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4.0 Precedent Studies

4.1 *Yokohama International Port Terminal*

Architect: Foreign Office Architects; Farshid Moussavi and Alejandro Zaera Polo.

Client: The City of Yokohama Port and Harbour Bureau Construction Department, Osanbashi Passenger Vessel Terminal Maintenance Subdivision.

Quantity Surveyor: Futaba Quantity Surveyors Co.

Structural Engineer: Structure Design Group.

Date completed: 2002

Yokohama is the second largest city in Japan, rivaling Tokyo as a port. The industrial character of the city makes it an unlikely destination for cruise ships, presently fifty to sixty ships visit annually.

"In contrast to the Sydney Opera House, which dominates its waterfront and has

become an internationally recognized icon, or the Constructivist exuberance of Michael Rotondi's Dragon Promenade in Nagasaki harbour, the Port Terminal is intentionally low-profile, deferring to the floating hotels; from a distance it resembles an earthwork more than a building." [Webb, *Architectural Review*. 213/1271 2002, p.35]

Designed by Foreign Office Architects, the Yokohama Port terminal is an extension of two public parks into the harbour, creating a transitional territory between land and sea. The upper level of the 'landscape' serves as civic space. This public realm provides the residents of Yokohama an escape from the congested city environment, where people can progress along the promenade, sunbathe, picnic and attend festivals.

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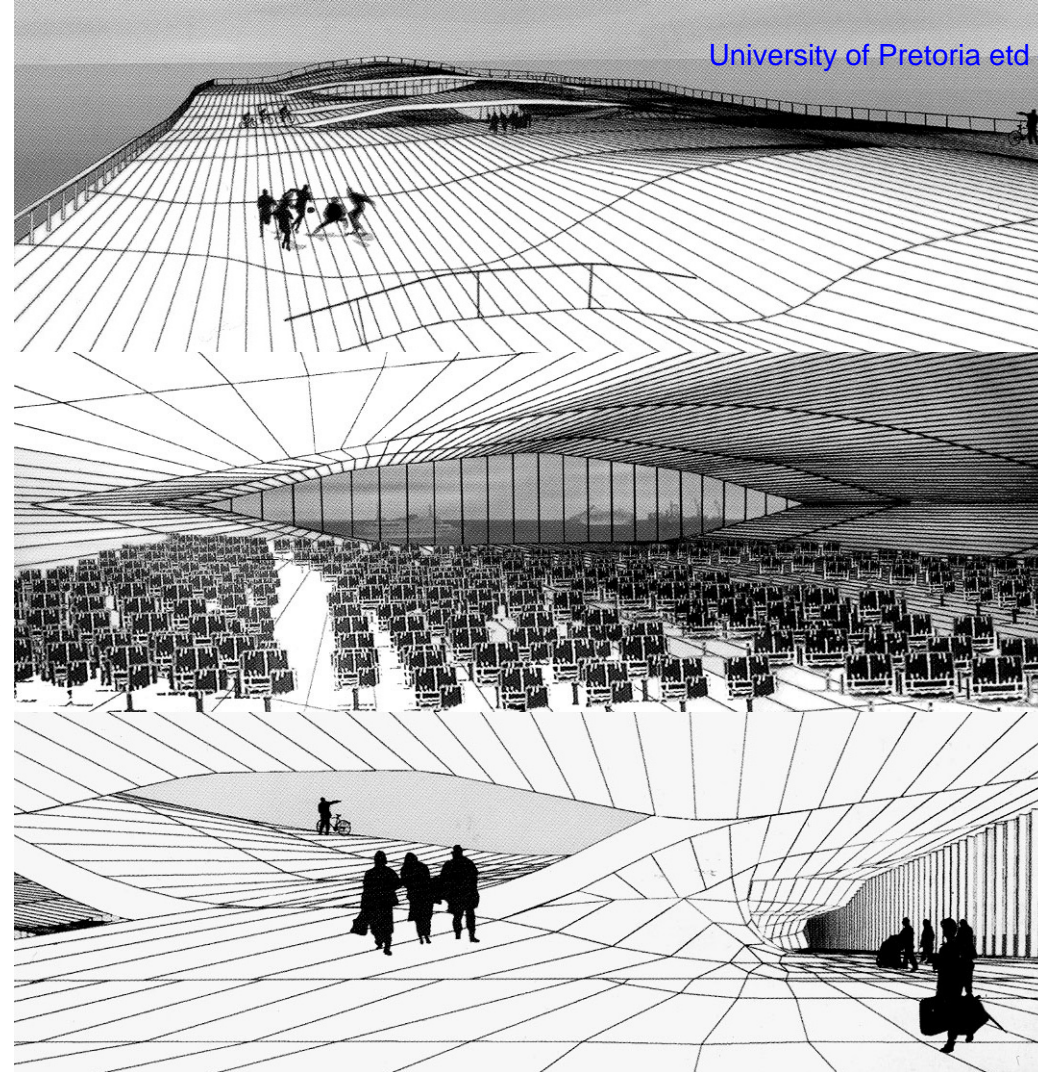


fig. 4.1 foreign office architects: Yokohama international port terminal

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In addition to this, the 'landscape' accommodates two exhibition spaces: the arrivals hall and the Osanbashi Hall. These spaces can be used for functions such as markets, expositions and group functions. These additional functions have been included within the project, foreseeing that cruise ship traffic would be insufficient to make full use of the complex.

Essentially the project is a transport building, a place of flux. The design is based, in the architects' accounts, on the dynamics of movement. Moore, *Domus*. 851 (2002), p.67. Provision is made for pedestrian, vehicular and cruise ship passengers. Parking is provided for on the pier level (predominantly for economic reasons), and pedestrians gain access into the arrivals and departure hall from the promenade

level via a ramp. The 450-meter terminal can accommodate four cruise ships simultaneously. Passengers board or disembark their ship through walkways into the customs and immigration area that is separated from the area by movable structures. The intervention has the ability to transform when boats are not present: baggage consoles descend into the floor and immigration consoles disappear generating an adaptable space offering the prospect of a diversity of uses.

The intervention is a hybrid of building and landscape. There are no walls in the traditional sense, floors and ceilings are simply folded to create walls. This blurring of boundaries is present throughout the design, 'the conventional division between levels, and inside and outside, is blurred'. The as-

piration to blur boundaries is yet again evident in the circulation system through the building. In an attempt to avert from the terminal functioning as a gate, for the reason that people bridge international borders continuously. FOA designed a non-orientated space. "Throughout the building the user is presented with choices of left, right, up or down; there are many different ways of moving through it and many intersections of routes taken by passengers and citizens." Moore,

Domus. 851 (2002), p.67 A steel structure has been used to create the landscape, evoking without mimicking the roll of the ocean. Construction techniques adopted from ship construction strengthen the structure links to the site. Sections were prefabricated in shipyards and brought to the site via barge. The structure is well suited to the resistance of earthquakes. The limited material palette includes steel, glazing and solid planks of ipe timber flooring from Brazil.

"Built like a ship, Yokohama's new port terminal is an audacious fusion of architecture and engineering that creates a topographic landscape for public activities." [Webb, *Architectural Review*. 213/1271 2002, p.35]

"The ordinary experience of walking from point A to point B is anything but; FOA's wooden ramps link water earth, traveller and vessel, in an intimate transitional space." [Slaten, *Architecture*. 92/2 2002, p.73]

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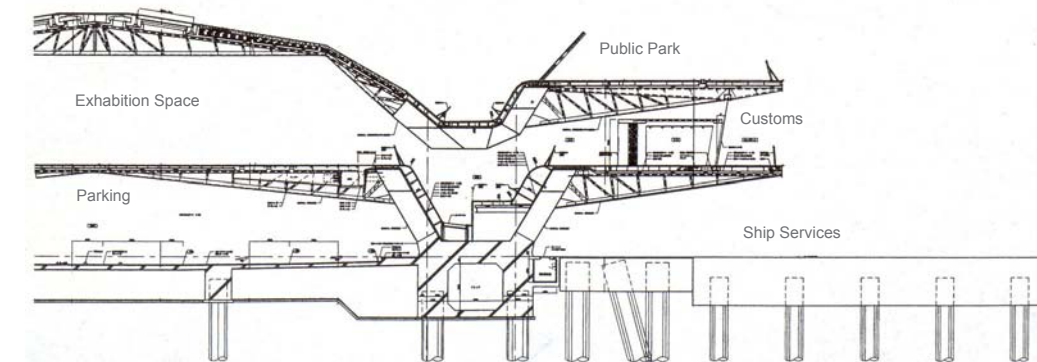


fig. 4.2 portion of cross section

DURBAN

4.3 Electric Ladyland Offices

Architect: OMM Design Workshop
Client: Electric Ladyland Properties
Date completed: 2001

The reason for this precedent study was to analyse a building designed in response to the context of Durban, South Africa.

“The project is sensitive to context, but is also reflective of current international practice” [van Wyk, South African Architect. November/December 2001, p.30]

OMM Design Workshop were briefed to design new office accommodation in Kloof, Durban. The chosen site consists of an existing house and a mature garden.

The building form consists of two existing pavilions and four new pavilion buildings,

arranged in such a manner as to create semi-public and private courtyards. These pavilions are long, narrow, rectangular forms, with large openings on the longer sides allowing for cross ventilation throughout the building. They also alleviate the problem of excessive humidity. Deep overhangs shade the facade reducing solar gain. Timber shutters are also used to shade the building. The trees that have been accommodated within the building, now shade the building, while casting interesting shadows across the building planes. Canvas sun-screens are also used to achieve the same objective.

The building has been designed to accommodate the surrounding landscape, incisions in the slab allow for existing trees to merge with the building. The facades of the building components open to this courtyard. The

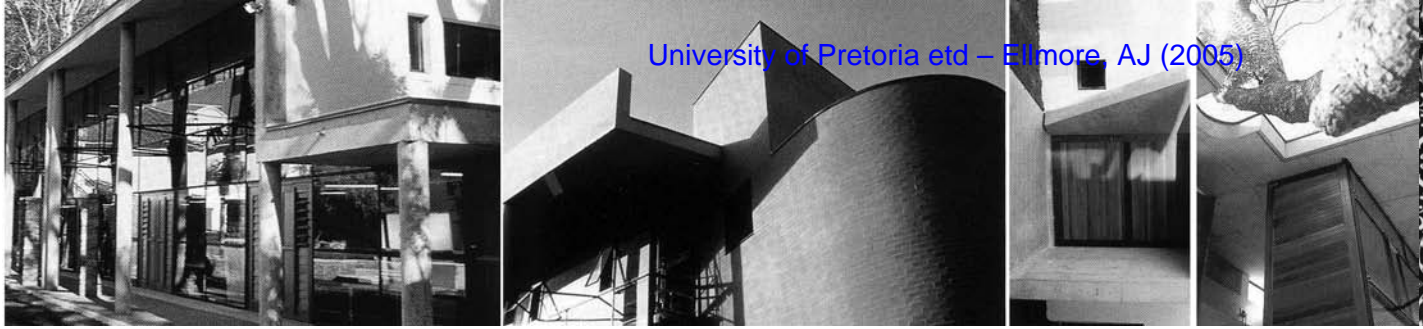


fig.4.3 - 4.6 Electric Ladyland offices

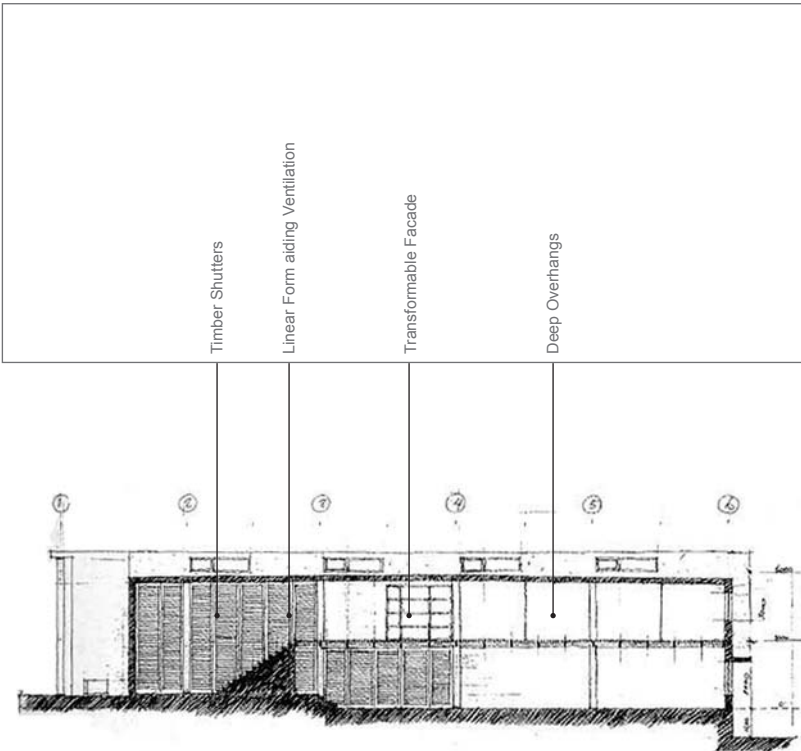


fig.4.7 elevation

Timber shutters and multiple window openings allow for the users to customize their space accordingly. Large doors can be opened creating inside-outside spaces, and permitting climate change into the building. The user becomes further aware of the landscape and the way it transforms i.e. the user is aware when the sun is shining and aware if it is raining.

boundaries between inside space and outside space are blurred, creating an outside room. This central courtyard also provides a safe environment using “eyes on the street” concept. The slope of the site has again been used to merge the building with the landscape. The natural topography has been carried through into the levels of the building.

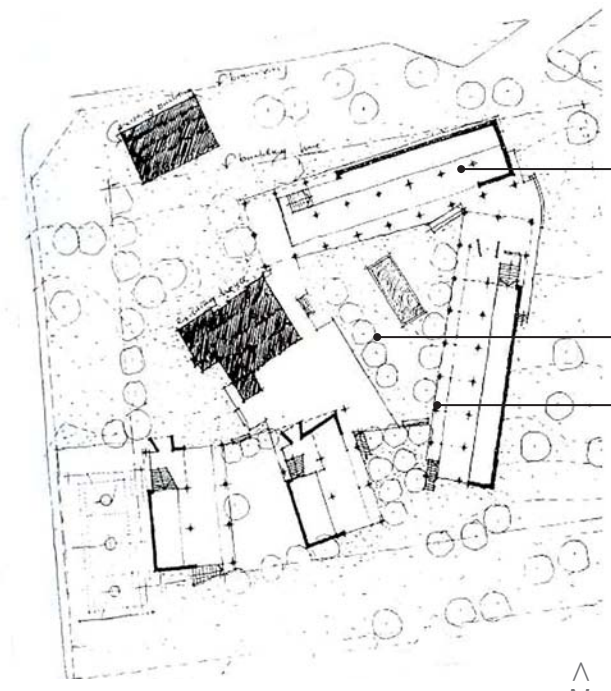


fig.4.8 site plan

- Linear Form
- Courtyard
- Facade Opens to Court

4.6 Rereading the City:

Architect: Dagmar Richter
1990

This project proposes the horizontal extension of Los Angeles above a freeway, responding to the linear form. Translucent screens broadcast information to users, and a genealogical library is suspended within the structure, creating an information journey.

“For Richter, the city is a media-related text, altered by its producers and users alike; the city is a geographical map, at once the ‘skin’ of a territory and a representation. The city is both the condensation of traces from the past and their dissolution in the electronic fluidity of different forms of circulation.”
[Migayrou, 2000, p. 396]

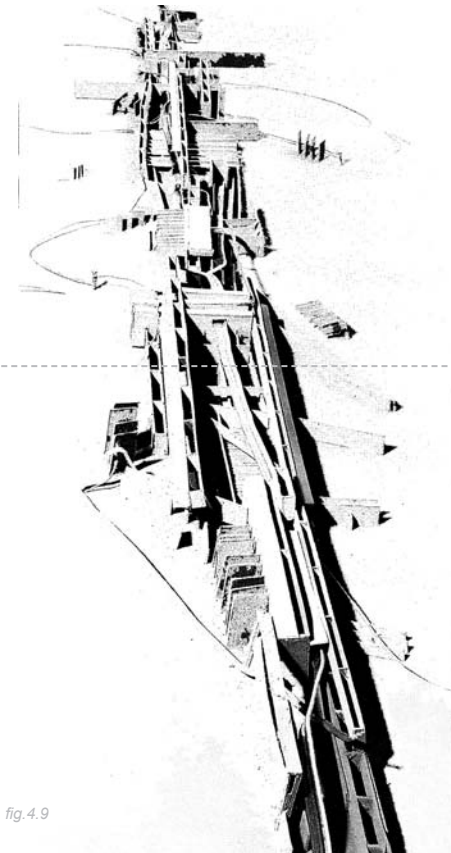


fig. 4.9

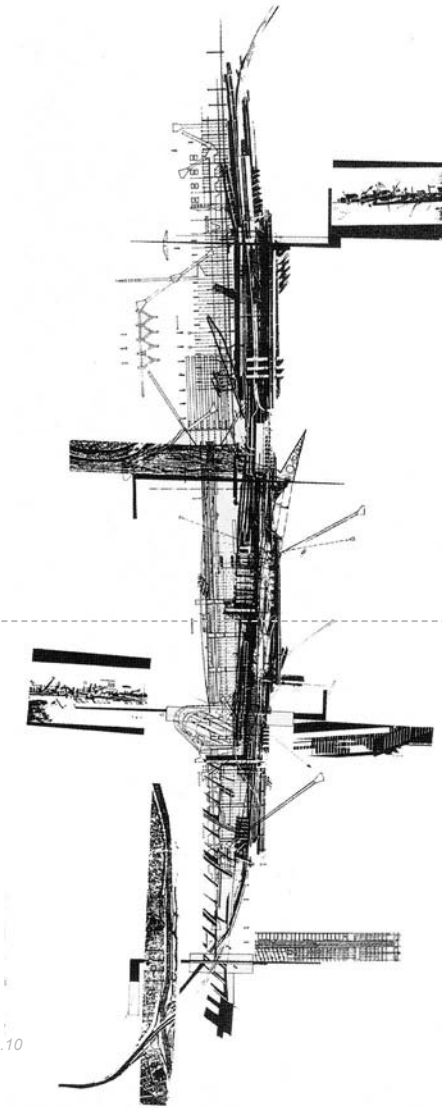


fig. 4.10

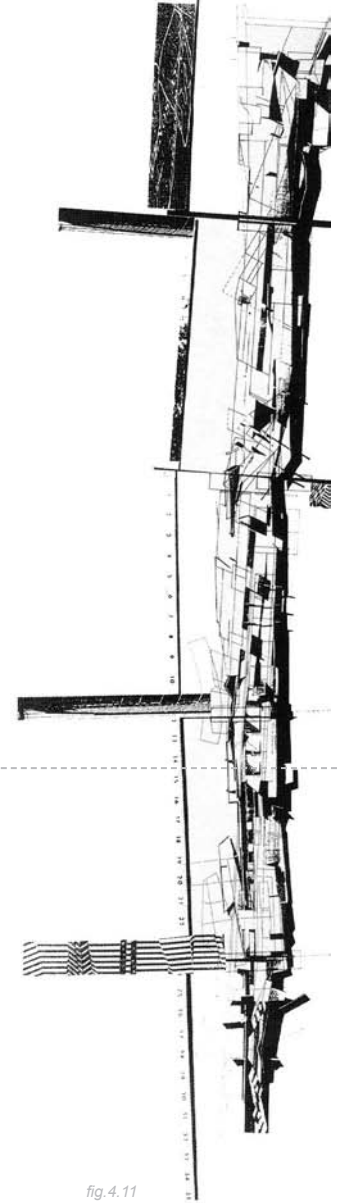


fig. 4.11

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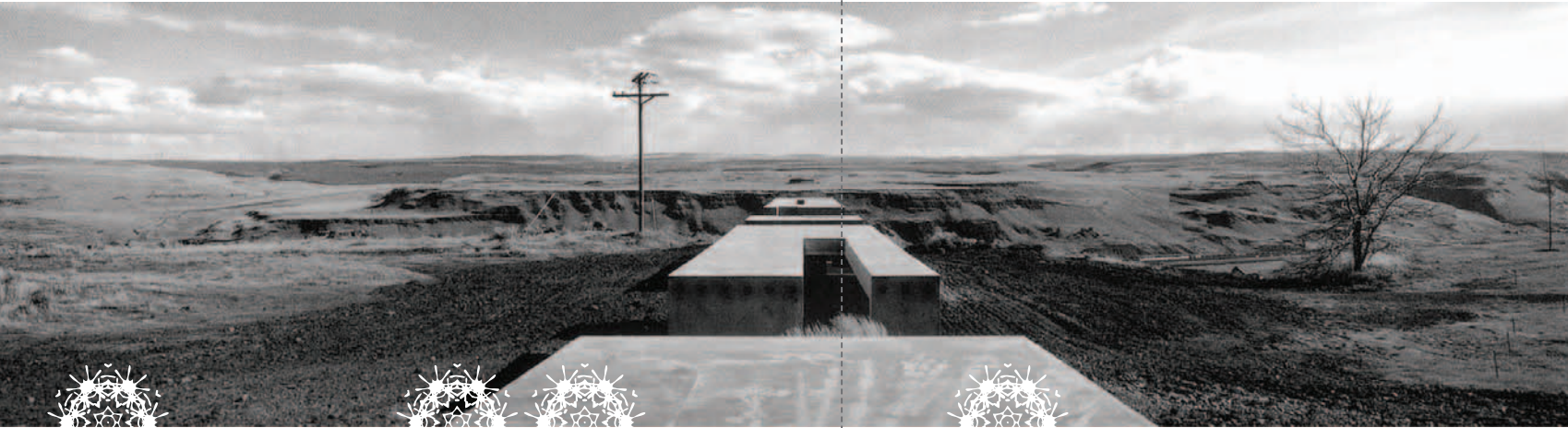


fig.4.12

fig.4.13

4.6 Maryhill Nature Outlook:

Architect: Allied Works Architecture

“It makes a place in a vast plain, yet does not enclose anything. It is only the merest hint of the difference that architecture can make in and on the land.” [Betsky, 2002, p. 162]

The Maryhill Nature Outlook is an investigation into man-

made and natural edges, the project makes use of lines humans create in nature. The 450-meter concrete structure provides a viewing platform and seating, while directing attention to the surrounding vista. Appearing to penetrate out of the slope the intervention merges with the landscape, blurring the boundary between man-

The form of the structure does not communicate the function, creating a sense of curiosity.



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4.2 Perugia's Via dell'Acquedotto

A retired thirteenth-century aqueduct that has found a new lease of life as an elevated pedestrian walk. "Built in 1286 by Fra Beignato, a Sylvestrian monk and expert in hydraulics, it is not much of an antique as Italian monuments go." (Rudofsky, 1964, p.189)

The walkway is 215-meter long, crosses a gully at rooftop height. Below are gardens and a few minor streets. The viaduct connects the town to the University on the neighbouring hill. With the official declaration of the aqueduct as a viaduct in 1812, a parapet wall was added, providing pedestrians with safety and comfort.



fig. 4.14



fig. 4.15



fig. 4.16

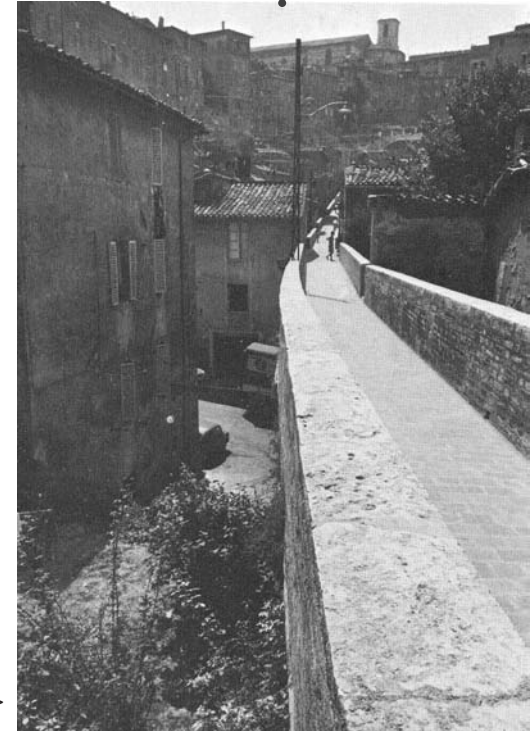
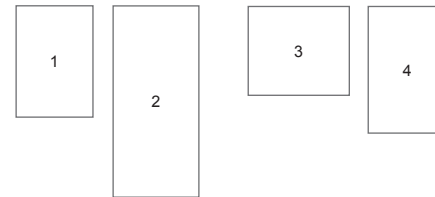


fig. 4.17



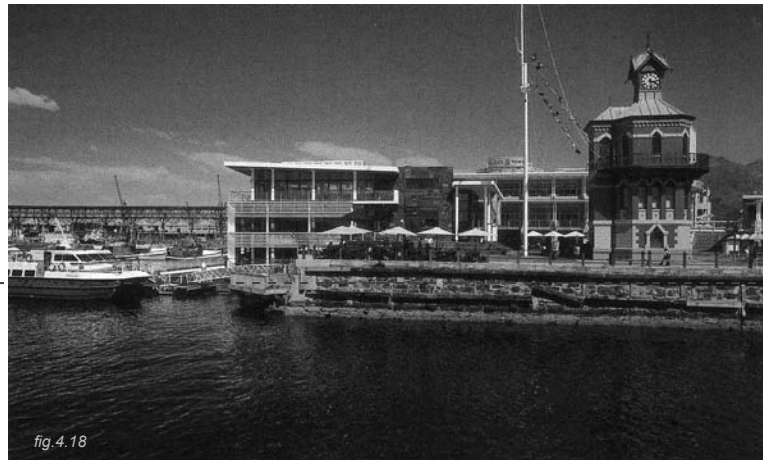


fig.4.18

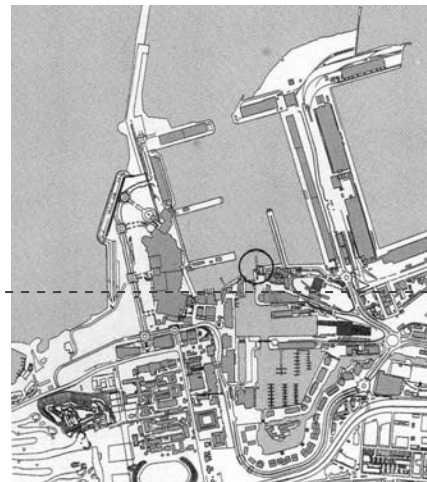


fig.4.19

Development Impact.
The site falls within the V&A Clock Tower Precinct, A historic district. The majority of the buildings within this historic district are “Victorian” in style. “From the beginning it was felt that the design should not imitate the “Victorian” style of the surrounding context. The building is thus contemporary, as we believe all buildings should speak of their time and place.” [le Grange, South African Architect. March/April 2002, p.32]

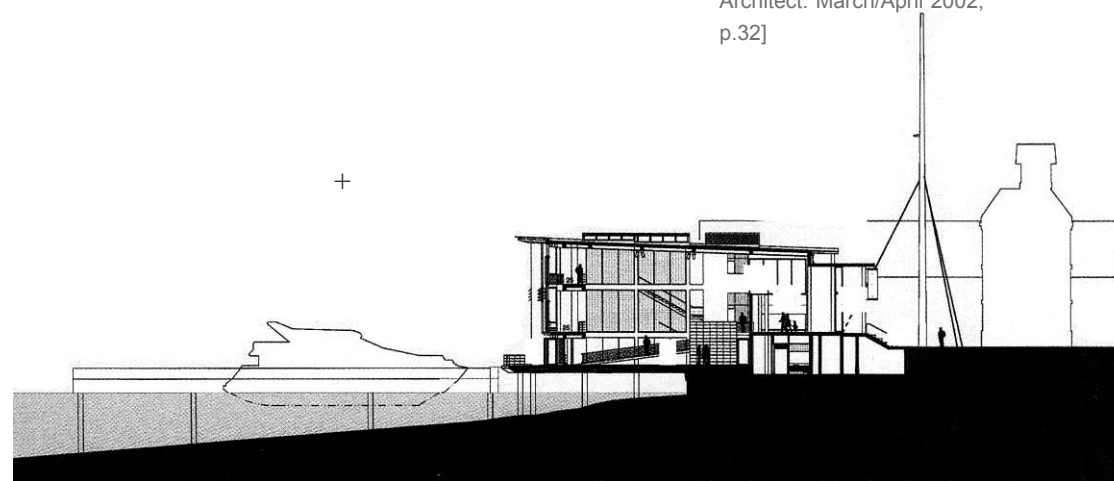


fig.4.20

4.4 Robben Island Ferry Terminal Building:

Architect: Lucien le Grange Architects and Urban Planners (Pty) Ltd
Date: 2002

The idea of this precedent is to understand the function of a building as a gateway, connecting land to water.

The Robben Island Ferry Terminal is a gateway between the mainland and Robben Island. Situated within the ‘Island’ Clock Tower precinct.

The brief was to address the utilitarian functions as well as addressing the question of the memory of Robben Island. The accommodation schedule was to include an embarkation point from the V&A Waterfront to Robben Island. The building also had to provide for visitors who were unable to visit the island. To achieve this exhibition spaces were used. A 150 seat auditorium, 120 seat restaurant operating at two levels, offices and boardrooms for RIM are

also to be provided.

Transparency.

The transparent building allows for views to the surrounding harbour, to the former prisoners embarkation point and to the harbour mouth to be maintained. These transparent facades have been layered to deal with sun penetration.

The building as a transitional space.

The building serves as a gateway chiefly between land and sea. However also as a

place of memory, preparing visitors for the island. A starting point for the journey to the Robben Island Museum. Materials common on the island are used within the design.

Movement through the building.

The primary movement involves gaining access to the ferry. This is achieved through a series of gangways that are intended to induce a feeling of uneasiness. Movement is

through a series of different spaces.

The Building as a boat to Robben Island.

The building becomes a reference to the vessels transporting prisoners to the island, as well as a reference to the V&A Waterfront and its maritime context. The building also becomes a container of information. (historic, archival, exhibition material)

4.7 CJ Lim:

CJ Lim is a director at the Bartlett School of Architecture and the Bartlett Architecture Research Lab. His literature highlights the impact of the environment on architecture rather than architecture on the environment. "Is it possible for buildings to learn from organic systems? And can the banal interactions of flora and fauna in the domestic flat be scaled up into hybrids of growing edifices and engineered gardens of gargantuan size?" [Lim, 2004]



fig. 4.21

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fig. 4.22

4.8 Joris Laarman

A product designer from the Netherlands. Produces works of art from mundane functional objects.

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fig. 4.23



fig. 4.24



4.9 Eleanor Rennie:

"Her thesis project, a printing works, is constructed of sharp, splinter-like fragments that are flung like shrapnel across the site and deep, almost archaeological, undercrofts are scored into the ground. The result: an intense interweaving of brooding volumes, densely packed spaces, clouds of propeller turbines, and the wiry trajectories of ink-supply lines." [Tabor, Architectural Design, p. 76]



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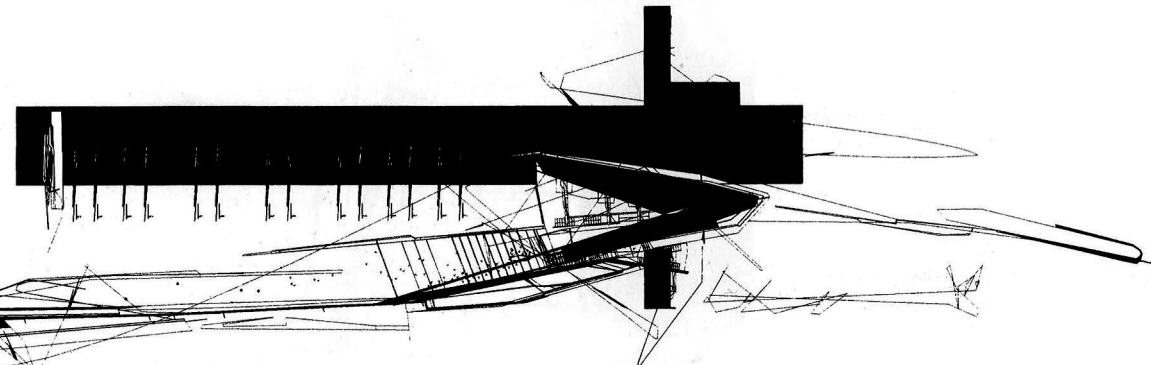


fig.4.25

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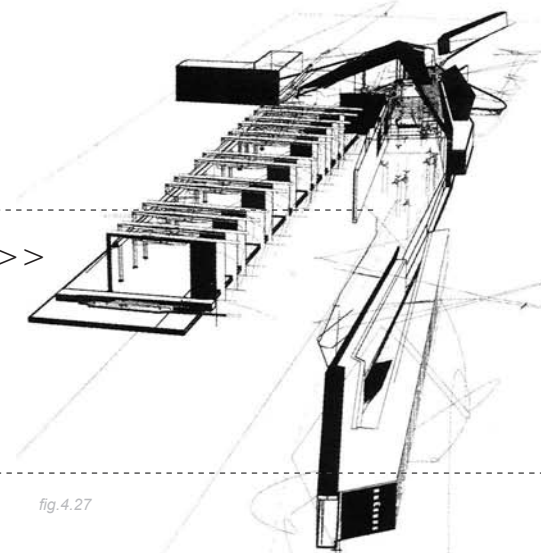


fig.4.27



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5.0 Baseline

5.1 INTRODUCTION

Designers have been placed in a position of great responsibility. The construction industry is one of the largest consumers of material and energy and produces large quantities of waste and is therefore a major contributor to the problem our planet faces in terms of the irreversible damage being done to our ecosystem. Designers are in a position to help reduce this damage through sustainable design decisions.

This baseline study is a guideline, to explain the design process prior to conceptualizing. The Sustainable Building Assessment Tool (SBAT) has been used to aid this target setting process.



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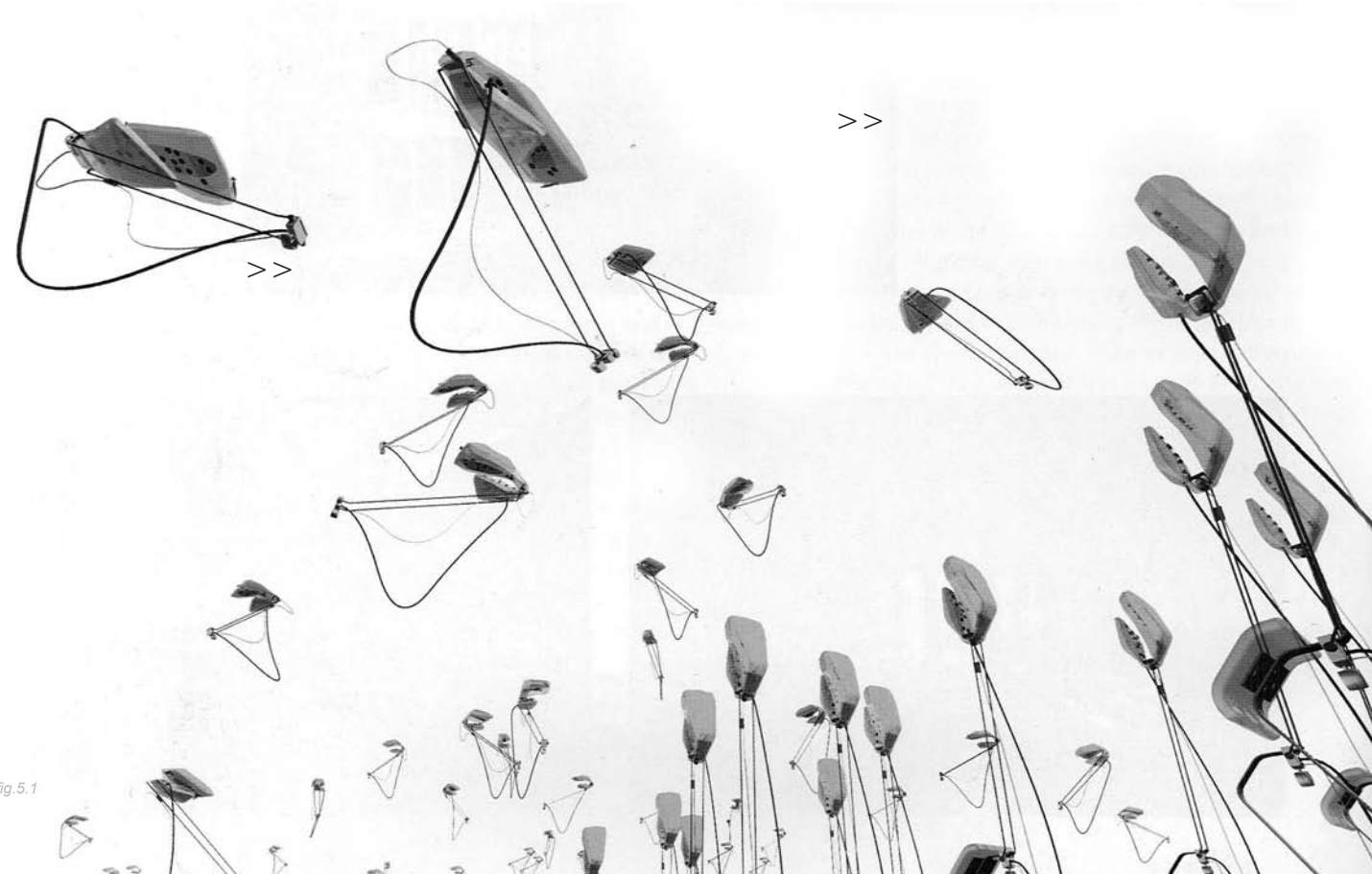


fig. 5.1

5.2 SOCIAL ISSUES

5.2.1 Occupant Comfort

Ventilation

The use of natural ventilation wherever it is possible, otherwise the use of assisted natural ventilated systems, which should be energy efficient and reliable. Due to the high humidity of Durban sufficient ventilation is extremely important to provide a comfortable environment to work or relax in.

Thermal Comfort

Thermal mass to be used to maintain a constant temperature and ensure correct thermal comfort for occupants. Due to the extreme hot, humid climate of Durban, the use of air-conditioning may be unavoidable in sections of the building. By reducing the size of these areas to be as small as possible and insulating them, energy usage can be

reduced. Planting can also be employed to regulate internal temperatures.

Connection between indoor and outdoor

Due to the favourable climate, outdoor rooms should be created incorporating the natural environment. The boundary between building and the landscape should be blurred, emphasising the connection and dependence of man on nature in Durban. The building becomes an extension of the landscape.

The building should be welcoming, encouraging visitors to enter and view the ships or wave passengers farewell. This should be achieved through transparency of building skin, allowing visibility into the building. Interaction between the cruise ship and the building is important. Passengers on the ship should be able to see the public on the viewing platforms and walkway.

5.2.2 Inclusive Environments

Transport

The building should link easily to existing transport facilities. Provision is made for bus and taxi parking. A circular route allows for easy drop-off and collection of passengers.

Connection should be provided to Durban's proposed people mover. The people mover would connect the Point Development, the Beach Fronts and the CBD. Connection to this would allow passengers, who are visiting for the day, to move between the major nodes of the city with ease. A link to the airport will be provided by taxis.

Circulation

The building should be designed in such a manner as to allow for simple movement from the cruise ship to the city or in the opposite direction. The

building acts as a gateway to the city. These routes should be well indicated using clear and simple signage and other methods, such as floor surface. A well defined entrance is important so that first time visitors are aware of where to enter the building. A separate entrance for deliveries needs to be provided.

A ramp with fall of 1 in 12 will be required to allow wheelchair access and for passengers with luggage. This ramp should become a major element within the building design.

5.2.3 Access to Facilities

Facilities should be provided for the dropping off and collection of passengers by the public, the cruise ship crew, and the public who wish to view the cruise ship or wave farewell to passengers. Provision for informal trade can be provided along the walkway

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where the public using the walkway on a daily basis could buy daily goods.

doors can be moved to suit the requirements for the space.

5.2.5 Education, Health and Safety

Education

Information boards can be provided along the walkway providing the public with information about the history of Durban, the cultures of Durban and environmental issues, such as information about the mangroves. These information boards can create awareness about our present environmental challenges. Information screens could also provide users with daily news.

Safety and security

The existing security gate can be used to monitor vehicular access to the site. The walkway will be well lit and security sourced from the local community. The building must comply with all health and safety requirements.

Banking

ATM to be provided within a 3km radius of the building

Restaurants

The terminal program will provide for a restaurant and the walkway will provide for smaller kiosks and eateries.

Communications

The crew from the ship need access to public telephones.

5.2.4 Participation and control

Environmental Control

Users of the building must have reasonable control over their environmental conditions. People using the restaurant can choose between the air-conditioned space with less view, or the naturally ventilated area with a view. The large pivot

Social spaces

Spaces to be provided for informal and formal social interaction between occupants. A space where passengers will meet their friends or family who have come to collect them or wish them farewell. Seating should be provided in these spaces.

Amenity

Easy access to refreshment facilities including ablution facilities for all users of the building.

Local Community

Spaces should be shared or made available to the public. Spaces should be provided where Durban citizens can view the departure or arrival of cruise ships. The luggage and customs hall can double as a art gallery or space for public meetings.

fig.5.2

5.3 Economic Issues

5.3.6 Local Economy

Local craftsmen and contractors

Local artisans from the neighbouring BAT Centre to be used to create the mosaics and artwork within the building. Creating the sense that the building belongs to the Durban public. The majority of the construction to be carried out by local contractors from Durban. Upliftment of the local community through employment and skills training. Materials and products specified should be manufactured or sourced from the Durban region.

5.3.7 Efficiency Of Use

Occupancy

Due to the seasonal properties of the cruise ship environment. The customs and luggage hall should have a secondary

function such as an art gallery or exhibition space. The building also provides a landscape where the people can escape the city and view their city and harbour.

5.3.8 Adaptability and Flexibility

Vertical Dimension

Structural dimension of floor to the underside of the slab above should be a minimum of 3m. The added vertical dimensions also aids cross-ventilation.

Structure

The structure should be placed in such a way as to allow for large open spaces that can be adapted to suit various requirements or uses.

5.3.9 Capital Costs

The project is a joint venture between the City of Durban

and The National Port's Authority. The capital costs can therefore be shared. The building is designed to fit into the existing infrastructure, such as the transport system. The project utilizes a brownfield site, currently used as the car exporting terminal, which has now been outgrown.

5.3.10 Ongoing Costs

Maintenance

Specification to be in such a way as to allow for low maintenance or low cost maintenance. Due to the harsh coastal climate materials need to be selected that are appropriate and treated accordingly. Details must be constructed in such a manner that they can be easily replaced. The concrete frame structure requires minimal maintenance. Hard-wearing surfaces should be used

that are easy to clean.

Stainless steel should be used due its high resistance to corrosion in the harsh coastal environment.





5.4 Environmental Issues

5.4.1 Water

-Storm water runoff reduced by using pervious or absorbent surfaces to maximise the replenishment of ground water. Run-off to be collected and directed toward the wetland and mangroves.

-Water usage to be kept to a minimum by using water efficient devices. Dual flush water closets and aerated shower heads should be used.

-Indigenous plants with low water requirements should be specified to minimize the amount of water required for irrigation.

-Promote water saving awareness in the building.

5.4.2 Energy

Transport / Location

The building needs to connect seamlessly to the existing public transport system.

Provision needs to be made for public transport such as buses and taxis. The idea of a new people mover for Durban should also be investigated, and how provision for such an intervention can be incorporated into the design.

Passive Environmental Control

The design should respond to the micro-climate of the site through basic passive control systems. Appropriate orientation, shading devices and passive systems should be employed. However, due to the extreme hot and humid conditions Durban can experience in summer, air-conditioning will be unavoidable. The design of the shade devices will need to take into account the views from the building and be designed in such a way to allow vision out from the building.

Ventilation

The building shall be divided into a naturally ventilated zone and a air-conditioned zone. Both zones will need to be dealt with differently: the naturally ventilated zone will need to open to the outside to allow air to move through the area. While the air-conditioned zone will need to be insulated to retain the cool air within the zone.

The location of the site is favourable for natural cross ventilation, on the water's edge there are few buildings to obstruct the prevailing winds. The building should be designed in such a way to make use of these prevailing winds.

The air-conditioned areas are to be kept to the minimum possible - not only because of the increased energy usage but also

because the defensive insulating skin which "creates a barrier to the exterior and the connection to climate is lost. Secondly, a further consequence of this is to separate the visitors from the place they have come to experience, clearly defeating the purpose of the building." [Hyde, 2000, p. 9]

Renewable Energy

"South Africa has one of the highest solar resources in the world. The total solar potential across southern Africa amounts to 360 GW, which is almost ten times Eskom's current electricity output" [Giesen, 2002, p. 42]. This renewable resource must be exploited. Lighting and kiosks along the walkway should make use of solar energy to heat water and convert solar energy directly into electrical energy with photovoltaic cells.

5.4.3 Waste Recycling

A policy and management system needs to be put in place for all inorganic waste to be sorted, stored and disposed of to recycling plants within the area.

Construction waste to be minimized through careful management of the construction process and practices. Design limits wastage by designing to comply with modular dimensions of materials.

5.4.4 Site

Brownfield Site

The project is to be located on a brownfield site currently being used as the car terminal. The car terminal has presently outgrown this site and this project suggests it be moved to the proposed dug out harbour located near the Durban

international airport.

The aim is to create an urban infrastructure that successfully integrates into the existing urban fabric.

Landscape

Celebrating Landscape is a theme that runs throughout the project. The project strives to make the public aware of their surroundings and the genius loci of Durban. Information is provided concerning the history of Durban and its cultures. Mangroves and a wetland will be developed in Cato Creek.

Indigenous plants should be used throughout the project. The vegetation walls should be planted with creepers that require low maintenance. Trees planted in the main axis to the public parking should have a large canopy to emphasise them as an extension of the building,

and create similar shadows as the skylights would. The roof garden should be planted with indigenous grasses characteristic of the coastal bushveld-grassland biome such as Ngongoni Bristlegrass, *Aristida junciformis*, *Eragrostis spp.* and *Sporobolus spp.*

Granite Crush can be used in places of low traffic as a ground covering, enforcing the sculptural effect of the building if viewed from above on a cruise ship. This granite crush will be obtained from local quarries that export granite from the harbour.

5.4.5 Materials

Due to the harsh climate of the site, the resistant properties of materials is an important consideration when dealing with material selection. The materials

selected need to be hard-wearing, requiring low maintenance. Components need to be designed in such a way that replacement can be easily achieved.

According to Hyde, 2000, p. 51 "in the selection of materials there are two areas of interest, the energy used to produce materials and the impact of the materials on the health of occupants."

The ecological impact of materials must be assessed to inform the choice of materials. The following should be considered:

-Materials must be sourced from renewable resources.
-Materials and components used must have a low embodied energy. These include locally made and sourced timber, concrete, stainless steel and timber

doors. The use of local materials will reduce the amount of fuel used for transport and reinvest money in the local community.

-Modular dimensions of material to be used to reduce embodied energy and waste.

-Materials must be chosen with long term benefits (e.g. stainless steel). Materials that require higher maintenance, should be perceived as a social project, providing employment to local workers.

-Materials and finishes used should not have adverse effects on the health of occupants.

Contextual Influence

Through a study of Durban architecture, it has been identified that sunscreens play a major role throughout most buildings in the city. Through the use of perforated concrete facades

reference has been made to the sunscreens on Norman Eaton's Nedbank building.

The contrast between the existing harsh texture of the harbour and the new layer of the walkway and cruise terminal intervention should be emphasised. Material selection will play a large role in achieving this.