltaic panel = 85W*

*" 1m<sup>2</sup> = 170W*

*Commercially available streets lights:*

*[www.thru.to/architecture](http://www.thru.to/architecture)*



**Fig. 050 Positioning of photovoltaic panels**

### 03.3e NATURAL LIGHT

Natural daylight creates a better environment to work in than artificial light; it is life enhancing. It will be used to create gentle, rhythmic light that will change colours and direction throughout the day.

To design several smaller windows instead of one large one is better, not only from an energy saving point of view, for the same heat loss there is a better distribution of light, avoiding quantitative extremes, but also for quality.

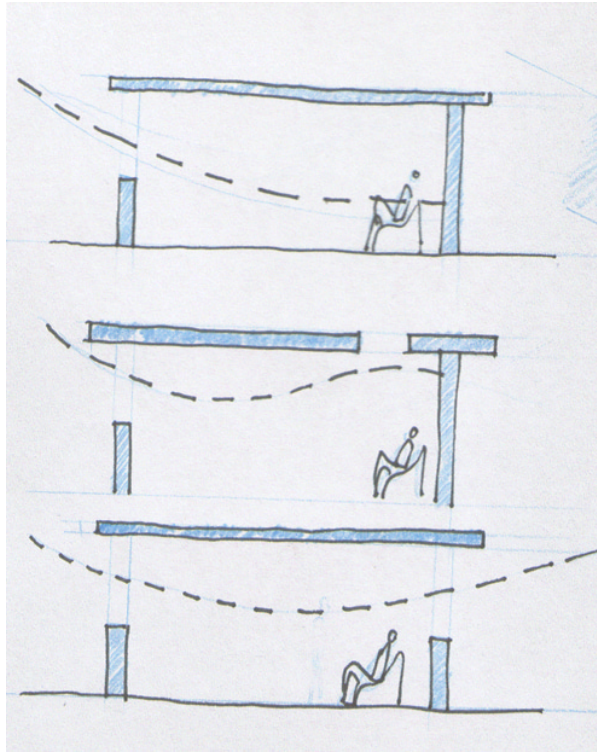


Fig. 051 Alternating lighting levels

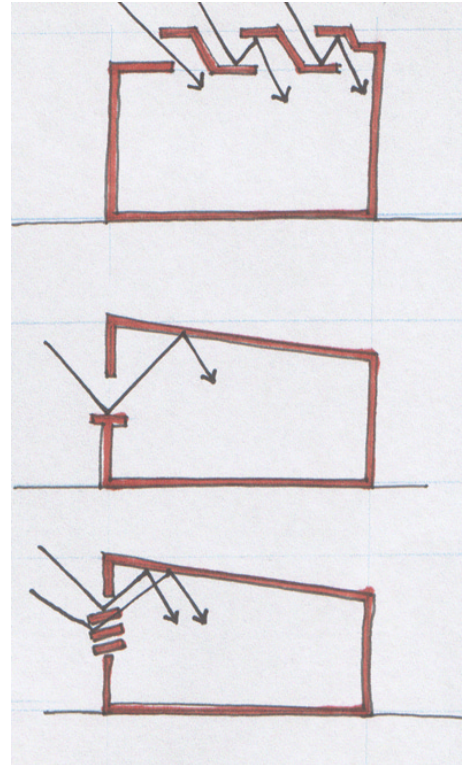


Fig. 052 Alternative means of light entry

### 03.4 RECYCLE AND REUSE

Inorganic waste will be sorted into paper, glass, cans, plastic and other waste. Arrangements will be made with companies like Environink that collects empty printer cartridges to recycle. Construction waste will be used to construct the mountain bike track and other "outdoor" landscape elements.

### 03.5 SITE

*The proposed design will be constructed on a Brownfield site and the footprint of the development is smaller than the previous development, giving opportunity to rehabilitate the natural ecosystems. Trees will be planted on the areas of site not developed.*

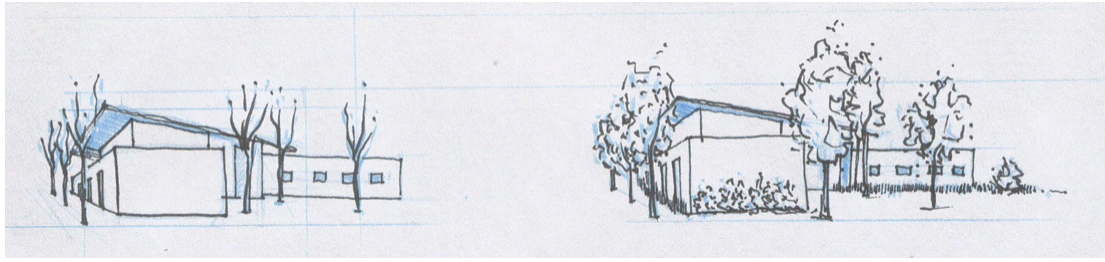
*The proposed design will be developed on an open space with only a neighbouring building on the west side of the site. This building will not be affected by the development. All excavated ground will be used on site as ground fill.*

### 03.6 VEGETATION

*The site is located in the transition zone of the Rocky Highveld Grassland biome and the Savannah biome. Existing alien vegetation will be eradicated and replaced with indigenous vegetation from these biomes. Vegetation will be used to create a wilderness or rough country feeling on site, for example a strip of Red Autumn grass will run along the exhibition wall. Woodland will be established on the northern end of the site, near the bike retail shop, wherein elevated wooden tracks, built on gum poles, will be built for the mountain bikers. All the areas that will not be developed on site will be planted with indigenous trees. This will also create habitats for other animal species. Vegetation will be used to bring life, softness and seasonal rhythm into the urban surroundings. The seasonal growth of vegetation can make a striking difference in the apparent scale of things.*



**Fig. 053** Elevated wooden mountain bike tracks



**Fig. 054** Seasonal changes in vegetation alters the apparent scale of things

*Vegetation that will be used in the design:*

*Rocky Highveld Grassland Biome:*

*Grasses:*

*Giant Speargrass*

*Broadleaf bluestem*

*Red Autumngrass*

*Andropagan Schirensis*

*Panicum natalense*

*Digitaria monodactyla*

*Trees:*

*Karee*

*Common Hook Thorn*

*White Pear*

*Mountain Karee*

*White Stinkwood*

*Savannah biome:*

*Grass:*

*Wool grass*

*Trees:*

*Red Bushwillow*

*Marula*

### *03.6a LANDSCAPE INPUTS*

*Vegetation will be indigenous with low water requirements. Landscape design will consider ways of maximising apparent dangers and reducing real ones.*



**Fig. 055 Maximising apparent danger**

*The design will also consider ways in which sunlight, at different times of the day and year, creates significantly different moods, landscaping which makes visible the progression of seasons. These rhythmic changes will play over a durable topography.*

### **03.7 MATERIALS AND COMPONENTS**

*Materials will be used extensively in creating a tactile, multi-sensory environment. Raw materials will be used instead of synthetic materials.*

*Even though synthetic materials will be the cheapest, most convenient to use, they can be very harmful for your health. In fires many, especially plastics, give off poisonous gases.*

*As Day [1990] says, "buildings are the third human skin. The skin performs many functions: it breathes, absorbs, evaporates and regulates as well as encloses and protects. A building, which through its fabric, is in a constant state of moderated exchange between inside and outside, feels, and is, a healthy place. A sealed-fabric building is full of dead air. Materials that create this healthy environment will be used".*

*The texture of materials is also important. Most of us don't go around deliberately touching buildings, yet without thinking about it we touch them all the time. Texture, which we walk on or feel with our hands and eyes, makes all the difference between places which are approachable and which are not.*

*Low embodied energy materials will be used in the design - concrete, wood, clay tiles and bricks. Research shows that concrete and brick's pollution/kg is minimal and have long life cycles. Of all the components concrete consists of, gravel is the largest part and water is only an eighth of the components. Gravel is the only component that can be recycled, of which only 20% can be recycled.*

### **004 SUMMARY**

*It is important to realise that all of the above mentioned aspects would fall into a hierarchy, where more valued aspects will be of a higher priority. This does not necessarily mean that the other aspects will be ignored; they will merely be of a lower priority.*

*Aspects that sustain the concept of tactility and the idea of an intertwined indoor/outdoor system will be generally viewed as a higher priority than the other aspects. Environmental aspects like rainwater harvesting, solar control, thermal massing and ventilation will also take a high priority in the design.*

*This technical report is a response to the baseline document, explaining and illustrating the systems and technical aspects of the design.*

*This document should be read together with the construction drawings as a continual reference.*

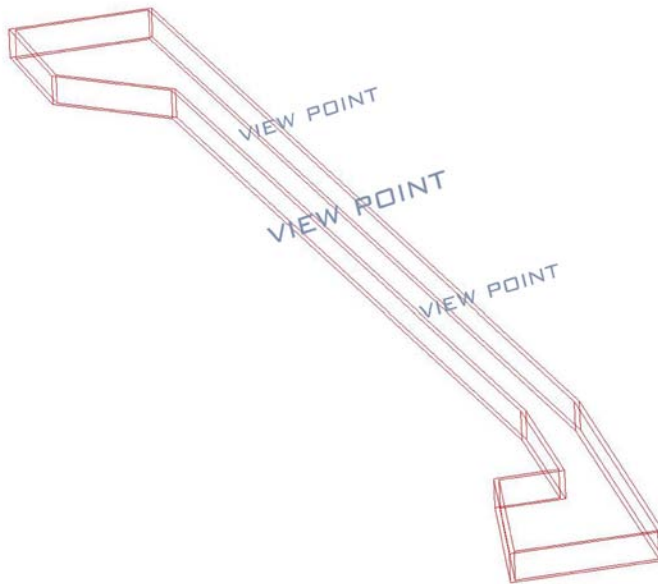


## 00.1 MOVEMENT SYSTEMS

*These systems connect all movement on site and strengthen the concept of an intertwined indoor-outdoor system.*

### PADDLING

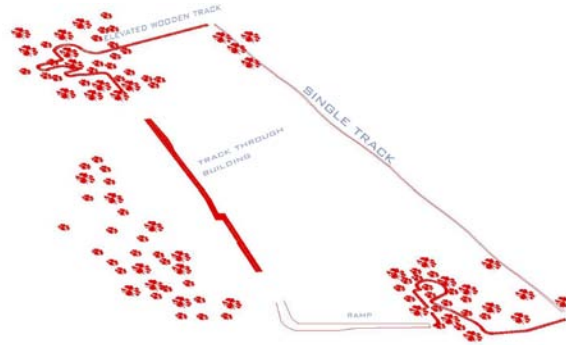
*This element entices passers-by; is an audible, visual and dynamic connection spine and serves as a storm water channel that receives rainwater from the related shop's roof.*



**Fig. 056 3D of the kayak channel**

### MOUNTAIN BIKE TRACK

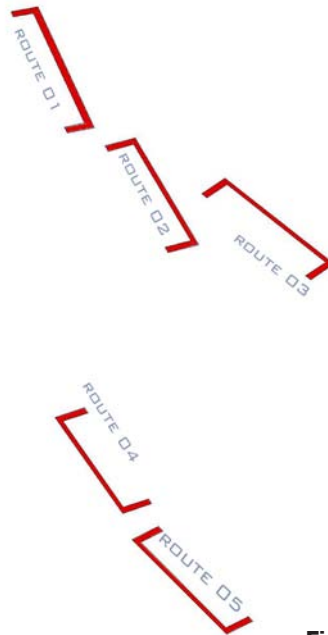
*This track runs through and around the site, forming and braking boundaries, connecting indoor and outdoor programmes; involving and entertaining both visitors and pedestrians alike.*



**Fig. 057** Mtb track

### *CLIMBING*

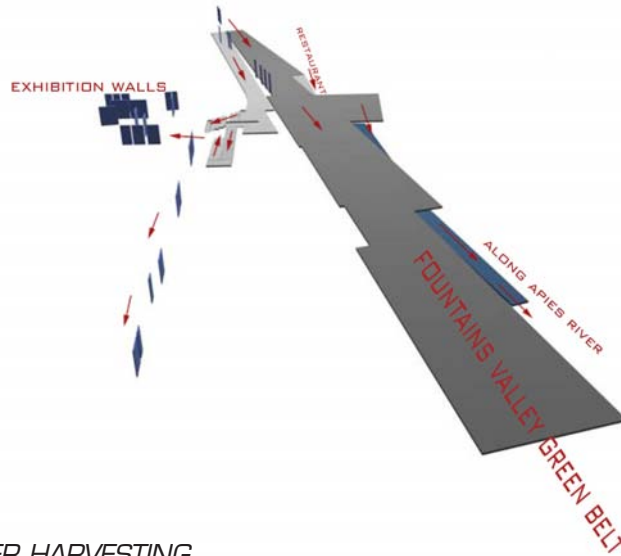
*The climbing routes are designed to exist and evolve in and around the retail area. To evoke, inspire and involve all visitors; to express the precision of motion in space.*



**Fig. 058** Plan of climbing walls

*PEDESTRIAN MOVEMENT.*

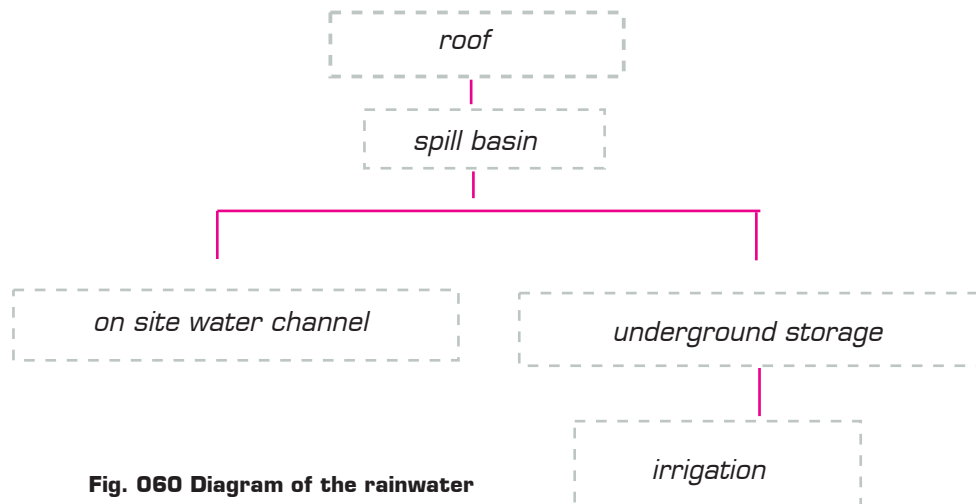
*This movement system directs pedestrians and visitors along different routes on changing levels, always allowing full views across the site [also refer to "routes" in this document].*



**Fig. 059 3D of the pedestrian walkway and exhibition walls**

*00.2 RAINWATER HARVESTING*

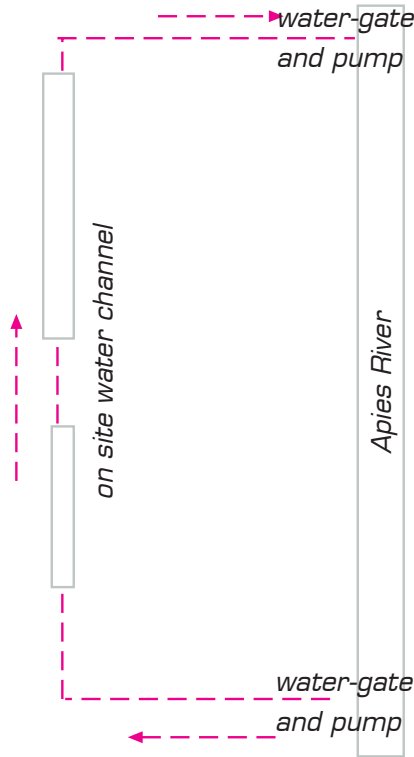
*Rainwater is drained to spill basins from where it is either stored for irrigation purposes, or it is channelled to the on site water channel [kayak paddling channel].*



**Fig. 060 Diagram of the rainwater harvesting system**

### 00.3 ON SITE WATER CHANNEL SYSTEM

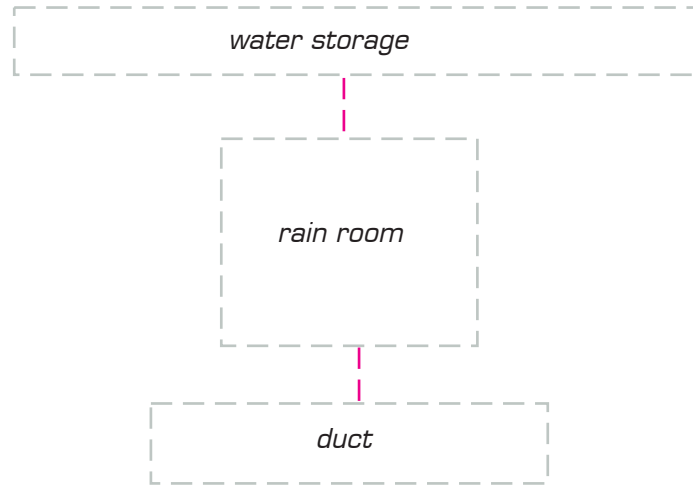
Water is pumped from the Apies River into the on site water channel. This on site channel also receives harvested rainwater. The water level is regulated and access water is pumped back into the Apies River.



**Fig. 061** Diagram of on site water chanel

### 00.4 RAIN ROOM SYSTEM

Weather tight gear is tested in this rain room. Water is released through several showerheads and is drained into the adjacent duct.



**Fig. 062 Diagram of rain room system**

## 00.5 MATERIALS

*Materials were chosen that give a raw feeling and leave a blunt physical presence of construction.*

### CONCRETE

*This material is used in most structural and envelope construction. The choice of this material is justified by its appearance, flexibility and thermal performance.*

*Allmost all external walls are off-shutter concrete walls, using 2.4 x 1.2 m steel formwork panels to achieve a smooth finish. The walls are constructed to appear as if they are free standing and become the transfiguring elements that express the plan and generate movement and a sense of surprise and intrigue, guiding visitors through the site.*

*A lowered extension of the pedestrian walkway, that functions as public seating, twists 90° to become the entrance façade of the administrative building. This wall and all other applications are cast in-situ and finished off.*

*The roofs become horizontal extensions of the walls, magnifying the intentions of the walls. Outer roofs are sloped inward, with suitable drips at the slab edges, where the inner roofs receive the runoff water. Inner roofs are constructed with parapet walls in such a way that the roofs still appear to be continuous,*

*flat concrete slabs. The roofs are finished off with 25mm inward-sloped screed, which is waterproofed, and runoff water is drained to a purpose made precast concrete spout.*

*Most floors are finished with 25mm concrete screed tinted with red-oxide and finished with a layer of 6mm clear epoxy, mimicking the earth found in this region and further blurring the boundaries between the interior and exterior.*

*The climbing walls are constructed with in-situ cast rib columns, laterally supported by concrete rib beams @ 3m centres. This structure supports a 150mm concrete slab.*

#### *FACE BRICK*

*Walls that are designed for functional purposes only are constructed with Corobrick silhouette satin face bricks, flush jointed. Where a visual link is necessary these bricks are turned on their edges to expose the extruded holes of the bricks.*

#### *STEEL*

*The decision to use corten steel was made due to the fact that this material alters its appearance over time and finds its application to the decorative panels on the mountain biking bridge crossing the central square and the shading devices on the western façade of the kayak and canoe centre. These panels are patterned for both structural and aesthetic purposes, creating changing shadow lines and patterns.*

#### *GLASS*

*Glass is used throughout the building: frameless glass is applied to the horizontal strip windows in the eastern and western facades. Larger fenestration comprises a designed glazing system, consisting of a 120 x 60 x 6 GS angle iron to which GS flat bars are welded to form the louvres [to be painted]. A framed glass window is fixed to the interior of this frame and can either be openable or rigid depending on its location.*

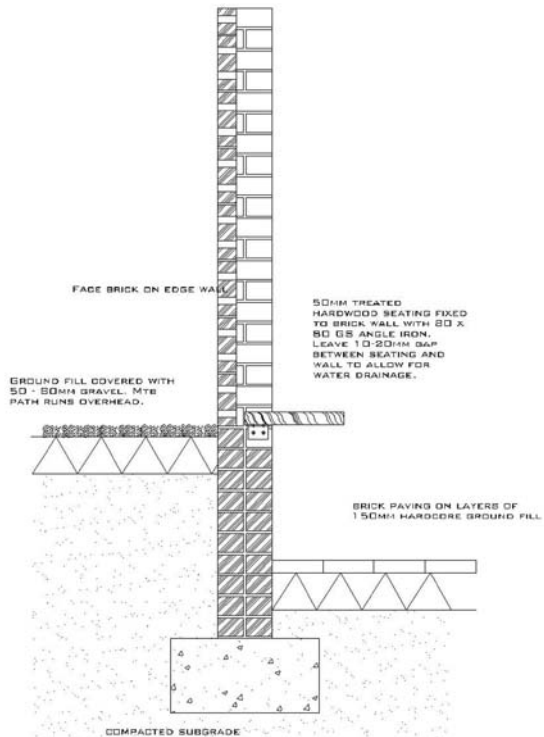
*Frosted glass is employed in longitudinal openings in the pedestrian walkway to provide light to the functions below.*

## O1.1A Views

The western and eastern facades are dominant, mostly solid concrete walls, with openings on specific locations to direct views on activities.



**Fig. 063 Fenestration designed to direct views**



**Fig. 064 Detail of landscape seating**

## O1.2 INCLUSIVE ENVIRONMENTS

### O1.2A Routes

Routes are constructed out of concrete, brick pavers or natural ground. Seating areas are detailed and natural vegetation is used to create a human scale.

### O1.2B Changes in level

Level changes on site are employed to enhance the sensory experience of the visitor, to direct and to manipulate views. Refer to the sections of the construction drawings.

01.4 PARTICIPATION AND CONTROL

01.4A Social spaces

These spaces are designed to be life enhancing. Meticulous detail is given to landscape seating, quiet and more serene spaces are created midst all the activities and all the access points to the site lead to the central square.

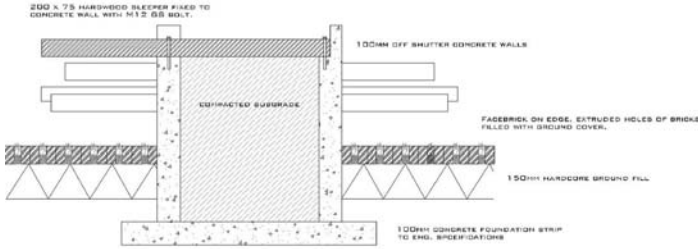


Fig. 065 Climber's seating

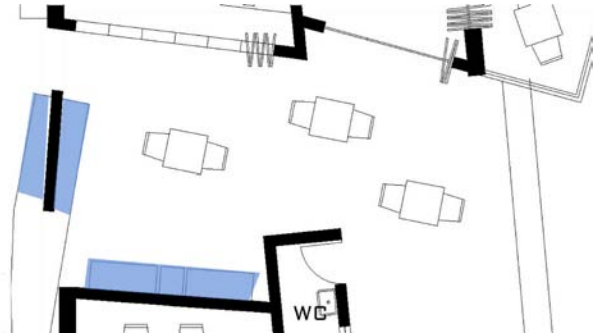


Fig. 066 Quiet and serene spaces

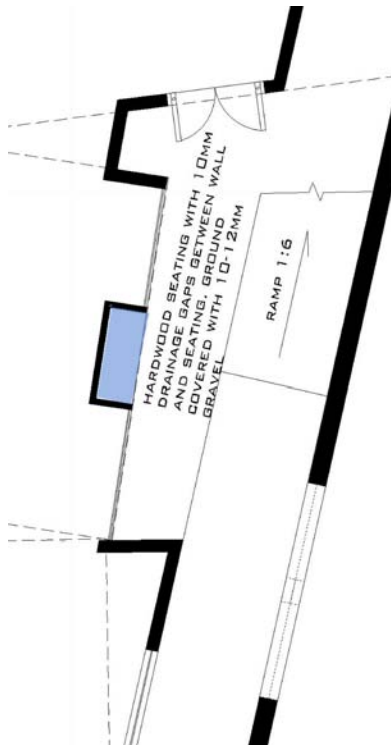


Fig. 067 Quiet and serene seating

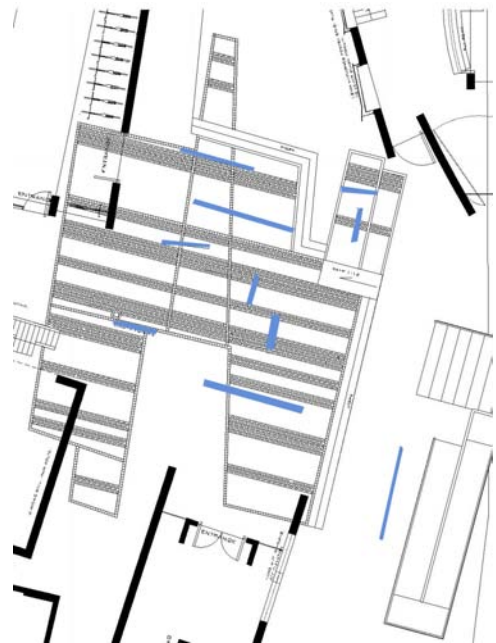


Fig. 068 Central square with exhibition walls



The following tables show the cost estimate, feasibility study and the risk analysis that was done on the project.

description of area		total area	rate	total cost
<b>retail</b>				
	ground floor	1007 m <sup>2</sup>	R1900/m <sup>2</sup>	1,913,300
	first floor	481 m <sup>2</sup>	R2055/m <sup>2</sup>	988,455
<b>TV studios</b>		38 m <sup>2</sup>	R2055/m <sup>2</sup>	78,090
<b>offices</b>		147 m <sup>2</sup>	R2000/m <sup>2</sup>	294,000
<b>restaurants</b>		165.5 m <sup>2</sup>	R1900/m <sup>2</sup>	314,450
<b>landscaping</b>		2486 m <sup>2</sup>	R200/m <sup>2</sup>	497,200
<b>open parking</b>		739 m <sup>2</sup>	R160/m <sup>2</sup>	118,240
			<b>total building cost</b>	<b>4,203,735</b>

Cashflow after completion of project					
years	2004	2005	2006	2007	2008
cross income [no vacancy factor]					
escalates @ 10 % /year	801 084	881 192	969 311	1 066 242	1 172 866
current expenses					
escalates @ 12 % /year	144 195	161 498	180 868	202 572	226 880
nett income [no vacancy factor]	656 889	719 694	788 443	863 666	945 986
LESS vacancy factor [%]	5%	3%	2%	0%	0%
nett income [with vacancy factor ]	624 045	698 104	772 674	863 666	945 986
LESS Bond repayments R4					
697 969 @ 15% over 30 years payable in advance	704 695	704 695	704 695	704 695	704 695
nett income before tax	R-80650	R-6591	R67 979	R158 971	R241 291

Identified risks	Risk assessment [consequence]	Control assessment risk factor [probability]	Assurance priority [category]
Insufficient budget		4	3
Life span		5	4
Continual suitable management		4	4
Development relies on the upgading of the Apies River scheme		5	3
Insufficient marketing		3	2
Delay in schedule		4	4
Adaptability and flexibility of design		4	4
Culture differentiation		2	3
Environmental sensitive area		3	3
Floods		4	2
Water restrictions		4	2

Identified risks	Risk quantification
Insufficient budget	medium
Life span	high
Continual suitable management	high
Development relies on the upgrading of the Apies River scheme	high
Insufficient marketing	low
Delay in schedule	high
Adaptability and flexibility of design	high
Culture differentiation	low
Environmental sensitive area	medium
Floods	medium
Water restrictions	medium

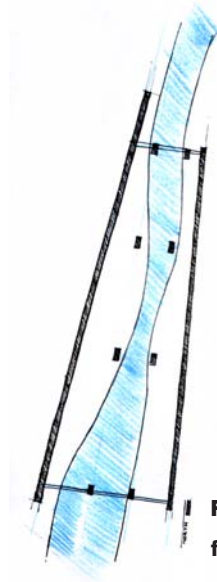
Identified risks	Risk assessment [consequence]	Control assessment risk factor [probability]	Assurance priority	Mitigation Measure
Life span	catastrophic	moderate	high	Ensure sufficient marketing and managing of the project. Ensure that the development is feasible and profitable before lifespan ends. Ensure a good financial system and appoint a QS to oversee the development
Continual suitable management	major	moderate	high	Increase security by increasing financial stakeholders
Development relies on the upgrading of the Apies River scheme	catastrophic	unlikely	high	Ensure continual negotiations with the Tswane City Council on the development of the Apies River scheme. Implement a risk analysis on whether this project could go on with out the Apies River development. Consider the possibilities of another site.
Delay in schedule	major	moderate	high	Provide external oversight and good project management to enable phasing of this project. Implement a strict adherence to the schedule and provide channels of reporting
Adaptability and flexibility of design	major	moderate	high	Even though this project is a function specific design, ensure, as far as possible, that floor to floor heights and internal walls are adaptable and flexible.

### 03.1 Water

Refer to "Systems" diagrams 00.2, 00.3 and 00.4.

### 03.2 Energy

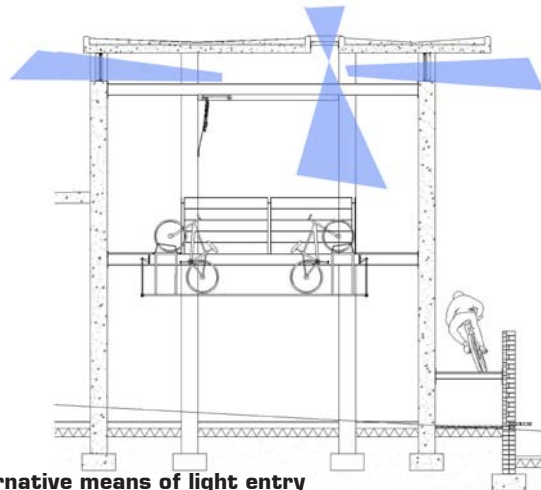
Solar control is achieved by minimilising the openings on the exposed eastern and western facades and also by protecting the northern and southern facades with elongated E and W facades. A steel louvre system [discussed in "glazing"] is designed to protect some of the facades.



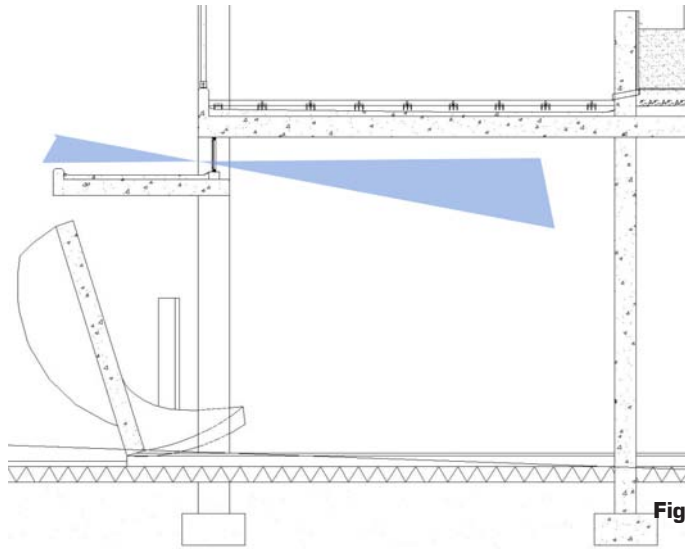
**Fig. 069** Mostly solid E and W facades allows for N-S ventilation

### 03.3 Natural light

The minimised openings on the E and W facades created the opportunity to introduce alternative means of light entry and the variation of lighting levels in specific spaces.



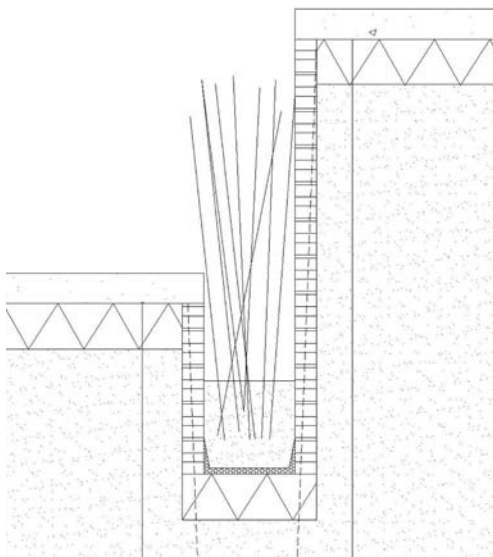
**Fig. 070** Alternative means of light entry



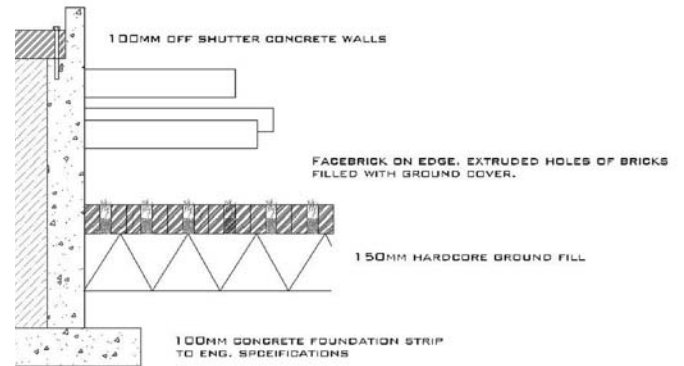
**Fig. 071 Alternative means of light entry**

**0.3.4 Vegetation and landscape**

*A strip of Red Autumn Gras runs along two main pedestrian entrances. To further enhance the rough veldt feeling on site brick pavers will be filled with ground cover and veldt weed/grass will be left to grow in it.*



**Fig. 073 Rooigras grass strip running through the site**



**Fig. 073 Detail of the central square paving**





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*“... The little prince went off to look at the roses again.*

*“None of you is at all like my rose. As yet you are nothing,” he said to them. “Nobody has tamed you and you have tamed no one. You are like my fox when I first encountered him. He was just a fox like a hundred thousand other foxes. But I made him my friend and now he is unique in all the world.”*

*And the roses were greatly embarrassed.*

*“You are beautiful but you are empty,” he continued. “One cannot die for you. To be sure an ordinary passer-by would believe that my very own rose looked just like you, but she is far more important than all of you because she is the one that I have watered. And it is she that I have placed under a glass dome. And it is she that I have sheltered behind a screen. And it is for her that I have killed the caterpillars (except for the two or three saved to become butterflies). And it is she I have listened to complaining or boasting or sometimes remaining silent. Because she is my rose.”*

*[De Saint-Exupery, 1944, p81-82]*

shawni  
bernard  
vonne  
marleen  
chris  
my parents  
linelle  
  
theoi

You have tamed me...

*"Your love colours the dawn.  
Your voice, the power of thunder.  
Your hand the healer of the weak.  
Your love fills oceans and Your voice calms seas...  
and You created me.*

*Your eyes are so amazing, so deep like crashing waves on a cloudy sea and these pounding waves they consume me.*

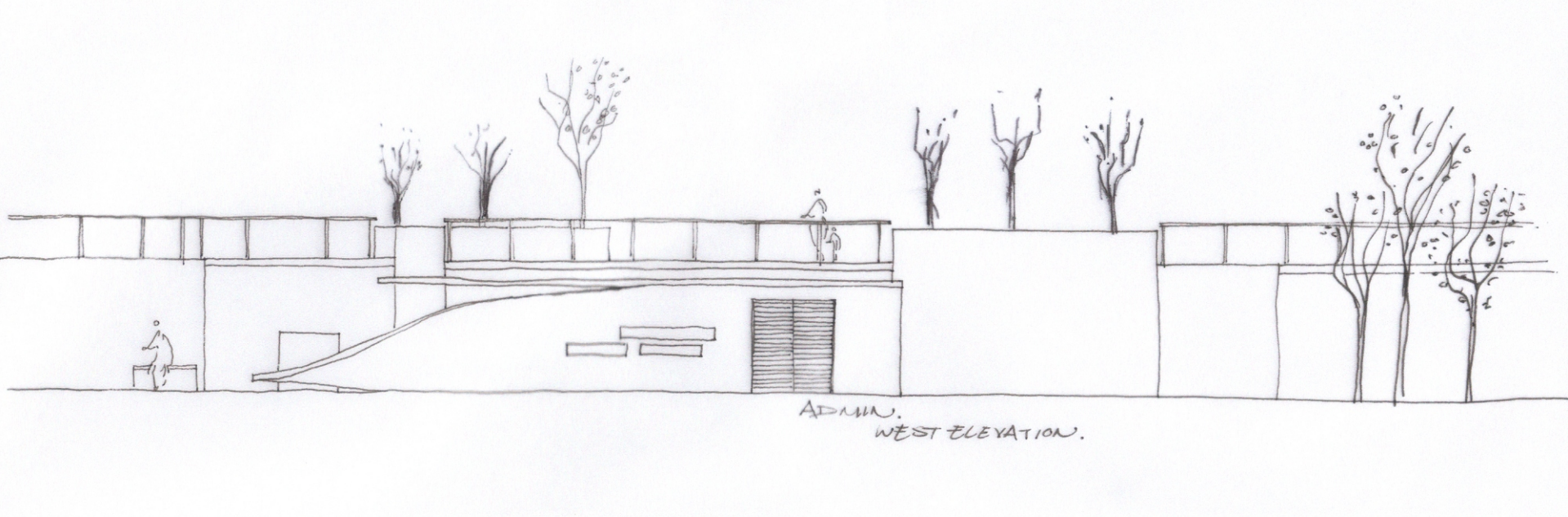
*But there is so much more to you, so much I do not know, so much love I have yet not encounter, so much You overflow.*

*And just when I think I know Your complexities, You step into the light.  
And just when I think I know Your voice, You open up my ears.  
It is like trying to know every single glowing star on a cloudless night, but Your depth and Your vastness keep me running after You..."*

*[Rieger, F., 1999, Remnant Records]*

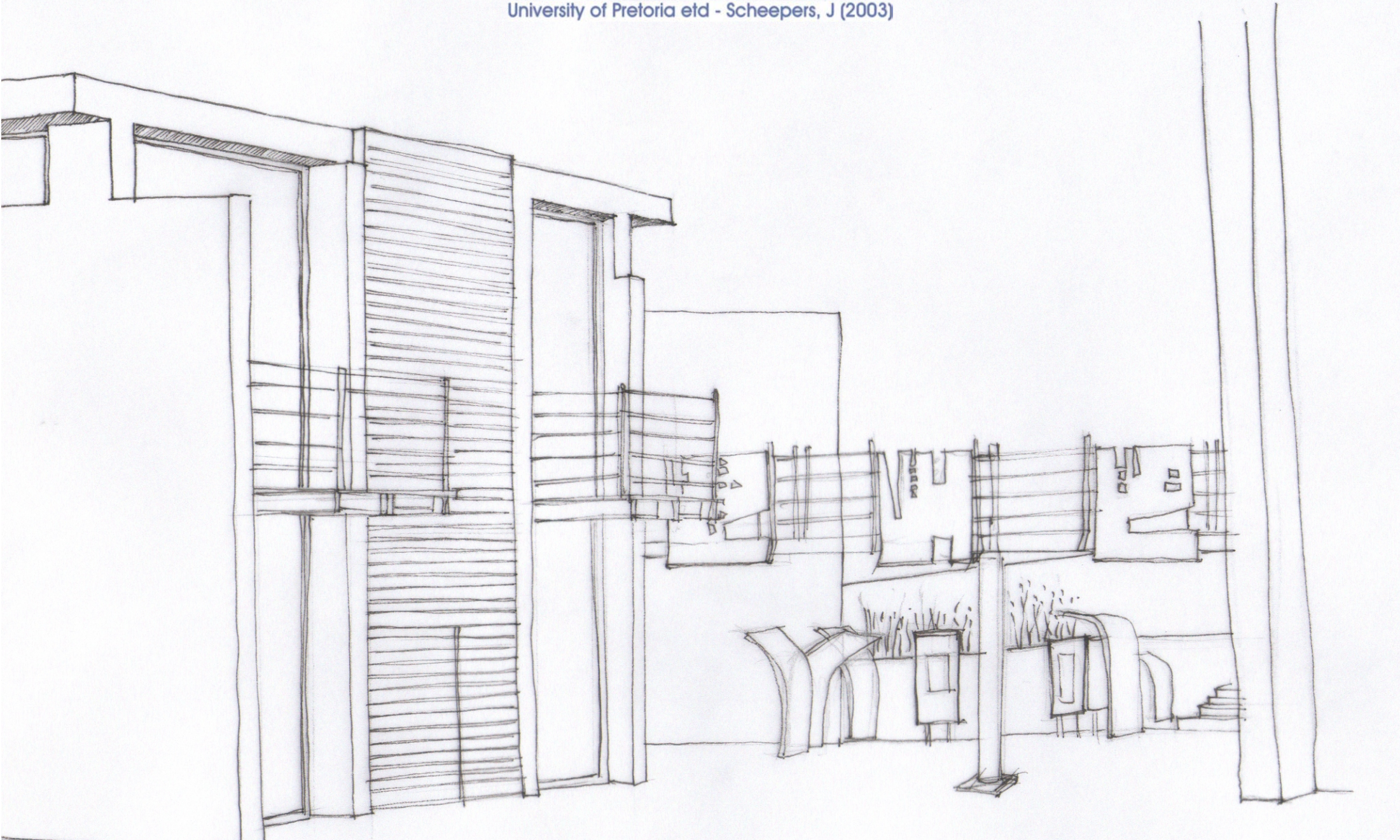
**It is truly only in You that I live and move and have my being**





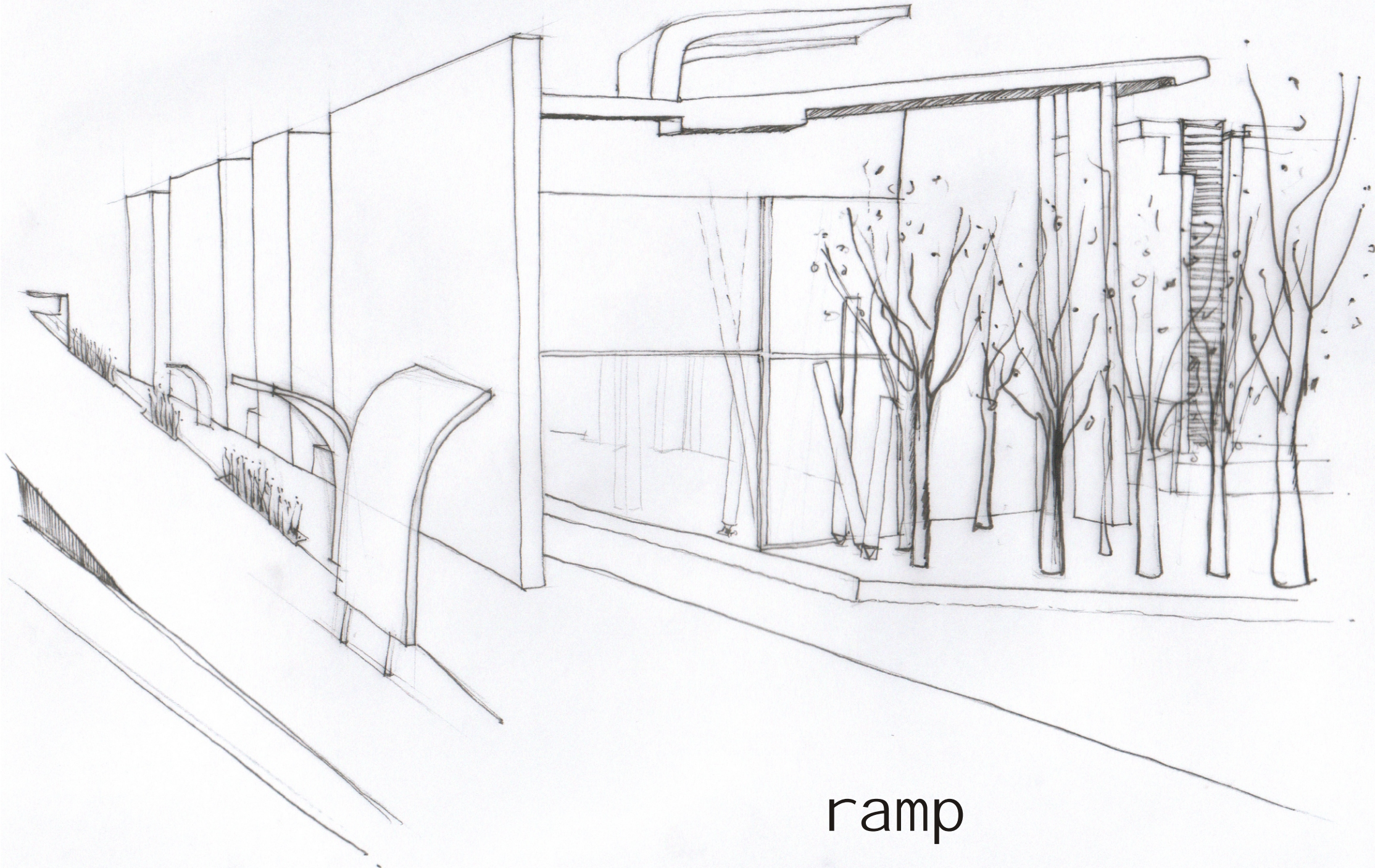


kayak

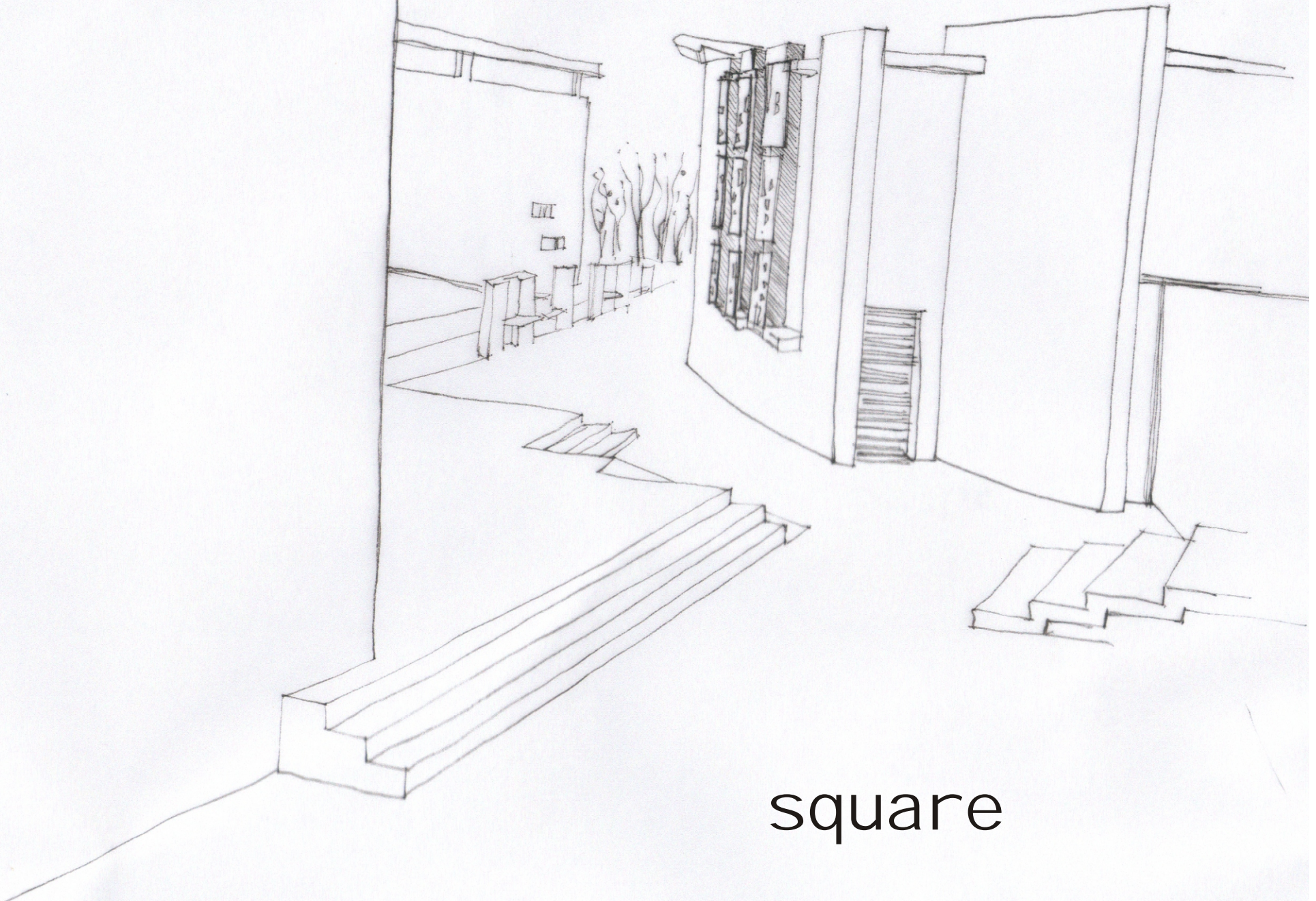


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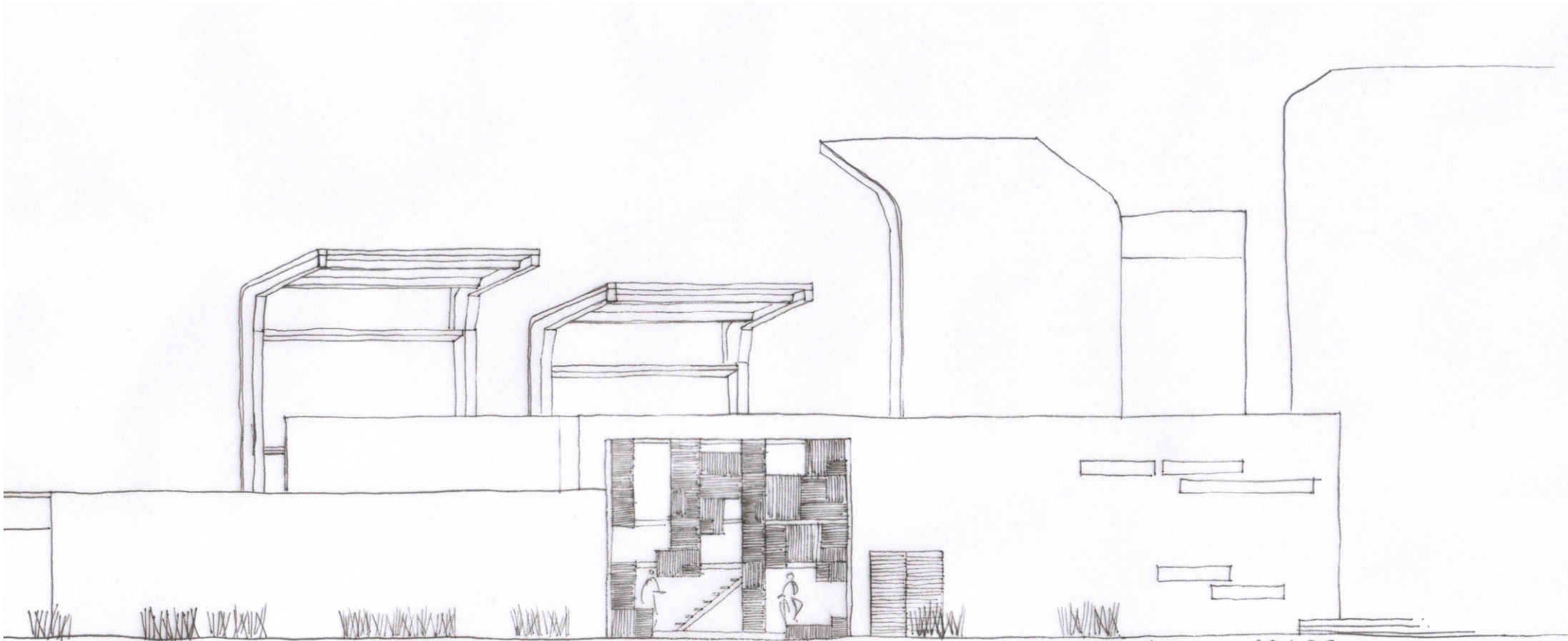




ramp



square



CLIMBING & HIKING CENTRE  
EAST ELEVATION.