Under the mentorship of Professor S.W. le Roux, who also acted as study leader.

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NELSON MANDELA FORUM

A CONGRESS CENTRE FOR PORT ELIZABETH

CONTENTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

MBDA: Madiba Bay Development Agency
NMB: Nelson Mandela Bay
NMMM: Nelson Mandela Metropolitan Municipality
SDF: Spatial Development Framework
SIDF: Spatial Interim Development Framework
SME's Small to Medium Enterprises.

Architectural agnostic manifest

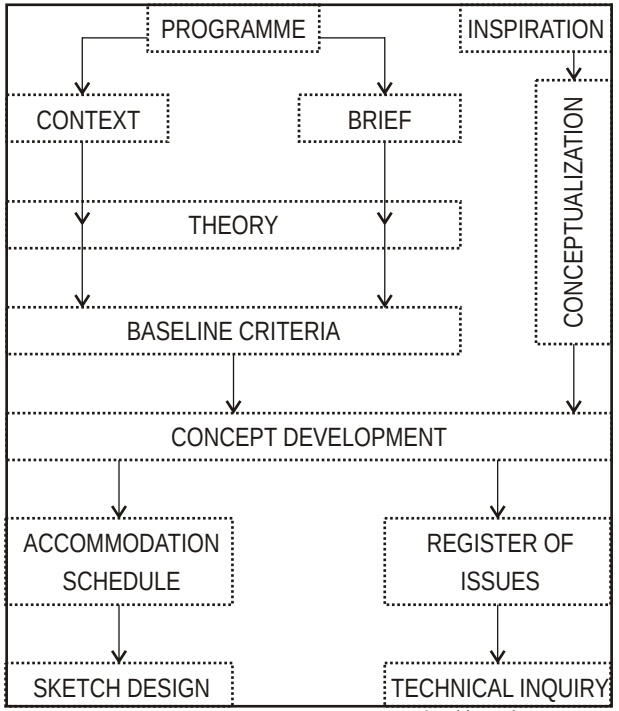
The failed projects of modernism and post-modernism leaves a theoretical void. More specifically the author takes issue with the apparent purposelessness of architecture. At the outset of this project the author ventured a Faustian attempt at relevance. Appendix A is a speculative description of architecture as a market deliverable - a consumer product. It proposes a design method adapted to a production-line view of architectural production. In this view the architect is an integrator of ideas, constraints, processes, implications - his main deliverable is a drawing.

However, during the course of researching and designing this scheme even these sentiments were found not to be watertight. Inevitably the discourse degenerated into questions of poetics and spontaneity, character and meaning, liveliness and above all - Design.

The term 'design' mentioned here refers to the same idea encountered among pre-graduate architectural students and lay-people - consumers of architectural pornography. Design in the sense: "Can you add some design to our house. Design in the sense: "No, it doesn't matter if it works or not - I just want to know what it's going to look like". The architect is the queerly dressed individual with dark-framed glasses always dressed in black - a designer, a critic, a satirist, an esoteric.

At the 2005 UIA congress in Istanbul Peter Eisenmann prophesied the end of this concept of the role of architecture. Our fascination with the ocular - the image - came to a climax with 9/11. Assuming a cyclic trend he predicts that the importance of the visual spectacle will wane (Sobuwa, 2005). It is clear therefore that selling architecture to the free-market gives us a profession that is relevant but not essential. The architect is a fashion designer - his most valuable asset is his opinion packaged in reputation. His career is built on benevolent clients, dedicated to the cause of 'good architecture', which he meets through 'contacts'.

Here is a movement away from art - which uses a moral language to describe itself - *pure* forms, *honest* use of materials, *truth*, *god* is in the... etc - and therefore unfit for the free market (since money still resides outside moral good despite Ayn Rand's every effort) - towards craft - which is fundamentally a method. The architect therefore does not ask *why?*, or in *what manner?* but *how?* The architectural craft, the acquisition of which is deemed to be the main quest of tertiary architectural education is then appropriated as a design method. This design method is a system of sequential activities manifesting non-sequential thinking and can be graphically expressed as in Figure 1. The project presented here is an attempt to apply this method.



Graphic 1. Discourse map

Introduction

If architects are to be seen affecting social, economic, urban and aesthetic prosperity, I maintain that they get themselves co-opted by those patrons with a similar mandate - local government. Two recent developments in the windy city of Port Elizabeth hold promise for the realization of such lofty goals: The Interim Development Plan released by the Nelson Mandela Metropolitan Municipality (NMMM) and the establishment of The Madiba Bay Development Agency (MBDA). The following is an attempt to carve a project from the deluge of 'challenges'.

Nelson Mandela Metropolitan Municipality

The NMMM Interim Development Plan (currently circulated for comment) has set itself certain economic development interventions as goal: The following selection pertains to the current investigation:

Development and promotion of SMME's as well as tourism. Trade and investment promotion. Procurement and market development.

Tourism: Efforts to attract tourists focus on an international market (HSRC, 2001): United Kingdom; Germany; France; Benelux (Belgium, Netherlands and Luxembourg) and emerging markets: Central and Eastern Europe; United States; India and Africa.

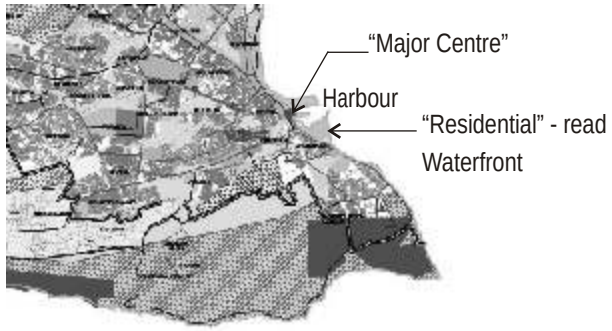
The Eastern Cape Tourism Master Plan affirms that business and tourism development zones are to be matched with each other. It also seeks to attract investment for the building of new hotels or for the upgrading of existing hotels. Also, the areas that are seen as strengths are beaches, shopping experiences and other entertainment attractions of city life.

The NMMM sees itself as an attractive venue for investment, development and conferencing.

The NMMM sees its cultural heritage residing in Xhosa villages, British, Dutch and German settlements as well as the early decades of European colonisation focusing on a heritage of Victorian buildings.

Specifically, the Port Elizabeth Regional Chamber of Commerce and Industry seeks to answer the South African competition in conferencing. A new high-tech multi-purpose conference centre in Port Elizabeth should be a cost-competitive project to increase PE's capacity to provide a “much needed, one-stop shop for conferencing needs”. It would also add mass to the value of the developments at Coega, as well as those such as Madiba Bay and the Statue of Freedom. (Nelson Mandela Bay Review).

The Interim Spatial Development Framework is a document currently being circulated for comment by the NMMM. Graphic 2. shows a zoning plan for the entire NMMM. Of specific interest here is the so-called Major Centre envisioned in the vicinity of the campanile. It will therefore be assumed that the city planners see this as a growth point and allowances for traffic impact, utilities, zoning and supporting services will be upgraded for the development of a “Major Centre”.



Graphic 2. Spatial Interim Development Framework, for the NMMM

Madiba Bay Development Agency

Based on the development agencies of Sweden and France, the MBDA was established in December 2000 to co-ordinate a range of projects that would “re-invent” the inner metro area to make it pleasant to visit and valuable to invest in. apart from an as yet unprepared Redevelopment Master Plan for the demarcated are, the agency have been set the following goals that pertain to the current investigation:

Removal of the oil tank farm; Removal of the manganese ore loading facility; Removal of the Settler's freeway; Development of a comprehensive public transport system and facilities; Location of the Nelson Mandela Freedom Statue; Rehabilitation of the Lower Baakens river valley; Redefinition of the role of the existing

harbour and its railway stations (main line and Apple Express); Attracting public, private and international funding and partnership; Govan Mbeki Avenue, CBD, Strand street urban design and redevelopment; Lower Baakens river valley Main railway station King's beach redevelopment; Establish a civic character in the metropolitan area.

Furthermore the agency should be self-funding and as financially independent as possible within a short period of time. Lastly the agency must ensure effective and sustainable urban development and reverse urban decay in the demarcated area. A secondary role of the agency is that it will become “a major source of income for the municipality. The projects are therefore primarily focused on being reliable sources of income”.

Aspirations summarised

From this synopsis of the real-world problems a brief summary can be made of categories of needs.

1. Tourism

1.1 Focus on an international market

1.2 Location of the Nelson Mandela Freedom Statue

1.3. Match tourism and development zones

1.4. Build new hotels and upgrade existing ones

1.5. Provide entertainment attractions associated with city life

1.6. Develop conferencing ability by way of a new conference facility that:

1.6.1. Answers competition of the South African market

1.6.2. Is a high-tech multi purpose facility.

1.7. Celebrate cultural heritage as evidenced in local Xhosa, British (Victorian and Georgian colonial), Dutch and German settlements

2. Urban regeneration.

2.1. Re-invent inner metro area,

2.2. Removal of the oil tank farm

2.3. Removal of the manganese ore loading facility

2.4. Development of public transport systems and facilities

2.5. Rehabilitation of the Lower Baakens river valley

2.6. Redefinition of the role of the existing harbour and its railway stations

2.7. Strand street urban design and redevelopment

2.8. Improve quality of business, residential and tourism in the designated area

2.9. Reverse urban decay

2.10. Provide an example of sustainable urban development.

2.11. Development of a 'major centre' as indicated on the interim Spatial Development Framework (SDF).

3. Industry:

3.1. Recognition of the automotive industry as a major contributor to the economy of the region

3.2. Facilitation of the invaluable taxi industry because it is often the only means of access for people to jobs and access for industry to labour.

3.3. Facilitation of Small to Medium Enterprises (SME's).

Urban Framework Proposal

In lieu of the above a narrower scenario is necessary for the development of a grounded architectural concept. To this end the author proposes an urban framework. This framework is hereafter assumed to be city’s accepted development strategy and all planning will be based thereon.

1). A 100m grid is overlain on the existing oil tank and manganese ore farm. This Cerdian grid allows maximum freedom severally for each block but gives the whole an urbanised legible structure that extends the CBD. It also promotes a higher density.

2). The Nelson Mandela Freedom Statue is located at the furthest edge towards the breakwater. This allows maximum view of the CBD and its built-up hill profile. To the east lies Algoa bay and shark rock pier in the distance. Further more it allows this monument to be clearly visible and remains enigmatically in the distance while geographically in the heart of the city. The implication of its location for the Nelson Mandela Forum is that it sets up a viewing platform from the south-east. The Forum therefore has to turn a long distance iconic elevation towards the statue.

3). Although zoning is not an essential part of the urban framework, allowance is made for grouping recreational activities towards the northern beach area. Commercial activities towards the harbour and more business like activities towards the CBD.

4). The implication of the above strategy is that the mouth of the lower Baakens river which is essentially the northern-most extremity of the Waterfront development, will already have a more formal character that assimilates the civil heart of the CBD. The river mouth will therefore be a gateway element for the Waterfront. In light of this it is essential that the mouth together with lower Baakens river valley be in an aesthetically acceptable condition. This framework proposes a naturalised setting with planting, landscaping and amenities reminiscent of a river mouth. This should create an amicable setting for the activities of formalised businesses, financial institutions, offices and the like.

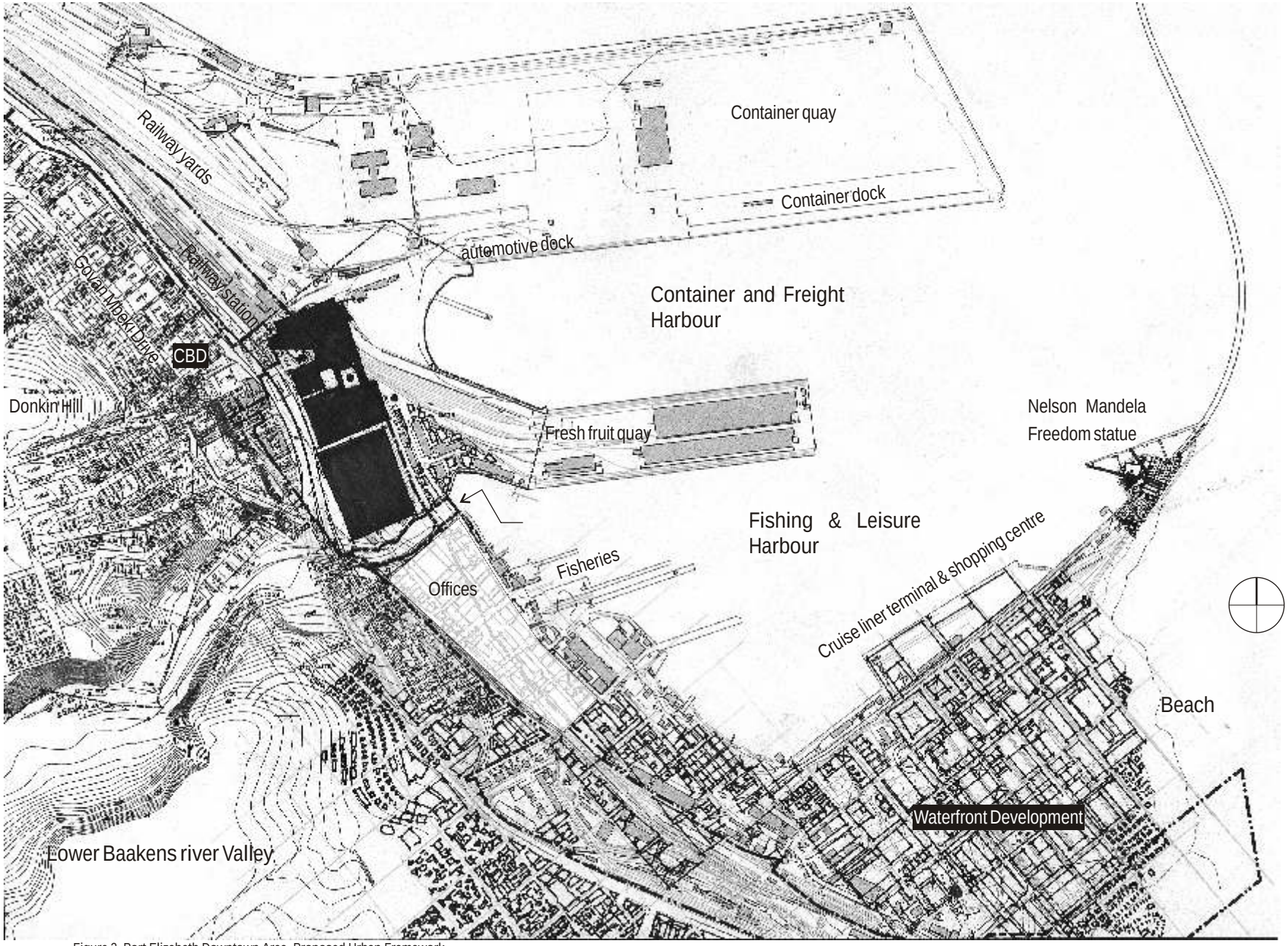


Figure 3. Port Elizabeth Downtown Area. Proposed Urban Framework

Expedient programming

The rational design, as explained above, starts with the gathering and generation of information. Information on the context is gathered and a brief is generated in conjunction with the client goal. Because the amount of information is so vast the architect summarises the contextual reality into a conceptual personality. From this he asks: "What does the site want to be?". It is a synthesis of information. The brief on the other hand is an extrapolation of client needs and confining this explosion of desires into a feasible built form is achieved by asking the question: "What does the building want to be?". Finding a fit between these two romanticised concepts is a compromise informed by theory - See figure 1.

CONTEXT

Introduction

The description of the context here presented is already a reductive design act and should not be regarded as an objective reflection of reality - whatsoever. The architect approaches the site as an undeveloped building project and any description thereof must have at its core information that contributes to the concept. The contextual analysis is already informed by the architect's vague conceptual thinking.

The issues under investigation fall into the broad categories of economy, site and culture.

Economy

Economic considerations are foremost in any human venture. The general drive in any economic system is towards higher productivity whereby less is given in exchange for more - very unsustainable.

The Port Elizabeth economic hopes are pinned on the Coega development to kick-start growth (Andre de Wet, MEC for Economic Affairs, Environment and Tourism. 2005. Nelson Mandela Bay Review. 2004/2005). It is an industrial venture 30km north of Port Elizabeth and consists of a deep harbour (completed) and an Industrial Development Zone. This R3.4b project is waiting for international "takers" - notably Pechiney, a Canadian aluminium manufacturer - to start operating. It promises to bring international trade and business to Port Elizabeth. One could foresee that these activities would benefit from supporting services such as conferencing facilities.

The City has made some effort to make the city a more lucrative place to invest in. Currently a foreign investor sees the following when looking to invest in Port Elizabeth: a Corporate tax rate of 30%, secondary tax: 12.5% - payable on dividends distributed; Local branches of a foreign company is taxed a flat corporate rate of 35,0%; Value added tax (VAT) is currently fixed at 14% although foreign consumers can get VAT refunded. Many programs exist for organizations to qualify for tax-deductible donations and tax-exempt status and foreign direct investment is not subject to South African tax. Capital gains tax is implemented, and there are no significant tax incentives as the policy is to provide tax outside the tax system.

The following services and population characteristics support investments in the Nelson Mandela Bay (NMB) municipal boundary:

- NMB has the legal infrastructure to provide services related to property transfers, contractual arrangements, estate matters and the like.
- Regional offices of all the major financial and insurance institutions are located here, including the government's Reserve Bank.
- Surplus low-cost electricity supply, among the cheapest in the world.
- Ample water supply of excellent quality at low cost.
- Properties can be purchased by foreign visitors and residents at a significant discount compared to similar properties in the western world.
- Unemployment: 55% of economically active population are not able to contribute to economic growth. Normally this means that labour is less problematic as in China and India. This is not necessarily applicable given the lower productivity of South African labour (Author's perception).
- Majority of the area's population is classed as urban. This implies that people are mobile and can function at some degree of social literacy.

Furthermore, Nelson Mandela Bay is a regional centre that serves a hinterland with a population of approximately six million.

Port Elizabeth, like the rest of South Africa, operates under what Thabo Mbeki calls a "Double Economy". This is clearly visible on the streets of Port Elizabeth. A loaf of bread was sold on the side walk of Govan Mbeki drive for *R2* (personal observation, February 2005). On the same day, on the same street, but inside a large chain store a comparable loaf of bread was sold at *R5.49*. There is abundant proof that the president's observation is accurate. It implies a two layered society: one rich - one poor; one formal - the other informal; one concerned with status - the other with survival. Currently the CBD belongs to the latter - masses of poor people using taxi's and buses to get around. Conventional buildings are mostly occupied by civil offices and large semi-public institutions. The rich are fled to the perimeter of the city.

Figur 4. Bourgeoisie dreaming: the top-side of the double economy promoting a leisurely lifestyle in a natural setting serviced by the friendly "locals".

Figure 5. Proletariat nightmare: the bottom part of the double economy 'existing' inside the caverns of civil structures like the central bus station.

In the words of Jonathan Mercer, planner at the Madiba Bay Development Agency: "Port Elizabeth is a blue collar town". Port Elizabeth has at its economic core the activities of industry - specifically automotive manufacturing. This fact is very clear as one enters the city from the N2 which passes the Coega Development and goes through an intensely industrial zone - called the Deal Party - before entering the CBD which is also not free from industrial elements.

Figure 6.

Figure 7.

Figure 8.

Figure 9.

Figure 10. Industrial activities are the hallmark of the Port Elizabeth economy. Even the more central parts of the city are not free from industrial ventures

Site

1. Location.

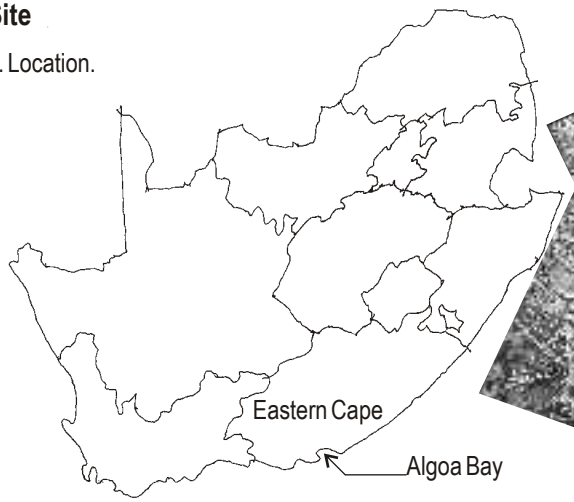
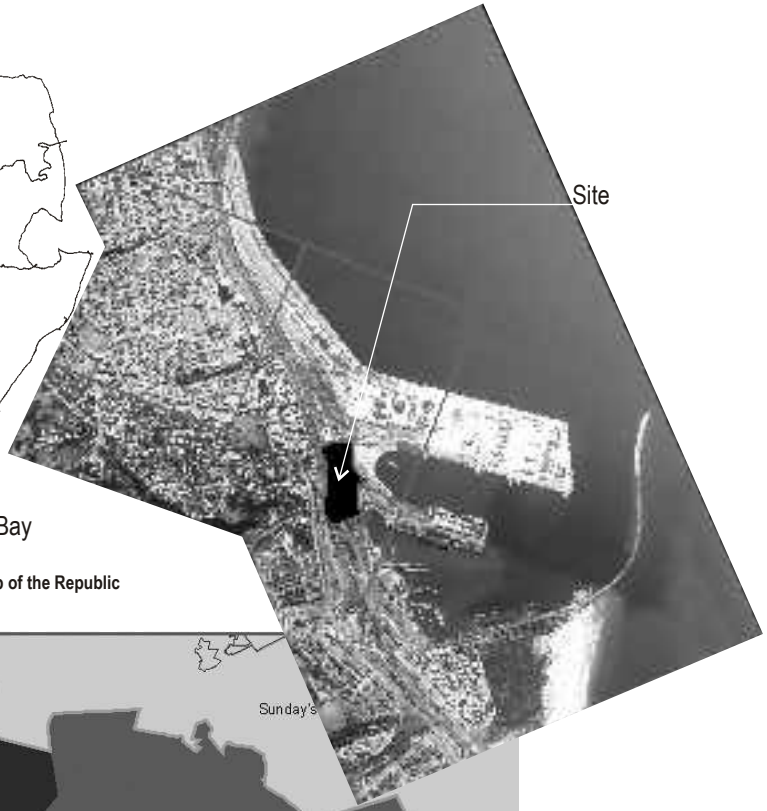


Figure 11. Map of the Republic



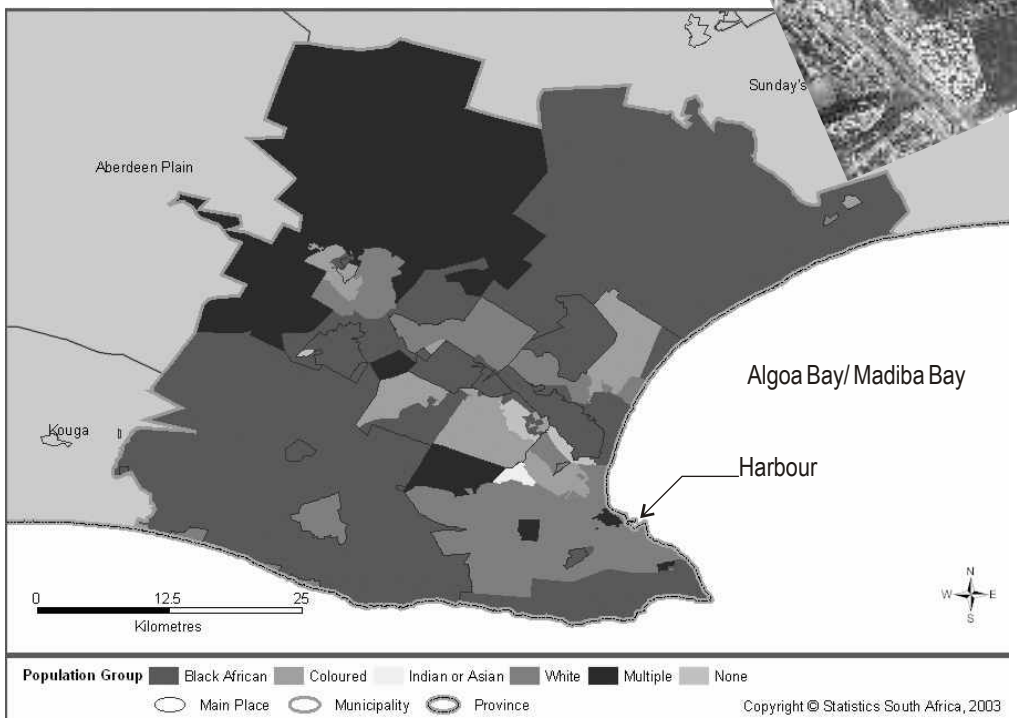


Figure 12. Map of Nelson Mandela Metropolitan Municipality showing "population groups". Note the significant portions of "Multiple".

2. Terrain description.

The site is an un-proclaimed (legal/ urban) piece of land on grounds belonging largely to Spoornet, cutting the harbour from the CBD. It lies on man-made/ reclaimed soil that was formerly beyond the high-water mark. The site and its surroundings will be discussed by way of a numbered description of figure 000.

A) The Campanile: completed in 1923 to commemorate the British Settlers it is probably Port Elizabeth's most identifiable landmark. Today it stands as a mere afterthought and enjoys no spatial hierarchy - despite its height. Its surroundings completely ignore its presence. But it was not always like this.

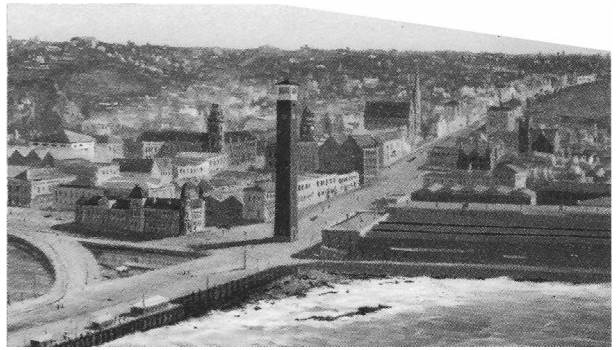


Figure 13. Painting by Ron Belling 1928.

As figure indicates, the Campanile was originally built in the middle of the road leading into the harbour. This east-west axis was crossed by a north-south consisting of the beach line and reinforced by the Train Station. The crossing point of these axes was marked by the Campanile. It stood as a marker in narrowly bounded space. Assume that this is, spatially, the Campanile's 'natural' environment - or at least its original setting.

With the reclamation and establishment of the new harbour the Campanile remained the centre point of the cardinal axes that passed through it. However, smaller qualitative changes were made. The Campanile became more of a

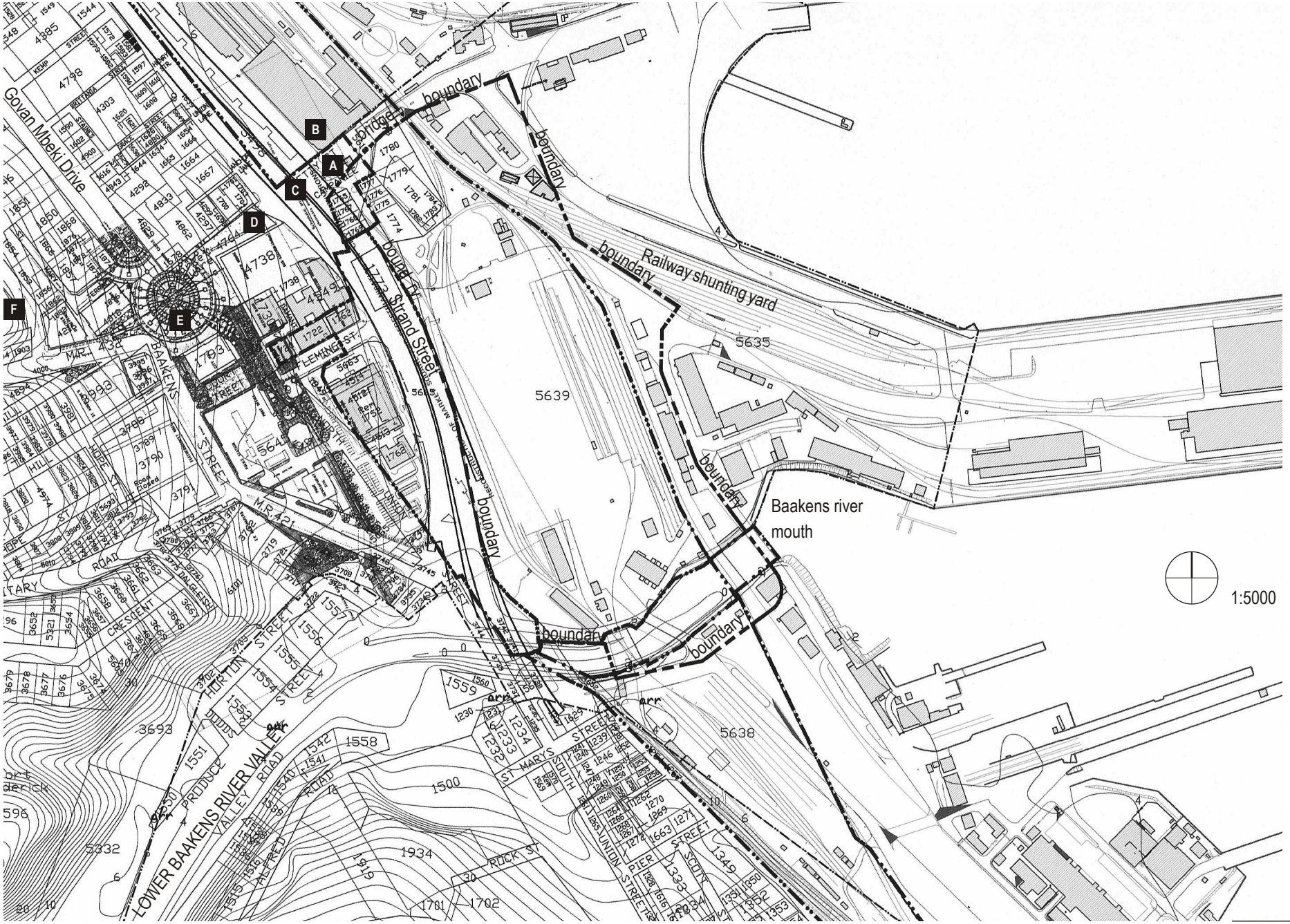


Figure 14. Drawing of the surroundings of the site

Figure 15. View from the jetty west towards the Campanile, Market square behind it and Donkin Hill in the Background.

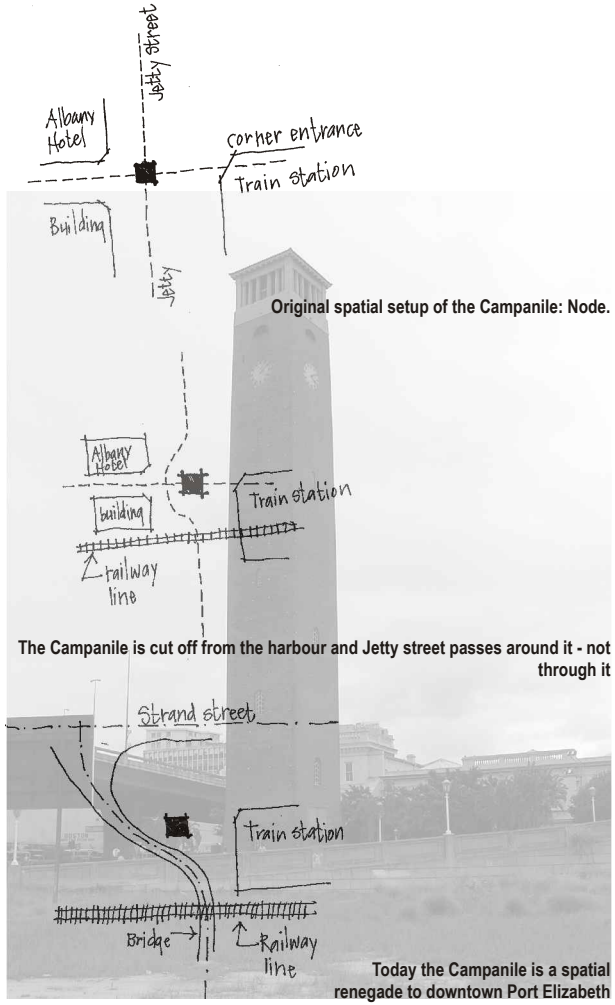
Figure 16. View of the newly reclaimed harbour and the new bridge over the railway. The Campanile remains mid-stream to any movement around it.

Figure 17. Most recent developments around the Campanile has seen the demolition of the Albany Hotel

'gateway' element to the entrance of the harbour - the dividing line between the city and the harbour being the railway line. The railway line is not an axial element as much as it is an 'edge' element.

Another alteration, so small that there is little recorded of when and why it happened, was the real end to the spatial layout so fitting to the Campanile. Jetty street that passed on both sides of the Campanile was cut off to the north of it. Movement therefore, only passed *around* the tower and not *through* it anymore. This effectively side-stepped its nodal significance and was 'moved' into a dead corner behind the station.

In a last act of humiliation some landscaping features were built at the foot of the Campanile. This was part of a municipal 'pedestrianisation' effort in the late 1980's that also saw the establishment of circular brick paving on Market Square. These bricked up semi circles of dirt and palm trees only reinforce the Campanile's motionless environment. Its only redeeming feature is a narrow walkway between itself and the train station that accesses the bridge with a non-descript concrete stair.



B) The Port Elizabeth train station is a long and low building parallel to the harbour and Strand Street. It receives passenger trains but is also a depot for long distance buses to and from the rest of the country. In keeping with this, long distance taxi's have also established themselves on the doorstep of the station. The elevated expressway that rushes past the CBD towards the beach resorts also pass by the station. All in all, the station is an arrivals landmark for anyone entering or leaving the city - apart from the airport which is also only a few kilometre away. Together with the Campanile it is a gateway element to the harbour.

Figure 18. Southwest elevation of the Port Elizabeth Train Station

Figure 19. Interior perspective of the waiting area of the Station. Access to the perron can only be gained via a gate through a 'cheap and nasty' palisade fence made of devil's fork steel sections. These 'temporary measures' detract from what could be a pleasant experience

C) Settlers Freeway. Port Elizabeth's elevated freeway was built in stages over several decades only to be hated by its populace. Most recently the Major has asked for an investigation into the feasibility of demolishing it. The author maintains that it is not the freeway, but the dead-end edge condition - mainly caused by the railway line, that gives the ocean-edge of the CBD its characteristic gutter appearance. There is ample evidence that the freeway can be regarded as an asset to the city - not only in the sense of the infrastructure it provides (Motorised inhabitants proudly laud the ease with which they travel from one part of the city to the other in 15 minutes), but also the many opportunities for shelter to informal ventures it allows.

Figure 19. Strand street below, Settlers freeway above, the city to the left and people in between

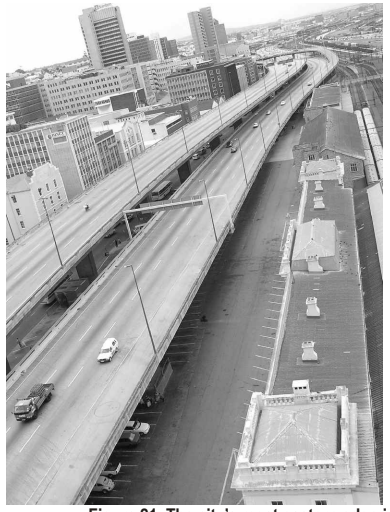


Figure 21. The city's most eastern edge is defined by the freeway. More significantly though, access to the shoreline is denied by the railway line just beyond the freeway. The freeway gives fast access to any part of the CBD. Would it not be beneficial if a trend of going through under the freeway could be established?

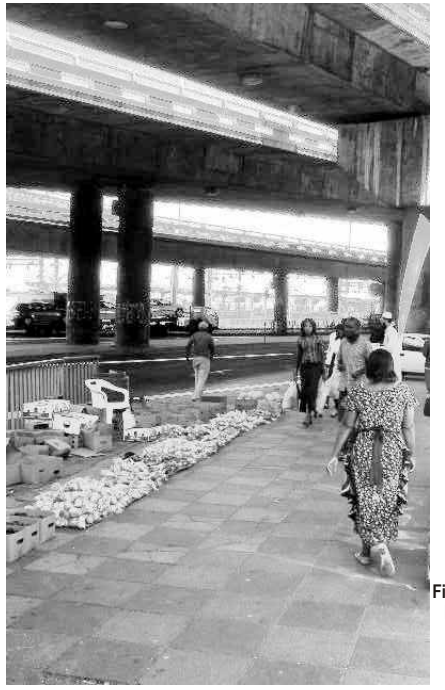


Figure 22. For some, the Freeway is a city-sized roof under which one can trade and prosper

D) Central bus station. The station houses the very efficient Algoa bus service. During peak times the station is a hub of human activity despite its hardened setting. After school it becomes a playground with soccer balls flying over slow moving buses and protective parents chattering away on the benches. This dark, noisy, diesel-fume pervaded hole would greatly benefit from demolishing the part of its roof that does not support the Norwich centre above. Instead a large staircase could be built that connects Market square to Strand street and the Campanile square. This would open up the station to more natural light and ventilation. Light canopies could protect pedestrians along its northern shopfront.

Figure 23. Interior view of the Algoa Bus Station.

E) Market square. The 'Mayor's garden' is the heart of Port Elizabeth's civil arena. Govan Mbeki Drive terminates into it from the north and Whites Road from the west which makes it the centre point of the CBD to the north and Donkin Hill precinct to the west. It is enclosed by the City Hall to the south (which was rebuilt after being burnt to the ground), the C.M.L. Building to the southwest (which houses some important civil functions), the beautiful Library to the northwest, union castle corner to the northeast and Norwich house to the east - which effectively dominates by its size. It received a circular brick paving installation during a pedestrianisation scheme in the late 1980's which served to galvanise its significance.

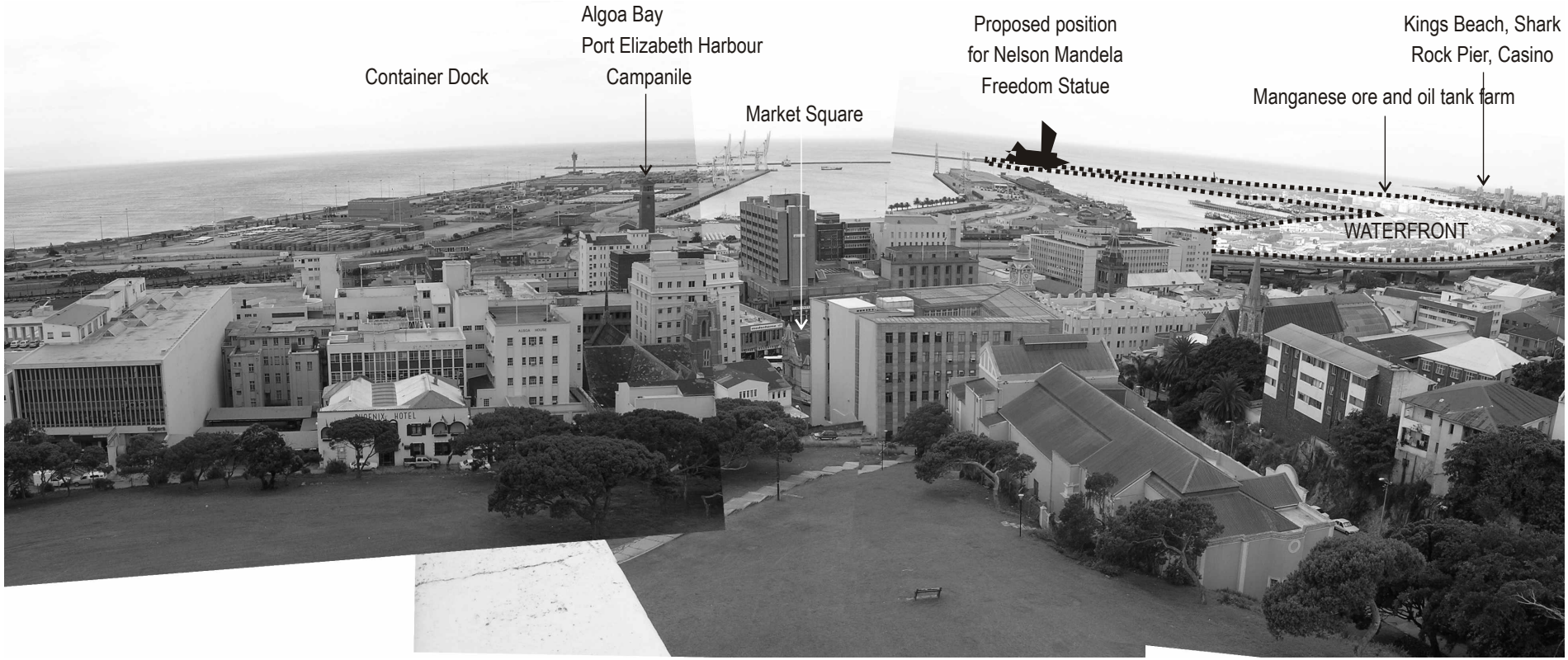
Sadly though, probably in an effort to keep the square "picture perfect", its connection to the harbour bridge and the Campanile was severed by a concrete platform that forms the roof of the bus station. This platform also hides a little shopping mall - Traduna mall. To get down to Strand street from the platform one has to climb a set of concrete stairs suspended over the bus station entrance. Alternatively one could jump into, what seems to be a make-shift hole in the platform, that leads past the "underground" remnants of the quant shopfronts to the station below.

One of the important tasks of this project would be to establish a functional connection between Market square and a first touching point towards the planned Waterfront development.

Figure 24. View of Market Square from the west. Norwich house/ Kwanto towers dominate through size. To the right lies the reserve bank. On the left is the back of the Library. The Campanile remains a strong reminder of that which lies beyond the square's eastern edge and the freeway - the harbour.

Figure 25. The connection with the Campanile and the harbour entrance is effectively severed by the platform that extends towards the freeway over the bus station below. A make-shift hole leads to the underground. A make-shift sign reads: "Police vehicles only - no entrance" - a police station, whatever for?

F) Donkin Hill. The Donkin Hill memorial and the light tower are significant features of the Port Elizabeth landscape. The stone pyramid of the Donkin memorial is not only a reminder of the heartbroken sir Rufane Donkin's young wife Elizabeth Donkin, but is also the most recognizable landmark of Port Elizabeth's historical district. Apart from the well-known staggered units to north there are other distinctive buildings and streets in the area including fort Frederick. The view from the Hill towards the Campanile is also significant in that it connects the light house to its previous *raison d'etre* - the harbour.



Group of Figures 26. The view from Donkin Hill and the beautiful historic neighbourhood that surrounds it

3. Precipitation, wind, temperature: Port Elizabeth falls within a all-year rainfall region and receives 574-725 mm mean annual precipitation.

The city is known as the windy city with good cause. Winds of near-gale strength is an everyday affair. Complete window casings can be found on the pavement next to some buildings after such a spell of gusts. The combined effect of the two abovementioned characteristics is a driving drain from the southwest and most buildings in the region, especially the harbour, have considerable pitch. Furthermore, the coastal environment is highly destructive to all building materials because of the simultaneous presence of water and oxygen (oxidation) and the acid attack that accompanies the sea-water. Additionally, once atmospheric moisture has penetrated a building's fabric the salts will accumulate and expand over time to cause blistering - a force strong enough to disengage concrete from its reinforcing.

The variation in temperature in Port Elizabeth is relatively small compared to inland regions because of the large body of water - the ocean - that absorbs variations over the diurnal and annual cycle.

Figure 27. This beautiful Art-Deco balcony have just about rusted and blistered away.

Figure 28. A complete window casing came loose during a brief spell of gusts

Figure 30. Wind is a strong shape-giving force in Port Elizabeth.

Figure 29. Wind roses for P.E. Indicating high strength winds from the southwest

4. Geology and soil: The site's grade level is man-made and carrying capacity - according to the NBR - may therefore not be assumed and should be subject to a rational test.

The sub-soil geology is Arenitic - sandy. This indicates a low load carrying capacity. It is inadvisable therefore, to build tall concentrated loads on the site. Development will be cheapest - in terms of foundation costs - with a squat building that spreads its weight over a larger area.

5. Vegetation: The city of Port Elizabeth lies at the junction of three major South African vegetation zones, namely Karoo-, fynbos- and valley bushveld-biomes, with coastal vegetation on the sand dunes (NMMM Economic Report). ENPAT states that the site is within a vegetation zone called Alexandria forest. These descriptions are, however, nominal as vegetation growth on and around the site is sporadic - at best.

6. Services & Utilities: electricity, water, sewer, stormwater drainage, data:

The Nelson Mandela Metropolitan Municipality is a reliable services supplier to Port Elizabeth: Electricity can be bought at extremely low cost. There are doubts however, as to how long this supply can be maintained with South Africa's current number of power plants. A nuclear power plant is currently in the pipeline (Pebble Bed Modular Reactor). It is not feasible to consider solar panels or wind driven generators as they do not compare well with the cost of conventional municipal current - yet.

Water too is extremely cheap, by world standards, and of a high quality. It can be acquired from the NMMM at an acceptable pressure level.

Sewer processing is problematic at the harbour.

Although the National Ports Authority provides a service and runs its own plant, it is doubtful whether it has the capacity to cope with an international congress centre. NMMM can provide the service but only from a certain height to which it has to be pumped. Here too the capacity of the municipal pumps may require upgrading at the developer's cost and consideration should be given to installing and operating a dedicated plant.

Storm water flow can be piped to the Baakens river or into the harbour.

Land-line Telecommunication is provided throughout South Africa by Telkom - a national monopoly. A Second National Operator is apparently in the pipeline but cannot be accommodated in planning at this stage. Other, very competitive, alternatives exist in the line of satellite and cellular technology. In terms of planning the difference between the abovementioned implies how the data signal enters the building - either by an underground cable or by a dish on the roof. Inside the building data will be distributed with fibre-optic cables. In this regard radio signal is also becoming a viable option and requires much less infrastructure although it is doubtful if radio signal have the same capacity as a fibre-optic backbone.

Culture

A description of the people who are interested in and affected by the current project is necessary in order to avoid developing an inappropriate building. This social profile will focus on the metropolitan area. It should be remembered that the purpose of an international congress centre is to attract international clientele and their character, requirements and expectations are foremost. Even though the marketing appearance of the project is aimed at a globalised/ western civilized population, the local populace is regarded as an important stakeholder in guaranteeing the success of the centre through their employment effort. The factors under consideration include population density, employment and access to services. The data given below are derived from the census 2001 results.

Population

The Nelson Mandela Metropolitan Municipality consist of approximately 1 000 000 people, the majority of which reside in formal housing supplied by government such as Soweto-on-sea. The majority of the population (57%) are isiXhosa speaking and 60% of the population are Black African while 23% are coloured and 16% white. 30% of the population are Afrikaans speaking and 12% speak English. The largest portion of the population 37% fall between the ages of 14 and 34 while the older labour force , with ages between 34 and 64, make up 31% of the population. A strong work force is thus available in the area.

Employment and household income

According to the 2001 census, only 42% of the population form part of the total labour force, although only 22 % of the total population are formally employed. 5% of the total population over the age of 24 does not have any schooling, while 45% have levels of education higher than primary school.

Access to services

46% of the 260 800 households in the area has access to potable water in their homes, while 33% have access to clean water in their yard. Of the remaining 21%, 18% has access to water within 400m of the homes. 79% of the population have access to flush toilets in their homes, however 14% still makes use of bucket latrines. Pit latrines and chemical toilets make up the remaining 7%.

The information above implies a rather improved situation from a decade ago in which the majority has access to basic services, including sanitation and education even though 60% of the population was previously disadvantaged, having not enjoyed the 'benefits' of western culture. This may be indicative of the tendency to easily accept the western capitalist values and technology.

Considering this background, the acceptance of an international congress centre, could be tentatively assumed. A systematic and controlled integration between the international clientele and the local population - in spatial terms - would however still be important in order to accommodate different levels of western cultural literacy - which would be the mainstay of the centre's activities. Although these sentiments betray the author's privileged, cultural elitist nay, racist colonist paradigm, the approach is still deemed relevant.

The question therefore arises, as with all developments of any kind in South Africa: How should the threshold manifest between poor and rich, African and Western - ultimately - **black and white?**

BRIEF

Introduction - a normative position

The following instructions constitute the mandate of the architect. It is not a project specific design product yet. It is a template that generates the research that informs the design concept.

However, it will be clear that this document already bears traces of a normative position on the role of architecture in an organization, in the built environment and in the society beyond the project's boundary line.

In brief, architecture is assumed to exercise the following influence:

- Protection of humans from the natural environment.
- Protection of people from other people.
- Development of an environment conducive to human activity - productivity
- Contribute to the quality of the environment outside the artifact: Appearance, Emission, urban environment, natural environment.
- Manifest social values
- Manifest cultural values
- Manifest spiritual values.

Civilization impels individuals and organizations to produce higher values in each of the above categories but in reality these forces have contradicting implications. Therefore the architect, as agent to the client's effort in achieving these goals, endeavours to find the most suitable compromise through a rational planning exercise.

The planning exercise starts by systematically stating objectives. This statement of objectives is called the brief.

To this effect a brief is required for the development of a conference centre for Port Elizabeth:

1. Establish through research the requirements of an international conference centre.

1.1 The research will be based on an analysis of the international conferencing market with which the centre has to compete.

1.2 Deliverables required from the market analysis:

1.2.1 Recommendations will be put forward regarding:

a) Number and nature of facilities required.

b) Size/ capacity of each facility

c) Specify levels of supporting services required.

d) Specify capacity of supportive elements to achieve the above mentioned levels of service.

1.2.2 Qualitative description of an appropriate response to competing centres.

2. Translate findings of the market analysis into verifiable baseline criteria consisting of:

2.1 A schedule of facilities

2.2 A schedule of elements

2.3 A list of features

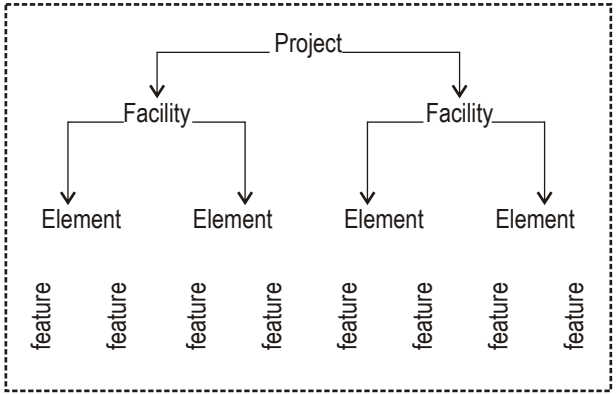


Figure 31. Project content

3. Establish criteria for the following design requirements:

3.1 Structural safety, stability and serviceability.

3.2 Fire safety and compliance with fire safety regulations

3.3 Environmental control:

a) Moisture

b) Air movement

c) Daylighting and electric lighting

d) Thermal comfort and thermal installations

e) Sound

3.4 Utility services:

a) Water supply

b) Sanitary appliances

c) Drainage

d) sewage disposal

e) refuse collection and storage

f) electric power

g) telecommunication

3.5 Circulation: establish performance levels for the circulation of people including:

a) programmatic functions.

b) service.

c) arrival and departure.

d) Parking requirements

3.6 Establish performance criteria for the following building elements:

a) Substructure/ foundation

b) Basement

c) Superstructure

d) Roof

e) walls (skin and partitioning)

f) openings

g) finishes

4. Establish criteria for an appropriate response to the built environment context of the development.

a) Protection and celebration of heritage in the built environment including buildings, spaces, movement patterns, rituals, cultural events.

b) Support of small to medium enterprises.

c) Develop the quality of the surrounding urban environment.

5. Establish norms for the appropriation of values adapted from any development framework to which the project is subjected.

Conclusion

Summary

The following deliverables are required in response to the instructions given above:

1. Market analysis
2. Baseline Criteria

MARKET ANALYSIS

Introduction

The primary sector of the NMMM is the automotive industry (Matomela, Dineo, 2005. "Local industries get boost with university's new robotics facility." The Herald. 4 February, p6). The Coega development also promises to further the region's industrial and business activities (Booyens, Johan," Coega skep geleentheid vir sakelui." Beeld) but according to the Municipality's Long term plan, Vision 2020 , more investment will go towards the tourism industry. Furthermore the Municipal council have already committed to the construction of a conference centre to serve local and international markets ("Super conference centre plan: R392m project will provide thousands of jobs." Vision 2020 - supplement to the Herald and die Burger: Monday, February 7, 2005."). Current plans indicate a 12'730m² facility with a 900 seat auditorium, smaller meeting rooms and some public areas. It is envisioned together with the Nelson Mandela Freedom Statue. According to the Vision 2020 report, international studies have shown an employment gain of 5'282 people during the construction process and 3'678 within 5 years. It is hoped to contribute to the GDP around R5'2m during the year of construction and R4'8m in its 5th year of operation. It is referred to as an International Convention Centre. The study have shown that Africa has a 3% share of international meeting market. Also an additional 500 hotel rooms will be required. The biggest problems for the idea of a convention centre in PE, as the report indicates, are the environmental impact, getting the combined loan funding from government and the NMMM and lastly, getting public support - of which last mentioned is surely the only real threat to the idea. The project hopes to "propel the metro to the status of one of the leading centres for the convention business around the globe." - not likely

This kind of argument reminds one of similar dreamy data generated around the Cape Town International(?) Convention Centre - The CTICC generated R1.2b during construction. KPMG was commissioned to determine a feasible size for the project but their financial virtuoso indicated a facility that was substantially enlarged by the time construction was finished (size and value increased by 40% (Reily, 2003); The 1'500 seat auditorium was not included in the original design! (Architect and Builder, July/ August 2003) This tendency to think too small has now led to the CTICC being unable to serve its purpose: "...the size precludes many international exhibitions which demand more than twice the space provided."(ibid)! If the NMMM is using the same patterns of thinking to determine the scope of their international conference centre it is certainly ignoring precedent. A more thorough search of the international convention business is required to determine an appropriate accommodation schedule that will "propel the metro to the status of one of the leading centres for the convention business around the globe."

"An international convention centre enables a city to break into the lucrative market of business tourism...the need for organisations to gather at conferences and conventions continues to rise." (Davis Langdon & Everest, 2000).

According to ExPact2004 Convention Expenditure & Impact Study conducted by the International Association of Convention & Visitors Bureaus (IACVB) convention delegates spend $266 per day, or $945 per event, over an average of 3.6 nights (Tormohlin, Sept 2004). 80% of delegates stay in a hotel during the convention.

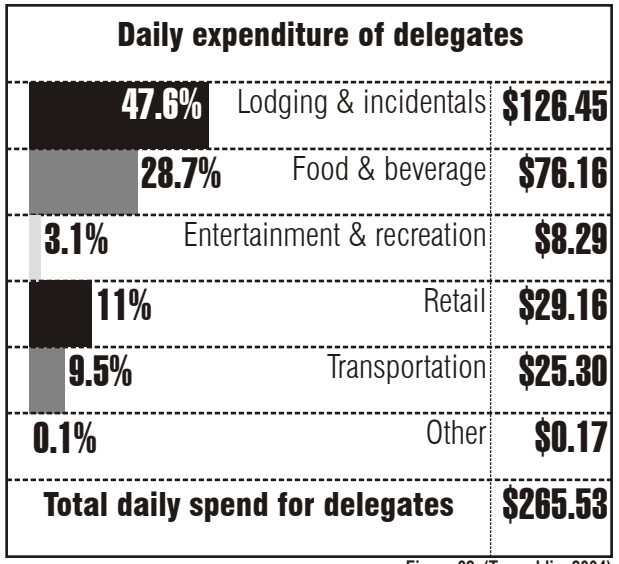


Figure 32. (Tormohlin, 2004)

These spin-offs are the real benefit of convention centres. Convention centres rarely make a profit "within the walls."(Ordonez, 1994). Don Jewel, an American facility consultant, says that even the most successful centres like the ones at Anaheim and San Francisco operate at a loss (Ordonez, 1994). David Langdon says considering that convention centres are expensive to build and operate, they have to be flexible so that a wide range events can be accommodated from concerts to trade shows in order to keep the centre as busy as possible (Langdon. D, Everest, Nov 2000. Building).

Furthermore the average sized convention centre is growing ((Heather Kirkwood. September 2004). Using the American market as a benchmark, a need has been identified for a mega exhibition hall of at least 100'000m².

Does the market really need such large spaces? What else do exhibitors think of when selecting a venue? A recent study (Tormohlen. D. December 2004) has categorized the three most significant exhibition organisers and listed their reasons for

leaving a city venue - in order of importance:

Trade association/society:

1. Lack of attendance draw from city or region
2. Event outgrew **size of exhibit hall**
3. Labour issues/costs
4. Exhibit complaints
5. Attendee complaints

For-profit show producer:

1. Lack of attendance draw from city or region
2. Exhibitor complaints
3. Event outgrew **size of exhibit hall**
4. Rental cost of facility too high
5. Labour issues/costs

Corporate event management:

1. Lack of attendance draw from city or region
2. Event outgrew **size of exhibit hall**
3. Member complaints
4. Wanted to try a newly upgraded or newly built facility
5. Labour issues/costs

From this it is clear that the most important selection criteria for the selection of a venue is the crowd that it can draw. The Nelson Mandela Municipal Metropole certainly does not contain the kind of paying crowd that such an exhibition needs, being in the poorest province of a country in the poorest (sub-Saharan Africa) region in the world. The strategy would then be, given an adequate facility, to host events of such size that their catchment area should extend beyond the saturated boundaries of the country or the region to that of a global market. A small venue like the one currently envisioned would certainly make all the benefits available that can be gained from any form of public spending: job creation, GDP contribution, skills acquisition - but an opportunity for greater gain might be missed albeit at much greater risk. Maybe the risk will be diminished by taking a look at what is happening in the Meetings Incentives Conventions and Exhibitions (MICE) market: What does this market look like? Considering the lack of readily available data on more representative markets the author here quotes research into the American market (Tormohlen. D. December 2004):

What type of organization do you work for? How much exhibit space (in net square feet) does your show require? How many attendees does your show attract? How many room nights does your show generate? What type of events is produced by your organization?

Figure 33. (Tormohlin, 2004)

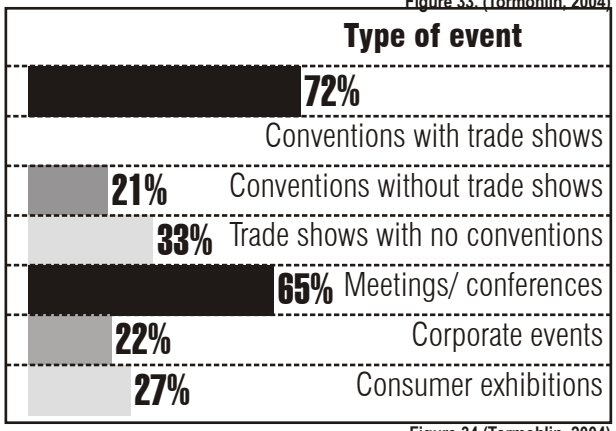


Figure 34 (Tormohlin, 2004)

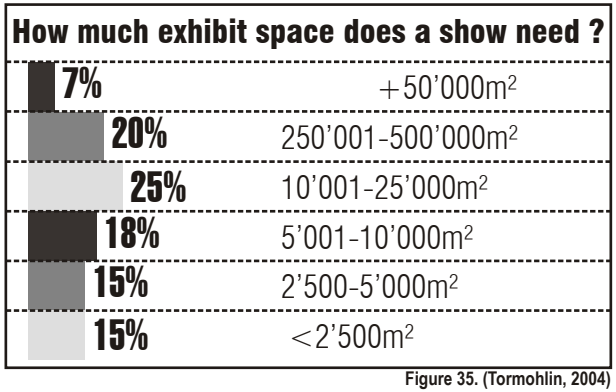


Figure 35. (Tormohlin, 2004)

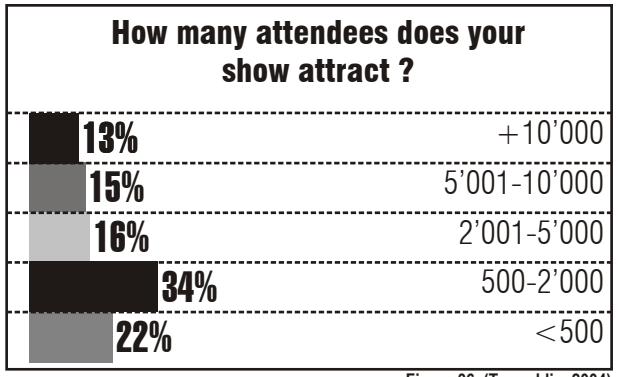


Figure 36. (Tormohlin, 2004)

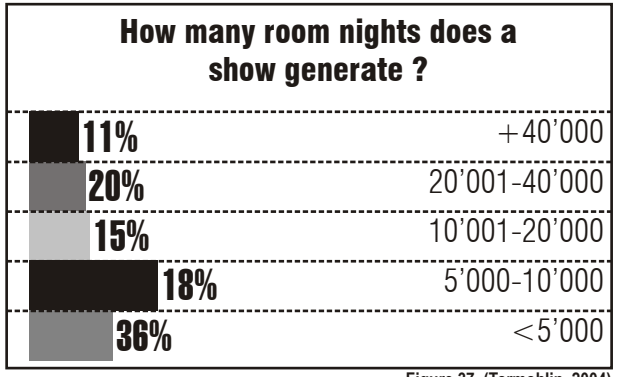


Figure 37. (Tormohlin, 2004)

As an indication of what the American market has found to suit this environment, in terms of facilities, a list of venues below were nominated by the board of directors of the Trade Show Exhibitors Association (TSEA)((Kirkwood. H, June 2003) - the criterion being the ease of use of the convention centre, the skill and cost of labour, the affordability of hotels and restaurants, the accessibility of transportation, and convention centre services:

Anaheim has 75'716m² of exhibition space and a 12'077m² ballroom. There are 10'000 hotel rooms within walking distance.

Atlanta's centre (362'321m²) is surrounded by the city's attractions and has 130'000m² of exhibition space in 12 halls. Internet, phone lines, utilities and other services can be

ordered from the centre's website.

Chicago's centre benefits from the city's rapid transit system and 6,700 cabs and has 260'127m² of exhibition space and 18'580m² of meeting space.

Dallas's centre has **92'903m² of column-free exhibition space**. It also features many **high-tech features**, such as video conferencing, Web casting, equipment rentals, dedicated modem lines and instruments, ISDN, DSL, T-1 and T-3 connections.

The Las Vegas centre has **185'806m² of exhibition space**.

The New Orleans centre has **102'193m² of exhibit space**, including a **4,000-seat conference auditorium**, state-of-the-art fibre-optic capabilities and 140 meeting rooms. Trolleys take visitors to **nearby tourist attractions**.

At Orlando's centre electrical, plumbing, lighting and rigging can be ordered on the centre's website. Trolleys take visitors to some of Orlando's sites.

The San Diego centre is located in the CBD and offers delegates **views of the ocean** and the city. Trolleys take **visitors to tourist sites**. The centre has a **49'000m² exhibit hall** and a 8'360m² Sails Pavilion. **Logistics** are made easy by 50 loading docks, eight direct drive-in access doors, on-site storage for empties, and multiple freight and service elevators.

San Francisco's **112'000m² centre** is the focal point of the city's **cultural precinct** with restaurants and museums.

Washington Dc's centre, **located between an historic and revitalised district**, has **650'000m² of exhibition space**, **11'613m² of meeting space**, a **4'830m² ballroom** and **4'088m² of shops and restaurants**. **Logistics** are made easy by 60 enclosed freight docks. High technology capabilities makes it suitable for 'tech' shows and crowds. The centre has its **own Metro station**.

A reasonable person might object to citing these examples in the context of the same region that J.M. Coetzee describes in his Booker Prize-winning novel, *Disgrace* but other regions have been well rewarded for taking such bold leaps. The modest city of Ruili in Yunnan, Southwest China, has only 60'000 residents but attracts more than 800'000 foreign visitors a year from Thailand, India, Pakistan and Myanmar as well as 850'000 domestic visitors. Ruili spent 10million Yuan to improve roads and has a water sprinkling festival and actively promotes its local farms, tropical environment and its local jewelry manufacturing (Kotler, Makens and Bowens 1998: 648 in Heath).

While South Africans sit around sulking about not living in a first world country others are moving. A $2bn development project was launched in Rabat, Morocco as a collaboration between Dubai Holding from the UAE, Caisse de Depot et de Gestion and SABR management. It will be the largest of its kind in North Africa. In an attempt to turn the Bouregreg area into a tourist destination the project will include a convention centre targeting international events and conferences. Also included are theatres, a harbour for yachts, five star hotels and resorts, apartments and shopping malls - Fortune favours the bold.

Should one then be interested in entering the international market a word of caution would not be out of place. In the words of Jack Welch - "If you do not have a competitive advantage - do not compete". Table 000. indicates what the international playing field looks like.

PLANNED CONSTRUCTION (FUNDING APPROVED)

Facility name	Construction details	Estimated completion date
Kansas City convention & entertainment Centres, Kansas City, MO	Adding **3'700m² ballroom**	2007
Morial convention centre, New Orleans	**148'645m² exhibition space**	2008
Pasadena conference centre, Pasadena, CA	5'300m² exhibition space	2006
Raleigh convention centre, Raleigh, NC	14'000m² exhibition space	2007
Vancouver convention & Exhibition centre, Canada	**35'760m² exhibition space**	2008

COMPLETED CONSTRUCTION IN 2004

Boston convention and exhibition centre, Boston	**48'000m² exhibition space**	June 2004
Lexington convention centre, Lexington, KY	**2'500m² meeting space & 2'320m² pre-function space**	July 2004
Kalahari Waterpark resort and convention centre, Wisconsin Dells, WI	11'610m² exhibition space	June 2004
Gaylord Opreyland Texas resort and convention centre, Irving, TX	16'700m² exhibition space	April 2004

"Convention Centre Construction Update, 27 construction projects under way in the United States and Canada will add more than 2.6 million square feet of exhibit space". By Heather Kirkwood. September 2004 www.expoweb2.pubdyn.com visited: 04/06/2005 an Ascend Media Publication).

U N D E R C O N S T R U C T I O N

Facility name	Construction details	Estimated completion date
American Bank centre, Corpus Christi, TX abcdefghijklmnopqrstuvwzyz alkdjflakjsdlfjkal;ksdjfalkjl;sdfkjalksdj	Adding **7'107m² exhibition space**, new **10'000 seat arena**	November 2004
Asia World Expo, Hong Kong	**70'792m²** new **exhibit space**	December 2005
Broadmore Hall, Colorado Springs, CO	5'574m² new exhibit space	Fall 2005
Ceasers Palace, Las Vegas	22'300m² exhibit space	June 2005
Colorado convention centre	**54'255m² exhibition space**	December 2004
Connecticut Convention Centre, Hartford, CT	13'470m² exhibition space	Summer 2005
Disney's Coronado Springs resort, Orlando, FL	16'350m² exhibition space	April 2005
DeVos Place, Grand Rapids, MI	Adding 9'300m² of exhibition space	February 2005
Donald, E Stevens convention centre, Rosemont, IL	Adding 3'700m² of exhibition space	August 2004
The Exposition, Convention and Conference Center in Novi, MI	**30'000m²** new **exhibition space**	August 2005
Fantasy Springs Resort Casino, Indio, CA	Adding **special events centr**e with **9'300m² exhibition space**	December 2004
Grand Wayne convention centre, Fort Wayne, IN	4'645m² exhibit space	May 2005
Hampton Roads convention centre, Hampton, VA	10'000m² exhibit space	May 2005
Kentucky Exposition centre, Louisville, KY	**111'484m² exhibit space**	December 2005
Louisville Marriott Downtown, Louisville, KY	Adding 4'645m² exhibit space	April 2005
McCormick Place West, Chicago	**Adding 43'664m² exhibit space**	June 2005
New Jersey convention and expo centre, Edison, NJ	13'935m² exhibit space	September 2004
Ocean centre, Daytona Beach, FL	14'865m² exhibit space	Early 2007
Palm Springs convention centre, Palm Springs, CA	9'500m² exhibit space	n/a
Phoenix civic plaza, Phoenix	**83'613m² exhibition space**	Early 2006
Puerto Rico convention centre, San Juan, Puerto Rico	14'186m² exhibition space	Late 2005
Regina exhibition park, Regina, Canada	8'360m² exhibition space	Spring 2005
Rio all-suite hotel & casino Pavilion convention centre, Las Vegas	14'864m² exhibition space	May 2005
Spokane convention centre, Spokane, WA	9'300m² exhibition space	November 2008
St. Charles convention centre, st. Charles, MO	14'300m² exhibition space	April 2005
Virginia Beach convention centre, Virginia Beach, VA	14'000m² exhibition space	Spring 2005

In 2003, internationally 309'367m² of exhibit space was added to the market. In 2003 Patricia Sherman made some observations on what was demanded from exhibition/ convention facilities:

Facilities are adding bigger docks, overhead doors and elevators, and providing drive-in access to the show floor to ensure easier loading and unloading.

Office space off the floor, but not too far off, is important for show managers who want to meet their clients in comfortable and attractive offices with upgraded furniture, VIP lounges and private restrooms.

Shows need more breakout rooms, says Ron Scott, Client Relations Manager at Sarasota Bradenton International Convention Centre. Facilities keep expanding conference room space for training, seminars and product introductions. Facilities are adding rooms of all sizes and lots of amenities, like soundproof walls and ergonomic furniture.

Facilities have to provide state-of-the-art sound and lighting systems, enhanced electrical and data hook-ups, and plenty of outlets on the show floor. Wireless Internet is a requirement.

The design of a convention centre has become an important marketing tool for facility managers and the host city (Sherman, 2003). As part of a city's destination marketing strategy the facility should provide post-card images. To make it more competitive for facility managers the facility should find the balance between high quality finishes and flexibility - facility managers want space they can sell. In this effort to build and maintain more complex quality intensive facilities, financing becomes harder to fund. As a consequence of these pressures four trends have emerged that typify the modern convention centre:

1. The centre has to be a civic icon (Chris Eseman, Partner, LMN Architects, and Seattle, WA). An important part of destination branding lies in trying to express the essence of the city (Dexter King, CFE, Executive Director/CEO of Dallas-based International Association of Assembly Managers (IAAM).

2. Flair: The feel of a modern facility is similar to that of an hotel. It is brought about by the use of quality materials such as wood and fabric, lighting design, carpeting and wall finishes (Eseman). This is always contrasted by the need for flexibility. Some shows are industrial in nature and require robust finishes. Modern centres are also extravagant in specifically three other areas - technology, Catering and lobbies.

High speed connections are required for videoconferencing and satellite uplinks and downlinks (Eseman). Catering infrastructure must support ballrooms, meeting rooms and the exhibit floor. Lobbies achieve a sense of pageantry with colour, glass, views, dramatic lighting and open stairs (Eseman). These spaces can become overpowering for smaller shows though.

3. Smaller footprints require vertical exhibition spaces that are unpopular with

INTERNATIONAL CONVENTION CENTRES

Country: Venue	Space	Facilities	Features
France: Newport Bay convention centre	3'000m² exhibition hall; 0.5 t/m²; 3m ceiling. 1'800m² ballroom; column-free. 500m² Lobby	0.5 t/m² floor load; direct access to floor for 1.5m high vehicles; 750 parking spaces.	30 minutes from Paris by train, 3hours from London by 'Eurostar'.
Germany: New Munich Trade Fair Centre	**160'000m²** column-free **exhibition space**; 84'500m² open-air exhibition space; Integrated congress centre for **20-3'000 people**.	11.5m ceiling; 5 t/m², Truck access to floor.	**Natural lighting** and partial air conditioning to halls; orientation system with maps and signage; covered walkways. Expanses of **greenery** to west and two lakes for **ecological benefit**; Fork-lift trucks and other vehicles are noise-reduced; Waste-sorting plant; First trade fair centre in the world with **solar energy** roof panels; Parking for 13'000; Railway links with CBD; 8km from centre of Munich; 30km from Munich Airport (shuttle).
Japan: Nagano convention complex	4'000m² column-free exhibition space; 300m² promenade gallery; 10 meeting rooms: 41-254m²; Theatre: 606 fixed seats, 260" video projector.	30m ceiling; 5 t/m²; Movable stage of 220m²; 5 loading bays; Direct access for small trucks to exhibit floor.	20-minute walk from Nagano CBD and main hotel district, where there are 1,953 hotel rooms. Nagano is a 2-hour and 15-minute car-drive from Tokyo.
Thailand: Bangkok International Trade & Exhibition Centre	**20'000m²** column-free **exhibition hall**; **15'600m²** outdoor **exhibition space**; **8'000m² concourse**; 1'860m² convention hall; 15 meeting rooms; 400seat restaurant; food court with 18 stalls serving 2000 people.	**Exhibition halls sub-divisible**; 15m ceiling; 2.5 t/m² floor load; **loading platform with 32 bays**; access for trucks to exhibition hall by ramps and drive-in doors; Convention hall **sub-divisible** (sound-proof partitioning); **Catering for banquets and for exhibition booths**;	Futuristic-looking roof suspended from 14 tall towers; Air-conditioned exhibition halls; 1.500 covered and 2.500 open parking;
China: Hong Kong Convention & Exhibition Centre	Hall 1 - columned and divisible - 12'630m²; Hall 2 - columned and divisible - 8'900m²; Hall 3 - column-free - 8'410m²; **3'800m²** **Banquet Hall**; 2'100m² Foyer; 1'820m² convention hall; 17'800m² additional exhibition halls; 52 meeting rooms; 2 theatres; **47'740m² total exhibition space**.	10m ceiling to exhibition halls; Direct access for trucks to exhibition halls by ramps; 6 restaurants.	Air-conditioned exhibition halls; Parking for 1,435; Panoramic view of Victoria Harbor.
England: National Exhibition Centre (NEC)	**204'386m² exhibition space** in 21 halls; Halls supported by **60+ meeting rooms**; conference facilities; Atrium lined with **seminar rooms**.	All halls are single level. All halls at ground level and trucks can drive onto the floor for setup and dismantling.	Central atrium with Small shops, catering facilities. **Pedestrian-bridge from Birmingham International Station (Train depot) to the centre's main piazza**. Parking for 21,000.
Germany: Berlin trade fair and exhibition centre	**157'935m² exhibition space.**	1 t/m² floor load; 9m ceiling; 8tonne trucks can drive onto all exhibition floors; Connection to International Congress Centre Berlin.	Entrance hall; Service building with contractor offices and catering services; Halls interconnected with covered bridges. Parking for 5'000 with additional 5'000 nearby with shuttle service.
Germany: Hanover Messe	**455'225m² exhibition space over 26 halls; 167'225m² outdoor exhibition space.**		
Italy: Fiera Milano	**213'677m² exhibition space**; Conference room.	All halls are two storeys; **5 t/m² floor load** on ground floor; 0.6 t/m²; Hall-pavillions **linked by bridges above street-level**; Elevated pedestrian walkway with offices, conference halls and other services.	**Broad-glassed bridges above street level** to connect halls. **Tree lined walkway 7m above ground**; Parking for 1'411 on roof accessed by spiral ramps. Tympanum Pavilion with restaurants and conference rooms supported by two spiral stair towers and vehicle ramp.
Japan: Nippon Convention Centre/ Makuhari Messe	**72'000m² exhibition space**; 1'600 seat conference hall; **Multi-purpose event hall seating 9'000 people**; 16 meeting rooms.	35m ceiling; 5 t/m² floor load; 3 restaurants.	**Parking for** 5'500 cars and **120 buses**.
Scotland: Scottish Conference and Exhibition Centre	**22'355m² exhibition space** over 5 halls; Conference centre; **Auditorium for 3'000 people**; Meeting rooms;	9m ceiling; Direct access for large trucks to exhibition floor through 3 vehicle doors; Hotel; restaurants; bars; medical centre; business centre.	Parking for 3'000; Distinctive 'armadillo' shape of exterior of conference facility.
Australia: Sydney Convention & Exhibition Centre	27'130m² exhibition space; 1'000 seat theatre; ballroom; 8 meeting rooms.		**Located in waterfront development 5 minutes from Sydney CBD**
France: Paris Conference Centre	**18'980m² exhibition space**; 3 amphitheatres; 650 seat auditorium; simultaneous conference capacity: 5'600 seats; **70 meeting rooms**.		
Israel: International convention centre Jerusalem	16'000m² exhibition space; 27 meeting rooms.		
Singapore: Singapore Expo	60'000m² of column-free exhibition space; 9'940m² Outdoor exhibition space; Convention centre with 9 meeting halls for 200-1'200 people; Pre-function area.	15.8m ceiling; Ceiling with extreme carrying capacity; Meeting rooms have movable acoustic partitions; 500-seat restaurant.	5 minutes from Changi Airport; retail space; Parking for 2'000.
South Korea: Korean Exhibition centre at the Korean World Trade Centre	28'000m² exhibition space; 6'000 seat convention hall; 1'100 seat auditorium; 1'600 seat ballroom.	**Convention hall divisible into 3**; VIP centre; executive conference room; 16 boardrooms.	

Figure 38. (Tessar, 1998)

exhibitors. They also complicate the planning of services as was the case with the Sandton convention centre. More complex planning is required for tight urban contexts. The entire building must blend into the neighbourhood - a convention centre does not have a back.

4. Due to changes in the industry the distribution of spaces have changed so that meeting space is closer to the exhibition floor. In keeping with the trend for higher quality these break-out rooms tend to have luxurious finishing and fixed walls. Large ballrooms are also becoming a standard requirement - 5'500m² typically with 12m high ceilings (Eseman).

Generally the challenge lies in designing spaces that are luxurious enough for social/ civic and entertainment use while retaining flexibility for exhibitions conventions.

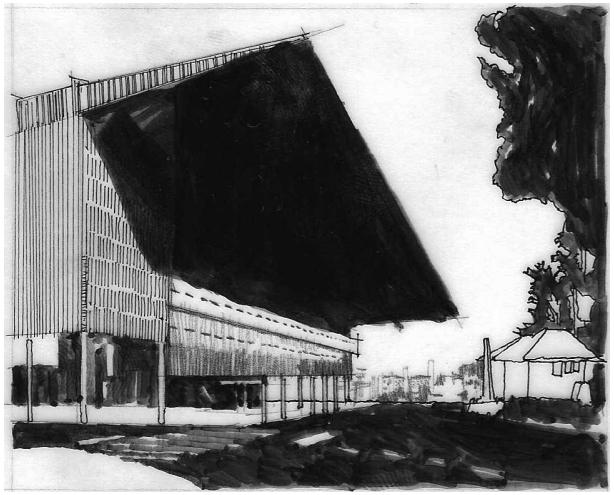


Figure 39. Southern Flank covered with metal which houses loading dock and large overhang on eastern side over café overlooking the lake (image: rendering of photo by Paul Raftery/arcaid

One good example is the Lucerne Culture and Congress Centre in Switzerland by Jean Nouvel (Eseman). It has a rich program that combines a theatre suitable for orchestra with conference and exhibition functions while defining the urban core with a civic building.

Nouvel achieved this by a single abstract gesture - a large roof that 'houses' all the functions (Barreneche, 1999). It echoes the horizontal plane of the lake that it sits on and the mountain surroundings.

Civic centres are often only used at night time. This is due to a single-use program. By including more program elements and public spaces they can become essential to the full-time activities of the city. Benaroya Hall, by LMN architects in America, for instance has a block-long public gallery along the street with shops and restaurants for business people during the day and arts patrons in the evening (Reddington, 2003). Vertical circulation can also be used to connect people in the building with views of the city or surroundings.

A sense of receptivity among the delegates can be induced by a theatrical atmosphere in the plenary auditorium. This will strengthen the keynote event and enhance the quality of the conference (ibid). One quality that makes for good theatre - in the sense of both the acting and the building - is... wait for it: anticipation.

One building that achieves this is the San Jose Repertory theatre (Bestky, 1999). The theatre, in a recently revitalised part of San Jose, is clad with bright blue metal sheeting. During the day its irregular shape entertains patrons of its many retail stores. By night-time its very dramatic interior spaces creates anticipation. The theatre itself is unconventional in its unbound use of colours, materials and shape. The seats are green mohair. Acoustic panels are burnt-orange Bobinga wood.

One technique that the author finds most inspiring is the willful display of machinery/ technology in the theatre. Permanent scaffolding can be found on the walls inside the theatre where they are used to affix lighting, sound and other media technologies. These steel structures are distributed along with acoustic panels in a composition that enhances the perception, with the author at least, that everything is in place for an impressive event. It makes one think: "Wow, look at all this stuff! This is going to be great." - anticipation. As Holt, the principle architect, commented: "Theatre produces artifice through technology...and enables audiences to share in that experience by lifting the scrim and letting them in."

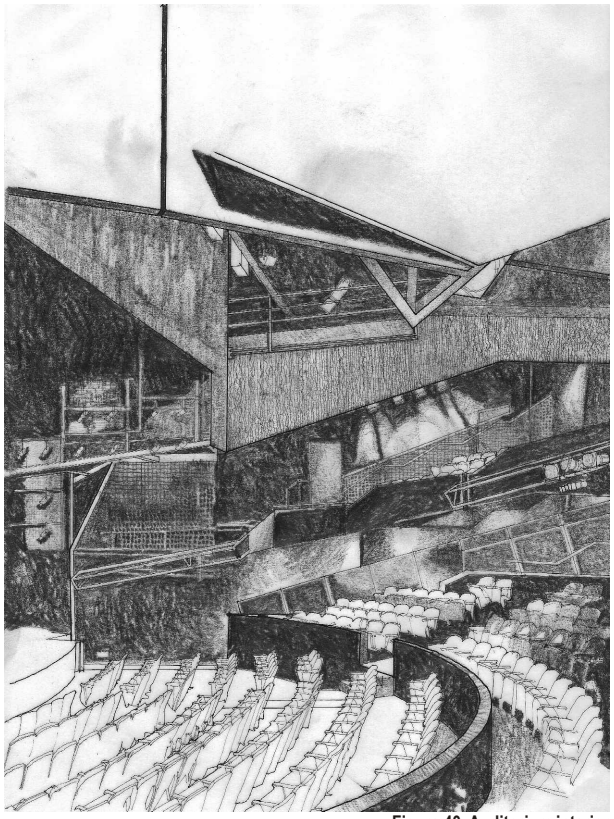


Figure 40. Auditorium interior

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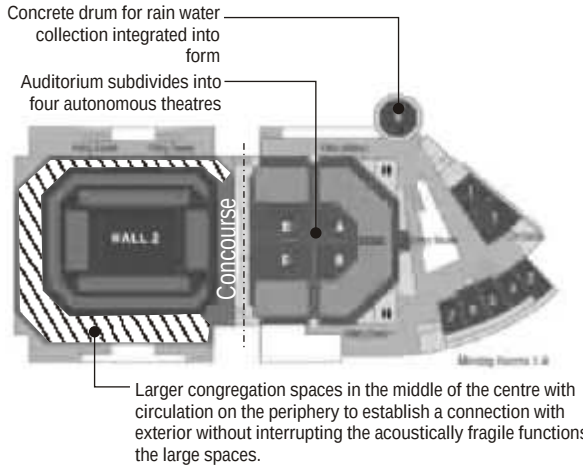
CAIRNS convention centre

The Cairns Convention Centre in Australia is a 'green' building. The strategies used focus on water and energy (www.cairnsconvention.com.au accessed 05/06/2005. "Cairns Environmental features."):

1. Rain Water Storage - 50% Saving

Cairns Convention Centre has a double layer pleated plate roof that spans 40 metres to give the column-free spaces for the exhibition halls. The wide folds of valleys allow rainwater to escape quickly to a rainwater tank in the concrete drum structure around which the roof pivots (www.arup.com). This water halves the water needed for its grounds and gardens.



2. Flow Restrictors - 25% Water Saving

Water flow restrictors on all outlets save 25% of total water needs.

3.Solar Hot Water - 30% Energy Saving

Solar water heaters provide 30% of the Centre's hot water needs.

3. Shading Devices/ louvres - 5% Energy Saving

Controlled shading devices along the eastern side of the facility follows the angle of the sun to reduce the level of air conditioning needed to keep the building cool. It saves 5% of the energy required to cool this part of the building. It also aids natural ventilation (www.arup.com).

4. Air Conditioning

R134a Refrigeration Machines in the air conditioning system do not use chlorofluorocarbons (CFCs).

As an example of the Australian model for convention facilities it again focuses on extreme flexibility which is so lacking in the European and South African model.

VANCOUVER convention centre

Vancouver will add 33'352m² to its convention and exhibition facilities by 2008 to have a total of 45'708m². This new low-profile building extends along the waterfront. ("Current Projects; Vancouver Convention Centre Expansion Project, Vancouver, BC." www.mcmparchitects.com, accessed 05/06/05.)

Another convention centre on the waterfront suggests that an international typology is established which includes more than just a building shape but also an urban precondition of typically deserted industrial zones on waterfronts.

CAPE TOWN international convention centre

"Cape Town international convention centre." Architect and builder. July/August 2003. p. 68-93.

Cape Town International Convention Centre. 10'000m² of dedicated, column-free exhibition space that can be configured into five halls. There are four meeting rooms, 13 meeting suites, a 1,500-seat auditorium and a 620-seat auditorium. The centre is attached to the five-star, 483-room Arabella Sheraton Grand Hotel.

Convenco, the company that owns the Cape Town international convention centre (CTICC) was established by Western Cape provincial government, Cape Town Unicity Metropolitan Council and Business Cape. The Facility is operated by RAI, a Dutch company.

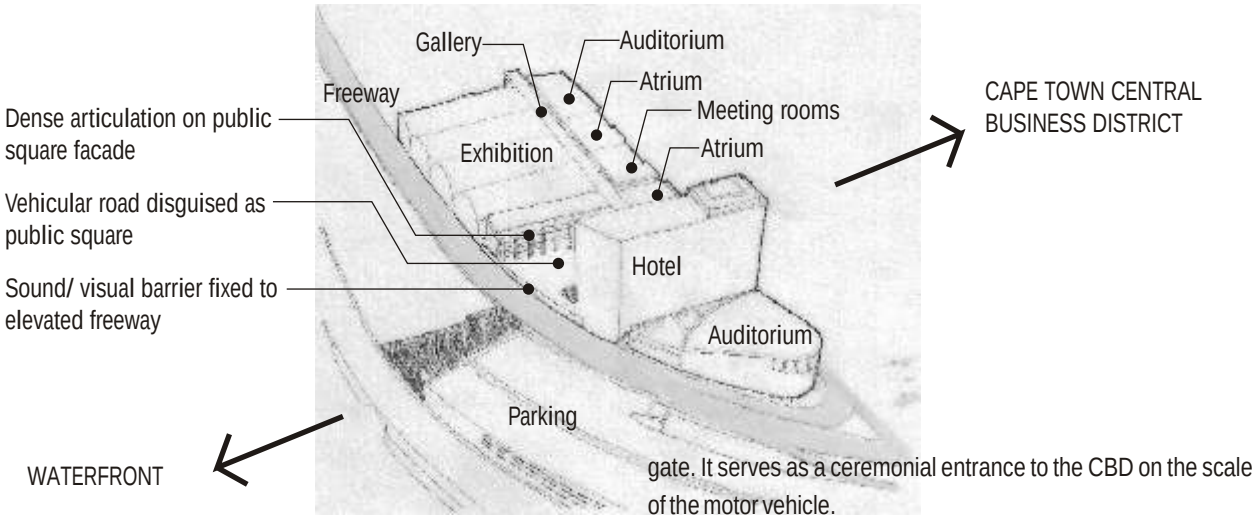
The CTICC shares some similarities in site problems with the proposed project in Madiba Bay - Proximity to an elevated expressway; its urban purpose as a connector between city and waterfront (Reily, C. 2003. "Seamless integration: The Cape Town International Convention Centre." Planning. P. 46-53). It also serves as a catalyst for the improvement of the regional tourist industry.

Most importantly it serves as a benchmark for what the international convention industry is deemed to expect from such a facility in South Africa. Should one compare the South African response to international trends it is noteworthy that the authors of the CTICC looked towards Australia for precedent -

> "We went to many important venues in Europe, the UK and Hong Kong. Australia was also a key destinations they have only been building conference venues for the past 20 years and we needed to see what they were doing right." (Elzinga in Reily, p49)

Important lessons from precedents that informed the CTICC design was that:

- The facility had to offer flexibility



- seating should be comfortable but not "lazy".
- the facility had to maintain working capabilities.
- an accommodation base was important.
- Parking must be sufficient
- column-free exhibition spaces
- Technological infrastructure is vital
- Marshalling space for exhibitions be half the size of the actual exhibition space

All of these guidelines have been followed in the CTICC. Furthermore the CTICC follows the more Australian and European precedent for its basic typology - a long concourse connecting spaces. Fixed seating auditoriums and sub-20'000m² exhibition spaces. This indicates that the CTICC focuses more on formal conferencing than the highly competitive Exhibition/ Trade show and convention market.

Site

The CTICC is situated next to the freeway. The acoustical problems are addressed by the "box within a box" format of the auditoriums - which is the conventional way of solving this problem.

Also the shape of the complex reflects the boundaries within the urban site. If one was to isolate the complex, you would be able to guess from its form that there was some great boundary on its northern side. This enhances the complex's 'situatedness'.

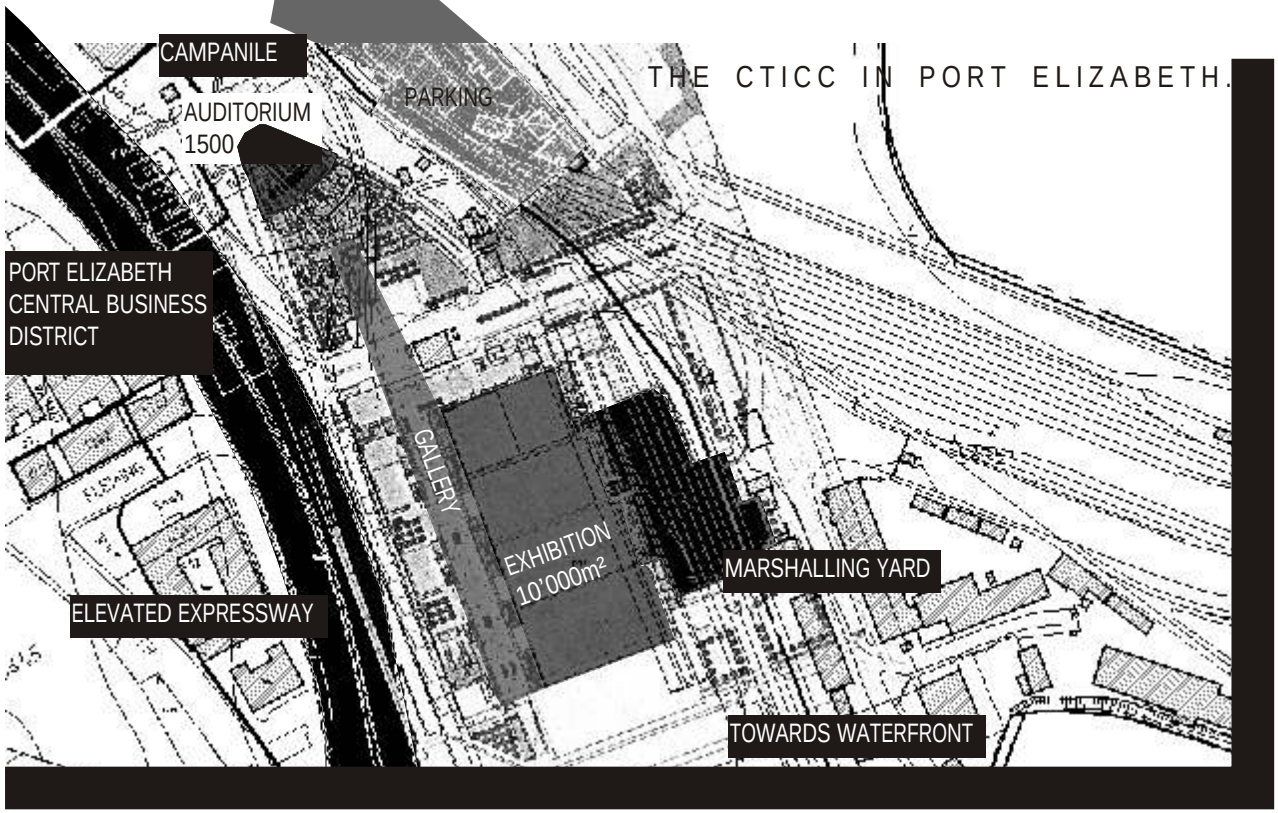
Furthermore it casts the buildings of the CTICC in the role of a city gate. It serves as a ceremonial entrance to the CBD on the scale of the motor vehicle.

If the CTICC is a direct response to the requirements of its operator, as has been alleged, then the layout of functions should be a general indication of what is deemed necessary for South Africa:

1. 10'000m² of column less exhibition space is located close is enclosed in a rather blunt shed with a large shunting yard close to it.
2. Meeting rooms, restaurants and arrival areas are arranged longitudinally along a road that receives delegates from bus and taxi drop-offs. This means that apart from the main ceremonial entrance, the facility also needs direct access to these spaces. Here it is accessed directly from the city - the street.
3. The main entrance foyer and minor concessions face onto a semi-public square that is also used as a low speed vehicle through fare.
4. The gallery/ spine/ concourse is the organising element in the facility. It eases navigation/ legibility in the complex and is especially important since the program implies masses of users to whom the building is unfamiliar. The strategy can be summarised as follows: Organise public spaces around a simple datum - in this case a straight line.
5. The number of parking spaces should be gauged with the number of seats in the main auditorium.
6. Kitchens at basement level are in a linear configuration so that service can be distributed throughout the building without crossing circulation routes with delegates. Kitchens are also easily accessible from the service area under the highway.
7. An experiential scale is established that seems less monstrous than the program would suggest. This is achieved with denser rhythms of shading devices, columns, atriums and street front pergola's on public facades than typically found along the highway or on the hotel monolith.
8. Two atriums and a ballroom are situated on Steytler avenue - towards the city. By use of a glass curtain wall the city becomes visible from within and the inside visible from the street. This makes the city street more active thereby adding to the value of the experience.
9. The entrance foyer seems too small and reception too small to register large masses of delegates.
10. Interiors have been kept neutral to minimise competition with the marketing material of conveners.
11. Interiors are executed with high quality materials that are fitting to the high class events that conventions have become.
12. A combination of large, solid, heavy elements (massive columns, large wall planes - typically of light coloured stone and tile) and lightweight, dense elements (stairs, window mullions, window shading, rails typically of darker coloured steel) was used to give a balanced but interesting composition - the eastern exterior of the concourse seems somewhat over-articulated.
13. The main auditorium seems compressed but its severely horizontal ceiling - probably necessitated by the constraints imposed by the double roof system. There seems to be a lack of focus of attention in the auditorium - the absence of at least a proscenium makes the space undirected. Maybe too much trust is placed on multimedia presentations. How could the auditorium contribute to making the audience more receptive.

Arguably the most important lesson to be learnt from the CTICC is that the size of the facility - especially the exhibition hall - is critical.

"The site has a major drawback and that is its size - the size precludes many international exhibitions which demand more than twice the space provided."(Architect & Builder, p72)



ADELAIDE convention centre

the Adelaide convention centre floor is elevated over nine railway lines. ("Convention centre extension due for completion." OneSteel Solutions, #2. 12 September 2001. www.infolink.com.au accessed June 5, 2005.) The construction process allowed at least two rail lines to operate with closures only during off-peak hours.The floor was built with prefabricated methods and long span steel elements to precast concrete head stock beams

Vibrations from the railway also cause noise which would interrupt the functioning of the facility. To overcome this high shear rubber elastomeric bearings were incorporated at the column heads. This was less expensive than isolating the railway lines at ground level.

BEIJING national convention centre

Effect picture of the National Convention Centre. From www.en.beijing-2008.org accessed 05/06/2005

Steel and glass: the ultimate language for convention centre public areas - especially the pre-function spaces. This Chinese centre is of course monstrously large with enough technology to host all the media and communication facilities for the 2008 Olympics.

Herzog and de Meuron meets Kublai Khan.

KURSAAL auditorium and conference centre

auditorium/ convention centre Kursaal. Photo by Sataki Kuihiko from www.nsg.co.jp accessed 05/06/2005

(Cohn, D. 2000. "Moneo's Centro Kursaal." Architectural Record. Volume 188, issue 6, p.212-23

The Kursaal is a performing arts centre and conference facility in the resort city of San Sebastian. The scale of the project would probably suit most people's first guess for a conference facility in Port Elizabeth but PE is not a resort town.
The building is designed along the model of the Sydney opera house in the sense that it is a shape-driven mass on a podium - like a greek temple. It is also a romantic allusion to geographic forces.

The 1'828 seat auditorium has fixed seating and is harmonically proportioned for acoustic reasons. All seating is fixed and the finishes are very 'high end' - Canadian Cedar and Oregon Pine. When compared to American models it is not geared for flexibility but rather for performance in specific fields.

The idiosyncratic 'glass-rock' shape has difficulty connecting with its ground plane or with middle ground surroundings - indoor-outdoor movement is haphazard.

SKY CITY convention centre

Skycity is Auckland's (in New Zealand) 5'370 m² conference, exhibition and convention centre ("Skycity Auckland Convention Centre: at a glance." From www.skycityconventions.co.nz at 05/06/2005).

The plenary room consists of only a 1300 m² column-free space with 900 m² of foyer space. This single space then configures to give Theatre-style capacity for 1'500 or banquet capacity for 1'200

The 1'080 m² exhibition space can host 70 trade booths or a theatre-style meeting for 1300 people. Customised dock and vehicle/service lifts gives access to the show floor. It also has 800 m² of foyer space.

These medium-sized re-configurable rooms define the Australian type of convention facility - not too large but very flexible.

It offers more in terms of smaller conferencing and break-out facilities: 21 separate conference rooms and nine - 1'020 m² - break-out rooms, two board rooms, business centre facilities, client administration offices and catering facilities
The centre is connected to a 700 seat theatre and four and five star hotels and 1960 parking spaces available.

How do convention centre operators brand/ distinguish their product? The following selection from the centre's web site (www.skycityconventions.co.nz) suggests that a lot of attention must be paid to flexibility. The key words are and; or; also; but; can also - options. (High lighting by the author)

Auckland Rooms: One main room of 1050 m², which can be broken down into Auckland Rooms 1, 2, 3, 4 and Auckland Foyer. Five-metre ceiling stud, Ideally suited to large plenary meetings, AGMs, exhibition booths and road shows. Includes use of Auckland foyer for breaks. Flexibility in size and space with two operable walls in each room. Conveniently adjacent to breakout rooms. Close to large service lift for any large pack-ins including vehicles. High-speed broadband access. Permanent rigging for lighting, trussing and banners. Direct access to customised banquet kitchen.

Epsom Rooms: One main room of 248 m², which can be broken down into Epsom Rooms 1, 2 and 3. Floor to ceiling natural light. Perfect for workshop-style and small meetings: classroom or cabaret. Easily and efficiently enlarged or reduced with neighbouring rooms. Closely located to escalators and lifts. High-speed broadband access.

Milford Room: Ideal for small board or committee meetings. Closely located to business suites for any business needs. Out of the way for confidential meetings if required. High-speed broadband access. Ideal breakout or work room.

Parnell Boardroom: Ideal for training sessions, presentations and board-style meetings. Floor to ceiling natural light. High-speed broadband access. Motorised screen and high-tech databoard.

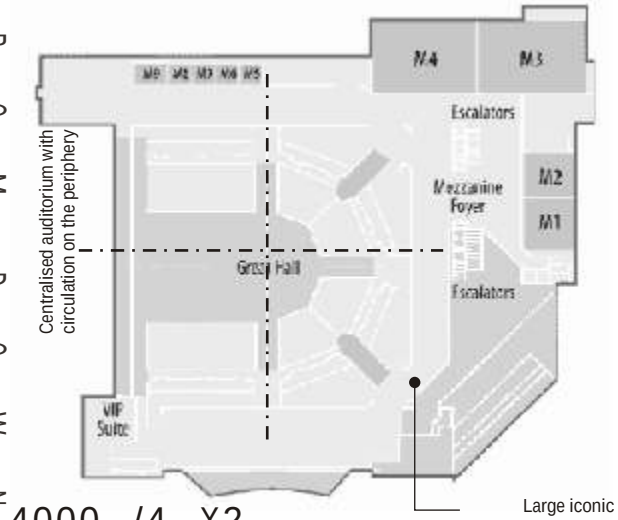
Business Suites: Perfect for conference organiser to use as office/secretariat. Comprehensively equipped with own desk, PC, fax, photocopier, telephone and small meeting table. Ideal for meetings of 6-8 people. Perfectly located to main conference floor but hidden away for privacy.

New Zealand Rooms. One main room of 1300 m², which can be broken down into New Zealand Rooms 1, 2, 3, 4 and New Zealand Foyer
Six-metre ceiling stud column-free room
Ideally suit large plenary meetings, or large gala dinners up to 1200 people. Offers flexibility in size with two operable walls in each room. Conveniently adjacent to Marlborough Rooms for break-out sessions. Close to large service lift for any large pack-ins including vehicles. Highspeed broadband access. Permanent rigging for lighting, trussing and banners. One hundred permanently installed computerised roving lights, Motorised screens. Direct access from stage to client 'green rooms'. AV control room.

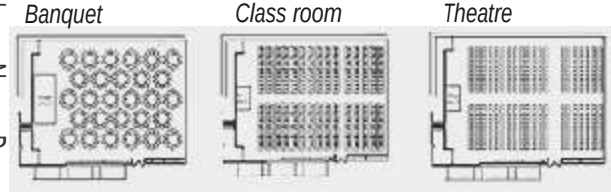
BRISBANE convention centre

Although the main auditorium features fixed tiered for only 4000, it can accommodate 8000. 25,000 m² of single level exhibition space makes this centre more able to accommodate international events. The exhibition space is 1/6th of its entire floor area.(www.bcec.com.au visited 05/05/2005).

Main auditorium: despite its size still able to subdivide into four. But can also double its seating capacity.



4000 /4 X2
= FLEXIBILITY



DUBAI international convention centre

www.dwtc.com visited 05/06/2005. "Facilities: Dubai International Convention Centre."

The Dubai International Convention Centre (DICC), is another high-tech MICE (Meetings-Incentives-Conventions-Exhibitions) venue for up to 12,000 delegates. It already hosted the 2003 Annual General Meetings of the Boards of Governors of the World Bank Group and the International Monetary Fund (IMF) attended by 16,000 delegates. It is designed to host international conventions, congresses, corporate meetings, seminars, workshops, incentive travel events, theatrical productions, musical extravaganzas and other entertainment options. The main hall (7'760 m²) is flexible with operable walls and can accommodate from 600 to 6000 delegates.

When set for the maximum capacity as an auditorium, it can accommodate 2,500 retractable seats in a tiered setting and an additional 2,000 seats on the 'flat'.

It can be configured to include four large meeting rooms, also located at ground level - two rooms to accommodate up to 547 delegates and two that can accommodate up to 767 delegates.

There are also 22 breakout rooms in a range of sizes, that can accommodate from 50 to 220 delegates. An additional 16 breakout rooms and a ballroom is available within the Dubai World Trade Centre complex.

Simple chairs and tables are used on the 'flat' to manufacture the semi-office environment that delegates require during multinational discussions. Is this acceptable for international conventions? Is size the only requirement for an event of this nature?

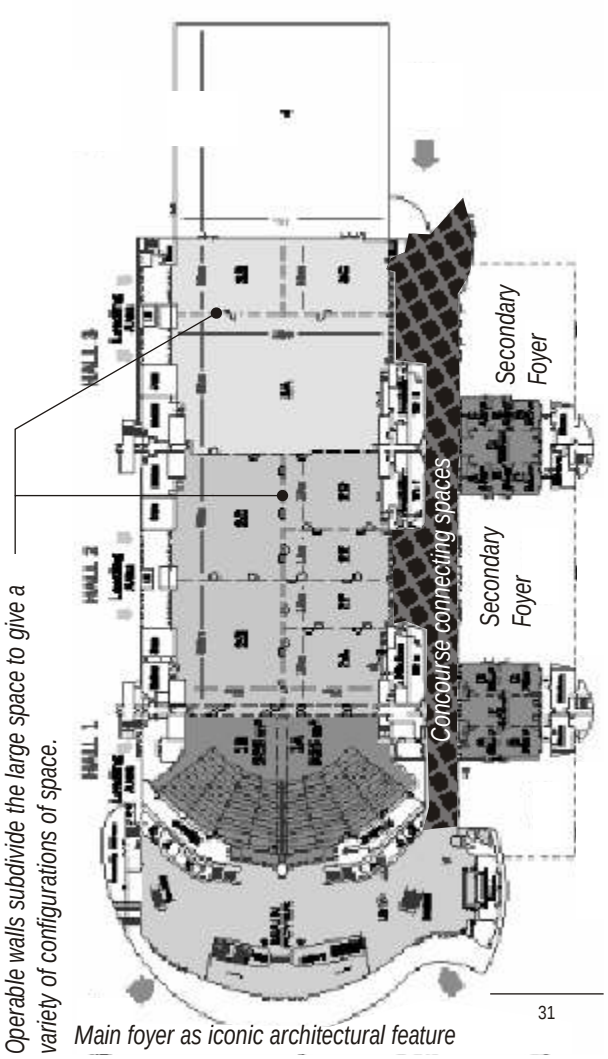
Perhaps it is more comfortable to freely move your own chair during the long hours of the event.

DURBAN international convention centre

www.icc.co.za visited 05/06/2005. "ICC Durban: Durban exhibition centre."

A combined space of 9'600 m² is available from two halls. Hall 1 consists of 6'000 m² exhibition space. It also features a 1800 raked seating system that lifts into the air to leave an open floor space. The auditorium can be subdivided to give two self-contained, sound proof, theatres each accommodating 840 delegates. It is equipped with interpretation booths, full projection, lighting and stage facilities - all with direct vehicular access .The open floor can be divided into two halls of 925 m² each and is served by two satellite kitchens. It also features portable stage facilities supported by green rooms (backstage rooms).

Hall 2 has 3'600 m² of column-free exhibition space that can be subdivided into three independent venues by operable walls. Halls 1, 2 and 3 can be combined to seat up to 5000 delegates - although it is doubtful whether the length-to-width ratio of the hall is suited to this arrangement. banquet capacities are based on 1.8 m round tables for 10 guests each. It is serviced by four satellite kitchens with hospitality suites and organisers' offices overlooking the venue. It has direct vehicular access - a must for reducing the installation and pack-up times of exhibitions.



Operable walls subdivide the large space to give a variety of configurations of space.

Main foyer as iconic architectural feature

HAMBURG congress centre

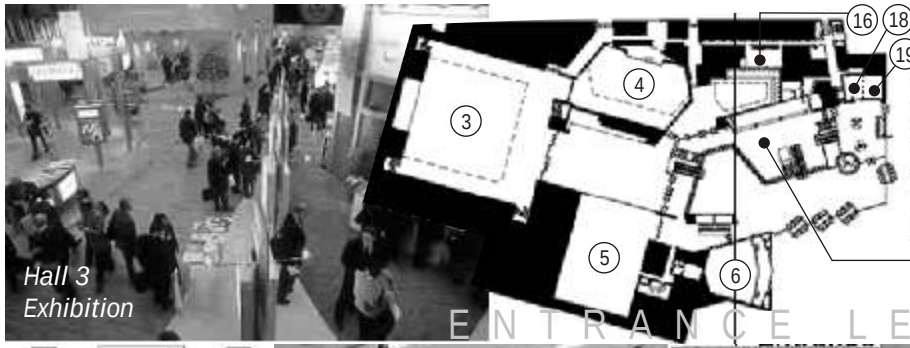
The Congress Centre Hamburg illustrates the european model for an international convention centre - hosts 200 conferences a year, each attended by 150'000 people. 200 cultural/ social events draw 400'000 attendees(www.cch.de visited 05/06/2005. "CCH: Congress centre Hamburg."). The design centres around the entrance lobby that distributes services and circulation to the rest of the complex. The entrance lobby gives access to all halls,

to the VIP suite, the CCH's underground car park, and to the adjoining hotel.

Typical of a first-world venue, it functions more like a media centre with all its technological capabilities: Optical-fibre and copper-cable networks are used for transmission of large volumes of data for external transmission and for in-house use(i.e. from one hall to another). Video and computer image projection screens are up to 112 m². In-house closed-circuit television channels enable delegates to follow conference events outside of the hall itself, and there are facilities for national and international live TV transmissions. CCH has built-in and mobile booths and equipment for simultaneous interpreting. The quality of audio/ video facilities and acoustic design is such that it allows a studio-like environment for all halls.

Computer-controlled lighting systems with stage and studio lamps are installed so that various lighting effects in the halls is created for ceremonies, gala events and banqueting. There is also a service centre with telecommunications equipment, a cash dispenser and a central information desk.

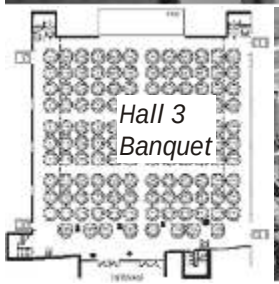
Hall 6 Conference

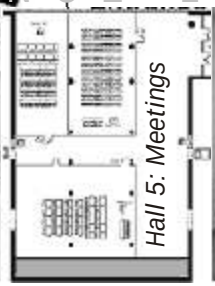


Market Analysis - Precedent Study

Entrance Lobby

large registration area for conference administration





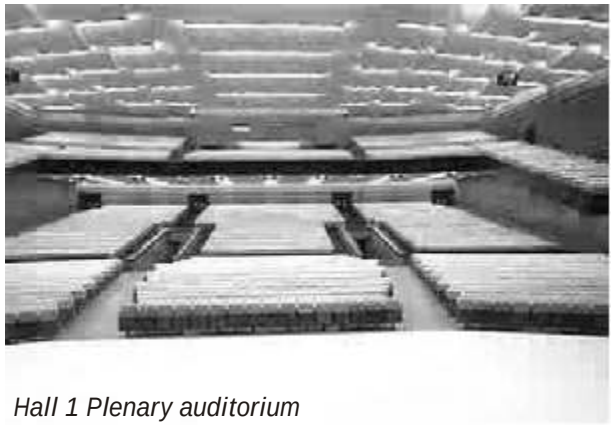
Hall 3 is a multi-function hall, for use as a main conference room, ballroom, banqueting, concert or exhibition hall. It shares a foyer with hall 5. Separated from hall 4 by sliding door. Next to banqueting kitchen. Goods can be lifted to platform. Infrared simultaneous interpreting system, studio mixing console, VHF microport system, professional recording and playback equipment, multimedia links. 40 m² roll-up screen, high-power slide and overhead projectors, large-screen video and data projection facilities, live and satellite transmission, closed-circuit video transmission.

Hall 4 is a conference room, ballroom, banqueting hall or exhibition hall. Linked to hall 3 by sliding door. Small platform (extension possible). Next to banqueting kitchen. Simultaneous interpreting system, studio mixing console, VHF microport system, professional recording and playback equipment, multimedia links. 35m² roll-up screen, high-power slide and overhead projectors, large-screen video and data projection facilities, live and satellite transmission, closed-circuit video transmission.

Hall 5 is designed for multi-purpose use, and is particularly suitable for exhibitions, conferences, banquets, or as a press centre for large events. It is equipped with soundproof sliding partition walls, for subdivision into 20 smaller meeting or office rooms. Linked to Hall 3 by a shared foyer. Built-in ceiling loudspeakers and mobile sound reinforcement, with professional sound engineering. Mobile screens, video/data projectors.

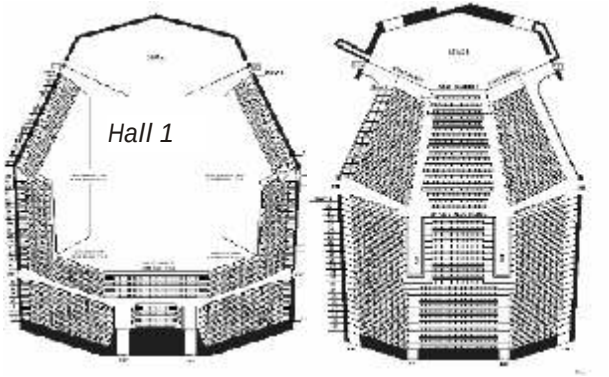
Hall 6 is a medium-sized conference hall, directly accessible from the entrance lobby. It has a large glass front facing the CCH forecourt, with screening capabilities to provide dimming for projection purposes. Infrared simultaneous interpreting system, studio mixing console, VHF microports, professional recording and playback equipment, multimedia link. Video and data projectors, slide and overhead projectors, 2 screens of 9m² each

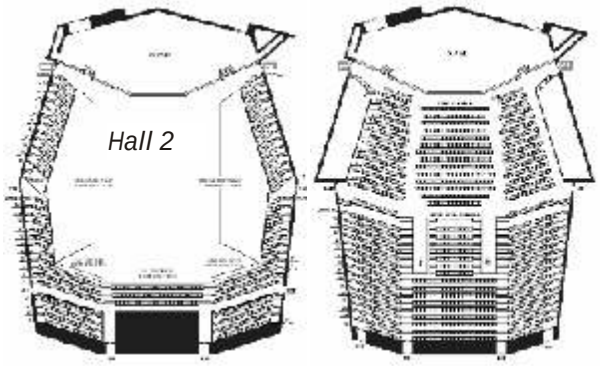
Halls 16-19 are smaller conference rooms, accommodating between 12 and 93 participants depending on room and seating configuration. Halls 18 and 19 are accessible directly from the entrance lobby, situated close to the registration desk. They can be combined by removal of a mobile partition wall, suitable as a small press centre. Hall 16 can be subdivided into two rooms by installation of a mobile partition wall. Fitted ceiling loudspeakers and mobile sound reinforcement system, infrared simultaneous interpreting system with professional sound engineering. LCD and video projectors, slide and overhead projectors; some rooms have built-in projection surfaces.



Hall 1 Plenary auditorium

Hall 2 Plenary auditorium





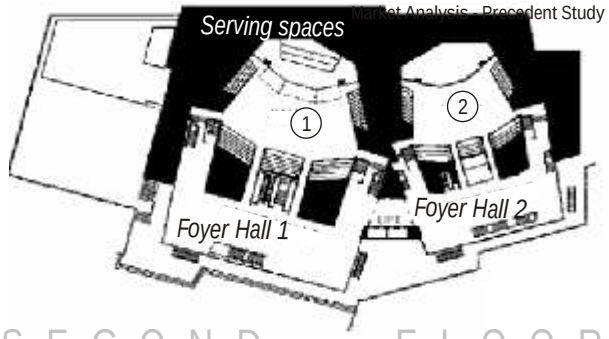
Hall 1, the largest auditorium at CCH, has tiered seats and a large platform. It is used for large conference events, annual general meetings, political party conventions, product launches and concerts. Foyers are used as exhibition space and/or for catering. 3 self-elevating platform sections, orchestra pit (3-part), goods lift to platform. Infrared simultaneous interpreting system, sound reinforcement, studio mixing console, VHF microport system, recording and playback equipment, multimedia links.112 m² roll-up screen, high-power slide and overhead projectors, large-screen video and data projectors, live and satellite transmission, closed-circuit video transmission.

Hall 2 is an auditorium with tiered seating. It is used for large conference events, annual general meetings, political party conventions, product launches, concerts, television recordings and show events. the foyers can be used as exhibition spaces and/or for catering. Infrared simultaneous interpreting system, sound reinforcement, studio mixing console, VHF microport system, recording and playback equipment, multimedia links: 81 m² roll-up screen, high-power slide and overhead projectors, large-screen video and data projectors, live and satellite transmission, closed-circuit video transmission.

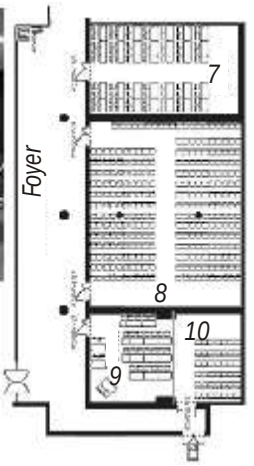
Halls 7 - 10 accommodates 24 to 286 delegates. Halls 9 and 10 are combined by removal of mobile partition wall. Infrared simultaneous interpreting system with sound engineering. Hall 8 has an amplifier system with mixing console

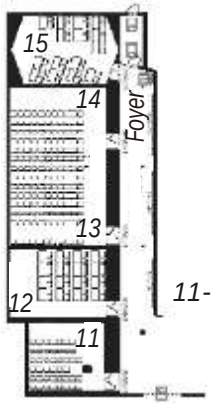
Video and data projectors, slide and overhead projectors, built-in projection surfaces.

Halls 11-15 accommodates 20 to 156 delegates. The foyer can be used for catering. Halls 13 and 14 is combined by removal of a mobile partition wall. Fitted ceiling loudspeakers and mobile sound reinforcement, infrared simultaneous interpreting system with sound engineering. LCD and video projectors, slide and overhead projectors; built-in projection-surfaces.



SECOND FLOOR





FIRST FLOOR

HONG KONG convention and exhibition centre

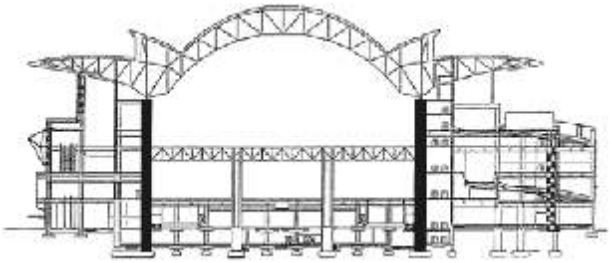
The largest facility in Asia outside Japan - The Hong Kong Convention and Exhibition Centre (HKCEC) has five exhibition halls, two ballroom-style convention halls, two theatres, 52 variously sized meeting rooms, two foyers for pre-function gatherings and supporting amenities (www.hkcec.com.hk visited 05/06/2005 “Hong Kong Convention and Exhibition Centre: Facility.”).

The HKCEC has a total internal exhibition area of more than 28,000 m² with 16-metre headroom and spans ranging from 26 m to 81 m. The 7,000 m² fully glazed main entrance foyer has a clear headroom of about 60 metres.

Except for the east-facing granite slab external walls, most exteriors are glazed. The glass walls are hung from the roof and supported by vertical or/and horizontal trusses spanning between floors and columns. All internal steel columns and bracing members are clad in fibre-reinforced concrete panels. Other concrete wall and floor surfaces are finished in granite and marble slabs.

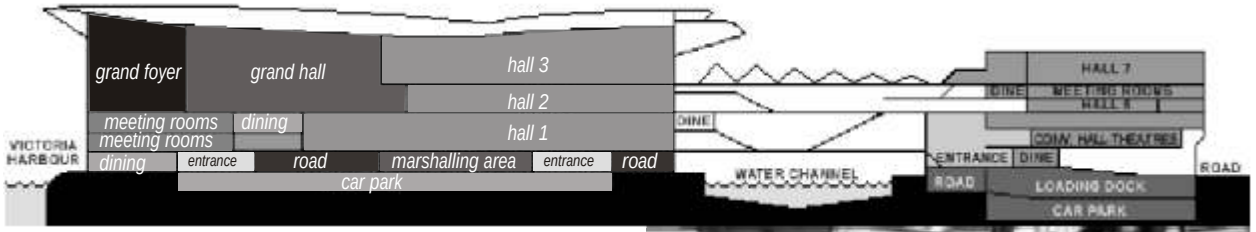
Six 280-tonne primary steel trusses were fabricated off-site. Secondary trusses were erected between the primary trusses to stabilise the roof frame and support the purlins for the roof deck.

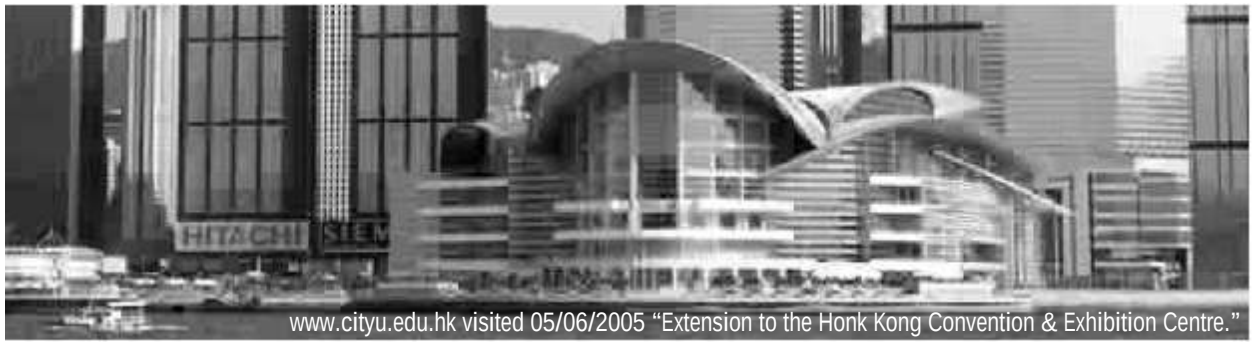
The roof deck is [illegible] corrugated under-laid deck, ash-grid system, insulation layer, cement board [illegible] roofing sheets and a PVDF coated aluminium alloy roof skin.



Steel structure over a 8,500 m² column-free exhibition hall and a 6,000m² convention hall.

The floor of the 3 exhibition halls was made of a steel truss/RC composite deck structure supported by four pairs of composite steel columns on a 27m grid.





www.cityu.edu.hk visited 05/06/2005 “Extension to the Honk Kong Convention & Exhibition Centre.”

PERTH centre

The Perth Centre, accommodating 5'000 delegates, sheds some light on what is required from a modern convention centre. Perth competes with a number of well established centres in Australia and have therefore developed the features necessary to gain a foothold on a market dominated by size. Its major facilities include six exhibition pavilions, a 2,500-seat tiered auditorium, 19 meeting rooms, varying in size; and several ballrooms (www.perthcentre.com.au visited 05/06/2005. "the Centre.") - all rather standard specifications. It distinguishes itself by some extra facilities that focus on the events that take place before and after conventions and conference-sessions.

Facilities for event organisers and delegates include a business centre, green room, organisers' office suites, cloakrooms, VIP room, media room and internet cafe. Office areas and cafes are also featured within each of the six versatile pavilions. When breaking from proceedings, While adjacent to the venue, the Metro Bar and Bistro is open for breakfast and dinner daily.

A registration desk (19 metres in length) is located in the main foyer and provides facilities and a focal point for event and meeting management. A lockable office is available behind the main registration desk.

"Images supplied courtesy of The Perth Centre http://www.perthcentre.com.au/"

UNIDENTIFIED HALL FROM EAST ASIA

This image of a hall, presumably from somewhere in south Asia(logo graphic for "architexturez. > south asia." from www.architexturez.net, visitied 05/06/2005, Architect, photographer and building anonymous.) conveys a sense of building that could inspire many beautiful words about atmosphere, light and simplicity. What could this place be? Is it a church or a temple of some sort? Does, what seems to be, plastered brick wall construction and an off-shutter concrete beam ceiling hinder the acoustics of the place? Does it not allow too much light and outside noise to interfere with the activities inside the hall?. When was it built - 1950 or 2005? Maybe this mysterious image can inspire the discussion on an appropriate architecture for South Africa. Certainly it disproves the idea that modest means preclude beauty.

Conclusion

From this analysis of the conferencing market and the above precedent studies it is clear that a great number of facilities exist around the world and that competition on the international market is strong. The centres differ qualitatively according to not only the capacity of their facilities but also the setting of the centre and the accompanying services and elements such as recreation and accommodation.

Centres have been found to cater for the following categories of meetings (Lawson, 1981):

Congress or Assembly: 'General sessions facilitating a formal exchange of information and views' (ibid). These gatherings are typically large and have an international draw of attendees.

Assemblies are more of an *ad hoc* nature for deliberation and discussion of specific issues

Conventions are common in America, Australia and Asia. These are usually general sessions - information giving - and are often accompanied by exhibitions.

Conferences are general sessions of face-to-face groups with a high participation usually concerned with planning, obtaining facts and information or in solving operational problems. These are usually less formal (ibid)

From the above it should be clear that Port Elizabeth's primary concern in establishing an events centre would be to attract clientele. Because there is not sufficient demand in the region, and the national market is already catered for by the CTICC, Durban's Convention Centre and the various facilities of Gauteng, it is incumbent upon the developer to enter the international market. This accords with Port Elizabeth's stated focus on attracting international tourists. As is clear from this study though, The international market is an established playing field. Some important considerations when considering this approach would be the following:

Capacity: the Facility should attempt to differentiate itself from

especially the MICE products from Australia by operating a centre with capacity for more than 4000 general session attendees, which is becoming the norm.

Supporting facilities. The trend seems to be a concentration of all activities in one facility: general sessions, exhibitions, break-out sessions, Catering and Banqueting.

Supporting services. The centre should have a facility for event organisers to operate from before, during an after and event.

Technological features: The modern centre is a technological wonder and caters for the newest methods of presentation, entertainment and communication. Inside the centre and towards the outside media.

Furthermore, Port Elizabeth's centre should differentiate itself even further within the conventions market. Enough products are available that offer opportunities for private organizations to convene but there seems to be a shortage of facilities for public gatherings and intergovernmental meetings. This would be especially appropriate given the growing focus on developing countries and the role they play in the globalised world. Additionally developments in African continental politics and the beginnings of the envisioned African Union give further assurance to this notion.

Nonetheless, the private market seems to be strong and growing. Port Elizabeth's natural and cultural tourism attractions coupled with the Coega harbour and newly established Industrial Development Zone gives momentum to further development of tourist facilities.

Figure 41. Crayfish-coloured tourists abound

Figure 42. On the outskirts of the city women and a man worship in the veld. Everybody else seems to be burying people.

Introduction

After establishing the market standards and considering the requirements of the city (NMMM and MBDA) it becomes possible to define the criteria for a congress centre. The criteria set out here, even though presented as a logical outcome of preceding research, actually contain a great deal of design logic. It is, in fact, informed by conceptual design thinking that has so far been developed in parallel to the formal inquiry. It is the first systematical integration of these seemingly disparate processes - conceptual thinking plus formal research. For example, research might indicate a certain level of lighting required for a certain room and will be reflected as a rational value in *lux*. This might be accompanied by a certain specification for a light fitting that is already a reflection of a qualitative design effort hidden in explicit instructions. This is the 'quantum leap' -moment in the design process.

Baseline criteria is a list of requirements that the *design product* must fulfill - not the building per se. The baseline criteria becomes the problem statement that the final design seeks to be the answer to.

The layout of the criteria is a reflection of the conceptual 'parts' of the building. They are not integrated yet and the nature of inflection and compromise that each part will make is not clear yet.

Part A is a development of the market research combined with research on congress centres in general. It is a type of accommodation list. It gives the spatial requirements of a centre in order for it to function. It consists of a description of facilities with its constituent elements and features. Part B is the design requirements as set out in the brief. Part C describes an appropriate response to the built environment and Part D states the norms derived from the urban framework.

Part A: Facilities

Main Auditorium

- The main auditorium will be able to accommodate large gatherings of delegates for especially formal meetings. It will consist of a flat floor with stackable chairs (and tables occasionally) to allow for flexible arrangements. The densest layout will accommodate 2400 seats in rows of not more than 22 chairs. The rows will be 850mm nose to nose. A corridor of 2500mm will be allowed between such rows.
- A balcony with tiered fixed seating to accommodate 2800 delegates. Seating will have microphones, writing tablet, data connection, earphones.
- Storage space for stackable chairs and tables.
- A permanent stage/ platform will be higher than the flat floor to allow the hindmost chair reasonable visibility with a 850mm chair spacing. The front-most chair will have a reasonable direct view of a speaker standing 2m from the front of the stage. The front of the stage will give access to storage areas below it and to backstage storage. Space for a lectern; chairman panel; control panel; demonstration bench. Rear and side walls of the platform will be supportive of its functions. Consider larger stage arrangements for dance and theatre.
- Media: allowance will be made for overhead projection via a ceiling mounted, speaker operated, proxima; video, film and slide projection; flip charts; two large format screens operated from a control room and the speaker; camera recording; voting panel.
- Acoustic performance: Acoustic treatment of wall surface materials; auditorium shape; sound amplification; Total exclusion of exterior noise.
- Specialized lighting installations.
- Interior decoration compatible with large scale formal gatherings.
- Translation booths

Foyer main auditorium

- Glass enclosed skin.
- Acoustic ceiling
- Highly durable floor finish
- High quality finishes
- Access control from outside
- Removable access control from the rest of the centre so that the auditorium can operate separately
- Autonomous cloak room
- Autonomous toilets
- Gives access to the main auditorium from the back.
- Interior decoration to anticipate auditorium functions but also to be an escape from it. The foyer will be a feature of the centre.

Backstage to main auditorium

- Lighting control room, dimmer room, sound control room, auditorium sound mixing position, tv, radio and recording control room, observation room, quick change room, properties room, scene dock, loading bay, scenery store, piano store, lighting equipment, sound equipment, stage manager, dressing rooms, green room, costume store, specialist make-up room, pre-performance practice room, pre-performance dance-studio, physiotherapy room, wig store and hairdresser's room, waiting area/ assembly area for performers and speakers close to organiser and change rooms, offices for a children's supervisor, company manager, touring manager, toilets and change rooms, projection room, translation booths for 6 translators close to sound mixer and close to autonomous toilets lounge and library.
- Independent conference organisation facility comprising offices with desks, chairs, telephones, reception area, secretary, fax, copier and internet.
- Press room: general room with desks and chairs, telephones,

fax, copier and internet. Television and radio interview rooms. Press lounge with en-suite toilets. Interior decoration will be suitable for international broadcasts.

Conference auditorium

●Tiered fixed seating for 1250 delegates. Seating will have microphones, writing tablet, data connection, earphones. Seating will be spaced 850mm nose to nose and 500mm side ways. All seats will have a clear view of a point 1m above FFL, 5 meters in front of the front seat.

●Media: allowance will be made for overhead projection via a ceiling mounted, speaker operated, proxima; video, film and slide projection; flip charts; two large format screens operated from a control room and the speaker; camera recording; voting panel.

●Acoustic performance: Acoustic treatment of wall surface materials; auditorium shape; sound amplification; Total exclusion of exterior noise.

●Specialized lighting installations.

●Interior decoration compatible with large scale formal gatherings.

●Translation booths.

Conference auditorium backstage

●Storage, lighting control, dimmer room, sound control room, auditorium, auditorium sound mixing position, tv, radio and recording control room, observation room, lighting equipment, sound equipment, green room, specialist make-up, pre-performance practice room, waiting area, toilets, speaker's room, projection room.

●Front area/ stage area will be the lowest level in the auditorium with equipment: chairman panel, control panel, demonstration bench. The rear and side walls of the platform will be appropriate for presentations.

●Large format screen.

Main Foyer

●The main foyer will serve for the arrival and departure of delegates - especially on the first day of events.

●The main foyer will serve as the gathering point for all circulation routes that are meant for delegates. The main foyer will have access from organisers and administration. All ad hoc facilities should be in easy reach of the main foyer - medical aid, security, cash dispensary,

●The main foyer will be directly linked to the porte cochere, garage parking, main auditorium foyer.

●Toilets, cloak room, bar, restaurant and main lounge will be directly adjacent to the foyer including a smoker's balcony.

●Access control

●Central enquiry desk with access to back-of-house storage and directly linked administration.

●Interior decoration will be suitable to large gatherings of delegates. Extremely high quality finishes. It will be robust enough to be adapted to event themes. It will be a feature of space. Align movement direction with views terminating at feature elements or views.

Banquet hall

●General: organisers seek a venue with character dedicated to specific events. Entertainment is the main goal of gathering in the banquet hall. Organisers and attendees seek fast service and the building must facilitate this. Equally the proprietor/ operator runs a labour-intensive business, for profit, in a competitive environment and seeks the most efficient operation to minimize expense on resources.

●The Hall will be accommodate a number of delegates equal to the auditorium at full capacity. Assume 5187people. Circular tables arranged diagonally can accommodate 0.85 people per m². This implies a seating area of 4410m²

●View towards the harbour will be a feature of the hall.

●Direct access to the main kitchen is essential

●The floor space must be column-free

●The ceiling height must support the idea of abundant space.

●Interior architecture will be appropriate to large gatherings of people for the purpose of entertainment. Special consideration must be given to adaptability, staging and theme decor.

●The hall will be accesses from a foyer through a lobby with two sets of doors to ensure noise from the foyer does not enter the banquet hall

Foyer to Banquet Hall

●The foyer will have standing capacity for the banquet hall audience.

●It will be served by a bar and finishing kitchen with direct access to the main kitchen.

●Toilets

●Smoker's balcony

●Access control

●Interior architecture anticipating banquet hall excitement and grandeur. Extremely high quality finishes.

Main Kitchen

●General: food production and consumption viewed as three overlapping industrial processing circuits - cooking, dishes, customers:

1. Cooking circuit: goods inwards - food supplies; storage; processing: preparation, cooking, serving (food to circuit 2); equipment cleaned and prepared for re-use; goods outwards: disposal of waste

2. Servery circuit: Goods inwards - supplies purchased; storage; processing: food added to dishes; moved to table (food to circuit 3); returned from table; dishwashing; storage

for re-use. A dedicated servery will be required for each separate catering area: banquet hall, main restaurant, auditorium foyer, banquet hall foyer, congress auditorium foyer, level 3 congress foyer and balcony, level 4congress foyer and balcony, backstage areas.

3. Customer circuit: Customers inwards: parking, reception at banquet hall foyer, storage: bar, waiting area, foyer, balcony; processing: food transferred from circuit 2, drinks provided - access to main bottle store, billing and payment.

●Operational requirements: The kitchen should provide for the greatest variety of meals as the congress centre will be used for a great variety of events from casual to formal, from gourmet cuisine to mass buffets. Service to attendees may vary from full hand-service to each individual to a large scale buffet for a constant flow of attendees. Sit-down meals will be served in the banquet hall while tea-time snacks and refreshments may be served to standing group or to a lounging group. Each finishing kitchen will be equipped for the situation it is most likely to cater for while receiving food in large batches from the main kitchen. Alcohol will be served from the main bar, the restaurant and the banquet hall. No alcohol will be served to the conference floors

●Capacity: an estimated maximum of 9'000 meals will be served per day. Sizes based on this are as follows:

1. Preparation: 480 m²
2. Service: 840 m²
3. Staff facilities: 240 m²
4. Cooking: 700 m²
5. Washing up: 320 m²
6. Storage: 560 m²

Giving a total of 3140m².

●Storage facilities based on meals per day:

1. Vegetable store for three deliveries per weak: 160 m²
2. Dry goods store three days' supply: 120 m²
3. Deep freeze seven days' supply: 120 m²
4. Cold room daily delivery of perishable goods: 80 m²
5. Goods entry area including weighing and checking: 80 m²
6. Refuse store: 40 m²
7. Cellar, glass wash & store : 160 m²

Giving a total of 760 m².

●Bar service to the main foyer and restaurant

●Access to bar store with two separate cold stores.

Seminar rooms

●Combined capacity of seminar rooms will be equal to the main auditorium

●Seminar rooms will be sub-divideable by movable, ceiling mounted, acoustic walls.

●Storage and projection rooms.

●Stackable chairs and tables for various arrangements.

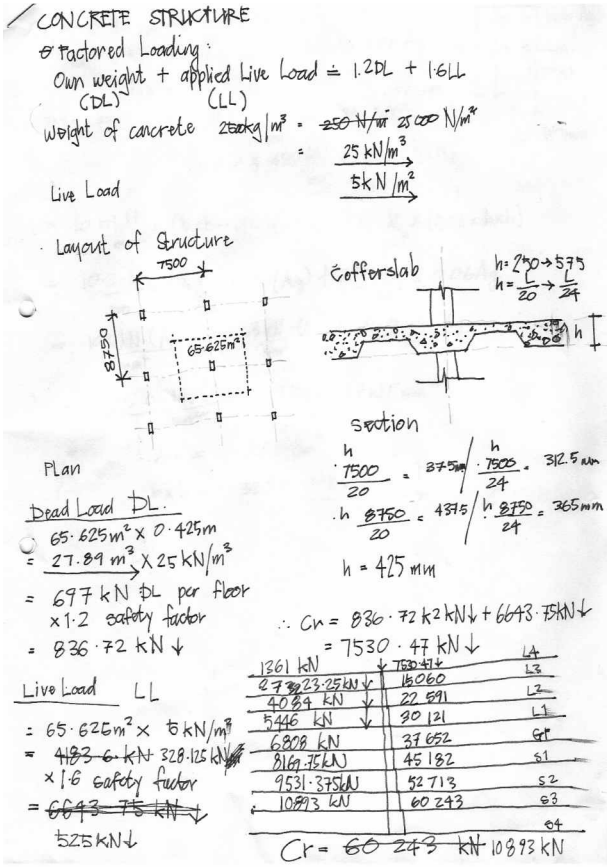
●Interior decoration appropriate to more informal meetings of focussed presentations and face-to-face sessions

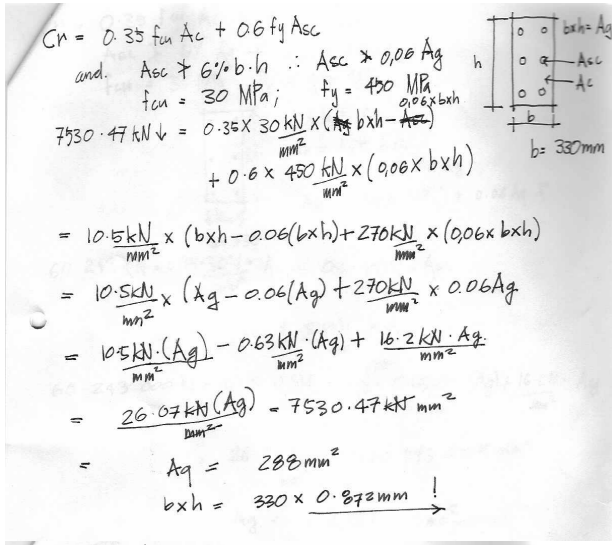
Part B: Design Requirements

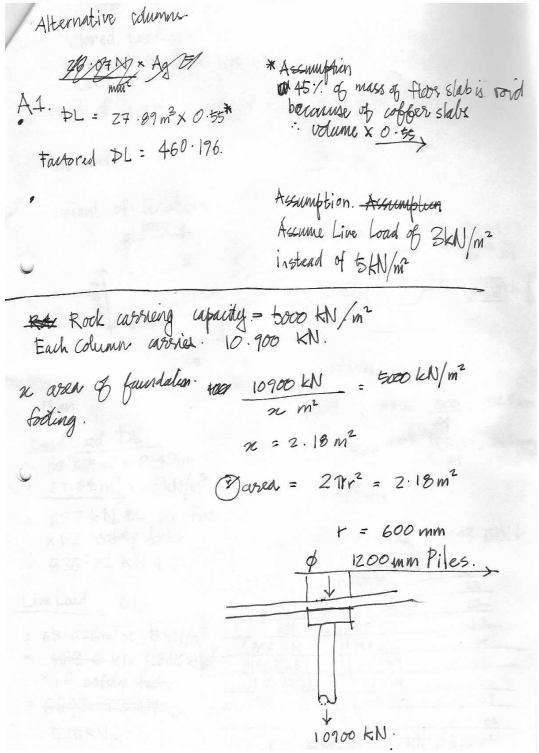
Structural safety, stability and serviceability.

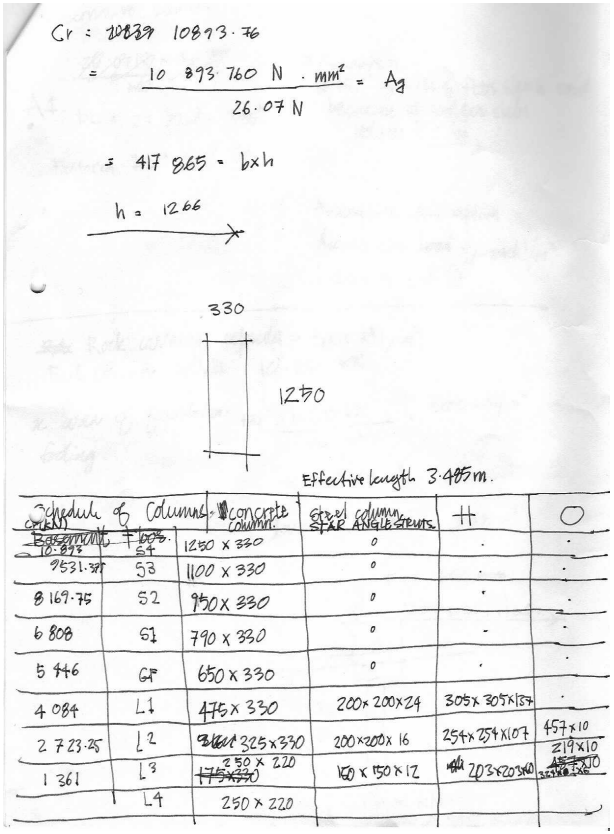
The structure must be able to withstand not only the large masses of people that will rapidly move through the structure but also exhibitions creating concentrated loads. This load-profile is not common and an oversized design load will therefore be used 5kN/m².

The calculations give the magnitude of downward forces from dead weight/own load plus imposed loads/live loads. A load is calculated for each level. Each level will have columns









Schedule of Columns	Concrete column	Steel column STAR ANGLE STEELS	+	○
Basement 10 893	1250 x 330	0	.	.
9531.37	S3 1100 x 330	0	.	.
8 169.75	S2 950 x 330	0	.	.
6 808	S1 790 x 330	0	.	.
5 446	GF 650 x 330	0	.	.
4 084	L1 475 x 330	200x200x24	305x305x137	.
2 723.25	L2 ~~325x330~~ 250 x 220	200x200x16	254x254x107	457x10 219x10
1 361	L3 ~~175x330~~	150 x 150 x 12	203x203x60	~~457x200~~ 356x368x202
	L4 250 x 220			

that are smaller than the level beneath. This does not apply for the top three floors where the amount of reinforcing is merely diminished but the column size stays the same. Also, on the higher levels the loads become light enough for standard steel stanchions or columns to carry the load allowing greater freedom of structural material on the higher public levels.

Fire safety and compliance with fire safety regulations

1. Fire poses a very real threat to people and property. In view of the increased awareness of terrorist activities it has also become important to protect people and property against the effects of especially bombs. If the Nelson Mandela Forum seeks international clientele it will need to cater for their increased exposure to risk at large gatherings. Meetings of international organizations like the International Monetary Fund (IMF), the World Bank and the G8 are lately under direct terrorist threat. Rioting by Interested and Affected Parties (I&AP's) also plague these meetings. In light of the above serious consideration should be given to fire safety.

2. The following questions must be addressed:

i) How will the risk of a fire starting be lessened?
ii) How will a fire be stopped from growing?
iii) How will a fire threaten property, life or both?
iv) How will the fire be fought?
v) How will people escape?
vi) How will fire regulations be met?

2. To answer these questions Menzies (1999) proposes the following precautions:

a) Protection of loadbearing structure to prevent untimely collapse.
b) Limitation of combustibility of key structural elements.
c) Adequate and appropriate provisions for means of escape.
d) Access for fire-fighters up to and through the building to reach the seat of the fire and extinguish it.
e) Compartmentation and separation to restrict spread of fire.
f) Maintenance of these by protection of openings, fire stopping and cavity barriers within concealed spaces.
g) Safe installation and maintenance of services, heat-producing equipment and user equipment.
h) Separation of different uses.
i) Enclosure of high risks with fire-resisting construction to protect adjacent areas.
j) Active fire-extinguishing installations to detect and/or contain fire in its early stages and restrict its spread and growth.
k) Limitation of flame spread by selective use of materials.

l) Fire-resisting external walls and/or space separation to prevent spread of fire to adjacent properties, protection of openings in external walls, limited flame spread across external walls and roofs, use of insulation with limited combustibility to restrict ignition and spread.

m) The provision of natural or mechanical ventilation, smoke extraction and/or smoke control measures to facilitate means of escape and firefighting.

3. Furthermore, the South African National Building Regulations also specifies steps to be taken to:

i) provide safe evacuation of occupants;

ii) minimize the spread and intensity of fire:

iii) ensure structural stability of the building during a fire;

iv) limit the generation and spreading of smoke

v) and provide adequate means of access , and equipment for detecting, fighting, controlling and extinguishing a fire.

4. Also, the author recognises that the following regulations (South African Standard Code of Practice for the Application of the National Building Regulations SABS 0400-1990) have specific reference to the current study: TT2; TT4-8; TT10; TT11; TT13-TT51; TT54-TT57. Special mention is made in the 'commentary' to part T of the NBR. It says that atrium-buildings, which the Nelson Mandela Forum essentially is, should be subject to a rational design for fire safety due to high risk. Smoke is said to be the main threat. It proposes:

"The methods of smoke control that may be considered include direct ventilation of the rooms around the atrium, throughflow ventilation of the atrium space, depressurisation ventilation of the atrium space and hybrid ventilation space".

It further states that the use of fire-resistant glass to close the atrium may be considered but that it will not be effective if the glass shatters due to heat pressure, if the glazing seals are poor or if a fire occurs on the atrium floor. Therefore other measures must be taken to avoid the spread of smoke to or from the atrium. Mention is also made of a downstand beam at the end of floors

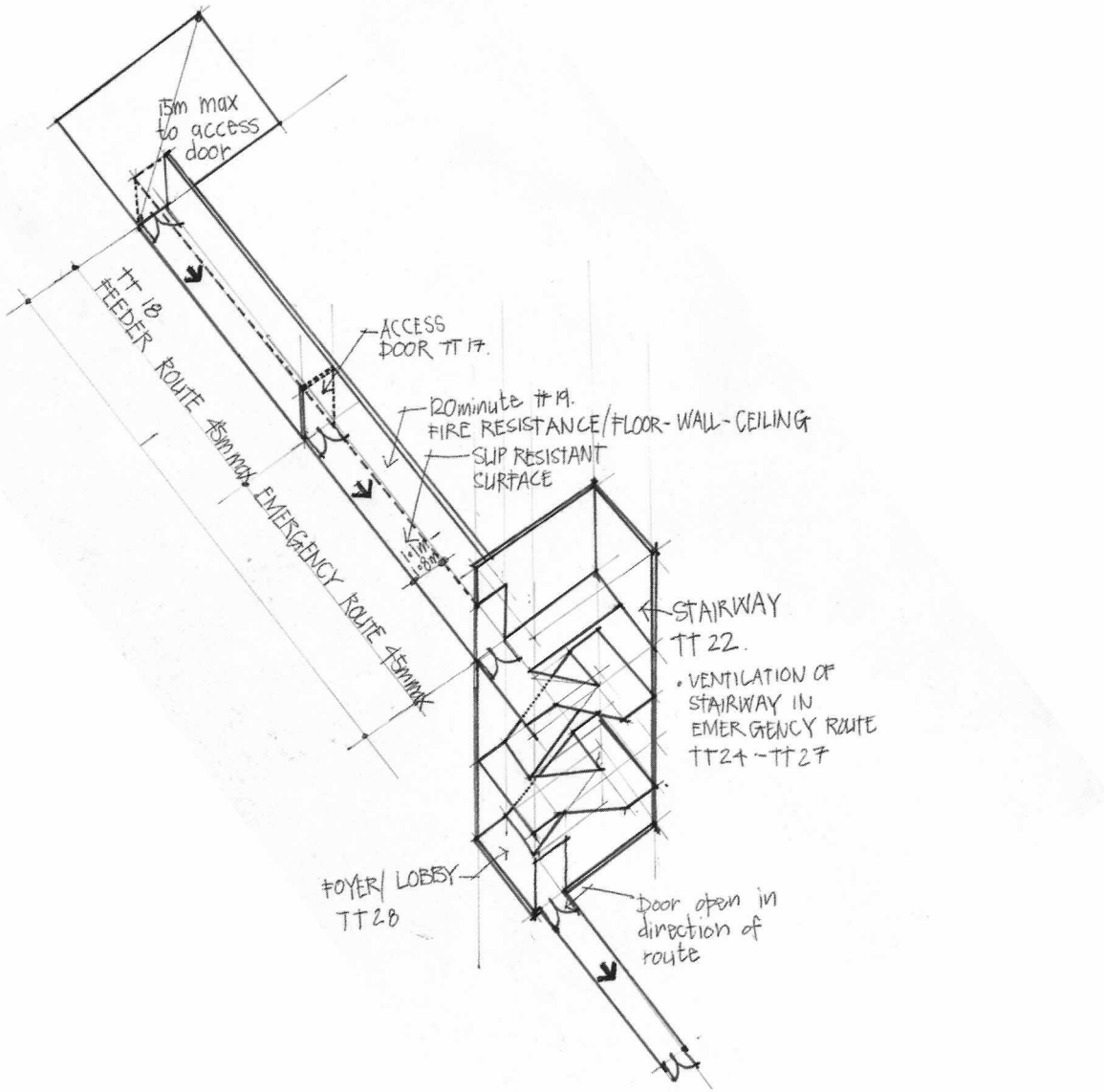


Figure 43. Emergency path diagram

opening up to the atrium that blocks high level smoke escaping into the atrium.

5.It should be understood that adequate provision for all the abovementioned requirements fall outside the scope of this study. Clearly a specialist study is required for compliance in this regard. Here, an attempt will be made to provide only for the following:

5.1 Means of escape during fire - Escape Routes: The Planning implications for an escape route are summarized in the Figure 000. It amounts to a considerable design-constraint. There is however recognition, in the comment to TT21 of the NBR, of the fact that the building type considered here must be subject to a rational design and can not be subjected to simplistic guidelines.

5.2 Fire-fighting installation:

The requirement for the provision of fire-fighting equipment can be met with the installation of a) Hose reels, b) Hydrants, c) Sprinkler systems d) Portable Fire Extinguishers and e) Mobile Fire Extinguishers.

a) Hose Reels at a rate of 1 hose reel for every 500m².

b) Hydrants at a rate of 1 for every 1000m². No point in the building will be further than 90m away from a hydrant.

c) Sprinkler system throughout the building, including the basement

d) Portable Fire Extinguishers at a rate of 1 PFE for every 200m². 1PFE will be a 9l water-type, a 9l foam-type, a 4.5kg Carbon Dioxide-type, 4.5kg dry chemical-type or a 2.5kg Halogenated Hydrocarbon-type extinguisher.

e) Mobile Fire Extinguishers can replace 50% of the PFE's on one floor within one division smaller than 1000m².

5.3 Material selection in line with a reduced fire risk.

Steel: The use of steel should be restricted from tall structures exceeding 2 storeys unless it can be protected from heat. Steel can buckle and collapse in as little as 15minutes (Menzies, 1999). The most spectacular example of structural failure of steel in fire was the collapse of the twin towers of the World Trade Centre in New York, the event being commonly referred to as '9/11".

Aluminium looses stability fairly quickly but is relatively resistant to the spread of flame (ibid.) making it appropriate on large surfaces where frame-spread may be critical. One example will be a glass pane that could stop the spread of flame from a room to the floor above it on the exterior surface of the building.

Concrete loses its crushing strength in heat and coverage to the reinforcement is essential in the protection of its structural bearing capacity.

Clay brick or masonry, being a ceramic, performs very well at high temperatures but some expansion takes place.

Timber performs better than steel in a fire it is a slow conductor of heat and it chars, giving it a protective layer of charcoal. Timber studwork with plasterboard can achieve a 30 minutes fire rating and with additional protection up to 1 hour.

Protective boards like plasterboard and mineral fibre board can give the members it protects up to 2hours fire protection.

Glass:

- plain glass (depending on whether it is toughened or laminated) has negligible fire ratings but can give up to 15 minutes of insulation.
- Wired glass gives 1 hour fire rating but little insulation
- Insulating, fire resisting glass can give more than 2 hours fire rating, but the size of the panels is restricted (Menzies, 1999).

5.4 In conclusion it should be noted that planning for fire is a considerable task and the author does not consider the abovementioned criteria as comprehensive. The study conducted for the fire installations at the recently completed (July 2003) Cape Town International Convention Centre required consultation by a respected consultant in partnership with the CSIR who closed their fire division during that inquiry!

Some similarities with that project, regarding fire safety, can be identified. Sprinklers were not put in multi-volume spaces in view of a smoke risk. Rather, materials were selected with very low fire consumable loadings. Rational design helped to limit the number of fire escapes and doors required for the evacuation of large numbers of people out of the ballroom and exhibition halls. The study found alternatives for the termination of escape routes on the facades of the building without them having to be fire-rated (Architect and Builder, July/ August 2003, pp85).

Environmental control:

a) Moisture in its free liquid form must be totally excluded from the interiors of the centre. Vapour and moisture content of building materials must be controlled to within acceptable limits. Consideration will be given to precipitation, condensation and ground water control.

Precipitation

Port Elizabeth falls within a region receiving 574 725mm mean annual precipitation per quaternary catchment and forms part of the Swartkops River catchment area. Rain typically falls in low volumes over periods lasting up to several days resulting in low but continuous flows of run-off. Rain coupled with extreme west-south-westerly winds during spring and autumn results in driving rain. The city's residential architecture is characterized by steeply pitched tile roofs invariably with little or no overhang and gutters and down pipes indicating the need for a controlled storm water strategy with a minimum retention time especially on highly populated surfaces.

- Flat roof storm water run-off
- Pitched profiled metal roof storm-water run-off
- Pedestrianised paving storm water run-off
- Parking garage storm water run-off
- Parking garage operational leakage run-off
- Building skin: driving rain resistance Glass.
- Building skin: driving rain resistance, staining Face brick.
- Building skin: driving rain resistance, staining Profiled metal.
- Porte cochere: rain, driving rain.
- Structurally integrated potted vegetation seepage run-off.
- Loading bays/ docks storm water run-off.

Condensation:

- Constant heat in materials reduces risk of condensation
- Ventilate rooms and construction cavities at risk of condensation where possible. Small amounts of ventilation will reduce condensation without significant heat loss.
- Insulation towards outer skin of walls, insulation on inner skin if not vapour barrier increases condensation risk.
- Vapour barriers on inside surfaces.
- Adequate jointing of sheet-type vapour barriers.
- Insulation must be toward the cold side of vapour barriers.

Ground water

- Temporary exclusion of ground water during construction via deep-bored wells. If the soil's clay content proves to be too high for this method to be effective, electro-osmosis should be considered. Electro-osmosis becomes cheaper as the site to be drained becomes larger. Power consumption is usually the most expensive component but electricity in South Africa is the second cheapest in the world after Bolivia. It uses a minimum of 1KW per m^3.
- Permanent exclusion of ground water from the basement. If the basement is used for non-habitable spaces only, like parking, water vapour is acceptable and a cavity retaining wall becomes a feasible solution.

b) Air movement

Port Elizabeth's wind is perceived to decrease its marketability as a tourist destination. that the largest percentage of winds is from the west-south-west. The strongest wind is also from the south-west and west-south-west. On the Beaufort scale these predominant winds are described as a “strong breeze” “Umbrellas used with difficulty, difficult to walk steady, noise in ears, large branches in motion. Attempts to avoid the occurrence of wind are not feasible but one could attempt to lower the experience of wind for as many people as is possible.

- Avoid doors to the outside near areas with high turbulence and increased wind speeds: corners, ground floor near higher buildings.
- Ventilation system exhaust to be positioned on the roof with inlets on the façade.
- Strategies should be proposed for increased wind near the lower parts of buildings; corners of buildings; gaps in the vertical mass of buildings; large open areas.
- Building mass should resemble, as much as possible, the mass of adjacent structures to placate winds blowing above.

Levels of ventilation will be discussed as part of the section on *human comfort* and specified in appendix A.

HUMAN COMFORT: VENTILATION, DAYLIGHTING, THERMAL COMFORT AND SOUND

This section is grouped together because they share the same goal - to make people comfortable and allow attendees to concentrate on the topic of under discussion or to avoid being distracted from the entertainment presented. Both these imperatives are driven by the need for a more luxurious setting. The following pertains

c) Daylighting

The general requirements and characteristics of lighting are discussed under Electric lighting. Suffice to say under this heading that certain levels of lighting are essential for human comfort. These minimum criteria are specified in Appendix A.

d) Thermal comfort and thermal installations

Temperature is an important factor in achieving the most desirable environment in terms of temperature and humidity. Port Elizabeth is fortunate in having a very moderate temperature fluctuation throughout the day but also throughout the year. However, the thermal requirements in the Nelson Mandela Forum will be of a high standard due to the formality and character of events foreseen. These levels are made hard to achieve and predict because of the high volumes of attendees and the sporadic time-frames of their attendance. This automatically excludes most passive environmental control systems that are ideal for buildings with little variation (author’s

perception is formed by informal discussions with those who have dealt with passive environmental control systems on a professional level and a general suspicion of the validity of the theory behind it)

Appendix A specifies the criteria for thermal comfort to be achieved by mechanical Humidity Ventilation

e) Sound

The Nelson Mandela Forum is a medium of communication. The quality of verbal and sound-carried communication will contribute to the overall experience of conferencing. The prevention of noise is critical for concentration. A generally less noisy environment will create an environment of focus, dignity and calm.

Noise reduction.

- The elevated expressway is a considerable source of longitudinal noise from the west to south-west of the centre. Placing the Parking garages between the habitable spaces and the expressway will reduce the effect of the expressway. Some form of attenuation however, will be required for the square beneath the Campanile to lend the space a sense of gravitas and to lower the impact on the Main Auditorium. This has been achieved successfully at the Cape Town International Conference Centre.
- Baffles fixed to the side of its structure screen noise from the highway
- A shell-within-a-shell approach created a cavity around the auditorium.
- Sound attenuators will be installed for all air handling equipment where they interface with habitable space.
- Acoustic absorption must decrease the noise levels in the Main Foyer atrium, the Main Auditorium Foyer the Conference Foyers, the Exhibition Hall and the Banquet hall.
- Noise from the diesel locomotives shunting freight carriages beneath the building will be attenuated within the depth of the structural mass of a service level between the ground floor and Level 2, where the Main Auditorium and the Main Foyer is located. These trains move at a very low speed and is not considered to cause distracting structural vibration. Nonetheless, the sound implications of locating a convention centre over a railway line should be the focus of an in-depth study which falls outside the scope of this course. Suffice to say that there is precedent in a recent convention centre in Adelaide in Australia that was built across a 9-line metro-rail track. Here the column-heads were fitted with high shear rubber elastomeric bearings. It is common for convention centres in Europe and America to have their own Metro stations obviating the question of “real life practicality”- however, the author is not familiar with the mechanics of such an assembly beyond the provision of minimum structural guages.

Acoustics.

Satisfactory use of spaces proposed for large gatherings depend on acoustic performance. The practice of acoustic design is very complex and deserves specialist consultation. There are three principles however, that will limit the damage an architect does before a more knowledgeable person intervenes:

●Directing the path of sound as direct as possible from source to audience member (direct path or first reflection) by means of the shape and direction of interior components.

-Raking seating towards the back not only improves sightlines but makes the path of sound travel more direct.

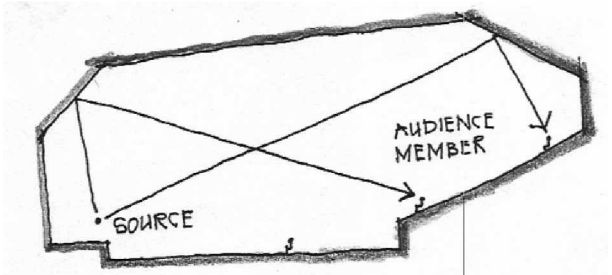


Figure 000. Sound distribution will be directed from the speaker to audience members by forming the interior surfaces of the auditorium.

Figure 000. Sound baffles against the edges of the N2 highway that passes through the central courtyard of the CTICC.

- Reflecting planes behind the source of sound towards the audience improves sound path direction.
- Reflecting planes above the audience directs upward sound waves down towards the audience.

●2 Unless the sound is absorbed it will keep on reflecting and make the source incomprehensible. The time it takes for the sound to decrease by 60dB is called the reverberation time and is an indicator of how 'alive' the space will seem acoustically. For speech the reverberation time should be low for, for music it can be longer. The following reverberation times will be maintained through the selective use of absorptive finishes to the hindmost third and sides of all auditoria and throughout conference venues and foyers generally: Refer to Appendix A.

●Standing waves will be obtained by parallel walls less than 10m apart and generally simple ratios of interior spaces like 1:2 or 1:3. Although these ratios were thought to inherently have harmonious spatial characteristics, during the European Renaissance, it should be avoided in current construction.

Sound Amplification

Electronic sound amplification will be required in both auditoriums and the conference rooms. These systems should be integrated into the planned interior components (ceiling, wall assemblies, roof and wall mounted frames), but should not be made part of structural components. This is to ensure that they can be easily replaced when a newer system becomes feasible. It is unacceptable to have loose standing sound amplification equipment.

Public address systems.

A discreetly detailed public address system should be integrated with security and fire-safety systems but should also be available for general announcements for the everyday functioning of the centre. Critical points of address will include: Porte cochere, Bus drop-off point, Parking garage, Main Foyer, Main Auditorium Foyer, Conference Foyer, Restaurant.

Furthermore, a separate communication system could be necessary for staff and management. This should however be inaudible to attendees.

Conclusion: the section on human comfort concludes with the specification of human comfort criteria in appendix A.

f) Electric lighting

The location of public spaces adjacent to open views is important because most people will express a need to observe signs of the diurnal and seasonal cycles and views significant landscape events such as a harbour or city lights are prized features of any building. The implications of the need for visual access to exterior views are solar heat gain, sky glare and large windows that must be covered at night, risk condensation, needs constant cleaning and easily fall victim to vandalism. Furthermore, because sunlight is only effective up to a depth of about 12m in most buildings it has serious implications for building shape. Additionally, certain tasks can not be done effectively with the limitations of daylight, therefore electric lighting will be required for the following applications:

Carrying out of certain tasks:

Reading, writing, assembling and repairing instruments, operating equipment and communication: Intensity of light, known as illuminance, measured in lux:

Recreation and catering spaces should not be less than 250 lux. Populated assembly spaces should be dimmable for effect with a minimum of 50lux. Offices and other working environments should not be less than 500lux. Conference rooms should be dimmable for effect with a minimum of 500lux.

The strategy for interior task lighting will be Permanent Artificial Lighting (PAL), with windows used purely for view out and ventilation where applicable. This implies that windows can be smaller thus eliminating problems of solar heat gain, wintertime heat loss, sky glare and loss of privacy. It also has the benefit of more freedom for the building shape. A more square building is cheaper to construct and maintain than a building of similar volume and shallower shape. Less window area has to be maintained and tinted glass can be used. It is however necessary that full standby power be available.

Creation of amenity as a supplement to daylight and pleasant general illumination of interiors:

Direct sunlight, although not directly a lighting issue does cater for a distinctly felt psychological need and will therefore affect building orientation and glazing. Large dramatic glazed curtain walling will be installed at all large public assembly spaces like the Main Auditorium Foyer, Main Foyer, Conference Foyers, Restaurant and Banquet Hall. All these spaces are likely to be used at night as well and to maintain amenity lighting levels, electric lighting should be used. To avoid the negative aspects of large glazed surfaces especially in the South African context like solar heat gain, sky glare and winter time heat loss these glazing systems will have to cater for some sort of sun protection and thermal insulation (probably double glazed with horizontal louvers). It is important to note that this glazing is purely for view. It would seem therefore that these spaces would need artificial lighting to supplement daylight.

Electric luminaires will be the main source of amenity lighting in the centre. To ensure that interiors are appropriately and pleasantly lit four aspects need to be addressed: the relative brightness of surfaces; modelling characteristics of illumination; glare control; and colour rendering

i) Brightness in a room, measured as scalar illuminance in lux, should be not less than ½ that of the planar illuminance measurement. Brightness will be enhanced by enhanced reflectances. The author is of opinion though, that an unlimited effort towards brightness is not necessarily positive and might lead to a senselessly artificial, stressed, science-fiction “planet-Krypton” environment. Spaces should rather be lit to feel like dusk or even late dawn but not like the centre of a nuclear explosion. Reflectances of materials should therefore be moderately light.

BZ-classification is an indication of the spread of a light fitting: a low BZ value will indicate a concentrated light where a high BZ-value indicates a dispersed light. Light with high BZ values will reflect off walls and ceilings and therefore contribute to a brightly lit room. Generally, populous rooms will be brighter with less modelling, more intimate rooms the inverted.

ii) Modelling characteristics are influenced by the relationship between the intensity and direction of light in a room. Intense lighting from above need to be offset from the side by either daylight or light reflecting off walls. Considering that a PAL (permanent artificial lighting) approach is followed allowances should be made in all public rooms and for horizontally directional light other than mere brightness and high BZ. This calls for wall

washing lights that simulate the modelling effect of daylighting through windows. If light is distributed evenly in all directions throughout the room, shapes in that space will seem flat very clean, impersonal and safe. If a strong focused light is lit in a room with little brightening, shapes in that room will have extreme contrast but detail in the shadowed area will be unclear very dramatic, intense and obscure. Furthermore, intense down-lighting could be offset by locating luminaires closer to walls so that some horizontal offset can be obtained from the reflection from these walls this would be effective in creating anticipation but still retain effective levels of task lighting in corridors like the Concourse and between the Conference Rooms.

iii) If a light source is very much brighter than other light sources in a room it leads to glare. The horizontal light required for modelling to offset down-lighting could add to this. It is therefore important to moderate the effect horizontal light sources like brightly lit or reflecting walls and especially windows. This further strengthens the argument for a moderate glazing schedule and comprehensive solar control. Glare is also a problem in rooms with large length to height ratios like the auditoriums, Conference Rooms, Banquet Hall and Restaurant. Luminaires with lower BZ values (BZ 2-4) more vertical down-lighting will decrease the risk of glare from luminaires. Dark finishes also increase the opportunities for glare as it contrasts with light coming through windows and luminaires.

iv) For reasons of efficacy fluorescent and discharge lighting will be used. These lights have a tendency to make objects appear unnatural. Advances in technology have made it possible to control the colour characteristic of the light emitted from these luminaires with a concurrent loss in efficacy.

Provision of safety:

Lighting will be required in outside areas, dangerous internal areas and areas at risk of theft, break-in and pilferage. These lighting installations must be protected from the possibility of power interruption.

Alleys, courtyards and all pedestrian areas must be well lit at all times with fittings positioned out of reach and evil-doer proof.

Internal areas that are dangerous without the normal lighting system must be fitted out for nominal lighting capabilities. These are normally battery-powered luminaires in places like escape routes and public assembly areas.

All areas where theft, break-in, robbery, attack or assault may occur will be identified and supplied with lighting.

Provision of lighting for deliberate aesthetic effect

will be used for display or dramatic or even deliberately misleading effect.

The Restaurant and Banquet Hall will use lighting to make tables glow warmly and invitingly within a generally warm glaze at dinner but at breakfast and lunch a cool, light and refreshing ambience will be sought.

The Main Auditorium Foyer, the Main Foyer, the Conference Foyers and the Concourse should be the subject of a specialist's inquiry.

It is important to decide which areas are to receive what kind of effect. Dramatic lighting and good task and amenity lighting do not combine well.

Two specific goals must be reached by the lighting design:

i) Multifunctional spaces with atmospheres that are adjustable or at least robust enough to cater for sobriety and brightness on the one hand and “mood” and festivity on the other. This can be achieved by using a combination of lighting systems in each room consisting of compact fluorescent, metal halide, neon and low-voltage luminaires. Typically rooms will be fitted with a primary set of linear fluorescent lamps, directed towards the ceiling to give a spacious, lofted feel. Secondly, a combination of metal halide (or compact fluorescent for lower ceilings) and dimmable low-voltage luminaires will be fitted to provide the working light.

ii) Establishing a layered interior for depth, interest and a generally feminine, non-minimalist interior aesthetic. This can be done by washing a wall with warm light and overlaying it with a lightweight screen highlighted by narrow-beam cool spots.

The luminaires referred to in Appendix A by letters are described in Table VI of Maritz Vandenberg’s section on Light in Tutt and Adler 1979.

Utility services:

a) Water supply

Adequate provision of potable water is important for the maintenance of hygiene wherever human consumption and use is concerned. Planting also requires enough water to sustain growth which in turn must be provided as a means of creating humane environments. Water is also prerequisite for some industrial and manufacturing process in the centre. These include cooking, cleaning, environmental conditioning and for aesthetic features such as fountains and pools. The requirements are as follows:

Even though most personal hygiene requirements (bathing and showering) of guests will be met at their respective hotels and guesthouses, large amounts of water will be required for processes that are much harder to predict Building maintenance including repair work; painting; surface cleaning with soluble detergents; mechanical flushing of interior and exterior surfaces; washing the garage pavement; washing public pavements; washing interior walls and floors, cleaning as part of catering including dishes; tables; linen; equipment, and a considerable amount of cooking. This, combined with the normal quantities required for sanitary requirements the biggest of which is certainly the flushing of wc's, amounts to a considerable need for potable water.

0.18m³ per person per day: Maximum of 10'000 people at peak time = 1'800m³

Furthermore an amount of water will be required for the maintenance of landscaping vegetation both interior and exterior. 0.012m/m² per weak is considered enough for irrigation. Assume a landscaped area of 10% of total site area = 30'000m²/ 10 = 3000m² to be irrigated of which, say, 85% receives rain at 0.010m/m² per weak = (3'000m² X 0.012m/m²) - (2'550m² X 0.01m²/m) + (2'550 X 0.002m/m²) = 36m³ - 25.5 + 5.1 = 15.6m³ water required for irrigation per weak. 15'600 litres of water per weak. This could be amply provided for by the recovery and filtration of greywater in subterranean tanks. This implies a daily recovery rate of 2.23 m³ of grey water. Four patented electrified filtration tanks processing 700litres a day would be sufficient.

Because the Nelson Mandela Forum is prone to sudden high demands for water, provision should be made for water storage. This will contribute to economic use of water mains and sizes of service pipes and reduce the risk of mains pressure dropping to nothing which could lead to back-syphonage of water from sanitary appliances into the main. It will reduce pressure on the installation to minimise noise and wastage and enables economical appliances to be used. Furthermore, heating and hot water supply apparatus can be vented to the storage cistern, thereby minimising safety valve requirements.

The water storage tank should be placed high within the isolating skin of the building. The actual capacity, which is around 70% of the nominal storage capacity, should be around 50% of the daily requirement. This would imply roof-top storage for 900m³ X 1.43 = 1'285m³ nominal storage capacity.

Water for use within the building should in all cases be potable. Roughly this implies a purity of less than 1000 particles per million of ammonia, oxygen absorbed, nitrates, nitrites and chlorine; less than 10 degrees of Clark as an indication of soft water; a pH of around 7 and should regularly be checked for bacteriological purity especially considering the consequences of water being infested.

Hot water for use in the kitchens and sanitary appliances throughout the building will be provided by a central heating installation which comprises a boiler fired by cheap fuel (preferably gas) heating water in a hot water storage cylinder. Assuming a requirement of half that of cold water, the system must supply 900m³ of hto water per day.

b) Sanitary appliances

The provision of sanitary appliances in commercial buildings in South Africa is not comprehensively regulated beyond the needs of the disabled, but falls to the discretion of developers. This is done on the assumption that their profit making imperative will force them to make adequate provision. However, predicting the actual population flows and their sanitary needs can be quite a daunting task. Estimates are based in part on the recommendations by Alan Tye (Tye, 1990) and precedent studies of European convention facilities. After spending a little time in the company of these figures and plans one develops a sense of the scale of provision.

Appliances for guests

Provision of sanitary appliances for males, wc's urinals, whb's

- Wc: 1/100 males up to 400, thereafter 1/250 @ 2594 males = 4+8= 12wc's
- Urinals: 1/50 males = 50 urinals (?)
- Whb's: 1/wc + 1/5 urinals = 12 + 10 = 22 whb's

Provision of sanitary appliances for females, wc's and whb's

-Wc: 2/50 up to 200, thereafter 1/100 @ 2594 females = 8 + 24 = 32 wc's

-Whb's: 1/wc = 32 whb's

Provision of sanitary appliances for the disabled

- 4unisex compartments

Bucket and cleaner's basin, cleaning facilities & cleaner's sink

These are the requirements for one facility - like the Banquet Hall or the Main Auditorium. It is a rough calculation for what would be required should the facility stand on its own. This is however, not the case. In the Nelson Mandela Forum various facilities are located in close proximity. It is reasonable to assume that peak time flows can be absorbed through different toilets throughout

the centre.

calculations are complicated by the unpredictability of the number of attendees. The irregularity of their spread through the building further contribute to this problem. Consider the following scenario. A plenary session is held in the main auditorium followed by a buffet breakfast in the banquet hall followed by break-out sessions in the seminar rooms on floor 3 and 4. When are attendees most likely to use the rest rooms? After the plenary session or just before breakfast. After breakfast or just before the break-out sessions? This is offset by the single event use of these facilities where the banquet hall, for instance, is used for a gala event on its own. Assume that the proximity of all the large facilities to the main foyer allows for peak time numbers to use its rest rooms as a supplement to other facilities' rest rooms.

Staff toilets and change rooms

Provision of sanitary appliances for unisex toilets: 5 wc's + 5 washing stations for first 100 staff members, thereafter 1 wc and washing station for every 25 staff or part thereof. Occupancy D3 population 1/15m² = 294 staff

- 5 + 10 = 15 wc's and washing stations

Provision of showers: 1 per 15 personnel. 294/15 = 20 showers = 10 per sex plus a changing room.

c) Drainage

Implied here are the control of waste water, soil flows, rain-/ storm water through gutters, downpipes and syphonage systems and the control of ground water.

The control of waste water is fairly standardised practice. The most important considerations here are that flows should be estimated so that economic pipe sizes can be used and ensuring that excessive pressure fluctuations do not occur. Care should be taken so that water seal is not broken in any of the fittings by evaporation, self-syphonage, induced syphonage or back pressure.

Furthermore, waste-water should be collected and filtered until suitable for irrigation. This will be done by patented, electrified processing tanks operating at 700litres a unit.

Soil water drainage is also rather standardized fair but here too, nevertheless, provision must be made to ensure satisfactory but economical pipe sizes and the avoidance of excessive pressure fluctuations.

Under no circumstance should a door leading to a sewer/ service duct open onto a space accessible by guests/ attendees.

Horizontal sewer pipes will not be taken through ceiling voids of spaces accessible by guests.

All sewer runs and turns must be fully accessible to service men without disturbing the functionality of the spaces they serve.

Surface water run-off from roof areas must be controlled and fed to municipal storm water disposal. The following requirements will be met:

- Internal gutters will be located within walls so that no noise emanating from it will be audible inside the building.
- Exterior gutters must be protected against the strong winds that prevail in Port Elizabeth.
- All gutters will at some time overflow and allowance must be made as to where any overflow must go.
- Gutters must be accessible for cleaning.

18.3.6.1 Provision will be made for the adequate sizing of gutters and downpipes for all flat roof areas. Assume the formula 100mm² for every m² of roof with a maximum downpipe diameter of Ø600mm. Assume a flat roof area of 12'000m² = 100mm²/1m² X 12'000m² = 1'200'000mm² of accumulated downpipe. One maximum downpipe with a radius of 300mm has an area of 565'486mm² (A=2.pi.r²). Therefore allow for 3 downpipes. These downpipes must be able to draw water over the total area of the diameter. Normally this is not possible but with the use of 'syphonics' it is a feasible solution. Patented systems are available and are routinely installed at all hotels of a well known international chain.

Paved areas are prone to accumulating water so that everyone approaching the building can be seen splashing through puddles formed on the paved surface This will be avoided.

- All paved areas must be laid to a fall of minimum 1:60, preferably away from buildings and collected in a storm water drainage system.
- Storm water drainage will not be aggregated to sewer drainage.
- All drainage flows will be propelled by gravity alone.

Drainage of the basement.

- Seepage holes in the basement's retaining wall will allow ground water pressure to drop. The seepage from these walls will then flow along the exposed interior of the basement retaining wall and be collected in a perimeter canal. Upwards pressurised ground water will also seep through no-fines concrete sub floor. This seepage must also be connected to channels that collect all the ground water to a single sump pump. This pump must be duplicated and will pump water to a surface level gulley that feeds to the municipal storm water disposal.
- Provision must also be made in the basement for rain water entering the garage from the perimeter and joint leakage throughout to be collected in gutters and downpipes. This is to avoid free flow of water in the basement that is the inevitable consequence of cheaper garage construction.

d) sewage disposal

Sewage will be disposed of by the sewer processing plant operated by Harbour authorities towards the north of the site. All sewer of the Congress Centre (excluding the Exhibition Centre) will be gravity fed to a central point from were it will be pumped to the Harbour's sewer works.

e) refuse collection and storage

Adequate provision for storage of refuse is hardly ever made in commercial buildings. Furthermore the system for the collection of refuse, cleaning of receptacles and the distribution of refuse collection points must be adequately provided for and robust enough so that inevitable expansion of the service can take place.

- Refuse chutes must be allocated where their noisy content will not be a noticeable to guests.
- Refuse chutes must be ventilated.
- Space for refuse containers on ground floor must be provided for with access for daily emptying.
- Refuse will be compacted by the use of mechanical equipment. The machinery that performs this are to be located where the noise and smell associated with them, will not be noticed by guests and where it is not a disturbance to personnel and staff.
- Space must be made for sorting of refuse so that a responsible approach concerning the recycling of glass, papers, metals, plastic and organic waste can be followed.

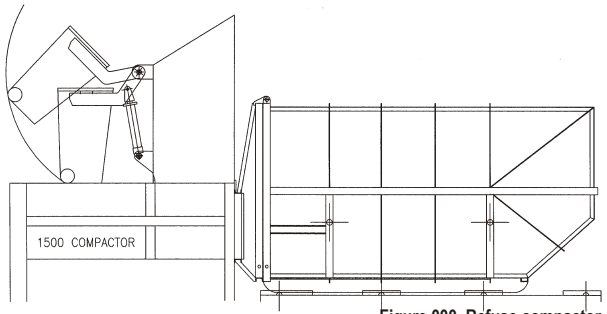


Figure 000. Refuse compactor

ensure hygienic conditions are maintained.

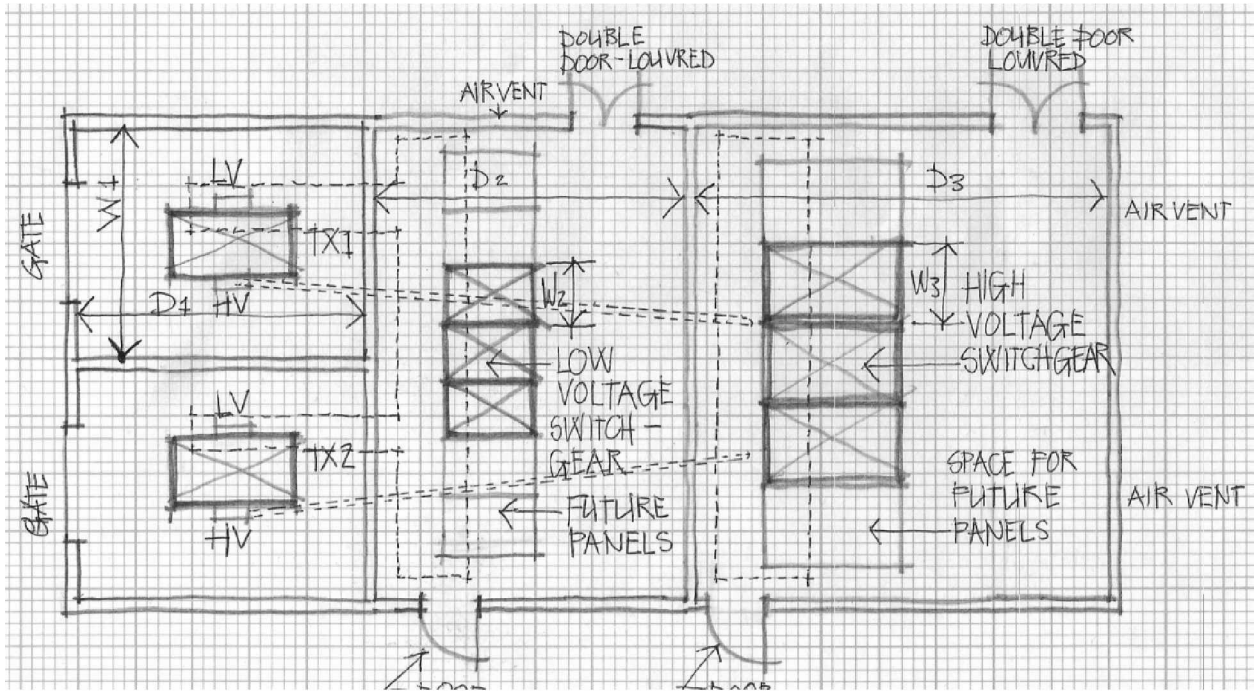
- Securing the contents of refuse containers is a priority since it is liable to become a commodity to the poor.
- Waste should be managed so that those who find benefit from it can do so with dignity.

f) electric power

Electric service is one of the fundamental tools characterising western civilization production of most commodities in the market is dependent on it. Its presence in buildings, conventionally, is confined to distribution through cabling and access by sockets. A new component, that of electricity generation, has now also been added to the repertoire of building services but remains on the margins of construction practice due to initial cost and socio-psychological inertia. The following will need to be considered in the 'wiring' of the Nelson Mandel Forum:

18.6.1 Provision will be made for the following sources of electric energy: Municipal supply, combustion-generated electric current for emergency use, solar power converted to electric current and Uninterrupted Power Supply (UPS) in the form of battery storage.

a) Electric power can be bought from the local service provider, the Nelson Mandela Metropolitan Municipality, at a very cheap rate. It is currently a reliable source but Eskom (the national supplier) has warned that energy demands might not be met by 2010. Local electric power is provided as 250 Volts at 50hz 3-phase current. After power has entered the building from the municipal line, main switch gear will divide the circuitry into a 'mains, sub-mains and final circuits' system. This implies dividing the power demands of the building into separate end-circuits for each logical unit of end-user, and branching them in a hierarchical system. Special provision must be made for the heavy loads imposed by the kitchen, auditorium and congress



centre not to mention the exhibition centre which should operate separately from the Congress Centre. It will be important to be able to make connections without interrupting the service. This is most effectively done by means of a 'bus-bar' distribution system.

The quantity of electricity required for the centre is estimated to be similar to a 'High Tech Office' as described by Adler (Adler, 1999). He estimates 190-460 kVA for a 2'000m² building implying 95-225W/m²; and 2900-6500 kVA for a 20'000m² building implying 145-325W/m². This extrapolates as follows for Nelson Mandela Forum which has a total built area of roughly 275'000m²:

95W/m² for 2'000m² = 145W/m² for 20'000m² = 305W/m² for 275'000m²

therefore 275'000m² X 305W/m² = 8'388'703 VA(Volts X Ampere)

8'388'703Watt/ 240Volt = 34'952 Amps

This then amounts to a design load of 34'952Amps at 240 Volts. This is about 635 times more than an average domestic load of 55Amps!

It can be expected that the local service provider would deliver this current at high voltage to limit energy losses due to higher resistance in lower voltage cables Assume 415V.

Estimated sizes of sub-station space requirements extrapolated from Adler (Adler, 1990):

D1 4m; D2 4.65m; D3 7m; W1 3.5m; The sub-station must accommodate the following:

6 transformers, 17 High Voltage switch gear panels; 14 Low Voltage switch gear panels.

g) telecommunication

One of the chief drivers for the initiators of the scheme is the development of a so called “high-tech” facility that can compete on the international market. The most incredible development took place in the field of information technology in the last decade or so and it is mainly in this regard that the term “high tech” is used. Four

a) Digital conference program

Attendees can download digital conference programs onto handheld devices. In advance of the event programs are downloaded from show organizers' Web sites. Attendees then download program updates from infrared touch-screen kiosks in the convention centre.

b) LAN, VLAN, WAN and VPN connections

Fibre-optic infrastructure, called a fibre-optic backbone, allow the use of Local area networks (LANs), virtual local area networks (VLANs), wide area networks (WANs), and virtual private networks (VPNs. LANs are used to transmit voice and data between various areas of the building; WANs, to transmit voice and data to remote locations. VPNs create dedicated, private, fully encrypted Internet-based connections inside convention facilities or between these facilities and other entities. VLANs permit multiple classes of network service to be delivered, and to send voice and data locally over an Internet-based network. It is important to ensure that the convention centre's fibre-optic structure allows for network redundancy.

c) Wireless and high-speed Internet connections

Wireless Internet access is made available access points that are connected to wireless local area networks (WLANs) linked to the Internet. WLANs use the WiFi (wireless fidelity) protocol to transmit data at speeds of up to 11 megabits per second. Individuals with laptops or network interface card-equipped PDAs can obtain high-speed Internet access within about 300m of an access point.

d) Sophisticated broadcasting capabilities

Fibre-optic cabling also allows Webcasting and streaming video. Webcasting is the transmission of live or pre-recorded audio or video to PCs that are connected to the Internet. Streaming video is usually sent from pre-recorded video files, but can be distributed as part of a live broadcast feed.

e) Improved telephone service

Upgraded wireless telephone service, provided by wireless signal distribution networks that support service from multiple wireless service providers rather than only one. Such networks collect carriers' signals, using dedicated fibre-optic cabling to low-power radio signals throughout a building. And although voice-over-IP (VoIP) has yet to become a mainstream technology, convention centre managers cite increased interest among groups. VoIP allows telephone calls to be placed and forwarded through the Internet.

It is clear that the most important infrastructural installation is a fibre-optic “back-bone”. The space requirements will be assumed to be similar to that of the customary telephone installation. In addition to the above-mentioned services a comprehensive Building Management System (BMS) will be required for the integrated management of building performance and diagnostics co-ordinated with operational information.

Circulation:

a) programmatic functions.

It has become the norm in modern convention centres that a centralised concourse gives attendees access to all major public facilities. In fact, the central corridor or concourse has become synonymous with conferencing and can be said to characterise the type. The concourse is also an indicator of the central operational continuum of the centre: attendees vs. staff/ personnel; public space vs. 'backstage'; service space vs. served space. The concourse is, and connects, the most public spaces - further from it are the more intimate spaces. Juxtaposed to this are the cores of service space. In the service cores space is compacted and efficient on the concourse and foyers space is stretched and turbulent. It is essential to the efficiency of the

service operations, and to the presentable-ness of the public areas, that these two circuits never cross.

Capacities

Vertical and horizontal circulation elements must be able to handle peak time flows of attendees. There will be roughly 5187 attendees, at maximum capacity, in the Main Auditorium or 5187 attendees at the Conference Centre. All these people will move vertically or horizontally through the building at especially the beginning and conclusion of Events.

Level 2 public floor capacity = 2.3m² per attendee = 15'800m² Foyer required.

Level 3 Congress Foyer capacity = 0.5m² per attendee allowing 25% seating and 75% standing = 3444m²

Level 4 Congress Foyer capacity = 0.5m² per attendee allowing 25% seating and 75% standing = 3444m²

Vertical circulation of attendees: All attendees (assume 5187) should be mechanically circulated from Level 2 to Level 3 to level 4 within half an hour by elevators and escalators.

Assuming lifts with a capacity of 24 people/ 1800kg moving at a maximum speed of 3.5 m/s the following extrapolations are made from the recommendations by Williams (Williams, 1979):

1 Lift for 60 people; 2lifts for 202 people.

200/ 60 = 3.36

2/1 = 2

therefore 3.36/2 = 1.683 = ratio of difference in population to difference in number of lifts

5100/ 200 = 25

therefore 25/ x.lifts/ 2lifts = 1.683

60/ 1.683 = lifts required = 30 lifts.

35/2 = 15 (lifts have twice the capacity in example). Therefore 15 lifts, each carrying 353 people per half hour, will be required between levels 2-4.

It is clear that the speed of an escalator becomes a necessity if the foyer is not to be crowded with lifts. Furthermore, lifts are not ideal for situations where floor to floor heights exceed 3.3m, there is more than one main floor, there are levels below the ground floor requiring normal service for passengers or there are large numbers of visitors all of which occurs in the present study. To decrease the amount of lifts by 7 an alternative will need to cater for 2400 people within half an hour.

An escalator can circulate 1600 people in 30 minutes for every 600mm of step width. An escalator of 900mm step-width would be able to carry 2400 people.

8 lifts each carrying 24people at 0.75m/s and one escalator of 900mm step-width will be sufficient to handle peak time traffic.

Additionally a staircase should also serve attendees when mechanical circulation is not available during emergency. Chudley and Greeno (Chudley and Greeno, 1999) proposes the following formula for calculating the minimum width of a staircase: P = 200 X width of stair +50(width of stair 0.3) (no. of storeys 1).

6'000 = 200.x + 100(x-0.3)

6'000 = 200.x + 100x 30

5970 = 300x

19.9 m = width of staircase.

This 20m of staircase will be divided and spread throughout the floor area to serve as fire escapes. The provision of a 20m staircase when there are already 10 lifts and an escalator present in the same foyer seems redundant. This 20m of staircase width must, however, still be provided as a means of escape when mechanical services are unavailable and will be spread over the floor as a number of staircases. A nominal staircase will therefore be provided for those who prefer to climb stairs and its width will respond to what seems fitting to the spatial quality of the foyer. This staircase will not be a fire escape.

b) service.

c) arrival and departure.

d) Parking requirements

Private motor vehicle ownership in South Africa is common among the rich in South Africa. Furthermore, transport in the country is mostly centred on cars. Therefore parking for attendees is essential. Additionally Port Elizabeth's central business district is said to suffer from a lack of parking. It is critical to the pedestrianization of the area, and for the success of public transport nodes in the vicinity of the centre, that additional parking is provided for use by the general public. The formulae here quoted are rough estimates based on population of the centre and represents only minimum requirements. The number to be provided additionally will be determined by conducting an in-depth feasibility analysis taking into account such factors as site capacity, resistance to parking fees, traffic and congestion and aesthetics.

Capacity

- Auditorium attendee parking: 1 space per 3 seats = 1729 parking bays
- Conference attendee parking: 1 space for 4 attendees. Number of attendees assumed to be similar to auditorium capacity = 1297 parking bays
- Staff population varies with season and operations of the centre. Furthermore staff is more likely to use public transport. Staff population assumed to be 1/10th attendee population.= 900 parking bays
- TOTAL: 3925 parking bays required

Building Elements:

a) Substructure/ foundation:

The weight of the building will be transmitted to a level where material with a sufficient carrying capacity can be found. The Nelson Mandela Forum is located on an area with soils described as having a "marked clay accumulation, strongly structured and a reddish colour" (Environmental Potential Atlas for South Africa ENPAT). Without referring to any analysis of such soils, the "clay accumulation" indicates to the author that bearing capacity will not be readily found in shallow conditions.

The area is also described as having Arenite geology. Assuming this is sandy sub-soils it will inherently have a low carrying capacity 100-150kN/m². This is further reduced by the fact that the soil will be drenched due to being within 1kilometer of the ocean further reducing the carrying capacity to 50-75kN/m². Furthermore, the Centre will be partially built on regained soil that was built to extend the harbour into the ocean. The capacity of backfilled soil is nominally zero and must be investigated before any load is put on it (SABS 0161-1980). This indicates to the author that the substructure will have to transmit the load of the building to a solid rock base The depth of which is not readily known. Even the Engineering Dept of the Nelson Mandela Metropolitan Municipality was unable to give information in this regard (telephonic inquiry August 2005). The author will assume a depth of 16 m below the current Natural Ground Line being 6 m higher than the Low Tide Water Mark and 4 m higher than the High Tide Water Mark.

In light of the above the following considerations will be important for the layout of the sub-structure:

i) Ground-water control

ii) Deep trench excavation

Ground water control and the method to be used for deep trench excavations can be economically combined in the present inquiry. Because the scale of the project it is unlikely that any contractor in the region will be able spread the cost of temporary cofferdam-sheet piling over several similar projects because these will probably not exist. Therefore a method that combines ground-water control with the method of excavation with the eventual structure would be ideal if somewhat idealistic. The proposed technique must also be compatible with the adjacent foundations of the elevated expressway to the South and the Campanile to the West and the Railroad to the North and East.

The only method that can fulfil this wish-list is that of diaphragm walls. It has low installation noise and vibration, can be used in restricted space and can be installed close to existing foundations. This method must however form part of the permanent structure; otherwise it is not economical (Chudley, Greeno, 1999, pp136). This single construction item will fulfil the purposes of ground-water control during construction of the basement, protect the construction cavity during construction and will also form the eventual deep basement perimeter retaining wall.

The trench for the diaphragm wall will be excavated using the bentonite slurry method (see Figure 000). The bentonite slurry method allows a greater freedom of shape for the perimeter wall than any other excavation method. The concrete used must be high strength, 20-40 N/mm². This also allows for the wall to be a load-carrying member for transmitting loads from the superstructure in addition to its main function of resisting lateral bending due to ground water pressure. The diaphragm wall thus formed is assumed to be waterproof whilst not requiring any waterproofing membrane. High density concrete is still essential to the wall to protect its steel reinforcing against corrosion.

iii) Piling

Piling will be used to transmit the design loads from columns to the rock bed because the sub-soil is assumed to be too weak as previously mentioned. The preferred piling method will be 'replacement piles' or 'bored piles. This method is suitable for the Nelson Mandela Forum construction site because it will be carried out in close proximity to the elevated expressway, the rail

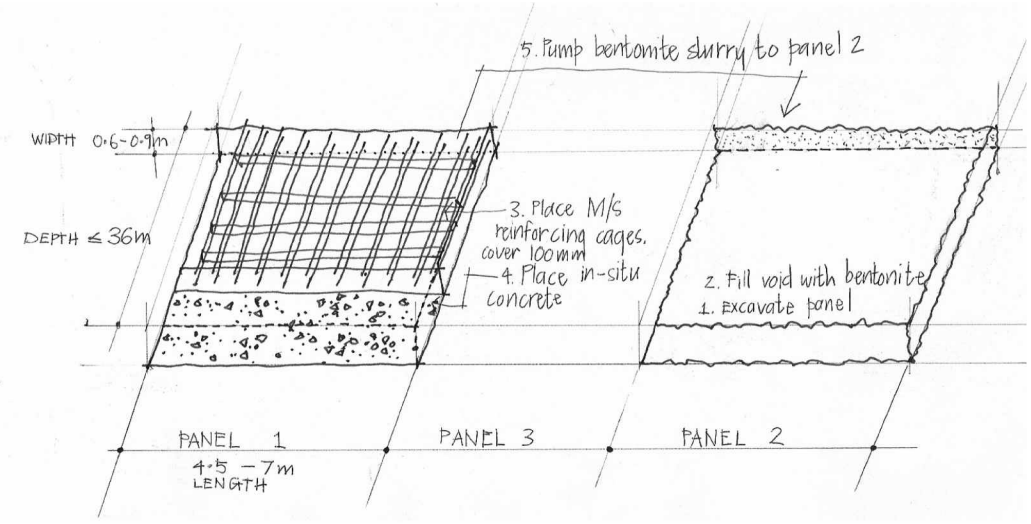


Figure 44. The Bentonite slurry method for the construction of deep trenches.

track, the Campanile and the Railway station. The piles will be formed using rotary-bored piling as this is the only method available that can carry the 10'900kN design-loads that the piles will receive from columns (see structural calculations below). A telescopic Kelly bar, housed in a Derrick, drives either a Chesire/ helix auger or a Flight auger. The pile will probably be Ø1200mm or 2 piles per cap of Ø600mm each. Reinforcement, according to a specialist's design, is lowered into the pile cavity and filled with in-situ concrete (or a combination of precast and in-situ concrete should the specialist decide on 'prestcore' piles) which is gravity-compacted. Reinforcing is extended beyond the piles for fixing the pile-cap to. Roughly 400 columns will transmit 10'900kN each to the pile-caps at the head of the piles.

If this method of piling cannot be used an alternative method will require smaller structural bays or lighter loading, like a steel frame, both of which have fundamental implications for the design of the structure

iv) Deep Basement construction

For the construction of a deep basement a strategy of a wet basement is most suitable because the abovementioned in-situ concrete diaphragm perimeter retaining wall's construction precludes applying a waterproofing membrane to the exterior of that wall. Furthermore the extremely long perimeter increases the risk of negligent waterproofing practice. The factory-manufactured pumps involved in wet-basements are less liable to failure, in the author's personal view, than a waterproofing membrane applied by 'semi-skilled' labour. A wet basement implies a cavity that extends the full height of the retaining wall. This cavity can simultaneously serve as a ventilating cavity for the parking garage. This technique was successfully used at the Brooklyn shopping centre in Pretoria's basement garage. The retaining wall can get lateral support from the floor slabs. Beams in line with the structural bays jut out beyond the floor slab perimeter to support vertical cantilever beams/ pillars supporting the retaining wall.

b) Superstructure:

The structural bay must accommodate all the functions of the building while being robust and repetitive. For the upper public floors, the larger the bay, the more open and un-cluttered the spaces will be. The centre is in essence an assembly building and requires large spaces unlike offices and apartments where compartmentalization is common. Although beams are more expensive than columns (Foster and Harrington, 1990) it remains important for the character of the income-generating space to seem uncluttered. The next important constraint therefore is the parking basement. It is ideal to have the same column-spacing repeated on each floor. Therefore the parking bay of the motor vehicles in the basement will greatly dictate the possible locations of columns

The proposed system of large span two-way spanning floor-slabs are cheaper than rectangular grids (Foster and Harrington, 1990, pp212) but the relatively large structural bay will lead to very deep horizontal slabs and beams unless the bending moment can be reduced. One method to reduce the bending moment is to reduce the dead load/ self-weight of the structure by the use of coffer slabs. Another method of reducing the bending moment in the horizontal members is to have stiff joints as with a portal frame structure. This discussion already begs the question What structure? Where a concrete floor is cast monolithic with the slab it acts as a flanged beam making it more efficient. Less deflection results from the structure being monolithic. Also in a monolithic structure, there is a less rapid increase in dead weight with increase in span because, due to stress distribution, weight is more concentrated near the supports which will take its weight directly. The disadvantage of such a monolithic structure is the movement caused by thermal expansion and contraction and also that caused by differential settlement of the founding structure

The choice of structural material is now important. The choice of concrete is based on the comparison in Graph 000. If it

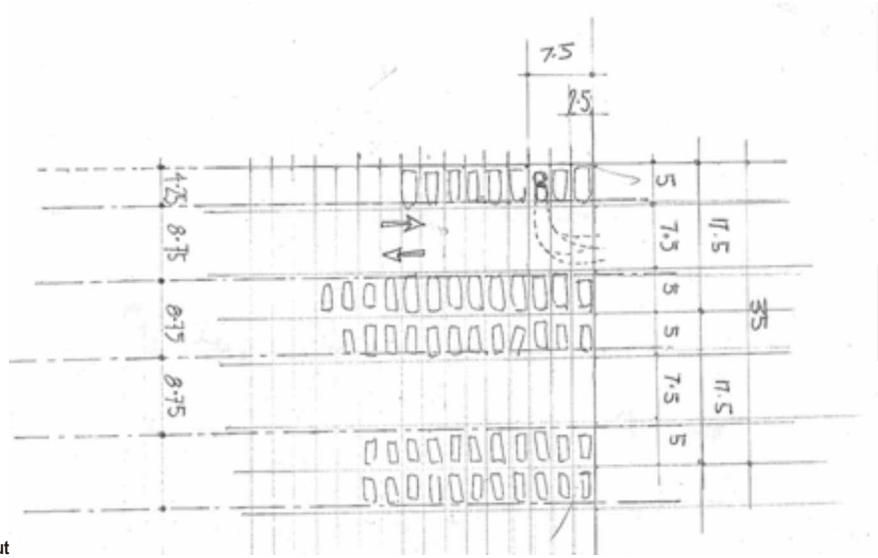


Figure 45. Parking bay layout

STEEL OR CONCRETE STRUCTURE?		
PROBLEM	Concrete	Steel
Portal Frame Structure	Monolithic structure is formed with greater ease. Any desired shape of member can be formed. Lateral and transverse stability is obtained by the frame being monolithic with in-fill panels like floors and walls.	Fully rigid members can be made but with extra steel components. Cross-bracing is required for lateral and transverse stability.
Cost	The site is not sold under high demand and therefore relatively inexpensive. Slower delivery time associated with concrete is not critical. Variations in structural members can be more cheaply manufactured.	Economy in steel is obtained by the adoption of a regular and reasonably close spacing of stanchions (columns) (Foster and Harrington, 1990, pp 189). Production time can be very little therefore cheaper than concrete if automated methods in the fabricating shop is used, hollow fire-protection methods are used, steel deck floor construction is used and modern organizational methods are used. None of these, to the author's knowledge, really characterize the South-African building industry.
Corrosion	Corrosion protection of concrete is achieved by deeper cover to the reinforcement and denser concrete.	Corrosion protection of steel, especially in an industrial-marine environment such as the Port-Elizabeth harbour, is comprehensive in terms of amount of layers of protective coatings and the regularity of recoating required.
Fire Protection	Reinforced concrete, with normal cover to the concrete, provides a substantial degree of fire resistance.	Steel requires a protective covering.
Manufacturability	Concrete is known to be widely available in Port Elizabeth, having its own cement kiln and plant. The quality of concrete improves with the size of batches being made.	It is uncertain whether steel products of large quantities, and the skill required to work it, it available in the region. Steel work is done under factory conditions and only needs assembly on site Quality is generally good.
Robust	The nature of concrete makes it more adaptable to differentiated structural members.	Variations in members require alternative steel sections which are only manufactured in large batches.

Figure 46. Comparison between steel and concrete as structural material

seems that this evaluation is some-what distorted toward concrete it is because the architecture surrounding the site in Port Elizabeth learned that simple shed like structures are built with a steel frame and more complex structures are executed in concrete. Furthermore, concrete frame construction seems to have a strong presence in the 'Baai'. The large overhead expressways, The 'Dollosse' that line the industrial sea-front, The quays and the harbour infrastructure, the famous bridges in the area, the campus buildings of University of Port Elizabeth, the Algoa bus terminal, the deserted factory in Main Road known for its suspiciously coloured aggregate, even the roads are often made in light coloured concrete all indicating a regional preference for the practicality of concrete

c) Roof

The choice of roof system will depend on:

- Ssupport
- Desired effect below
- economy
- constructability

The areas that have to be roofed are identified as follows:

Banquet hall:

- Span 70m X 82.5m.
- Continuous perimeter support.
- No applied downward load.
- Significant upward wind suction.

The aspect ratio of this roof is 82.5/70 = 1.18. Because this ratio is so small, the structural load is evenly distributed. To take advantage of this fact a two way spanning structure is recommended. A space truss installation will give, structurally, the most efficient solution for this span. Special consideration must be given to the roof.

The Main Auditorium:

- Span 70m X 70m.
- Continuous perimeter support.
- Applied load: services and personnel gantries, lighting equipment.
- Significant upward wind suction.

Structurally the solution would be the same as with the Banquet hall. The Banquet hall would have a significantly larger downward load. Special consideration must be given to the acoustic performance of the roof. The truss will not be exposed to view. Pending finalization of the Main Auditorium, the roof might have to curve to achieve an acoustically and spatially appropriate interior. This is achievable with space truss assemblies.

Roof over Conference and service shafts.

- Irregular shape.
- Intermittently supported over 8750mm X 7500 bays.
- Carries extensive rooftop service plant and acute point loads like water storage.

A concrete roof would be able to accommodate the structural loads while taking advantage of the economies of repetition of the structural frame. Waterproofing will be critical especially at movement joints.

Roof over parking garage:

- Regular shape.
- Supported over 8750mm X 7500 bays.
- Carries point loads (cars) and live loads (moving vehicles).

A concrete roof would be able to accommodate the structural loads while taking advantage of the economies of repetition of the structural frame. Waterproofing will not be critical.

The roofscape of the centre will consist of a combination of lightweight long-span metal profile roof sheeting and concrete flat roofs.

d) walls (skin and partitioning)

The external weather-resisting component of the building will be determined by the structure of the part of the building that needs to be protected. The structure of the building is mostly in-situ concrete frame. Large sections of the façade will be glazed. The glazed areas need sun-protection. Furthermore, the environment is highly corrosive being approximately 1km from the ocean. The region is subject to driving rain and winds of up to 14m/s being described as 'near-gale' strength. The architecture of the environment teaches us that plastered brickwork faced brickwork and exposed aggregate concrete panels are the preferred method in the area along with a few sheds of metal profile panels.

The Nelson Mandela Forum, being a highly market-driven venture, is liable to be 're-designed' every 5-10 years. It is insightful to see photo's of long standing convention centres and notice the complete façade changes that they have undergone over the years. It is therefore advisable to choose a cladding strategy that does not preclude remodelling.

To break down the scale of the centre a measure of differentiation is required on the exterior of the centre. In view of the dual roofing scheme considered above, it would be sensible to choose skins that complement each separate scheme: For example: The roof over the banquet hall will be a light steel frame with large sections of the banquet façade glazed. Below the Banquet hall two service levels can be enclosed by brickwork infill. This can be given a facing that would appear solid and heavy to contrast with the lightweight hall above.

A similar approach would be followed throughout to establish intermittent areas of solid and glazed, light-weight metal sheeting with glazed areas 'cut-out'.

The skin of the centre will therefore consist of intermittent surfaces of:

- Glazed curtain walling at the Banquet hall, the Restaurant, the foyer to the Main Hall and the Main Foyer.
- Brickwork infill between the concrete frame members, faced with aluminium panels, punctured with glass panes in aluminium window frames to the exterior of the Conference Centre and Kitchen and Administration department.
- Lightweight metal sheeting as cladding on the exterior of the concrete frame to the exterior of the service shafts and workshops.

e) openings

f) finishes

<u>Security</u>

Security requirements for the Nelson Mandela Forum can be grouped into four categories:

a) Securing property against theft

1. Securing money. For the purpose of this study one process only will be described. Entrance fees are collected at the reception desk in the main foyer. Money received is placed on irregular intervals into a under-counter secured cash-box. The cash-box drops through a dumbwaiter to a secured room below where it is counted and balanced by the accounting department. The money is prepared in 'Smart-boxes' according to the requirements of the bank. The money is then stored in a vault in that same secured room. On irregular intervals a cash-transit service picks up the 'Smart-boxes' and delivers it to the bank. The cash-transit service should preferably not be contracted to the same company that provides the security to the centre. The

cash-transit van would preferably be received in secured garage. The cash-transit personnel receives the 'Smart-boxes' through a chute in the wall between the counting room, containing the vault, and the secured garage.

b) Securing Very Important Persons

Considering that the Nelson Mandela Forum seeks to host, amongst others, gatherings that involve heads of state and other influential people or people with high security requirements. Of specific concern for the protection of VIP's are the point of arrival and departure and the visibility of VIP's from general public outside the building.

- A secure environment must be created for the arrival of the High Risk VIP (HRVIP). A helicopter landing pad out of view of general public and neighbouring buildings is preferable. A separate secured garage for demounting from a vehicle with secured passage to the interior is a minimum requirement. Furthermore, no person outside the controlled access points of the centre will have any visual connection to the interior of the centre. This implies either no windows to the exterior or windows must all have reflective glass.

c) Minimising the risk of terrorist attack

d) Access control of and minimising risks associated with large groups of people:

Some general principles will contribute to making a centre that is easy to monitor and secure, these are:

- Design for visibility: Adequate lighting, all obscure areas to be controlled, avoid unnecessary corners and hiding places. Make places easy to monitor.
- Control access: Few as possible entrances of which all are controlled. Make fewer entrances to monitor.

Part C: Response to the built environment

a) Protection and celebration of heritage in the built environment including buildings, spaces, movement patterns, rituals, cultural events.

According to Article 1 of the Venice Charter by the International Council for Monuments and Sites (ICOMOS)

"The concept of a historic monument embraces not only the single architectural work but also the urban or rural setting in which is found the evidence of a particular civilization, a
significant development or a historic event. This applies not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time."

This would have dual implication for the site around the Campanile and the entrance to the harbour. The first and most obvious item is the Campanile itself. The development of the Campanile and its setting has been explained as a context element. Secondly the Northern most extension of the Apple Express narrow gauge rail.

The Campanile is a typical monument and was built to be a monument. There are however two points of importance when considering development around it.

- Protection and revitalization of the monument
- Recognition and re-establishment of the Campanile's urban-spatial significance.

The former is a management concern and must be developed with other management and tourist programs. The latter concerns the spatial use of the Campanile.

As was explained in the section on 'context' it is clear how the Campanile was systematically put aside. Today it stands relatively uncelebrated. The current project will re-establish the spatial formula that the Campanile was originally designed for - as a node where movement paths cross. It would be a significant indicator of the future of South African cities if these paths will, instead of motor vehicle paths, be pedestrian paths. In this manner the Campanile's 'repositioning' could also carry meaning in the collective memory of the city.

Furthermore, an opportunity to fully exploit the significance of the monument could be gained by placing it on or closer to a public square. This would enhance the quality of urban spaces available in the city in that it provides opportunity more interaction with such meaningful spaces. This would be especially powerful if coupled with the Donkin Hill green square (urban historical) and Market Square (civil).

A further opportunity to expose evidence of history is the still existing Apple Express. The future of the urban role of the Apple Express is part of the MBDA's mandate. The Apple express is a narrow-gauge train and one of few in the world. There are several international organizations that celebrate the history of these

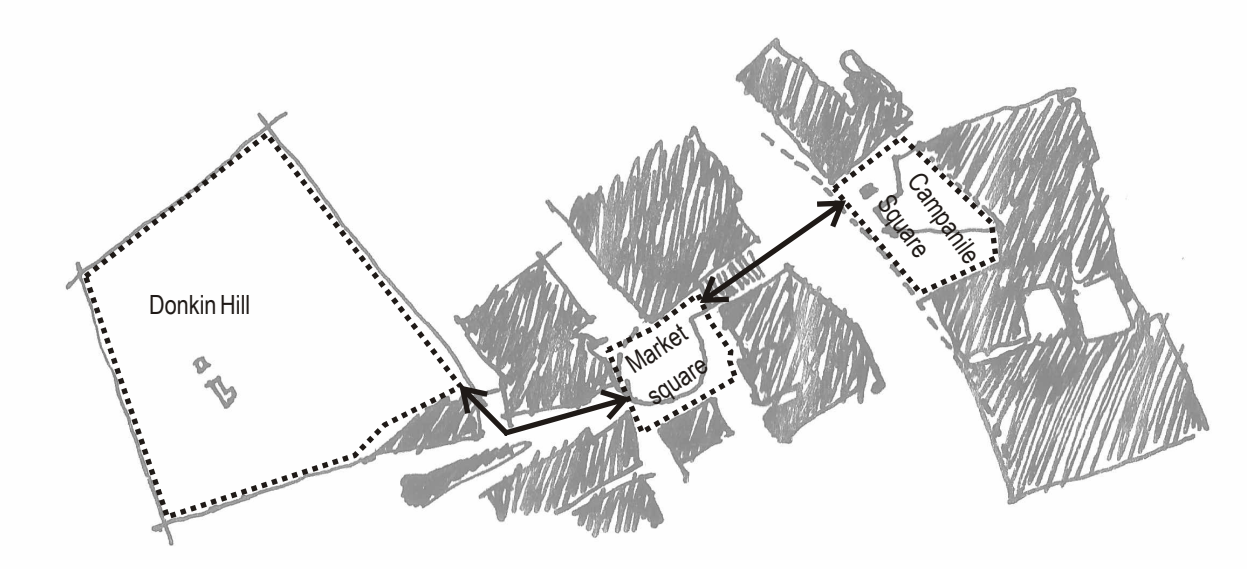


Figure 47. Chain of public spaces linking CBD to Waterfront

Class NG15 124 heads Apple Express from Humewood Road to Loerie 1984

Figure 48. An annual "race against the machine". Athletes compete with the Apple Express in a long distance race that starts in the street under a bridge. Would it not have urban significance if the race could start on Campanile Square where the train used to pick up its passengers?

trains. The Apple Express was a regional freight train that collected citrus products from local farmers at the many stations in the region. Today it is a recreational train. Very significantly it annually "competes" with humans in a "long-distance" running event. The event has a "Man Against Machine" slogan and starts from Apple Express station a few kilometres away from the Campanile. The runners gather in the street and set off from there. However, in the past when the train carried passengers it used to come all the way to the train station just below the Campanile. The rail still exists and lies intact across roads, paving and parking. It could be a significant addition to the development if the annual event could set off from the square below the Campanile. This would 'inscribe' the race, and the square, with the historical significance that lies dormant in the tarmac.

Article 5 of the Venice Charter supports this concept. It states: "The conservation of monuments is always facilitated by making use of them for some socially useful purpose."

b) Support of small to medium enterprises.

Apart from the many valid causes for supporting entrepreneurship, the project would have a mandate, given it by the MBDA, to support not only informal traders but another category namely Small to Medium Enterprises. This may imply a design effort beyond allowing for sellers to set up a stall. The development of SME's implies more the development of industry, workmanship, business acumen and higher levels of service. How can a building achieve all this? By writing in more functions into its programme. Yes, but more than that. A large scale urban intervention should consider those things that make industry and service work - Transport; markets for produce; business services, access to labour and, significant for developing cities, higher density of diverse enterprises.

c) Develop the quality of the surrounding urban environment.

This refers directly to experience of spaces between buildings. The integration of the whole scheme into an urban framework is considered hereafter. At issue here are the things that make any urban space acceptable. Some have called it 'Landscaping.'

Vegetation: Port Elizabeth falls within the Alexadria Forest biome. According to Gavin Brand, a fellow student in landscape architecture, smaller plants and shrubs are indigenous to this region. It is however important to consider the scale of the built fabric in relation to the vegetation that is planned for this project. In response to this Brand suggested using other larger trees that are indigenous to South Africa but not necessarily to the biome. These include Celtis africana (White Stinkwood) and Schefflera umbellifera (False Cabbage tree). The white stinkwood has the advantage of losing its leaves all in one go. This means that raking leaves is a time-efficient excercise. Both trees however, are deciduous and will give shadow in summer and allow sun in the winter. Benches, light

Figure 49. What would normally be a concrete island in a sea of tarmac is turned into a green spot of seemingly indigenous vegetation and a pleasant footpath that puts pedestrians in closer contact with natural elements.

Figure 50. Port Elizabeth has made Govan Mbeki Drive a more pedestrian-friendly environment by pacifying traffic, planting of trees, and allowing small enterprises to flourish.

fittings, trash receptacles, bollards, paving materials and patterns, vegetation and its concomitant maintenance programs and irrigation, kerbs, canopies, exterior handrails and steps, signage, fences, gates, booms, security structures, sound baffles to the elevated expressways and any wind attenuation elements - all should be integrated aesthetically to give a recognizable appearance to the environment around the buildings.

This is even more important considering that Port Elizabeth is a regular winner of the Blue Flag award which rewards cleanliness and beauty in respect of tourist destinations.

Part D: Urban Obligation

The Madiba Bay Development Agency (MBDA), as one of the initiators of the scheme, have stated that urban revitalization is one of their main objectives. This goes beyond promotion of the inner city as an investment and residential destination by such measures as relocating state offices to the CBD, tax deductions for inner city development and promotion of residential remodelling of old buildings. These measures have become the order of the day in many cities around the world and in South Africa and are very important. However, more is needed to ensure that real quality living environments are established. Moreover, the city as an artefact of a modern globalised civilization, is an opportunity for *Dasein*/ people to experience a revelation of meaning (even though the message might be that there is very little meaning - especially in a post-colonial, post-apartheid, late capitalist, proto-nationalist, African non-city). The keyword in inscribing meaning is - *order*.

The most criteria for the establishment of order in the current project are stated below:

1. Integrating the scheme with the Interim Spatial Development Framework:

i) Transport Node: the SDP calls for the development of transport infrastructure. The current scheme is built with the train station, bus station and several taxi junctions in very close proximity. The development of a transport node would benefit by the following:
- Public Parking to promote the use of public transport.
- Development of amenity-value and aesthetic coherence of an identifiable transport node through landscaping, benches, toilets accessible by public, lighting, security, protection from rain and wind etc.

ii) Development of a major centre: The project scale would suggest that has already been met but the nature of the project in a pure form would preclude real integration of public access especially on the grounds of security issues. A special requirement is therefore added to the role that the building has to perform - above its original programmatic requirement.

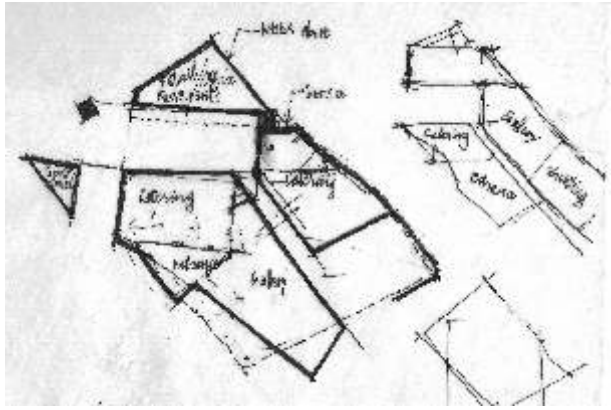
iii) Development of the Waterfront: The waterfront scheme has come a long way and still is not beyond the realm of early concepts and paperwork. It does however, present the special opportunity of connecting the CBD to the ocean waterfront - as the title would have one believe. It is, in fact, not an easy task to make this connection because the harbour, railway and industrial areas have all been developed in between. With the promise of moving the oil tank farms and ore dumps to Coega harbour, a real opportunity could open up. The area that would be released for development of a waterfront is also not directly between the CBD and the foreshore. It lies some 5 kilometres to the south. Therefore, not only the revitalization of the CBD and the development of the Waterfront would have to be done to achieve the above stated goal but also the development of a viable connection between the two precincts! It is the author's opinion that the Waterfront scheme in Cape Town, which was otherwise a great success, disappointed somewhat in this regard.

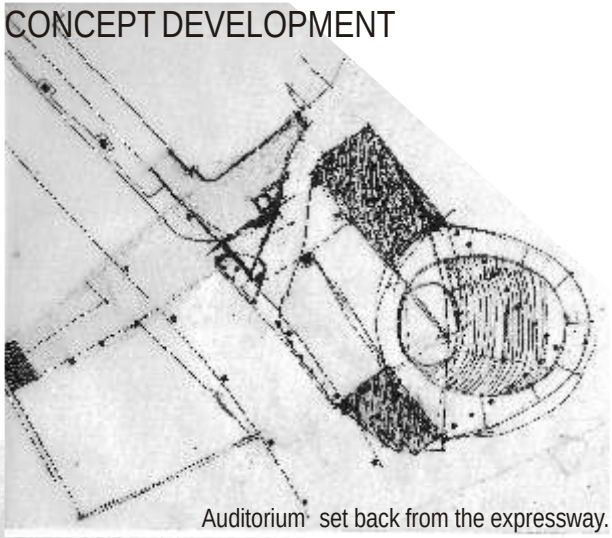
The task therefore is to establish a pedestrian link between the civil and historical centre (Donkin Hill - Market Square axis) and the Waterfront. This will not be achieved merely by a footpath. Here is need for something more substantial. A chain of urban spaces is required.

CONCEPT DEVELOPMENT

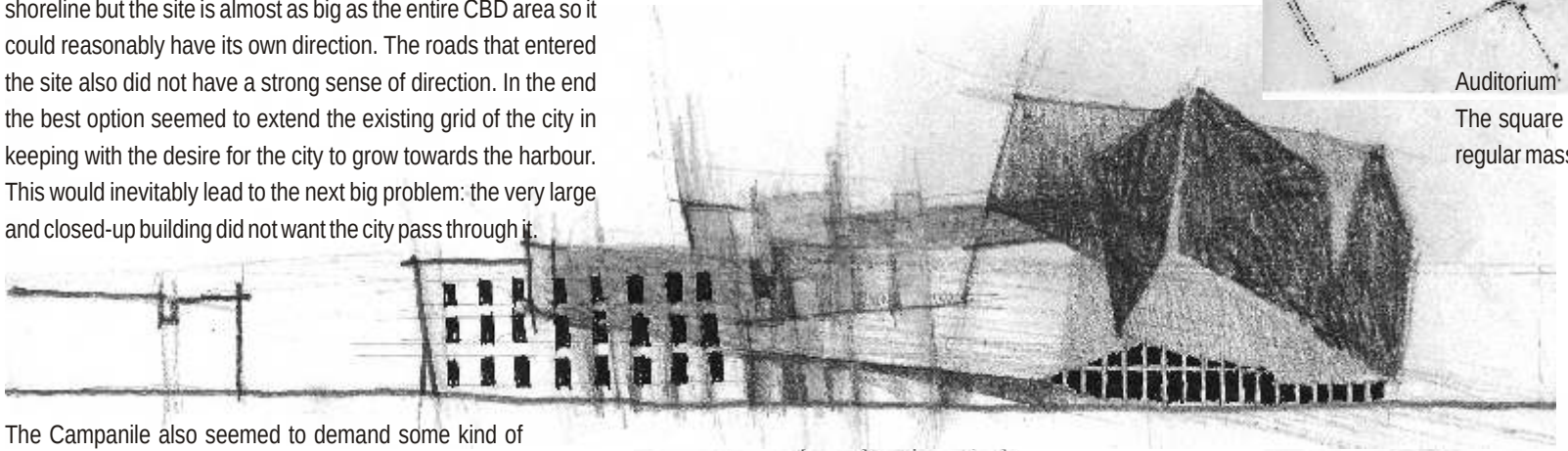
Initial Conceptualization

Starting from a vision of explosive masses the sculptural potential of a large building was very seductive in the beginning. Right from the start it was important that the height and distribution of mass was seen as a mediator between the height of the city's hill and the extreme flatness of the harbour. Another driver of early conceptualization was establishing the direction that the building had to face. The site was extremely un-directed - rail tracks follow efficient curves from one point to the other straight across the site. The city's own grid runs parallel to the shoreline but the site is almost as big as the entire CBD area so it could reasonably have its own direction. The roads that entered the site also did not have a strong sense of direction. In the end the best option seemed to extend the existing grid of the city in keeping with the desire for the city to grow towards the harbour. This would inevitably lead to the next big problem: the very large and closed-up building did not want the city pass through it.

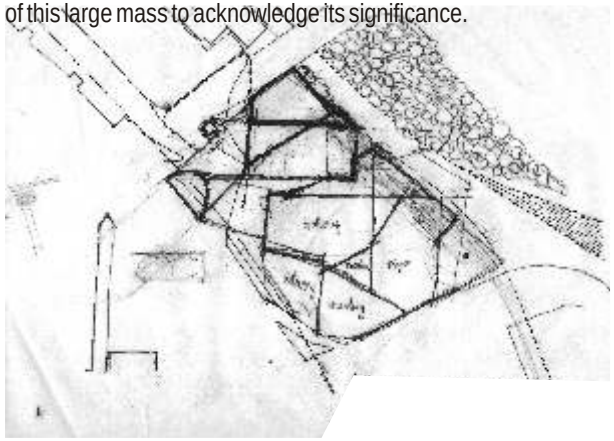


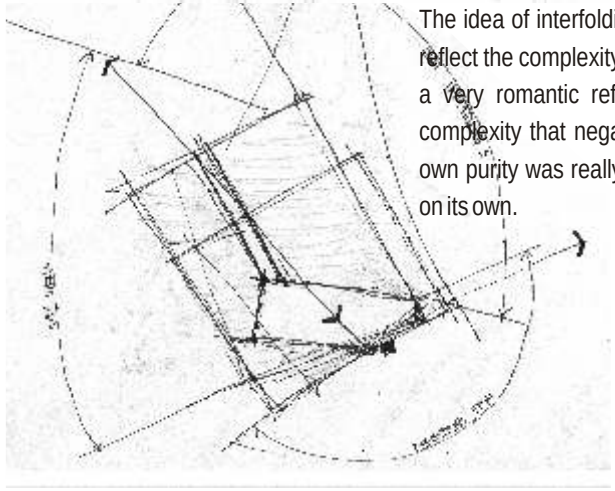


Auditorium set back from the expressway. The square is further defined by two more regular masses

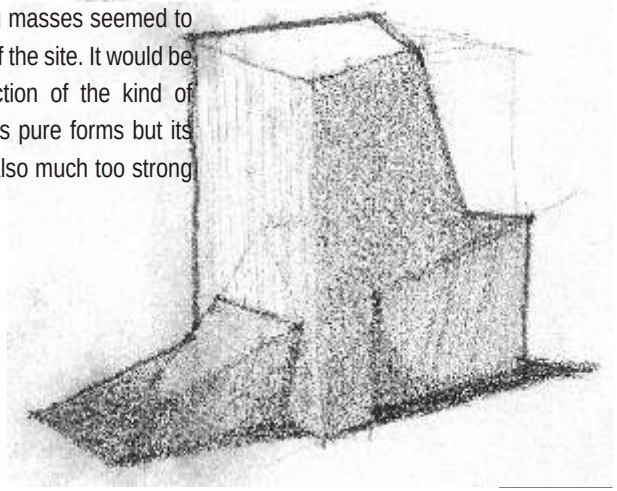


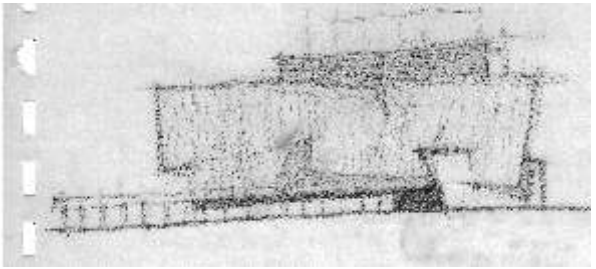
The Campanile also seemed to demand some kind of square or at least a decent spatial inflection from the side of this large mass to acknowledge its significance.





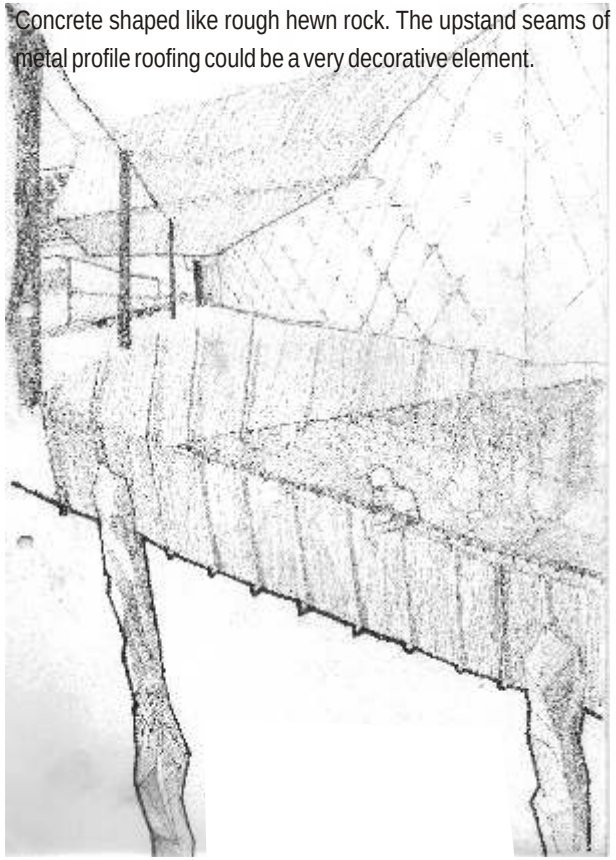
The idea of interfolding masses seemed to reflect the complexity of the site. It would be a very romantic reflection of the kind of complexity that negates pure forms but its own purity was really also much too strong on its own.

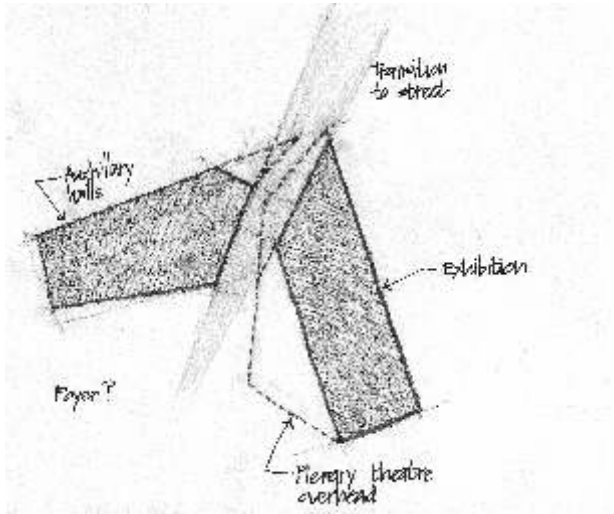




The interfolding mass is translated into a building.

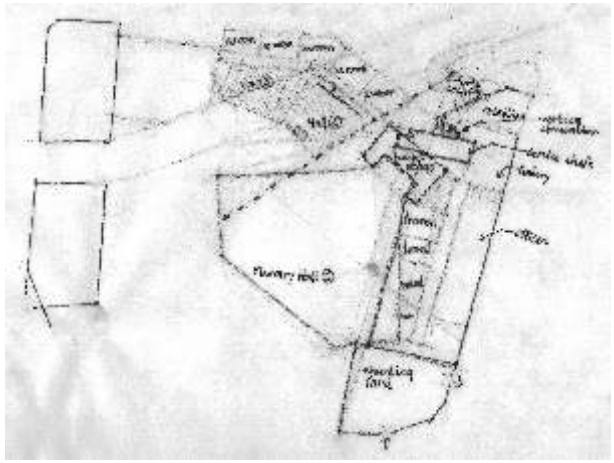
Another early vision saw the possibilities of finding a dignified passage through the very large building from the city's side to the harbour on the eastern side of the site. These passages - a colonnade or a bridge - could be an animated decorative space. Concrete shaped like rough hewn rock. The upstand seams of metal profile roofing could be a very decorative element.

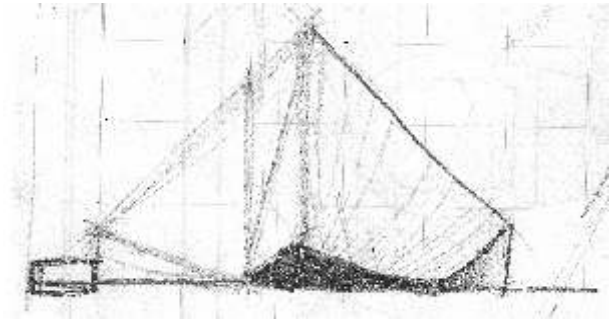




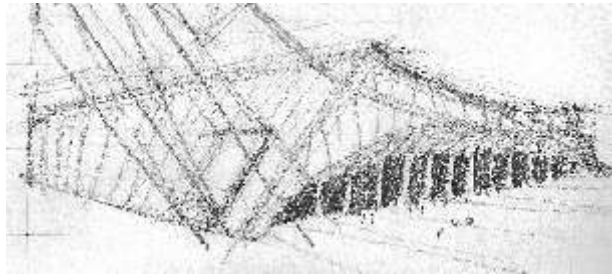
A schism in the built mass toward the south eastern corner of the site on ground floor establishes the connection between the CBD and the Waterfront development. This could be a real city-sized gateway. Immediately the problem of defining the rest of the square, in recognition of the Campanile, becomes a problem.

A further exploration of concept of two crystalline masses. Some problems come to the fore: How to define the square without laying crystals on its perimeter - Sculptural masses are incompatible with such a predictable layout. The relationship with the bridge? What to do with the railway line?

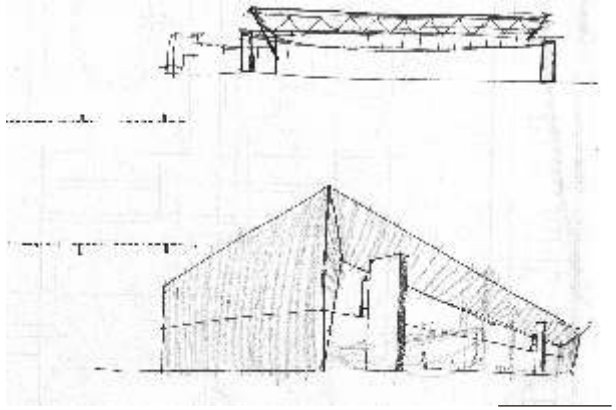


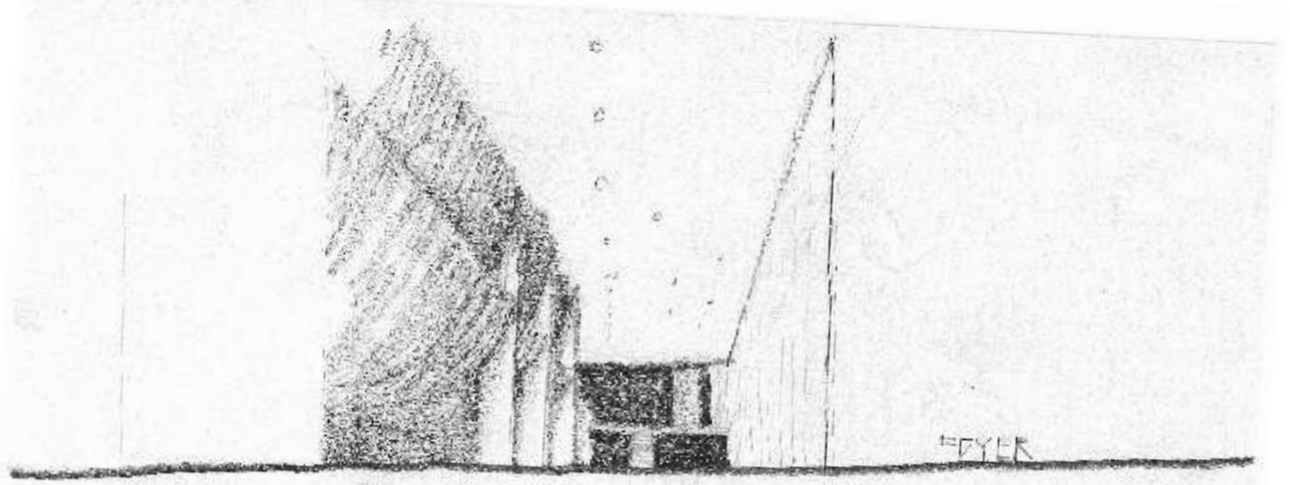


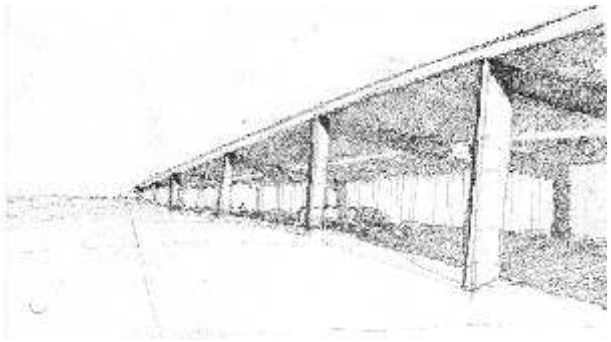
Meanwhile the real size of the spaces required came into consideration. Could that sculptural mass be extended ceaselessly?



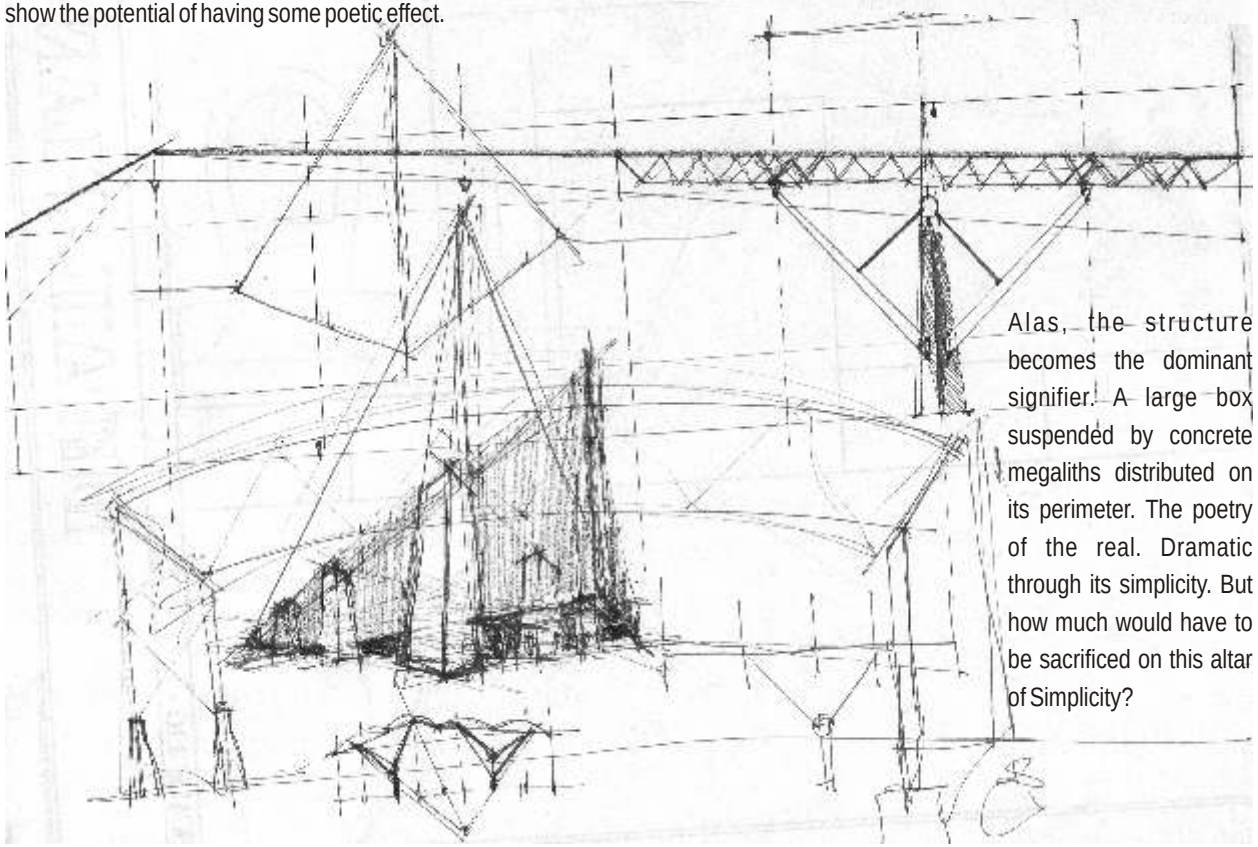
The structure that would span 75m or 140m would obviously be worthy of its own representation and demanded to be seen. Probably the first instance where the sculpturality gives way to the shapes inherent in real-world construction.







The sculptural play with large mass migrates to the interior of the shed. Meanwhile the mechanics of spanning the large spaces also show the potential of having some poetic effect.

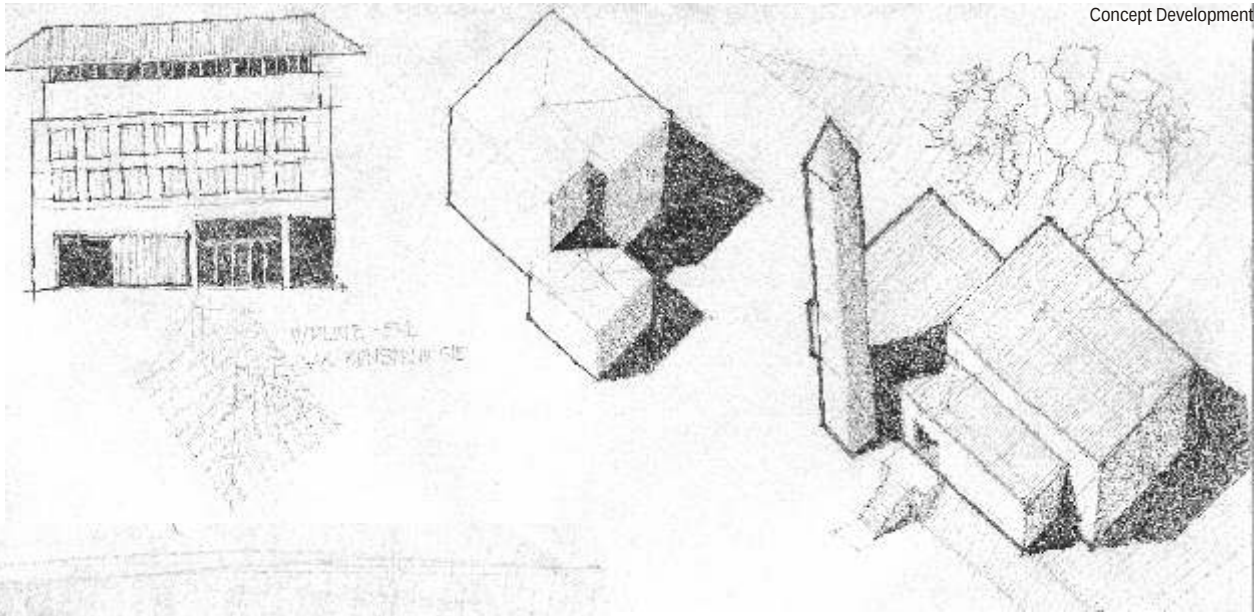


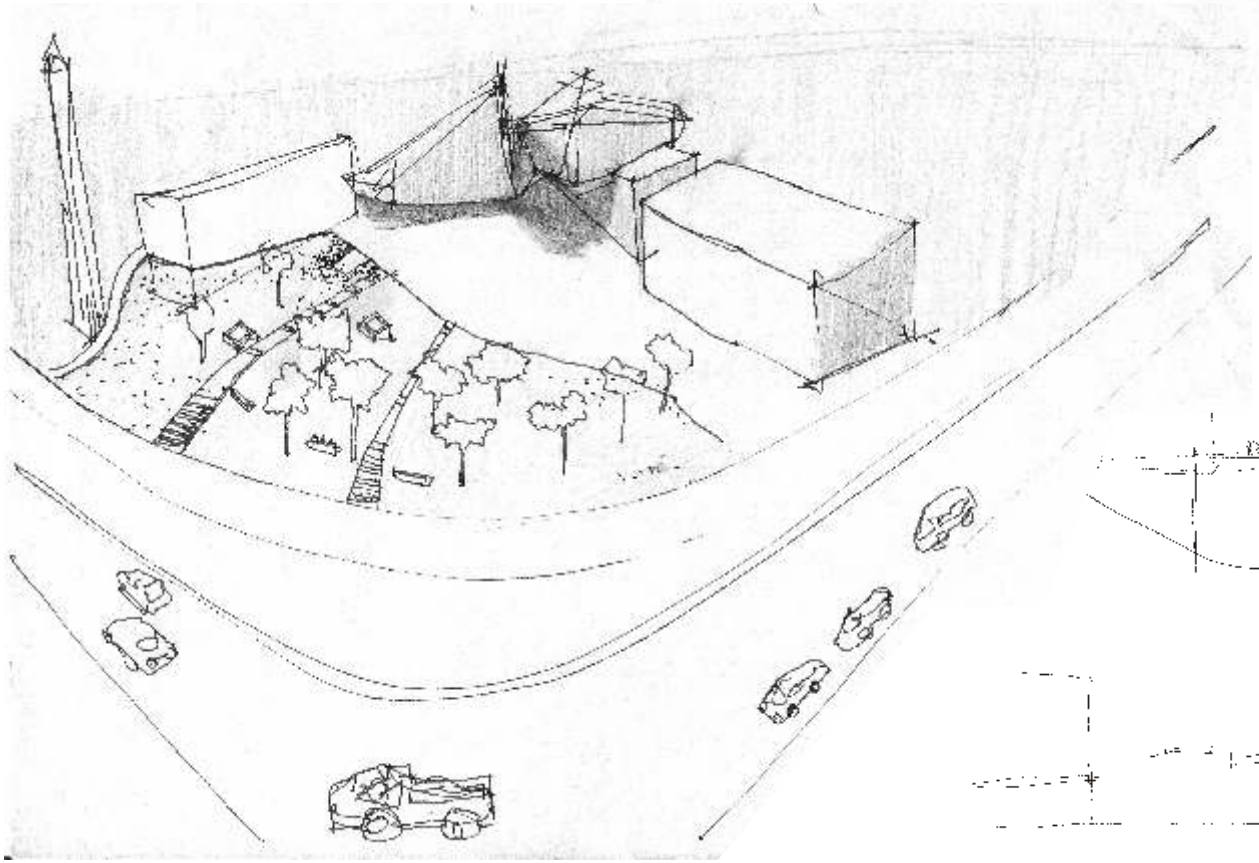
Alas, the structure becomes the dominant signifier. A large box suspended by concrete megaliths distributed on its perimeter. The poetry of the real. Dramatic through its simplicity. But how much would have to be sacrificed on this altar of Simplicity?

A sudden mental revisit to the site. See the expressway in the glaring sun. The cars uncaringly rushing by. The rest - Tabula Rasa. The size of the project precludes the little intricacies of 'context'.

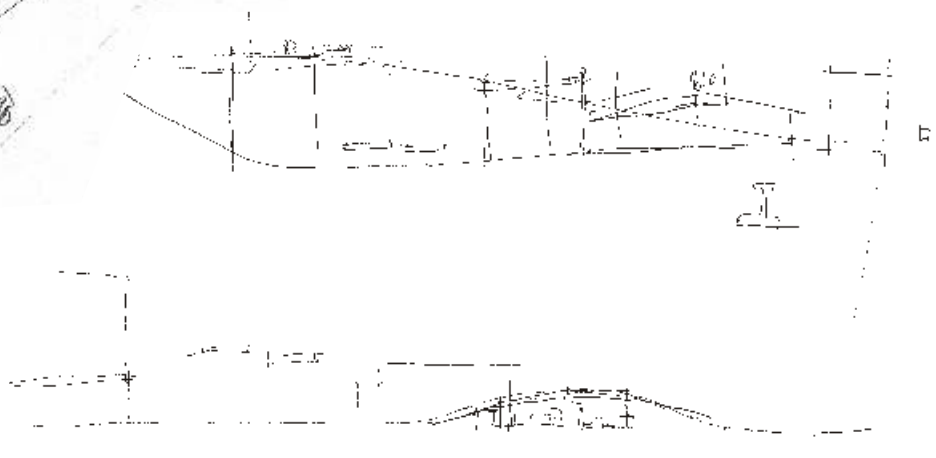
The problem of establishing a humane threshold between the congress centre and the city. How to make the square a safe and respectable place. An artificial vegetated hill is shoved in between the expressway and the square - the cars driving by ignorant of the urban paradise behind the obscure cave of concrete. Taxi's and other unlucky pedestrians are also stuck under this embankment against the people of the street. Relief is however possible on the hill but how long would the grass be maintained before it becomes a muddy, dusty block?

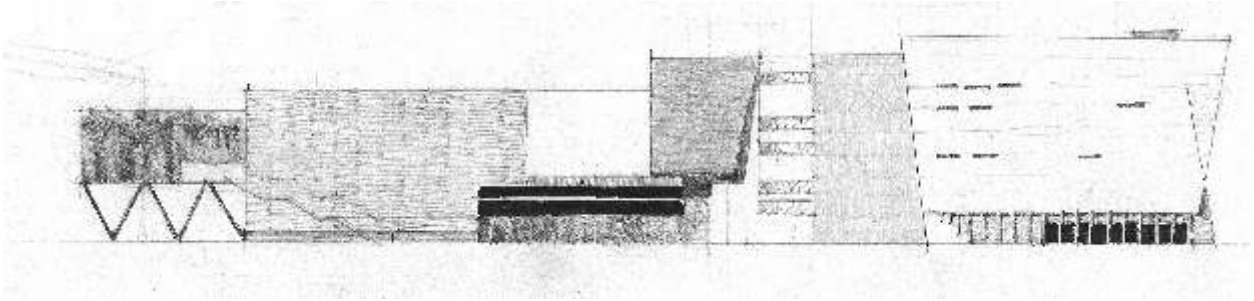
The congress centre is still distributed over smaller buildings - sculptures backed up against the railway line.





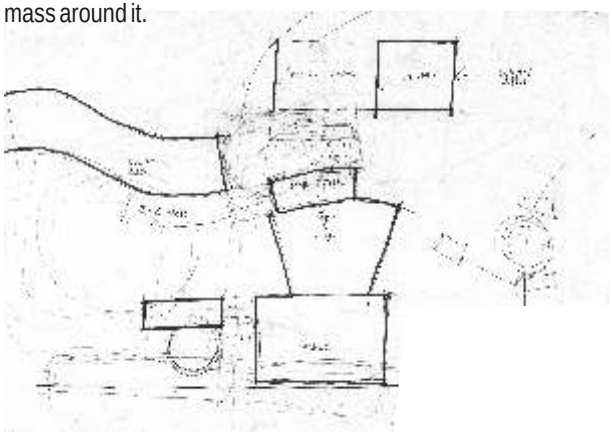
Testing the assumption of raking the city towards the harbour. Should there not rather be a climactic monument visible from the waterfront? The bridge over the railway is questioned as a really appropriate 'gateway' to the harbour.



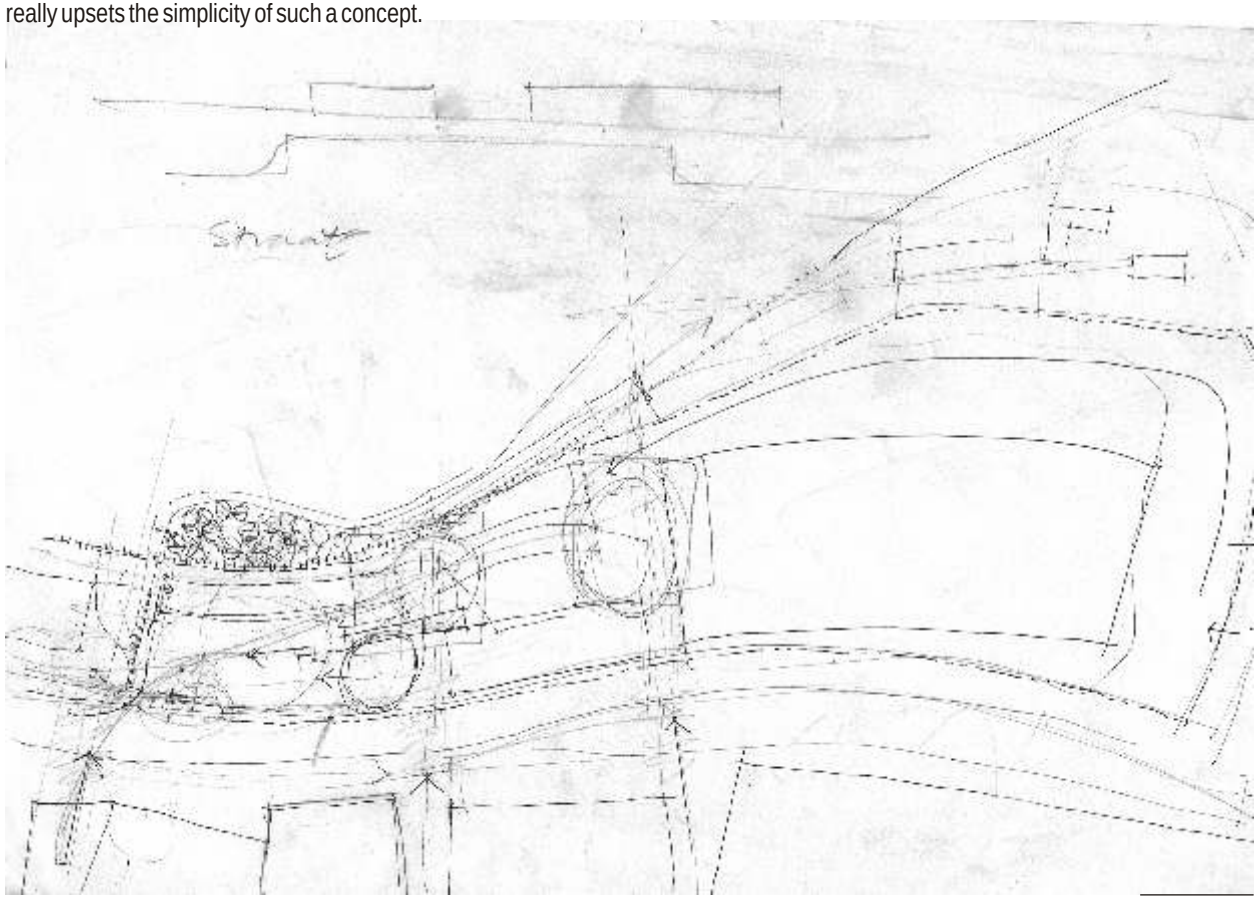


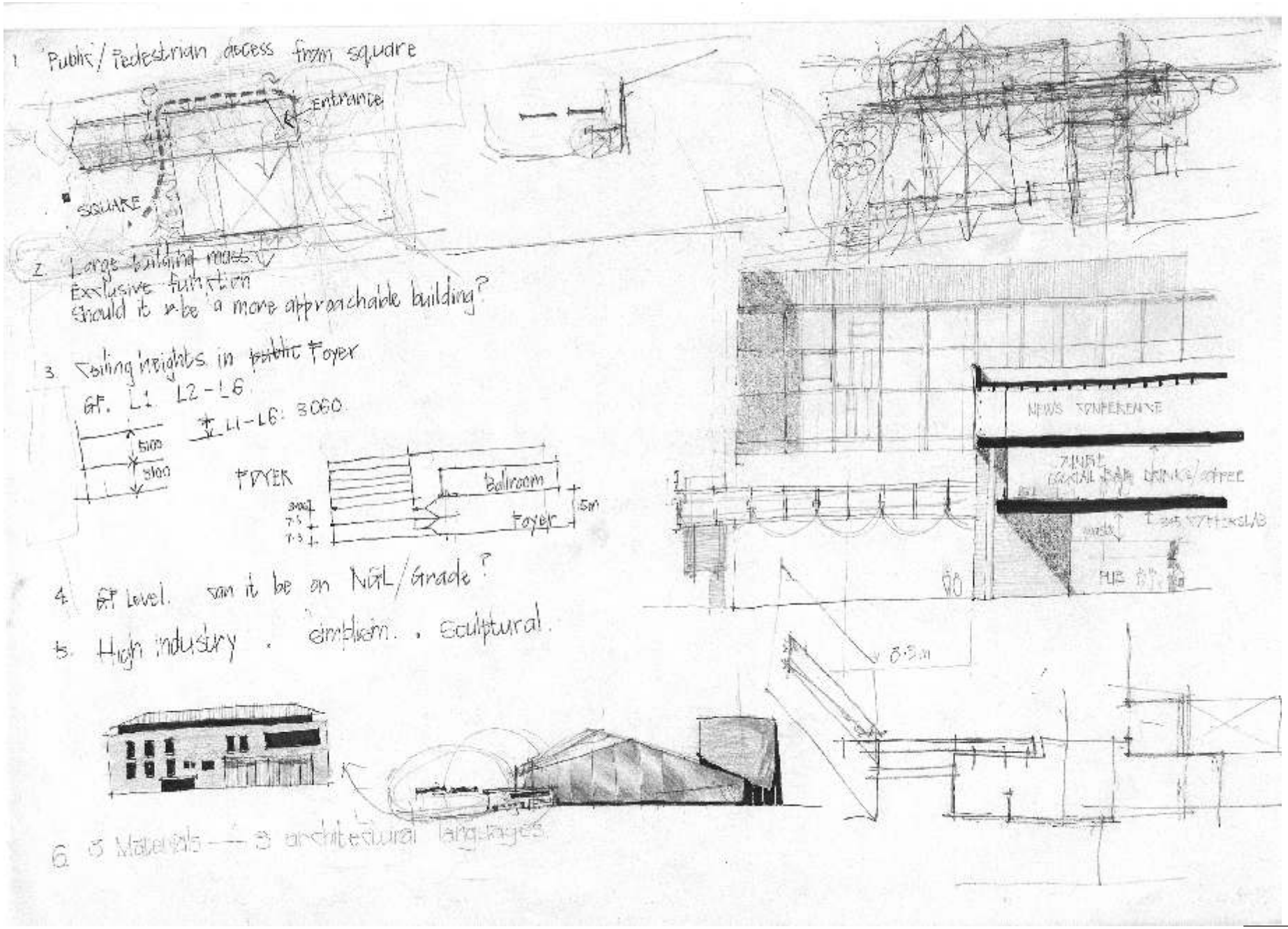
Sometimes it does not seem so terrible in your mind - until you put pencil to paper. The Last signs of a the sculpture disappear over the horizon. But what is to follow? The drama of technology - louvres, a large hall balanced on a truss-like colonnade. The pedestrian bridges lightly spanning the pedestrian gateway to the harbour. This is as far as one can go without a plan. The dominance of the plan shuffles around in the dark corners of the concept. It is the silent ruler - the generator. The search for a building elevation has proven itself utterly superficial.

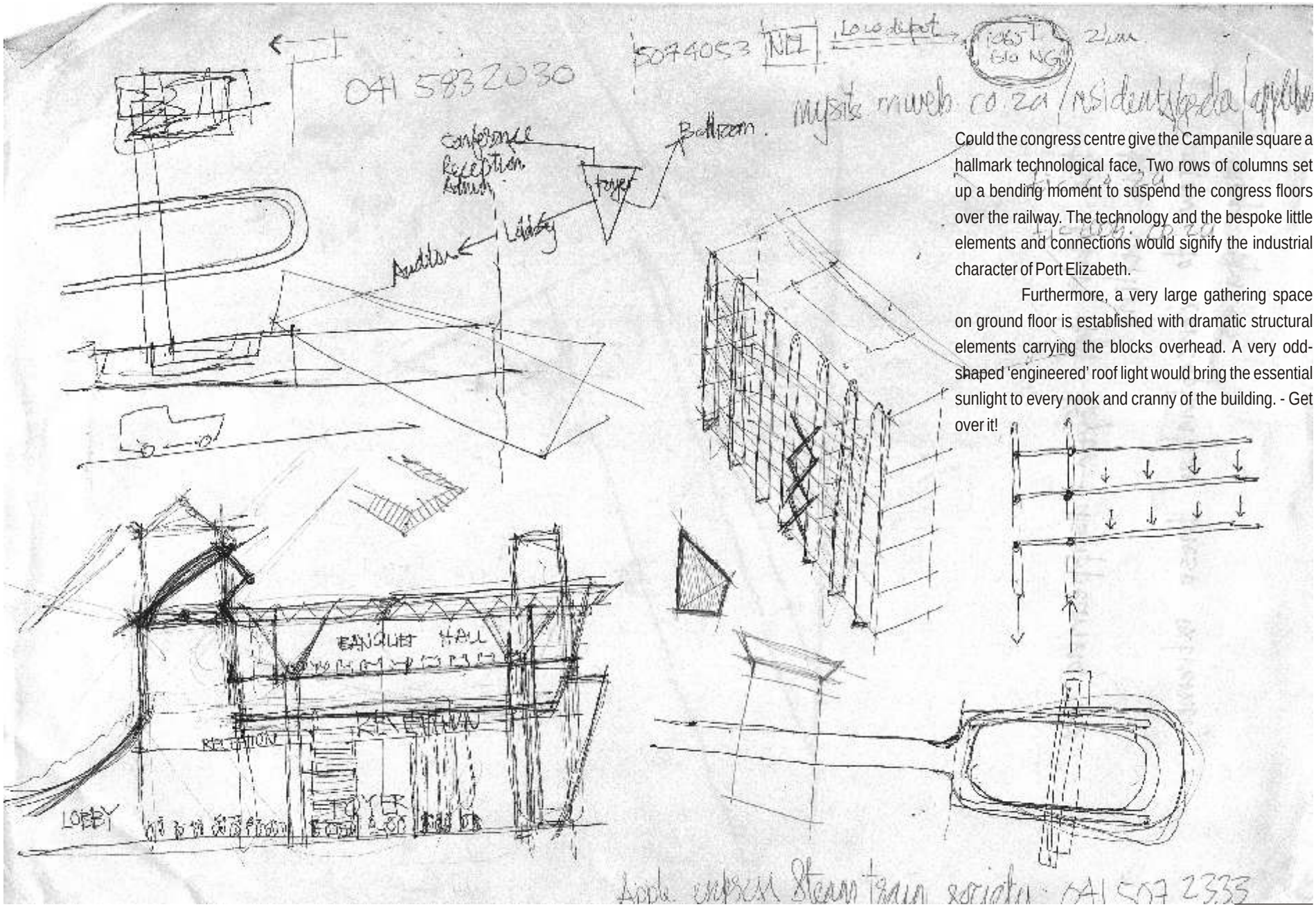
The buildings start moving closer together and the spaces in between become the centre-pieces. The relationships between functions become the dominant constraint. A road from the other side of the expressway, an ambassador of the city, is extended through the site and enters the harbour. On this road, in the middle of the site, a courtyard starts to grow from the gathering of mass around it.



How to maintain that benevolent relationship with the extended road, the courtyard and keep the courtyard. Could the courtyard and the Campanile's square be the same thing. Is it not just the same concept with a road added to it. The length of the site and railway really upsets the simplicity of such a concept.



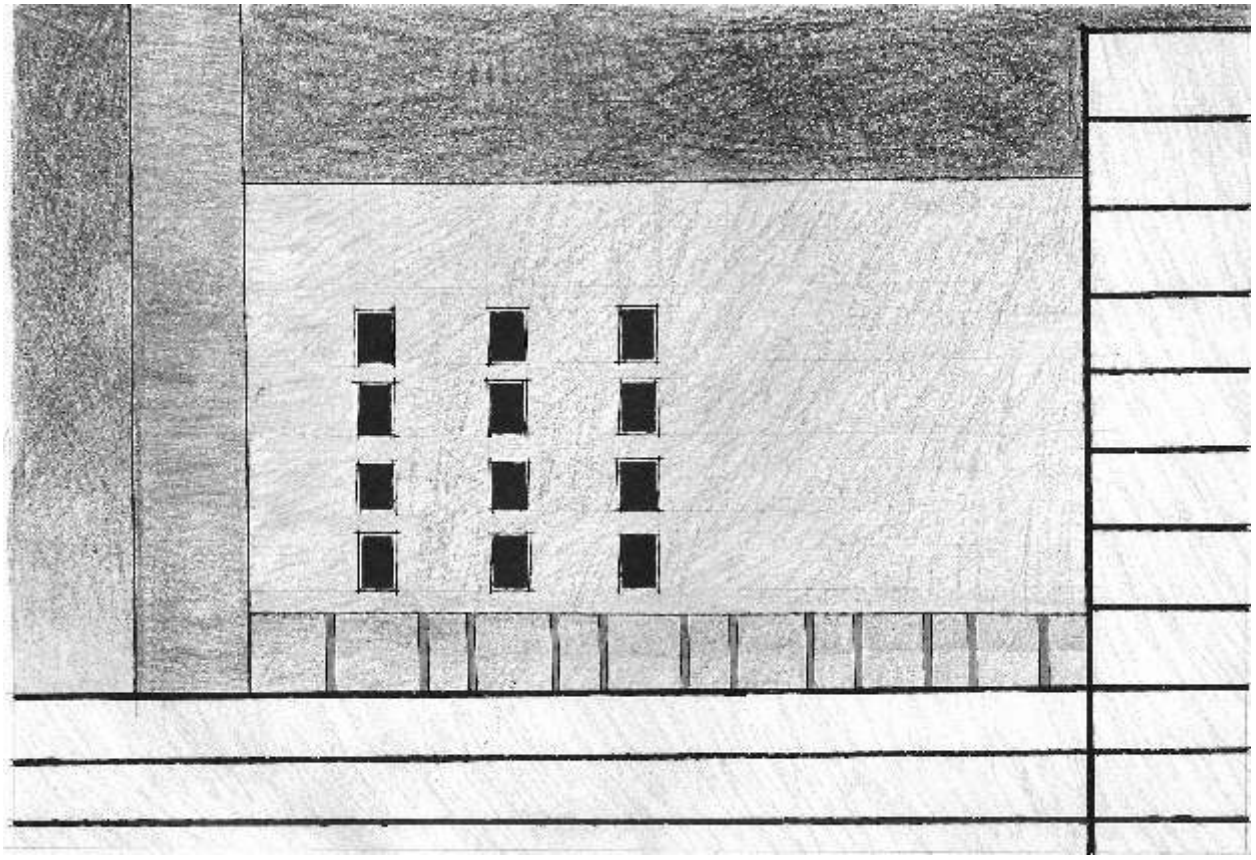


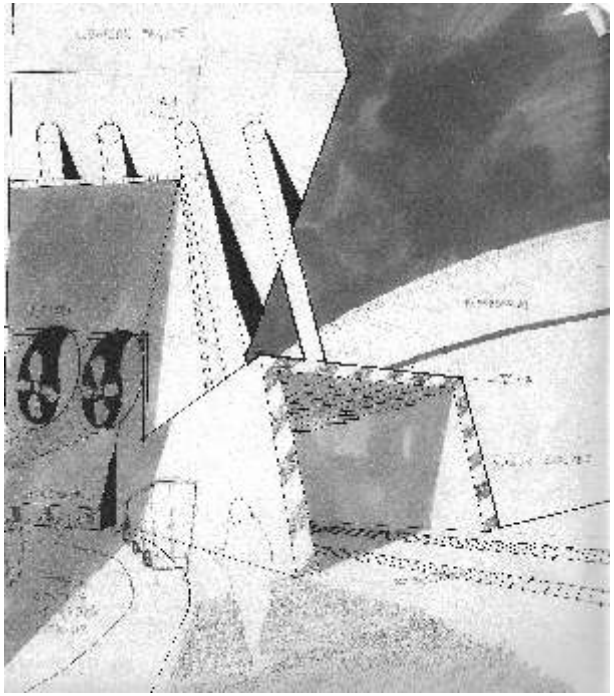


Could the congress centre give the Campanile square a hallmark technological face. Two rows of columns set up a bending moment to suspend the congress floors over the railway. The technology and the bespoke little elements and connections would signify the industrial character of Port Elizabeth.

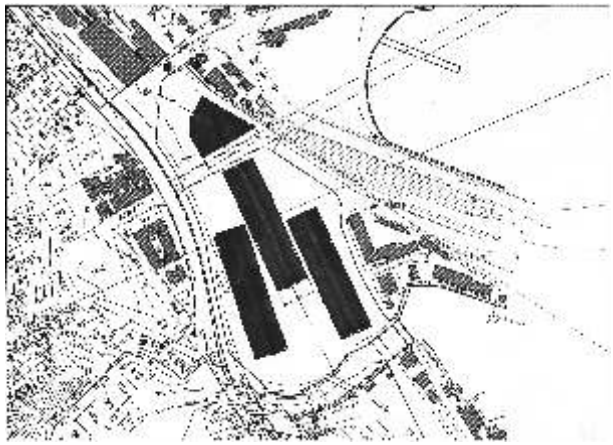
Furthermore, a very large gathering space on ground floor is established with dramatic structural elements carrying the blocks overhead. A very odd-shaped 'engineered' roof light would bring the essential sunlight to every nook and cranny of the building. - Get over it!

Aesthetic cynicism gains momentum until every beginning of a concept shrivels away in the glare of self-consciousness. What remains is a humble appreciation of the “simple and innocent” - back to beginning where shape and elevation dominates. Only this time the details have to be unspoilt and spontaneous.



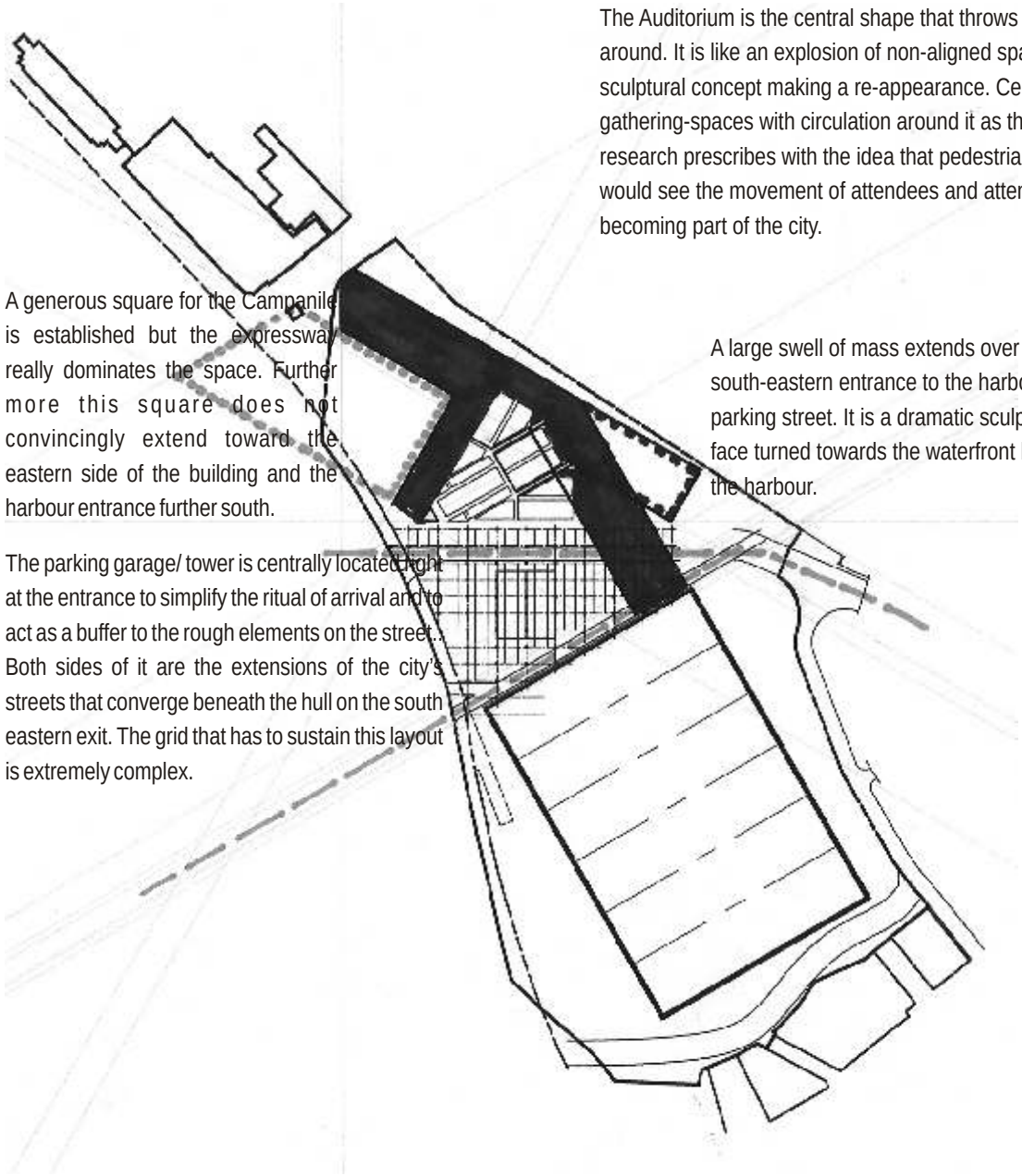


Instead, the arbitrariness of construction, services, a railway servitude and the necessity of large civil engineering elements, combined with the essential trivialities of commercial decorations - ”high quality finishes” - are the things that characterise this building. This is the complexity that silently demands expression.



An initial problem statement: large blocks indicate the largest spaces and the wedge is a symbol identifying the foreseen requirements of the main auditorium. Also the streets of the city are extended onto the site so that it the city would effectively grow over the site. An early indication of the relative sizes implied a shockingly unsympathetic approach the scale of the already large buildings in the area.

The change-over toward the waterfront to the south of the site becomes problematic. Glen Gallagher says: “You’ve got to glue yourself to the drawing board.” He also says there should be more pedestrian scaled elements on along the road - especially towards the southern edge where the large building converge with the much smaller harbour buildings which will inevitably become the waterfront’s most northern extension.

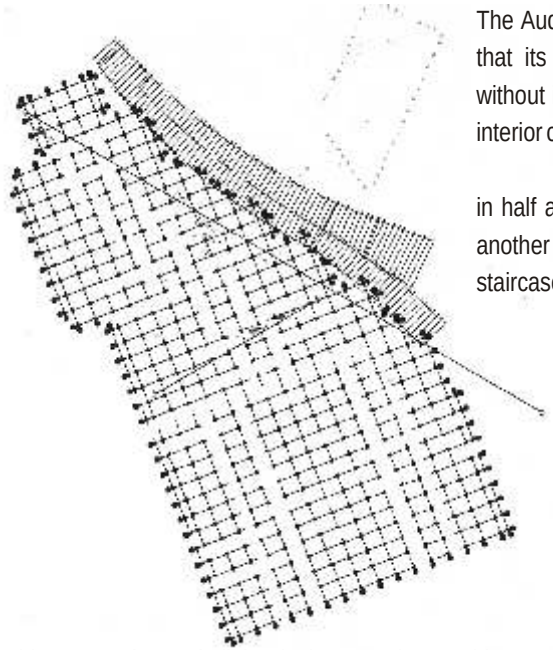


The Auditorium is the central shape that throws everything around. It is like an explosion of non-aligned spaces. The sculptural concept making a re-appearance. Centrally located gathering-spaces with circulation around it as the market research prescribes with the idea that pedestrians outside would see the movement of attendees and attendees becoming part of the city.

A generous square for the Campanile is established but the expressway really dominates the space. Further more this square does not convincingly extend toward the eastern side of the building and the harbour entrance further south.

A large swell of mass extends over the south-eastern entrance to the harbour and parking street. It is a dramatic sculptural face turned towards the waterfront beyond the harbour.

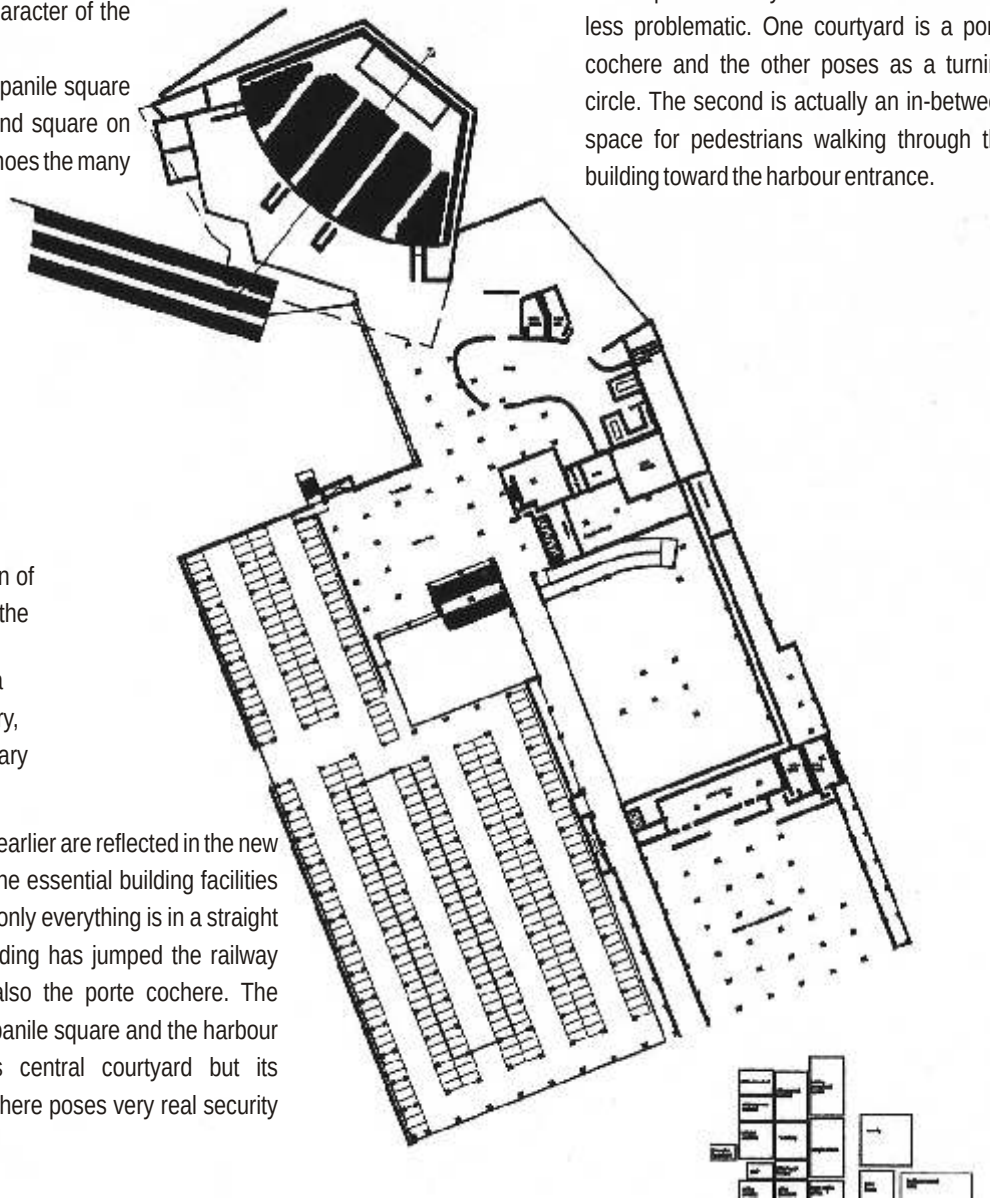
The parking garage/ tower is centrally located right at the entrance to simplify the ritual of arrival and to act as a buffer to the rough elements on the street. Both sides of it are the extensions of the city’s streets that converge beneath the hull on the south eastern exit. The grid that has to sustain this layout is extremely complex.



The Auditorium is moved to the northern edge so that its many service requirements can be met without interfering with the serene character of the interior courtyards.

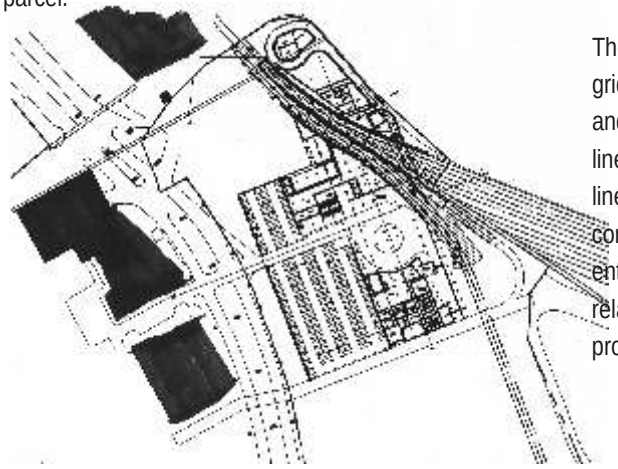
A large stoep cuts the Campanile square in half and actually becomes a second square on another elevation. The many steps echoes the many staircases throughout the CBD.

Two separate courtyards make the transition less problematic. One courtyard is a porte cochere and the other poses as a turning circle. The second is actually an in-between space for pedestrians walking through the building toward the harbour entrance.



The grid starts to demand all the design attention. Nothing can work without the co-operation of the grid which is again strained by the parking garage below. The building is designed from the bottom up. The car is the generator!

Most significantly, all the building facilities become one large structure unified by a simple orthogonal structural grid. The grid determines how close one can get to the boundary, where a street can pass through and, at last, the most productive direction within the boundary parcel.



The mayor zoning efforts from earlier are reflected in the new grid constrained building. All the essential building facilities and constraints are satisfied - only everything is in a straight line. Very importantly the building has jumped the railway line. A central courtyard is also the porte cochere. The connection between the Campanile square and the harbour entrance seems to be this central courtyard but its relationship with the porte cochere poses very real security problems.

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A NORMATIVE POSITION ON ARCHITECTURE IN A FREE-MARKET ECONOMY

Architecture defines the relationship between constraints

There is no such a 'thing' as architecture!

Engineers calculate a structure, anthropologists analyse urban form, and social psychologists appreciate the social dynamics of various building types. Often an interior decorator will beautify the inside of a building. Landscape architects consider the layout and selection of planting, paving, exterior lighting and furniture

Responsibility for the actual construction will fall to contractors. There is ornamentation as applied by a draftsman – sometimes board members, wives, politicians and other affected parties can be a great source of inspiration here.

Environmental specialists assess the environmental impact. A facilities-manager or user representative will consider the maintenance and operation of the building and services will be designed and installed by a swarm of specialists. Local authorities protect the health and safety of users and the client's expenses and liquidity will be monitored by quantity surveyors, sometimes also acting as project manager.

…What does the architect do?

All these constraints are acknowledged (at financial expense) but their relationship must be determined before anyone can start with construction. First, there has to be an idea of the building. The 'idea' of the building is a concept wherein a place is found for each constraint. Architecture therefore, is planning.

But architects also pride themselves on 'adding value'. In what way does the architect add value? The engineer adds value by making sure the beam depths can carry the foreseen load. The project manager puts pressure on the contractor but how does the building benefit from the services of an architect? The goal of the 'architecture part' is to plan so that each of these forces can manifest in the building with the least compromise to each.

Where the purpose of the building is to make money the developer is best positioned to understand the idea of a building – here the building is simply a commodity. Where the client is a cultural institution seeking some physical manifestation of their paradigm, the cultural critic will be well positioned to give critique on the facades of the building – here the building acts like a sculpture. Therefore the idea of the building (its architecture) answers directly to the client.

It should therefore be clear that the parts that make up the building should be related in the concept (expression of the idea of the building in a diagram) in such a way that the goal of the building is achieved but the constraints are not easy to integrate:

> *…Therefore, incoherence, or more precisely, randomness, is the underlying structure of all architects' careers: they are confronted with an arbitrary sequence of demands, with parameters they did not establish, in countries they hardly know, about issues they are only dimly aware of, expected to deal with problems that have proved intractable to brains vastly superior to their own. Architecture is by definition a chaotic adventure.*[1]

The architect therefore is not a specialist but a generalist[2]. The architect must know something about everything and from his understanding of objective reality determine the destiny or form[3] of a project. Failure on the architect's part to assume this role, puts the shape-giving activity in the hands of a specialist who considers only 'aesthetics', or user comfort, or return on investment, or environmental impact, or 'social issues'/ brown issues, or functional programming, or symbolism/ semantics, or the human lived experience, or zeitgeist relevance/ style, or material strength, or services integration, or circulation, or safety, or public participation, or building cost, or historical relevance, or contextual significance, or maintenance, or standardization, or the colour of the tiles. If architecture is not the mediator between all the above then it is merely a styling exercise added to the so-called planning phase.

One problem is that each constraint functions on a different scale. The selection of the site may be done at the scale of the city but the selection of roofing material may depend on variables from a scale of climatic regions. It is characteristic of specialists that their field of interest resides in a narrow band of scales – the engineer is interested in dimensions and material selection of structural elements, whereas the social researcher might gain privileged insight into the group dynamics to certain building types. How do these constraints find a fit? In most cases tradition and typology (pattern) is probably sufficient but sometimes the need for a fit with higher production value is too critical to be entrusted to an evolutionary dynamic. Architecture should therefore busy itself with finding a fit which will release more energy from the same inputs.

Architecture seeks the least compromise for each constraint because the profitability of each specialized part lies in hegemony

Like most profitable production processes, construction is subject to specialization. Specialization means that goods and services (staircases, project management, financing, social participation) are made to be more hegemonic severally – one elevator by ABC Elevators will closely resemble, in quality, another elevator of the same range. This is achieved by gaining

[1] (OMA et al: 1995: xix)

[2] Le Roux, S. Personal communication. 11 February 2005. University of Pretoria – Main Campus. These discussions are part a mentorship program.

[3] 'Form', here, subscribes to the meaning of the word as interpreted by Wölflin in his doctoral thesis, 'Prolegomena to a Psychology of Architecture' (1886), wherein he argues 'We assume that in everything there is a will that struggles to become form and has to overcome the resistance of a formless matter." (Forty. 2004:159)

control over the variables of the production process. Modification of any of the variables of a product or service requires higher input by the manufacturer/ contractor/ consultant and therefore either lowers the profitability of the service or product or elevates the price – depending on the demand in the market for those goods or services. Therefore the fit must ensure the minimum adjustment to each constraint.

But, as was stated earlier, the constraints of a building tend to operate at dissimilar scales. Architecture therefore operates at all the scales – in fact, it is the operator between the different scales.

To achieve the ideal conditions of only one constraint at one scale will mean failure. An architectural discourse that focuses on one scale only is a prelude to a failed concept - architecture does not focus

How then, does architecture relate the different pats of a building to one another if they can not be conceived on scale? Each force must be reduced to an appropriate scale and the forces of similar scale grouped together. In this state the forces can be compared, analysed and finally manipulated.

Architecture then is not the invention of any new solution to any of the constraints. Architecture seems to be the assembly of specialists' answers to the constraints considering the effect they will have one on each other – across scales.

But how is the impossibly large quantity of information required for a structural plan (engineering constraint) represented together with other constraints in a single comprehensible reality? It is necessary for the partial solution to each constraint to manifest as a visible, measurable system of elements – an engineering constraint may manifest as a grid of columns.

Constraint	context			system		elements
The structure	of the building is	No.1	a	Grid	of	Columns
		No.2	seven	Storeys	of	Floor slabs
The culture	of the Nguni user-group requires	No.1	at least	10% of usable floor area	of	Privacy

Table 1. Constraints are reduced to a visible, measurable system of elements.

In this example the structure of the building and privacy requirements of a certain cultural imperative finds itself in the concept at a certain scale, for instance 1:200 on an A1 sheet implying that the structure is built from a layout that is most economically described by a diagram in a drawing that is reduced to fit on an A1 sheet of paper. By visualizing these two constraints on a single

scale their spatial requirements can be superimposed as layers and any contradictions identified from where a compromise can be reached. In general, it is alleged that no more than seven such layers can be considered by the average human intellect!

It should be noted that one scale of presentation is not sufficient to fully describe a system – for example, how long is the shoreline of England? The answer is an approximated measurement at a certain scale and will always be different at some other scale. This implies that a single phenomenon will have different characteristics at different scales. At the scale of one person, clinical depression is debilitating. At the scale of her immediate family, it is less upsetting but still a hindrance. At the scale of the extended family it barely elicits gossip but again at the scale of national health it makes quite a hole in most western countries' GDP.

Architecture predicts the effect of the assembly of constraints on one scale on the assembly of constraints on all the other relevant scales

Climatic zones delineated on a 1:50'000 map will indicate precipitation patterns that building materials will accommodate at 1:5. These wall assemblies and window details are conceptualised at 1:5 or 1:1 but they were predicted at 1:50'000. A structural concept at 1:200 might imply beam depths that influence ceiling and roof assemblies at 1:50. It is the function of architecture to co-ordinate constraints from different scales with one another. Architecture predicts the influence of constraints from one scale on constraints of another scale. Very often regional types and traditions already point to acceptable levels of compromise found within a market – usually geographically bound – like particular roof pitches accommodating precipitation endemic to a region or settlement patterns endemic to certain political contexts.

For me then, someone who is responsible for the idea of a building is primarily a draftsman who delineates parts of a building, as suggested by others, to fit these parts together as a building. As is to be expected, these constraints do not fit easily and a compromise becomes necessary.

After such a compromise was reached, and the constraint again isolated, it will be seen that the system of elements have inflected. This inflection points beyond itself towards something else – the fit with another constraint. A collection of such assemblies can be described as the idea of a building which is as unique as the compilation of the constraints. For instance, the idea for a building required a roof (1:100) which required which required both structure (1:100) and sheeting (1:5). Cuts will be made in the rafters to accommodate purlins necessary to carry the sheeting over the eave to the gutter necessitated by the roof angle necessitated by the climate-region-specific behaviour of precipitation. If the structure is then isolated again it will be seen that the roof trusses have attained cuts to the rafters – why? That was the most economical way to put the structural constraint and the climate control constraint in one idea of a building.

The compromise on the part of a part is a function of style

There is of course varying degrees of compromise between the constraints. On the one hand of this continuum, building constraints resemble that which would be easiest to find on a market of mass produced goods: Standard windows; socially acceptable housing types; typical office layouts; deemed-to-satisfy structural layouts. In this sense style denotes a formula for specific parts/ constraints that have shown to be satisfactory – "In this style we solve that problem like this." It has become viable for producers to produce – *en masse* – those parts that fit into current building ideas with he least compromise needed from the part. The strategy for the assembly of parts is so similar in a market's ideas for buildings that it is possible for producers to predict the compromise needed from the part – all the similar parts in one market will start to resemble each other – "Are you in the market for a Modernist-/ Tuscan-/ Transvaal Regionalist-/ Johan Slee-building?"

Similarly a 'mock-sash' window can be understood when one considers the two most important[4] constraints that make up the idea for the window.

- Marketability: Cape Dutch styling elicits associations with a South African architectural patriotism, a beautiful Western Cape environment and historical handicraft traditions. Marketability is compromised somewhat by the lowering of the integrity of the styling.
- Price: lower production and maintenance cost due to fewer and simpler moving parts requiring less capital and labour inputs can be achieved with a side hung window than a sash window. The affordability is compromised somewhat by the addition of 'unnecessary' elements such as the sash extra's.

On the other side of the continuum of compromise is 'organic' architecture. When one considers the nature of compromises that each constraint makes, there comes a point when the building elements hardly resemble standard types any more. Each element/ constraint inflects so much that it does not just point to an adjacent element/ constraint anymore. All the different constraints start to take on the order of the whole building. The idea of the building becomes evident in every part of the building. Here the resemblance between a single building element/ system and its mass-produced counterpart is the least. There is said to be an idea of the building or a concept that can be conceived of as the 'form' of the building. To achieve this form the idea of the building is structured around a certain order for the building systems and elements. Because no assembly of parts are the same and the development of such an organic form is usually quite arbitrary, this mode of design leaves very little place for mass produced building elements, this causes such buildings to be expensive. One gains a high degree of individuality with such designs.

Individuality vs. commonality/ cultural mass/ regionalism

Individuality vs. low production cost.

[4] "Most important" here refers to appropriateness relative to the building's stated goal. The goal implies achieving certain values and the level of compromise depends on the values to be achieved.

The question then arises as to how the idea of a building can achieve individuality and marketability while maintaining a competitive production cost?

1. Exploiting the individuality/ newness value of styles from another time or another place. This is more cost effective because the syntax of elements already exists and must only be copied. It is also more cost effective because the technique required for production of such elements is already established and must only be imported or re-established.
2. Existing/ familiar mass produced systems and elements can be used in a new or unknown way. Although the elements might be cost effective the process of finding a fit consumes more design energy.

A question arises as to what style should be employed. The answer lies in the purpose of the project.

A purpose determines goals requiring a strategy for the attainment of values

Purpose is the answer to the question: "Why does it exist?" A purpose will be served by achieving goals. The purpose of a building is derived from the client. The client has a purpose. To serve its purpose the client sets itself goals. These goals usually relate to marketing, ethics, accounting, organizational behaviour, quantitative analysis, finance, operations, economics and strategy (Silbiger).

The properties of a product/ building enter this scheme of goals only in terms of marketing. Most products or services – especially architecture – must compete for the money of a very limited market. Therefore any effort spent on the characteristics of a building must be concentrated on issues/ values that will differentiate the final product. These issues are:

Issue	Determined by	Description
Features	Market analysis	Capabilities and minimum requirements, Operation, sustainability.
Fit	Architectural techniques: modules, grids, space ordering.	Appropriate for use, adaptability, robustness
Styling	Project purpose	Highest value: Expression of that which holds hope for the user Lowest value: Fashion driven image
Reliability	Context/ construction industry	Competence of specialist solutions

Context	Context/ site	Physical, cultural, economic
Size	Feasibility	Accommodation schedule
Service	Maintenance & operator performance	serviceability
Branding	Client strategy	Imagery to elicit values by association

Table 2. Issues related to marketing are the driving forces behind values that will populate the brief.

Such a list of values is called a *brief*.

Design process

The technique used in this discourse a co-linear process – one of *theory* and one of *programming*. These two areas of interest develop independently up to a certain point where they fuse. On conclusion of the *programming* investigation, the two fields converge in something resembling a quantum leap to produce a *concept*. The *concept* is then *resolved* by making decisions about shape, material, size and position (or trade name) of each element and specifying them at a relevant scale.

The two arms of the design discourse can be grouped according to their content:

1. Brief: a list of values and performance criteria required to make the product marketable.
2. Context analysis: Determining how the site on which the building is to be built will influence the building project by considering the physical, cultural and economic constraints of that site.

An example of the process: a decision has to be made concerning the colour of a handrail. A user representative in the form of a political party prefers red because of association with party ideology (political constraint). Red is the most expensive pigment (budget constraint). Red is highly visible but also puts emotional strain on the hallway (ambiguous ergonomic constraint). Red is the colour associated with fire safety elements and can lead to confusion during a fire (semiologic constraint). A famous architect recently built a red handrail near a parking garage to 'disassemble the authority of the main structure', thereby creating a craze among architects for red handrails (stylistic constraint).

The model for integration of these *constraints* will be determined by the current *theories*. If the city council is rededicated to fire safety because of a recent fire it will influence the gravity of the semiologic constraint. If the political party involved was marginalized by recent ideological failure it might handicap the political constraint. If the value of the national currency diminishes power to acquire imported red enamel paint it will hugely consolidate opinion behind the budget constraint. If the users might include mentally unstable people or situations – for instance a mental hospital or a public administration office – it will swing some importance towards the ergonomic constraint. If the building will stand in a fashion conscious society it will vaguely tinge the stylistic constraint with some significance.

Theory investigates the relationships between these issues so that a suitable compromise will be reached in the concept

Summary

Architecture determines the relationship between the elements of a building in considering the *programme*. The *programme* contains the *brief* and an analysis of the *context*. The *brief* which values the client requires for a marketable product. The context is analysed at scales appropriate to the site. A *concept* is arrived at by *programming* the *constraints* in a process of design informed by *theory*

NELSON MANDELA FORUM

ACCOMMODATION SCHEDULE

NOTE

Ventilation rates are specified as m³ per person per hour

Daylighting is specified as the conventional daylighting factor

Environmental specifications

Name of Room	Ventilation as m³ per person per hour	Daylighting as % of CIE sky
- Main Auditorium:	- 28	- 0%
- Main Auditorium Foyer:	- 28	- 5% (NB: solar heat gain, glare)
- Conference Auditorium:	- 28	- 0%
- Exhibition Centre:	- 28	- 2%
- Main Kitchen:	- 56 (fumes extracted at source)	- 2% (prep, cooking)
- Parking Garage:	- 2 air changes per hour	- 1%
- Main Foyer:	- 28	- 5% (NB solar heat gain, glare)
- Restaurant:	- 28	- 2%
- Banquet Hall:	- 28	- 2%
- Conference rooms:	- 28	- 1%
- Conference Foyer:	- 28	- 5% (NB solar heat gain, glare)
- Concourse:	- 1 air change pre hour	- 2%
- Offices:	- 18.5	- 1%
- Personnel and staff	- 28	- 1%
- Toilets:	- 2 air changes per hour	- 0%
- Retail Spaces:	- 28	- 1%

Thermal installations

Public spaces will be serviced with refrigerated air, heating through radiation with central heating refrigerant pumped in metal radiator-panels in smaller rooms and under-floor pipework in larger rooms (Main Auditorium, Auditorium Foyer; Main Foyer; Lounge; Restaurant a la Carte; Banquet Hall; Banquet Hall Foyer; Congress Levels seminar rooms)

NAME	SIZE	FUNCTION	SERVICE/ UTILITIES/ ACCESSORIES/ ENVIRONMENT	COMMENT
SUB4				
Garage	30,718m²	Public and NMF Parking	Mechanical Ventilation = 2 air changes per hour; 1% Daylighting	1184 parking bays
SUB3				
Garage	30,719m²	Public and NMF Parking		1184 parking bays
SUB 2				
Garage	30,720m²	Public and NMF Parking		1184 parking bays
SUB1				
Garage	30,721m²	Public and NMF Parking		887 parking bays
Perimeter Diaphragm wall				794755m perimeter.
Storage	525m²	landscaping storage, equipment and stock		
Plant box	1,771m²	contain soil for vegetation on ground floor	Irrigation,	
Plant box	393m²	contain soil for vegetation on ground floor	Irrigation,	
Plant box	262m²	contain soil for vegetation on ground floor	Irrigation,	
Plant box	328m²	contain soil for vegetation on ground floor	Irrigation,	
Plant box	328m²	contain soil for vegetation on ground floor	Irrigation,	
Planting boxes total	3,607m²			
Parking area	27,114m²			
SUB 1 TOTAL	30,721m²			

GROUND FLOOR

Kitchen	3,066m²	Provide catering for the Nelson Mandela Forum at maximum capacity of 9'000 guests and 500 personnel: Prepare meals and snacks for the Main Auditorium, the Conference floors, the Main Foyer, the Restaurant a la carte and most significantly, the Banquet Hall. Prepare hot and cold beverages to the Banquet hall. Provide storage for the finishing kitchens. Kitchen will consist of a main kitchen serving finishing kitchens distributed through the centre closer to points of service. The Main kitchen on ground floor will consist of preparation, service, staff facilities, cooking, washing up and storage.	Air change rate = 20 - 60 air changes per hour. Extraction points should be located above machinery where necessary. General ventilation rate of 20 air changes per hour: = 13'291'110m³ per hour. At 10m/s a total of 370m² of duct area. 24 X Ø5000 ducts.
Preparation	777m²		
Service	840m²		
Staff facilities	240m²		
Cooking	515m²		
Washing up	380m²		
Storage			
Vegetable store	160m²	Storage for three deliveries per weak	
Dry goods store	110m²	Three days' supply	
Deep freeze	125m²	Seven days' supply	
Cold store	109m²	Daily delivery of perishable goods	
Goods entry	92m²	Wheiging and checking	
Refuse storage	210m²		
Cellar, glass wash and store	234m²		
staff kitchen	50m²		
Staff toilets and changerooms	315m²		
Staff lounge	712m²		
Calorifiers	40m²		
Boiler room	267m²		
Hvac plant room	1,104m²		
Deliveries dock	781m²		

Garage	7,427m²	Centre parking	238 Parking bays; 6 disabled parking bays + 238 Parking Bays on intermediate level
Courtyard 1	2,467m²		
Courtyard 2	2,152m²		
Concession block	4,182m²		
Grocery store	946m²	Anchor tenant	
Stalls	895m²	Rentable stalls (African Theme market)	
shops	406m²	café's, retaurants, internet café's. concessions	
Fresh Produce Market	4,985m²		
Staircase	966m²	Under staircase market	
Market floor	1,880m²		
Toilets	252m²	Public toilets unde private ownership	
Litft	135m²	Lifts and lobby	
Office	467m²	Offices of market administration, agents.	
Refuse storage	138m²		
Transnet servitude	2,730m²	Rail track.	
Services Block	6,337m²		
Gardern storage	422m²		
pump room	26m²		
Transformer rooms	565m²	Transformers, switching gear and ventilation chambers	
Office	114m²		
Lift	48m²	Lift shafts and lobby	
Stair & lift dock	114m²	Goods lift, fire steps, loading dock	
Utility vehicle garage	111m²		
Trash sorting	112m²		
Trash store	131m²	Trash compactor and bin storage	
Office: trash	45m²	trash manager's office	
Internal circulation	1,268m²	roads and paved area, loading dock	
HVAC plant room	915m²		
piping chamber	273m²		
Utilities plant rooms	1,185m²		
Workshop	343m²		
Street Buffer	7,322m²	Bus parking, hard paving to receive taxi's and general public traffic	

Campanile square	3,033m²	Hard landscaping with large trees. circular platform.	
Waterfront gateway	6,860m²	Hard to soft landscaping. Circular planform train track integrated with paving.	
GROUND FLOOR TOTAL	33,346m²		

LEVEL 1

Hvac plant room	636m²		
Shop floor:	3,327m²	Stage set manufacture; textiles; general repair workshop;	Manufacture, equipment storage, stock storage, technicians offices, media shop - large format printers, copiers, binders, Publisher, paint shop.
FPM mezzanine	1,064m²	offices, storage	
Lift	134m²	Lift shafts and lobby	
Northern administration	1,000m²	Securtiy; Accounting; Vault	
balcony northern administration	236m²		
Security cash box	65m²	Cash pick up from vault	
VIP Reception	71m²	Secure waiting area for High Risk VIP	
Mechanical distribution	1,626m²	Piping room	
Gauge chambers level 1	396m²		
General Director's chamber	280m²	Reception, Lounge, Office	
Housekeeping	2,070m²		
Service run	985m²		
Perimeter road	3,430m²		
Lift	131m²	Lift shafts and lobby	
Lobby South administration	328m²		
Reception south administration	530m²		
Staff Lounge	860m²		
Staff kitchen	255m²		
General arcive	225m²		
Staff kitchen queing space	89m²		

Staff toilets and changerooms	313m²			
balcony administration reception	36m²			
Balcony staff south administration	134m²			
Administration South	2,033m²			
Goods lift	80m²			
Open Trusswork under Banquet hall	1,492m²			
Parking	7,865m²			291 Parking bays
LEVEL 1 TOTAL	29,498m²			

LEVEL 2

Main Auditorium	5187 people	Conventions. Congress sessions. Conferences. Plenary sessions. Public gatherings. Rallys.'Cultural' performances. Pop concerts. Indoor sports. Exhibitions.	Overhead projector, Slide projector; Video projection; Film projection; Television and Film cameras; Voting panel; Sound amplification; Acoustic components; Acoustic compatable finishes; Fire escape; Fire extinguishing overhead pressurised self-activating installation; Ventilation = 28 m³ per person per hour X 5187 = 145'236m³ per hour; Chilled air; Humidity - 45%; Internal environmental temperature = 18°C; Reverberation time = 2seconds; 0% Daylighting; Artificial lighting 100-500lux dimmable; Emergency signage; Specialist lighting;	
Flat	2,095m²	movable seating for a maximum of 2804 people	Stackable chairs; Removable tables with conference facilities;	
Storage - chairs and tables	836m²	Storage for stackable chairs; Storage for stackable tables and cenference equipment	Hard-wearing floor; wall-corners protected; Artificial lighting = 200lux; mechanical ventilation simultaneously activated on light switch; No windows; Maintenance free wall finish; 3X 1500mm lockable double doors.	Direct access to Auditorium "Flat".
Furniture store & workshop	483m²	Storage for stackable chairs; Storage for stackable tables and cenference equipment		
Under stage	213m²			
Lift	53m²	Lift wells and Lobby		
Balcony - fire escape/ workshop smokers	91m²			
VIP	232m²	Reception; Lounge; conference; suite		

Press room	231m²	Auxhillarry press facility	
Furniture store	108m²		
Balcony - fire escape	169m²		
Main Auditorium Foyer	1,689m²		Revolving door access control; 0.3m² per person standing area; Ventilation: 145'236m³ per hour; chilled air; humidity: 45%; Reverberation time: 3seconds; Daylight factor: 5% - beware solar heat gain; hardwearing, high quality floor finish; Artificial lighting: emergency signiage & lighting, 50-100lux dimmable, spotlighting; wall mounted signage; wall mounted art; non-combustible displays.
Stoep - Auditorium	1,206m²		
Steps - Auditorium approach	1,154m²		
Main auditorium foyer toilet male:			12water closets; 50urinals; 22 wash handbasins; Artificial lighting: 150lux; Ventilation: 2 air changes per hour - mechanical extraction directly above wc; soap dispenser; mechanical hand dryers; waste bins; mirrors.
Main auditorium foyer toilet female:			32water closets; 32 wash handbasins; Artificial lighting: 150lux; Ventilation: 2 air changes per hour - mechanical extraction directly above wc; soap dispenser; mechanical hand dryers; waste bins; mirrors.
Main auditorium foyer toilet disabled unisex:			1wc; 1X low-level whb; outward opening door; min 1.9m²; Artificial lighting: 150lux; Ventilation: 2 air changes per hour - mechanical extraction directly above wc; soap dispenser; mechanical hand dryer; waste bin; vertical mirror.
Cleaner's			cleaners bucket and washbasin.
Auditorium Toilet Total	522m²		
corridors/ back of house service	345m²		

Main Foyer	1,416m²		Revolving door access control; Ventilation: 132'160m³ per hour; chilled air; humidity: 45%; Reverberation time: 3seconds; Daylight factor: 5%; hardwearing, high quality floor finish; Artificial lighting: emergency signiage & lighting, 50-100lux dimmable, spotlighting; wall mounted signage; wall mounted art; non-combustible displays. 8 lifts; 900mm step-width escalator; Public address system;
Reception desk	165m²		
Lifts	64m²	7 Lift Shafts	
lifts - back of house			
Reception - back of house	202m²	lifts; stairs; finishing kitchen;	
bar	293m²	Bar counter; Barmans isle; cold storage; glass wash; bookkeeping; administration	
Lounge	1,173m²		2 % Daylighting; Ventilation 28m³; 21°C Internal temperature; Humidity 30-50%;
Restaurant a la carte	1,200m²		
Balcony - Foyer	234m²		
Stoep	1,180m²	Entrance stairs (Porte conchere); concourse; entrance landing	
Main Foyer toilet male:			12water closets; 50urinals; 22 wash handbasins; Artificial lighting: 150lux; Ventilation: 2 air changes per hour - mechanical extraction directly above wc; soap dispenser; mechanical hand dryers; waste bins; mirrors.
Main Foyer toilet female:			32water closets; 32 wash handbasins; Artificial lighting: 150lux; Ventilation: 2 air changes per hour - mechanical extraction directly above wc; soap dispenser; mechanical hand dryers; waste bins; mirrors.
Main Foyer toilet disabled unisex:			1wc; 1X low-level whb; outward opening door; min 1.9m²; Artificial lighting: 150lux; Ventilation: 2 air changes per hour - mechanical extraction directly above wc; soap dispenser; mechanical hand dryer; waste bin; vertical mirror.
Cleaner's			cleaners bucket and washbasin.
Change room male			Locker facilities for 1000
Change room female			Locker facilities for 1000

Main Foyer Toilet Total	358m²		
Cloak room	284m²		hangers for 2800
Banquet Hall	4,900m²		Capacity for 5187 diners at round tables; Ventilation: 145'236m³ per hour; Daylight factor 2%; Internal temperature: 21°C; Chilled air; Underfloor heating; humidity control; Artificial lighting 50-500lux - dimmable - temperatures compatible with cullinary presentability;
Balcony - Banquet hall	287m²		
Finishing kitchen	903m²		goods' lift: 4X5m
Banquet Entrance Lobby	534m²		
Banquet lift	131m²	lift well & lobby	
Bar - Banquet foyer	354m²	Bar counter; Cold storage; finishing kitchen	
Banquet Foyer	1,467m²		0.3m² per person standing area; ventilation: 145'236m³ per hour; chilled air; humidity control; Reverberation time: 3seconds; Luxurious floor finish; Artificial lighting: emergency signiage & lighting, 50-100lux dimmable, spotlighting; wall mounted signage; wall mounted art; non-combustible displays.
Banquet Lobby	364m²		
Storage - Banquet lobby	514m²		
Banquet Hall foyer toilet male:			12water closets; 50urinals; 22 wash handbasins; Artificial lighting: 150lux; Ventilation: 2 air changes per hour - mechanical extraction directly above wc; soap dispenser; mechanical hand dryers; waste bins; mirrors.
Banquet Hall foyer toilet female:			32water closets; 32 wash handbasins; Artificial lighting: 150lux; Ventilation: 2 air changes per hour - mechanical extraction directly above wc; soap dispenser; mechanical hand dryers; waste bins; mirrors.
Banquet Hall foyer toilet disabled unisex:			1wc; 1X low-level whb; outward opening door; min 1.9m²; Artificial lighting: 150lux; Ventilation: 2 air changes per hour - mechanical extraction directly above wc; soap dispenser; mechanical hand dryer; waste bin; vertical mirror.
Cleaner's			cleaners bucket and washbasin.
Gallery			

Toilet Total - Banquet Foyer	550m²		
Garage	8,055m²	Pariking	277 Parking bays + 277 Parking Bays (Intermediate floor)
LEVEL 2 TOTAL	35,601m²		

LEVEL 3

Garage	8,055m²	Pariking	277 Parking bays + 277 Parking Bays (Intermediate floor)
Banquet lift	131m²	lift well & lobby	
auditorium perimenter diaphragm	721m²		
auditorium backstage	342m²		
Balcony - auditorium backstage	74m²		
Loading dock	175m²		
Goods receiving	225m²		
Scenery store	76m²		
Lift	66m²	Lift well and lobby	
Costume room	9m²		
Wig & hairdresser's	9m²		
Specialist make-up	17m²		
Event management	93m²		
Male toilet	139m²	Sanitary and change rooms	
Female toilet	208m²	Sanitary and change rooms	
Congress toilets	323m²	Male & Female Sanitary appliances	
Meeting rooms	63m²		
Concessions & Display	45m²		
service corridors	161m²		
Enquiries	59m²		
Finishing kitchen	113m²	Service kitchen; staircase; lift	
Dance studio	663m²	Press lounge; dance rehearsals; seminar	
Councourse	516m²	Congress corridor, lobby to dance studio.	
Recording lab	166m²	technician's control room; archives; mixing room	
Recording studio	391m²		
Lobby- recording studio	42m²		

Press room	365m²	
Sound lab	230m²	Recording room; control room; sound mixing room; translation booths; archives; equipment store;
Lobby - press room	14m²	
Seminar rooms	1,256m²	Subdivisible seminar room.
Furniture store	33m²	
Lobby - seminar room	33m²	
Furniture store	41m²	
Lobby - seminar room	31m²	
Furniture store	62m²	
Balcony - congress level 3	514m²	
Lift	65m²	Lift wells
Smoker's balcony	126m²	
	2,018m²	
LEVEL 3 TOTAL	20,914m²	

LEVEL 4

Gallery seating - auditorium 1	1,474m²	tiered, staggered fixed seating.
Perimeter diaphragm wall - auditorium 1	1,036m²	
backstage	253m²	
Green room	178m²	
waiting room	45m²	
Service lift	53m²	Lift well and lobby
Translation room	49m²	Translation booths; lounge & toilet
Recording room	38m²	
Controle room	41m²	
VIP office	73m²	Office for hire accessed by Foyer and auditorium backstage
Controle room - auditorium 2	117m²	Projection, observation, sound mixing and controle
Lift room	114m²	Emergency staircase; goods lift

Speaker's room	25m²	Direct access to platform - auditorium 2; access to backstage corridor	
Service corridor	270m²		
Translation booths - a2	52m²		
Auditorium 2	1,407m²	Tiered, fixed raked seating for 1450	Overhead projector, Slide projector; Video projection; Film projection; Television and Film cameras; Voting panel; Sound amplification; Acoustic components; Acoustic compatable finishes; Fire escape; Fire extinguishing overhead pressurised self-activating installation; Ventilation = 40'600m³ per hour; Chilled air; Humidity - 45%; Internal environmental temperature = 18°C; Radiant heating (under floor heating); Reverberation time = 1second; Artificial lighting 100-500lux dimmable; Emergency signage; Specialist lighting; Fixed seating with conference features;
Foyer and lobbies - a2	207m²		
Concourse	502m²	Congress corridor	
Seminar room	433m²		
projection rm	38m²		
Furniture store	21m²		
Councourse	516m²	Congress corridor, lobby to dance studio.	
Recording lab	166m²	technician's control room; archives; mixing room	
Recording studio	391m²		
Lobby- recording studio	42m²		
Press room	365m²		
Sound lab	230m²	Recording room; control room; sound mixing room; translation booths; archives; equipment store;	
Lobby - press room	14m²		
Seminar rooms	1,256m²	Subdivisible seminar room.	
Furniture store	33m²		
Lobby - seminar room	33m²		
Furniture store	41m²		
Lobby - seminar room	31m²		
Furniture store	62m²		
Foyer Toilets - male & female	343m²		

Enquiry desk	59m²			
Finishing kitchen	180m²	Service kitchen; emergency staircase and lift		
Display, concession & meeting	73m²			
Balcony - congress level 3	514m²			
Lift	65m²	Lift wells		
Smoker's balcony	49m²			
Foyer - congress level 4	1,740m²			
Banquet lift	131m²	lift well & lobby		
Garage	8,055m²	Pariking		277 Parking bays + 277 Parking Bays (Intermediate floor)
Roof deck	3352 people	Open Air events, Demonstrations		
LEVEL 4 TOTAL	24,627m²			
PARKING BLOCK	62,964m²			
PARKING BASEMENT	95,764m²			
PARKING TOTAL AREA	158,728m²		PARKING SPACES AVAILABLE	6868 with intermediate parking levels; 5799 without intermediate parking levels: Parking density = 27m² per parking bay
BUILDINGS AND SERVICE	108,136m²			
NMF TOTAL		266,864m²		

NELSON MANDELA FORUM

FINANCIAL REPORT

Project description

International Congress Centre on Port Elizabeth Waterfront

Site location and details

The Madiba Bay Development Agency seeks to attract investment to the Nelson Mandela Metro inner city by development of a commercial waterfront on the grounds of the Port Elizabeth harbour thereby initiating economic growh through the influx of tourism and stimulating trade through the provision of facilities to support the regional industrial/ manufacturing sector (Coega Industrial Development Zone and Uitenhage.

The proposed site, belonging to the South African Railway Service, is located on a piece of dormant industrial land defining the border between the inner city and the operational harbour precinct. The site is deemed free of any lease agreements or tenants. The terrain is nominally flat, being a man-made reclamation supported on solid bed-rock at an assumed depth of 16m below grade. Grade is assumed to be 4m above Mean Sea Level requiring extreme waterproofing for basements. The Nelson Mandela Metropolitan Municipality, seeking iconic imagery for its 'Destination Marketing' branding strategy, has allowed discretion concerning Bulk, Coverage and Maximum Height restrictions to fall to the design team.

The design team have developed a proposal for a large scale auditorium, convention facilities and a banquet hall. Four levels of basement garages provide parking for the Forum and the transport nodes surrounding the site in an effort to pedestrianise the precinct. The centre also allows for full functionality of the harbour entrances and maintains the operational railtracks on the site through the establishment of servitudes. The design allows for partial withdrawal of the railway within a 5-20 year period.

Estimating method

The feasability is based on rough market rates and no elemental estimate has been done at this stage

Drawings and Cost information

The estimate is based on rough line drawings

Contract planning particulars

Land purchase date	01 Jan 2006
Start of design and procurement	01 Jan 2006
Start of construction period	01 Jul 2007
End of construction period	30 Apr 2010

Exclusions

The cost of roads to the site and infrastructure in surrounding areas are excluded

Assumptions

Effective Parking areas are counted as rentable area as the operation of parking facilities will be leased to a private operator.

Clearing will be done on the whole site

Cost/m² estimate will be based on recent experience of the author. It is here assumed that the project cost is will be an average between a training cen
currently under construction in Midrand at R4000/m² and the cost of the recently completed Constitutional Court which is rumoured to wheigh in
at an astonishing R15 000/m². We will assume a modest R 6 000/m²

Bulk services contribution to Local authority assumed at 45% of appreciation in land value.

Development costs are assumed

Interim rates and taxes as 8% of current land value p.a. X 18months = R 6 808 140.00

Rates and taxes after approval will be 8% of R 1000/m²Xland area/8% p.a. X 34motnh construction period = R 25 719 640.00

Proffesional fees are assumed

Occupancy as per Edie Grossfield Market Survey May 2004

	Tenant 3	195 m²	178 m²	
	ADMINISTRATION	2 470 m²		
	FOYER	251 m²		
	GARAGE	7 318 m²		
	Parking Spaces			278 parking spaces
	STORAGE			
	Storage/ workshop/ plant	5 274 m²		
	Vierendeel storage& services	3 727 m²		
	HVAC plant	963 m²		
	Utilities	755 m²		
	duct	89 m²		
	duct	68 m²		
	Staff administration & wellfare	765 m²		
	TOTAL	#REF!		
LEVEL 2				
	GARAGE	9 886 m²		368 parking spaces
	CONCOURSE	1 395 m²	1 043 m²	
	BALLROOM	4 826 m²	3 700 m²	
	RECEPTION	7 960 m²	5 113 m²	
	AUDITORIUM	5 295 m²	3 666 m²	
	TOTAL	39 275 m²		
LEVEL 3				
	GARAGE	9 886 m²		368 parking spaces
	CONCOURSE	2 287 m²		
	CONGRESS	1 239 m²		

	AUDITORIUM	2 762 m²		
	TOTAL	16 174 m²		
LEVEL 4				
	CONCOURSE	1 552 m²		
	GARAGE	9 886 m²	368 parking spaces	
	CONGRESS	3 977 m²		
	AUDITORIUM	4 289 m²		20000 m²
	TOTAL	21 256 m²		

TOTAL CONSTRUCTION AREA	266 864 m²		
TOTAL RENTABLE AREA		5 000 m²	
TOTAL INCOME GENERATING AREA		100 000 m²	
1st EFFICIENCY RATIO (Rentable: Construction Area)			0.02
2nd EFFICIENCY RATIO (Income Generating Area: Construction Ar			0.37

Building footprint 34 565 m²

Construction parameters

Planning design and documentation	1-Jan-06
Commencement :	1-Jul-07
Completion :	30-Apr-10
Pre-contract period in months :	18 mo
Construction period in months :	34 mo

Project cost estimation

Construction costs at current rates

Clearing and bulk earthworks		115472 m²	R 95 /m²	R	10,969,840
building & services		108136 m²	R 6000 /m²	R	648,816,000
parking block		62964 m²	R 2500 /m²	R	157,410,000
Parking basement		95764 m²	R 4000 /m²	R	383,056,000
Landscaping		10024 m²	R 1200 /m²	R	12,028,800
Paving and roads		22695 m²	R 1200 /m²	R	27,234,000
Bulk services contribution	45% of appreciation in land value = R1000-R500X0.45		item	R	25,530,525
				R	1,265,045,165
Preliminary and General Items [Overhead construction costs]			13.0%	R	164,455,871
Detail design contingency			1.5%	R	18,975,677
General risk contingency			2.0%	R	25,300,903
Total				**R**	**1,473,777,617**

Escalation

Precontract escalation in building cost up to tender date:			**R**	**216,480,805**
Escalation rate	0.8%/month			
Period	18 mo			
Start	01/Jan/06			
End	01/Jul/07			
			R	**1,703,780,490**
Escalation in building cost during construction period :			**R**	**170,438,044**
Escalation rate	1.0%/month			
Period	18 mo	months		
Start	01/Jul/07			
End	30/Apr/10			
Cash Flow	0.60			
Haylett allowance for non adjustables	0.85			
Total escalation			**R**	**386,918,849**
ESTIMATED TOTAL BUILDING COST AT :	**30/Apr/10**		**R**	**1,860,696,466**

Professional Fees

	%	On Amount	% construction	Fee	Subtotal
Architect	5.3%	R 1,860,696,466.25	50.00%	R 98,616,912.71	R 98,616,913
Structural Engineer	6.0%	R 372,139,293.25	20.00%	R 22,328,357.59	R 22,328,358
Mechanical Engineer	6.0%	R 186,069,646.62	10.00%	R 11,164,178.80	R 11,164,179
Civil Engineer	10.0%	R 186,069,646.62	10.00%	R 18,606,964.66	R 18,606,965
Electrical	5.0%	R 93,034,823.31	5.00%	R 4,651,741.17	R 4,651,741
Geotechnical	2.0%	R 9,303,482.33	0.50%	R 186,069.65	R 186,070
Lighting Design	5.0%	R 9,303,482.33	0.50%	R 465,174.12	R 465,174
Traffic	3.0%	R 9,303,482.33	0.50%	R 279,104.47	R 279,104
Fire Design	10.0%	R 9,303,482.33	0.50%	R 930,348.23	R 930,348
Electronics	10.0%	R 1,860,696.47	0.10%	R 186,069.65	R 186,070
Environmental Managers	5.0%	R 186,069,646.62	10.00%	R 9,303,482.33	R 9,303,482
Landscape Architects	3.0%	R 37,213,929.32	2.00%	R 1,116,417.88	R 1,116,418
Acoustic consultants	8.0%	R 37,213,929.32	2.00%	R 2,977,114.35	R 2,977,114
Empowerment & Procurement	6.0%	R 37,213,929.32	2.00%	R 2,232,835.76	R 2,232,836
Wind consultants	8.0%	R 930,348.23	0.05%	R 74,427.86	R 74,428
Graphic Design	7.0%	R 18,606,964.66	1.00%	R 1,302,487.53	R 1,302,488
Artwork consultant	10.0%	R 186,069.65	0.01%	R 18,606.96	R 18,607
Urban Designers	12.0%	R 18,606,964.66	1.00%	R 2,232,835.76	R 2,232,836
Town Planners	12.0%	R 1,860,696.47	0.10%	R 223,283.58	R 223,284
Project managers	5.3%	R 930,348,233.12	50.00%	R 49,308,456.36	R 49,308,456
Legal team	30.0%	R 372,139.29	0.02%	R 111,641.79	R 111,642
Quanity surveyor	3.3%	R 930,348,233.12		R 30,701,491.69	R 30,701,492
Average Professional fees as % of escalated construction cost			13.81%	**R**	**257,018,003**
TOTAL BUILDING COST INCLUDING PROFESSIONAL FEES				**R**	**2,117,714,469**

Development Costs

Legal fees, etc.		R	372,139	
Town planning fees - for proclamation		R	1,860,696	
Environmental impact monitoring, etc		R	35,000,000	
Plan approval fees		R	100,000	
Site survey		R	350,000	
Geotechnical investigation		R	9,303,482	
Legal fees, etc.		R	372,139	
Pre-opening management costs		R	86,000	
Finance raising fee	1.0% of total capital cost	R	18,191,508	
Development fee	3.0% of escalated construct. cost	R	68,880,000	
Other Sundries		R	5,000,000	
Rates and taxes	interim	**R**	**6,808,140**	
	after approval	**R**	**25,719,640**	
Plan approval fee		**R**	**907,752**	
Non-recoverable expenses		**R**	**900,000**	
Letting commission and marketing cost	5.00% of building cost	**R**	**93,034,823**	
Sub-Total				**R266,886,321**
TOTAL CAPITAL COST EXCLUDING : LAND COST, FINANCE CHARGES AND VAT RECOVERY				**R 2,384,600,790**

Land Cost

	AREA	RATE	AMOUNT
Land cost (including transfer fees)	1154728 m²	R 500	**R 577,364,000**
TOTAL CAPITAL COST EXCLUDING : FINANCE CHARGES AND VAT RECOVERY			**R 2,961,964,790**

Finance Charges

Interest charged	11.00%		
On expenditure of	R 2,384,600,790	**R**	**352,521,651**
Compounded monthly at an annual rate of :	0.92%		
Period in months :	34 mo		
From :	1-Jul-07		
To :	30-Apr-10		
Adjusted by a cash flow factor of :	0.40		
On land cost excluding VAT of :	###########	**R**	**356,239,092**
Compounded monthly at an annual rate of :	0.92%		
Period in months :	53 mo		
From :	1-Jan-06		

To :			30-Apr-10				
Sub-Total							**R 708,760,743**
TOTAL CAPITAL COST						**R**	**3,670,725,533**
Less transfer fees	7.0%				R (40,415,480)		
Sub-Total						R	40,415,480
TOTAL PROJECT COST						**R**	**3,711,141,013**
ESTIMATED NET INCOME			**Handover date**				30/Apr/10
ATTENDEE EXPENDITURE ON FOOD AND BEVERAGE							
attendance of average attendees per event			5000				
occupancy rate			35%				
days p.a.			365				
attendee expenditure on food and beverage			R 100				
							5,292,500
EVENT HOSTING							
Maximum nr attendees			5,000				
occupancy rate			35%				
events per year			52				
cost per attendee			R 500				
							3,770,000
CONCESSIONS		5000 m²	@	R	70	R	350,000
NET INCOME PER MONTH						**R**	**9,412,500**
GROSS ANNUAL INCOME EXCLUDING VAT						**R**	**112,950,000**
Less operating costs @	**50.00%**					**R**	**(56,475,000)**
Less vacancy factor of	**5.00%**					**R**	**(5,647,500)**
NET ANNUAL INCOME EXCLUDING VAT						**R**	**50,827,500**
NET RETURN ON TOTAL CAPITAL EXPENDITURE IN FIRST YEAR							**1.37%**