PROGRAMMING

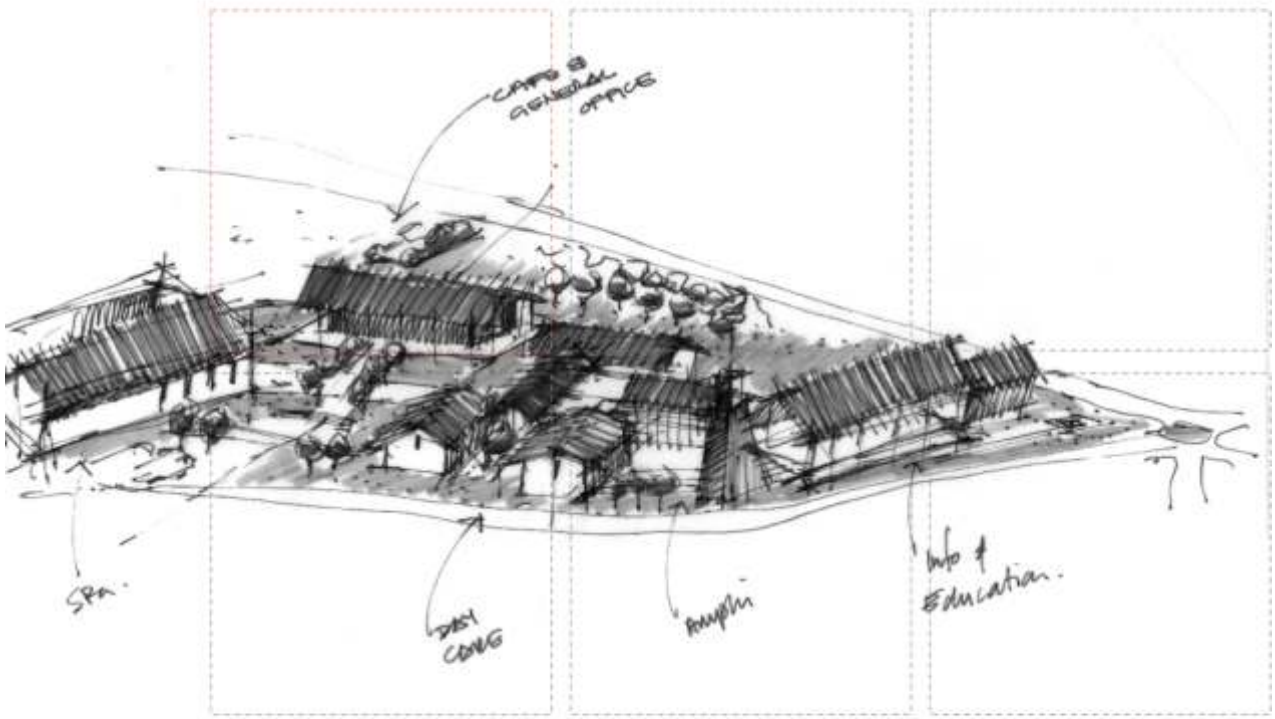


Figure 6.1: Concept sketch

"The programme of the building is the primary generator of the governing idea of order."

Kahn

" Mental health care should be provided through general health services and community settings. Large and centralized psychiatric institutions need to be replaced by other more appropriate mental health services."

5.1 Methodology

A combination of two methods of setting up guidelines or baselines for projects has been used:

5.1.1 VALUE-BASED PROGRAMMING

There are several different approaches to architectural programming. These include:

- Design-based architectural programming
- Knowledge-based architectural programming
- Agreement-based architectural programming
- Value-based architectural programming

For the purpose of this project, the approach of value-based architectural programming was chosen for the following reasons (Hershberger 1999:25-34):

- Value-based programming makes certain that the most important design issues are addressed in the programme document.
- Value-based programming uses systematic information gathering procedures to ensure that important information is not overlooked in the programming process.
- The intent of value-based programming is to let the most important values or issues set the tone of the programming effort, while making certain that recurring value areas are not inadvertently omitted.

5.1.2 SBAT

The performance prioritisation for the project was adopted from the Sustainable Building Assessment Tool. The tool has been developed by the Sustainable Building group of the division of Building and Construction Technology, CSIR, Pretoria.

The purpose of the tool is to access the sustainability of buildings. For this project the performance priorities, as stipulated by SBAT, have been used as an informant for the baseline criteria in order for it to function as a decision support tool.

Figure 6.2: The Pioneer Health Center (1926)

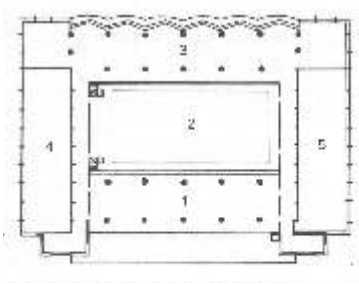


Figure 6.3: Ground floor

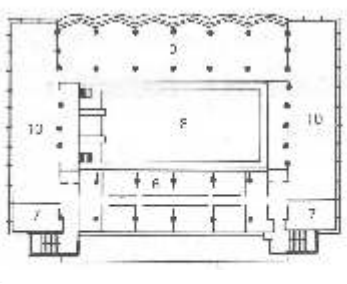


Figure 6.4: First floor

1 Lounge & cafeteria
2 Swimming pool
3 Lounge
4 Upper part gym
5 Upper part lecture hall
6 Medical rooms
7 Dental
8 Upper part pool
9 Library & rest room
10 Study & recreation

5.2 Precedents

Two precedents were chosen to inform the process of programming for health care centers. These precedents proofed to be very successful, therefore, an attempt was made to try and understand why they worked so well.

5.2.1 PIONEER HEALTH CENTER - PECKHAM

Chapter one

The Pioneer Health Center at Peckham in South London was a voluntary experiment, independent of government and the local authority. It began in a small way in 1926 and was finally established, much expanded, in purpose-built premises in 1935. Intended as a center for the local community, where the emphasis was on the promotion and monitoring of health, local families were invited to use it as a club and as a condition of membership were offered periodic health overhaul of the whole family. It also provided ancillary services for infants, children and adults.

Philosophy

The function of the Pioneer Health Center was primarily preventative and did not extend to treatment, and its nature was deliberately that of a community center.

The Pioneer Health Center was praised by Christopher Alexander in *A Pattern Language* as the only health center that they know of which actually devoted itself to health instead of sickness. The incident of emotional disturbance and childhood psychosis among children in later years, he reports, was drastically reduced within the Peckham population, starting exactly from the year when the health center began its operation.

Accommodation

Intended for the leisure use of 2000 families the Center was planned around an indoor swimming pool and had a day nursery and playground, a gymnasium, lounge, cafeteria, library and lecture room and a few rooms for medical and dental inspection.

Flow diagram

The servant and service spaces identify the flow of use, as well as the public and private entrances as used by the community and the staff.

Analysis

- The treatment spaces are situated together with other quiet spaces on the first floor. This aids to create a more therapeutic environment and privacy.
- The noisy spaces are situated around the pool area which creates the core of the project.
- The service spaces are allocated in vicinity to the entrance which is used by the public and the staff.
- Staff circulate primarily on the first floor.

Chapter two

A new health center was designed for Peckham in 1995. It formed part of a planned revitalisation of an area of Peckham. Southwark Council's architects designed a health center that deliberately echoes the ideals of Owen Williams' nearby Pioneer Health Center.

Situated on a 'backlands' site, the new building is intended to draw people into the area. It will therefore be as transparent as possible, with the exception of the consulting rooms.

Philosophy

Like its predecessor, the new center's medical ethos is to promote health rather than deal with sickness and so it will contain a mixture of health facilities and consulting rooms.
Although the focus is on health, the building was designed to be as non -therapeutic as possible, promoting the idea of fitness as pleasurable as well as healthy.

Accommodation

All the facilities center on the swimming pool, one of which has a raising floor to enable it to be used by people with health problems. There is also a gym, dance/fitness studios and play area - many of the attributes of a private health center. In this case, though, many of the facilities are on offer on doctor's prescriptions.

Beside the entrance is the café, in a dramatic ovoid structure. Consulting rooms are tucked to the side, so they are easily accessible, but do not dominate the space. Facilities on the ground floor should be easily accessible to all.

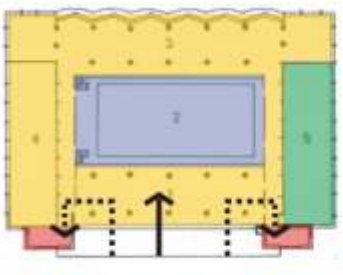


Figure 6.5: Ground floor analysis

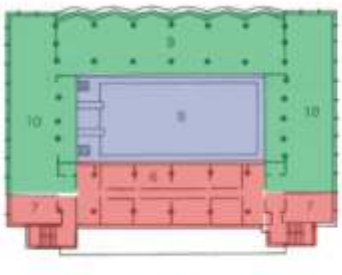
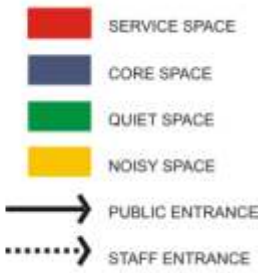


Figure 6.6 First floor analysis



Flow diagram

- Separate entrances are allocated for public and staff.
- The café forms part of the entrance and do not connect with any other functions of the building.
- Service spaces are placed together.
- Entry to the pool is regulated by movement through the play area.

Structure

It is interesting to note that the main aim of both structures, in the Pioneer Health Center and the Peckham Health Center, was to be able to cross the enourmous span over the swimming pool.

Contemporary technology and material use allowed the Peckham Center a greater roof span. The new center speaks the architectural language of a shed, maybe a contemporary version of the old Pioneer Center who reminds one of a factory.

Analysis

The purpose for analysis of this health center was to investigate an alternative way of rendering a health service in a community setting.

Because the impact on the mental state of users was so astonishing, the precedents were appropriate for a community center for the mentally ill.

Where the approach of the proposed community mental healthcare center will differ, though, is that although the center will also uphold health and the maintenance of health as a primary function, it will need to be therapeutic as well.

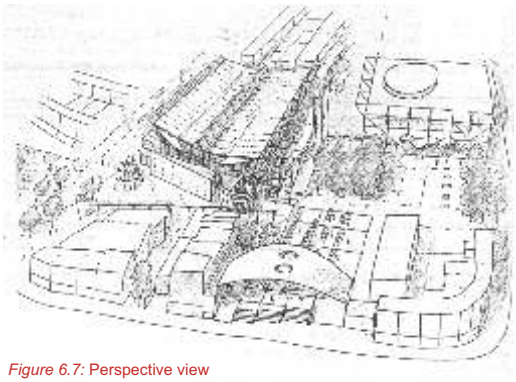


Figure 6.7: Perspective view

Figure 6.8: Section

Figure 6.9: West elevation

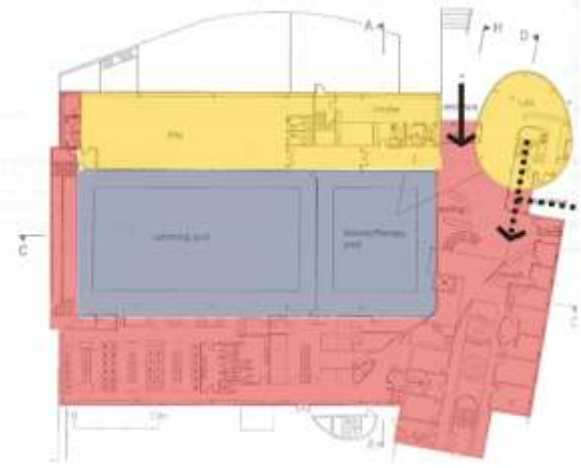


Figure 6.10: Ground floor plan analysis

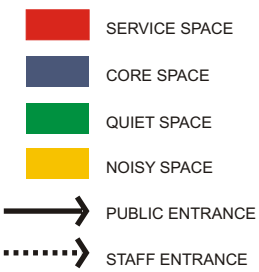


Figure 6.11: Main entrance off courtyard

Figure 6.12: Corner view of Wood Green Community Mental Health Center

5.2 Precedents

5.2.2 WOOD GREEN COMMUNITY MENTAL HEALTH CENTER - MACORMAC JAMIESON PRICHARD

Wood Green Community Mental Health Center was conceived as part of a program of moving services out of Friern Barnet Hospital, a large and austere psychiatric hospital that was closed as part of the Care in the Community initiative in March 1993. The center provides counseling, treatment and support for people who would otherwise have to attend hospital.

"Although much controversy surrounds the execution of the change (in policy) the basic movement has been to de-institutionalise and de-stigmatise this area of health care and make it more accessible."

The architect described the project as a relatively new building type created to bring facilities for mental care into the community. He said: "Although much controversy surrounds the execution of the change (in policy) the basic movement has been to de-institutionalise and de-stigmatise this area of health care and make it more accessible.

The project is an umbrella for two day-care units, a Community Mental Health Center (CMHC) and an Acute Day Hospital (ADH). The units required autonomy from each other, but share staff, catering and administration facilities.

Circulation

Visitors enter the building at a corner junction and come into a double volume space that provides an impression of lightness and openness. The centers two wings radiate from the reception, so the building is clearly and easily understood.

The corridors are opened up and developed into a sequence of double volumes formed by pushing back rooms on alternate sides. On the ground floor, this creates breathing spaces to the side of the main circulation route, making informal waiting areas and places where incidental meetings can happen, so enhancing the life of the corridor.

Two vertical movement systems are used from the main entrance: a set of stairs for staff and a lift for patients.

Accommodation

Reception
Secretaries
Occupational therapy
Training kitchen
Student resources
Seminar room
Admin/co-ord room
Café
Clinic
Utility room
Family therapy
Domiciliary
Archive
Nurses unit
Occupational therapy office
Community psychiatric nurses
Head psychiatric nursing
Social work room
Waiting room
Kitchen
Mother/baby room
Interview rooms
Psychology

Figure 6.13: Ventilation chimneys link each room to a low level inlet and a high level outlet

Figure 6.14: Daylit halfway passing through ventilation wall

Lessons learned

This precedent was chosen because of its similarities in use and purpose to that of the envisaged project. The accommodation list informed the project, as well as circulation and placement concepts. The siting of the building, however, causes the building to respond inwards, shutting out the public realm. This is due to noise and air pollution.

The following guidelines apply:

- Daycare and community care should function autonomously, but staff can be shared.
- Many facilities are shared between the community and the daycare patients, creating a hybrid center of care.

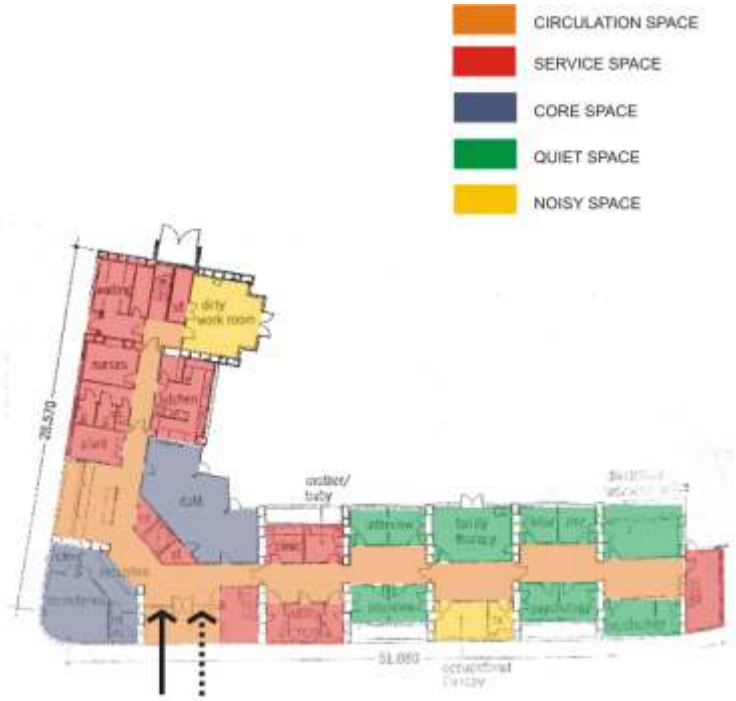


Figure 6.15: Ground floor analysis

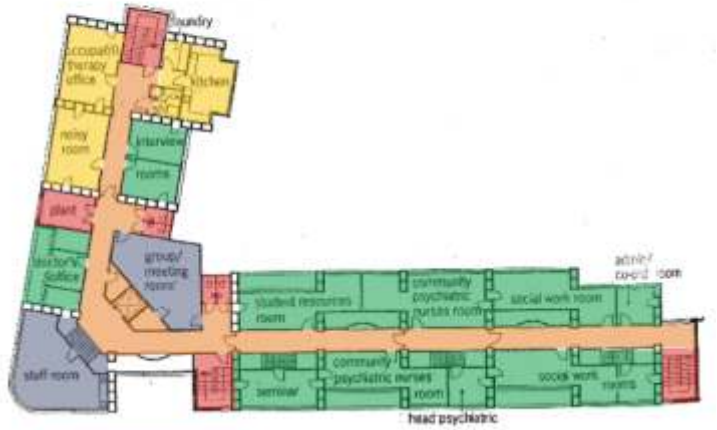


Figure 6.16: First floor analysis

5.3 Human Considerations

5.3.1 FUNCTIONAL CONSIDERATIONS

Figure 6.17: Mentally ill patient

The health facility will aim to bring healing on different levels to mentally ill sufferers, their family, friends and the community at large.

The focus of the facility is to bring healing to the mind, body and spirit.

- **Mind:** Information on illnesses and treatment will be made available to visitors.

  Training in basic skills will help recovering sufferers to adapt to society.

- **Body:** Recent cross-sectional studies and controlled trials have suggested that exercise provides both physical and psychological benefits. These benefits include greater life satisfaction, positive mood states and mental well-being, reductions in psychological distress and depressive symptoms and lower blood pressure. (Geneva; 2004; p.108)

  A wellness center equipped with a pool will be made available to visitors that will facilitate water aerobics.

  The park will encourage exercise through non-strenuous walking.

- **Spirit:** The wellness center will provide healing therapy through massage, sauna and spa. This process of treatment calms, relaxes and soothes and will encourage the renewal of mind, body and spirit.

  The spa can be classified as a health hydro and will center on water treatments. Medical personal will facilitate the center. Strict control will be exercised over clients, their diets and treatments. The approach is a holistic one and is recognised by both conventional and complementary medicine.

Concept for site layout.

Based on Rudolf Steiner's theory of anthroposophy (science of the spirit) the design decision was strengthened to develop the health facility as a series of buildings, rather than a singular building.

The concept is that each building should express and support one specific activity. This will inform the visitor of the purpose of the spaces.

For example:

- The health hydro: This is the realm of earth and water, filled with strong scents of oils and ointments made from healing plants. Here the user should feel protected, secure and grounded.
- The dining room (restaurant): This building should be filed with light and function as a typical dayroom and have a strong social character.
- Music workshop: The atmosphere is exuberant, created by a soaring space.
- Art workshop: The space should be more constricted, mirroring the intense concentration associated with therapeutic activity.

Figure 6.18: Concept site plan

FORMAL COMMUNITY MENTAL HEALTH SERVICES AS IDENTIFIED BY THE WORLD HEALTH ORGANIZATION:

Rehabilitation services
a. Community mental health centres/outpatient clinics
b. Clubhouses
c. Day care centres
d. Drop-in centres
e. Support groups
f. Employment/rehabilitation workshops
g. Sheltered workshops
h. Supervised work placements
i. Cooperative work schemes
j. Supported employment programmes

Accommodation

The building complex will consist of five buildings:

- A training and therapy center
- A workshop for use of machinery
- A restaurant
- An information desk
- A health hydro

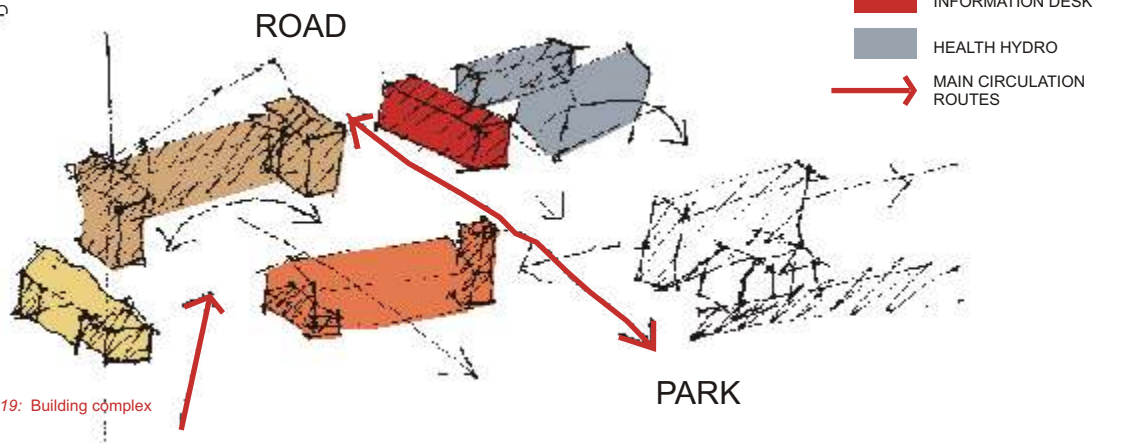


Figure 6.19: Building complex

Training and therapy center

The training and therapy will be accommodated in one building as to function as a modern-day daycare center, but on a more loosely formulated arrangement.

Inpatients, outpatients and the community can make use of the facilities and join classes at free will. No person will be restrained and can leave as they choose. The concept is that of a clubhouse.

In America clubhouse architecture for recovering psychiatric patients is becoming a fast growing concept, due to the need for facilities for the mentally ill that do not hospitalize. New York's Fountain House originated the clubhouse model, the main concepts of which have been highly influential, spurring 300 similar clubhouses world wide.

The basic premise of the clubhouse movement is that people with mental illness have a right to decent housing, meaningful employment and social interaction, all of which were denied to hospitalized patients.

The training and therapy center will be a place to go to for the recovering patient. Here he can receive training, take part in recreational activities or simply relax in the gardens.

TRAINING AND THERAPY CENTER

Space function:

Training division: ground floor
- Computer labs
- Arts and crafts room
- Music and multi-purpose room
- Ablution
- Storage

Therapy division: first floor
- Reception for center
- Waiting rooms
- Staff room
- Offices
- Counseling and therapy rooms

Occupancy:

Training division: 80 students

Teaching places:

N_t = number of teaching places required
N_s = number of students (80)
H_s = hours per week per student (25)
H_w = total number of available hours a week for accommodation (40)
F = net utilization factor (80%)

$$N_t = N_s \times \frac{H_s}{H_w} \times \frac{100}{F}$$

Thus: 62,5 teaching places is required for 80 students

Therapy division: 24 patients per two hours

AREA:

nr.	Space description	m²/student	students	Area
1.	Computer labs (x2)	1,85m²/s*	10	18,5m²
2.	Arts and crafts room	5,20m²/s*	15	78,0m²
3.	Music and multi-purpose	5,20m²/s*	15	78,0m²
4.	Storage (per workshop)	0,60m²/s*	15	9,0m²

*As per New Metric Handbook

nr.	Space description	pers.	m²/pers	area
1.	Reception and secretary	1	-	12,0m²
2.	Waiting rooms (x2)	8	3,0m²/p	24,0m²
3.	Staff room and kitchenette	12	4,0m²/p	48,0m²
4.	Head psychiatrist office	1	-	12,0m²
5.	Counseling room (x2)	4	-	15,0m²
6.	Group therapy room (x2)	8	-	20,0m²

Ablution*staff	m	f
wc	1	2
whb	1	1
ur	1	-

Ablution*stud	m	f
wc	1	3
whb	3	4
ur	2	-

*As per National Building Regulations

Ablution*	m	f
wc	1	1
whb	1	1
ur	-	-

Handicap toilets will be provided on both floors

*As per National Building Regulations

Critical factors:

Natural ventilation and sufficient daylighting must be provided. Additional light will have be provided for the workshops, as well as the therapy and councelling rooms.
Wheel chair access to all spaces must be ensured

Parking provision:

Adult training:	
1 space per 2 staff	3
1 handicap vehicle per 4 attendants	20
Total parkings	23

Health care:	
1 space per doctor	1
1 space per 2 staff	3
2 space per consulting room	8
Total parkings	12

The workshop

A separate workshop will be allocated for the use of machinery. This is due to the nature of the vocational therapy that can be quite messy and noisy. The workshop will be used for woodworking, leather tooling and metal work.

The ablution facilities calculated for the training facility has taken the occupancy of the workshop in consideration and will therefore be shared by the two buildings.

All the training facilities, including the workshop will be utilized during the day, but can be occupied by other users during the evenings such as support groups etc.

WORKSHOP

Space function:

- Workshop
- Storage

Occupancy:

10 students

Area:

nr.	Space description	m²/student	students	area
1.	Workshop	5,0m²/s*	10	50m²
2.	Storage	3,30m²/s*	10	33,0m²

*As per New Metric Handbook

Critical factors:

Natural ventilation and sufficient daylighting must be provided. Additional light will have be provided for the workshop.
Wheel chair access to all spaces must be ensured

Parking provision:

Adult training:	
1 space per 2 staff	1
1 handicap vehicle per 4 attendants	2
Total parkings	3

The restaurant

The restaurant will function as a dayroom within the clubhouse set-up. Rooms will be incorporated where visitors can just sit, relax and read or play games. The dining room will cater for all visitors, inpatients and their family and friends, outpatients and staff.

The restaurant creates the opportunity for family, caregivers and patients to engage and thus enables social support to the sufferer. It would be preferable that the restaurant be naturally lit with access to nature and garden views.

Table sizes and shapes should accommodate different groups. In the lounges a variety of seating should be available for the same reason. In general the restaurant should be warm, inviting and accessible.

THE RESTAURANT

Space function:

- Lounge
- Dining room
- Service counter
- Kitchen
- Storage
- Fridge
- Freezer
- Ablution

Occupancy:

150 visitors

Area:

nr.	Space description	m²/person	persons	area
1.	Lounge	2,5m²/p	20	50,0m²
2.	Indoor dining room	1,4m²/p*	74	100,0m²
3.	Service counter	-	-	20,0m²
4.	Kitchen	-	5	30,0m²

nr.	Space description	m²/person	persons	area
5.	Storage	-	-	5m²
6.	Fridge	-	-	3m²
7.	Freezer	-	-	3m²
8.	Outside eating area	1,4m²/p*	56	78m²

*As per New Metric Handbook

Ablution*	m	f
wc	1	2
whb	1	2
ur	1	-

*As per National Building Regulations

Critical factors:

Natural ventilation and sufficient daylighting must be provided.
Wheelchair access to all spaces must be ensured

Parking provision:

1 space per 3 staff	4
1 space per 2 seats	75
Total parkings	79

The information desk

The information desk will serve as a reception for the complex as a whole and, to an extent, the hospital. It should be located central to the complex and be highly accessible and visible.

Information on the hospital, location of buildings and time schedules will be made available at this point. If patients or visitors need to be located or called to the center it can be done form the info desk. Ablution for the center and park will also be provided within this building, since not all visitors will use the other buildings and their amenities.

The area around the information desk can be used as exhibition space due to its central location and highly visible nature.

THE INFORMATION DESK

Space function:

- Information desk
- Ablution

Occupancy:

1 Clerk

Area:

nr.	Space description	area
1.	Information office	12,0m²
2.	Ablution block	45,0m²

Ablution*	m	f
wc	2	4
whb	2	2
ur	2	-

Ablution for the handicapped will also be provided

*As per National Building Regulations

Critical factors:

Natural ventilation and sufficient daylighting must be provided.
Wheelchair access to all spaces must be ensured

Parking provision:

1 space per 1 staff	1
Total parkings	1

The health hydro

The health hydro should be located where privacy can be optimized. Due to the nature of the accommodation quiet surroundings and a tranquil setting is essential.

The concept is to make spa facilities available to the wider public at affordable rates and at the same time expose visitors to mental health care facilities. Both the mental health care and hydro spa will facilitate good mental health.

Treatments

- Hydrotherapy and underwater massage.
- Hot stone therapy
- Lymphatic drainage

> "Touching, kneading and rubbing the body has physical benefits. Even Freud is said to have prescribed massage therapy to cure hysteria."

- Aeromatherapy.
- Body wraps.
- Deep tissue massage.
- Indian massage
- Steam bath

Spa health bar

Healthy light meals will be served, as well as refreshments.

Exercise

Swimming is an excellent form of exercise and also one of the safest. The indoor/outdoor pool can be used in all seasons. Aqua aerobics classes can be facilitated which is a calm, safe and quiet form of exercise.

Sauna

It is not uncommon to find public saunas at health clinics and medical institutions. The sauna ritual cleanses the pores of the skin, like bathing, but also removes impurities from the body and forces the mind to relax.

Resting and relaxation

Resting areas for cooling and while waiting for treatments will be provided. They should be protected from wind and be kept warm.

HEALTH HYDRO

Space function:

General areas:
- Lobby
- Reception
- Head somatologist office
- Linen room
- Archive
- Health bar
- Lounge
- Indoor pool
- Single massage room
- Double massage room

Hydro areas:
- Sauna
- Steam room
- Massage shower
- Jet bath
- Plunge pool
- Showers
- Lockers
- Ablution

Occupancy:

- 20 Males for the spa
- 20 Females for the spa
- 20 People for the pool

Area:

nr.	Space description	m²/person	people	area
1.	Lobby	3,0m²/p	8	26m²
2.	Reception	-	2	22m²
3.	Head somatologist office	-	4	12m²
4.	Linen room	-	1	12m²
5.	Archive	-	-	7m²
6.	Health bar	1,5m²/p*	12	18m²
7.	Lounge (x2)	3,0m²/p	4	12m²
8.	Indoor pool	-	-	54m²
9.	Single massage room (x2)	-	2	6m²
10.	Double massage room (x2)	-	4	12m²

*As per New Metric Handbook

nr.	Space description	m²/person	people	area
1.	Sauna	1,25m²/p	8	10m²*
2.	Steam room	1,25m²/p	4	5m²*
3.	Massage shower	-	2	3m²*
4.	Jet bath	1,25m²/p	6	8m²*
5.	Plunge pool	2,00m²/p	2	4m²*
6.	Showers	2,00m²/p	3	6m²*
7.	Lockers	-	28	8m²*

*All these facilities will be doubled to cater for a male spa and female spa division

Ablution*	m	f
wc	2	2
whb	2	2
ur	-	-

*Ablution facilities will facilitate the spa and pool areas. These figures include toilets for the handicapped

Critical factors:

- The salon should be well ventilated.
- Therapists should be able to access hot and cold water from treatment points.
- The spa
  - should be kept at 25°C.
  - Non-slip flooring material.
  - No sharp edges.
  - Grabrails should be provided.
  - Drainage and hosing appliances should be provided for cleaning.
  - Walls: waterproof and durable material (Tile/mosaic).
  - Underfloor heating.
  - Warm and well ventilated to prevent condensation.
- Massage rooms
  - Sound proof.
  - Kept at 21°C
  - Shelves should be provided for oils/towels.
  - Rooms should be well ventilated
  - No direct sunshine in the rooms
- Sauna
  - Circulation space should be kept to a minimum
  - As much space as possible should be allocated to benches
  - Bigger saunas are more comfortably fitted with U-shaped benches
  - Keep the ceiling as low as possible
- The spas and baths could use the pool's support equipment to help to pump, filter and purify the water.

Parking provision:

Health hydro and swimming pool:

1 space per 2 staff	4
1 space per 10m² pool area	16
Total parkings	20

Figure 6.20: Jaqueline Fiske Healing garden, Jupiter Medical Center - positive outdoor space (Roy Fisher Associates - Florida)

Figure 6.21: Jaqueline Fiske Healing garden, Jupiter Medical Center - choice of seating (Roy Fisher Associates - Florida)

Figure 6.22: Jaqueline Fiske Healing garden, Jupiter Medical Center - touchable water
(Roy Fisher Associates - Florida)

5.3.2 SOCIAL CONSIDERATIONS

Therapeutic environment

The environment, whether it be natural or man made, has a profound effect on feelings, behaviours, general health, and productivity. The discipline of environmental psychology grew from the collaboration between architects and psychologists in the 1950's to improve mental hospitals. A discipline that began with investigating the effects of colour and chair arrangements on patients has now moved to a much wider field, and includes such diversity as noting the needs of visitors to our national parks to studying the stresses associated with urban living.

A healthcare environment is therapeutic when it does all of the following:

- Supports clinical excellence in the treatment of the physical body
- Supports the psycho-social and spiritual needs of the patient, family, and staff
- Produces measurable positive effects on patients' clinical outcomes and staff effectiveness

Healthcare architects, interior designers, and researchers have identified four key factors which, if applied in the design of a healthcare environment, can measurably improve patient outcomes:

- Reduce or eliminate environmental stressors:
  - Acoustical separation from other patients, mechanical noises, public address systems
  - Acoustical treatment of corridors adjacent to patient rooms
  - Appropriate lighting systems; "lighting can be a stressor that alters mood, increases stress, disrupts daily rhythms, and modulates hormone production" (J. Roberts, Ph.D.)
  - Provide lighting that supports natural circadian rhythm; "Provide natural daylighting where possible, or bright white lights (400-600nm) in the daytime.
  - Provide comfortable furnishings and comfortable layouts
  - Maintain good indoor air quality and ventilation
  - Appropriate use of color
- Provide positive distractions:
  - Views of nature wherever possible from lobby, waiting, and other 'high stress' areas
  - Access to nature, healing gardens
  - Chapel, meditation room, and meditation gardens
  - Artwork depicting nature, including back-lighted photographs of nature
  - Music; live piano in a public area, recorded music in patient room when programmed specifically to create a healing environment
  - Mild physical exercise; corridors, public spaces, and gardens that invite walking when appropriate
  - Pets and other activities or elements that allow for a sense of stimulation that help nurture a patient's sense of positive wellbeing
- Enable social support:
  - Provide places where patients can engage socially with family and other caregivers, such as places where families can eat together
  - Ensure culturally sensitive environments
- Give a sense of control:
  - Give the patient control over the immediate environment; i.e., operable windows, operable blinds, adjustable furniture and fittings.
  - Wayfinding; the built environment should provide clear visual cues to orient patients and families, and guide them to their destination and return. Landscaping, building elements, color, texture, and pattern should all give clues, as well as artwork and signage
  - Provide mini-medical library and computer terminals so patients can research their conditions and treatments
  - Choice of lighting; patients and staff can benefit from personal dimming controls
  - Choice of artwork
  - Volume and programming control of televisions in waiting areas
  - Menu selection

Figure 6.23: Highline Community Hospital Medical Office Building and Cancer Center - space illustrates textural variety and careful use of colour. (Northwest Architects - Seattle)

Figure 6.24: Parker Adventist Community hospital indicating good use of colour, texture and light. (HKS, Inc. - Dallas)

Social contact

The concept is that in-patients, outpatients, visiting patients, visitors and community members share facilities and be visually accessible to each other in order to cultivate an inclusive environment. Often more healthy patients see themselves as elite, and do not want to mix with sicker patients. Visitors or community members might also regard the mental patient as not worthy to communicate with. The center will be designed into integrate all classes regardless of disability and allow these groups to look into each others lives.

- Visual contact

Visual contact between patient spaces and visitor spaces, staff spaces and patient spaces increase the sense of transparent and accessible relations.

- Physical contact

Contact between all parties will be supported. Spaces for socializing can be enhanced. Corridors can be widened to arouse patients' interest in activity and create gathering spaces for patients, visitors and community members. Dayrooms, the healing garden and the spa and pool areas can also induce socializing.

Healing environment

Many factors have been considered in the creation of healing environments:

- Noise control
  - Sounds of footsteps in corridor
  - Slamming doors, clanking latches
  - Loudspeaker paging systems
  - Staff conversations from nurses' stations or staff lounge
  - Televisions
  - Clanking of dishes and food carts
- Air quality
  - Need for fresh air
  - Avoidance of noxious off-gassing from synthetic materials, including certain types of paint
  - Avoidance of odiferous cleaning agents
  - Adequate number of air changes
- Thermal comfort
  - Ability to control room temperature, humidity and air circulation to suit personal needs.
- Light
  - Patients should be able to control light
- Communication
  - Ability to contact staff when needed
  - Comfortable places to visit with family
  - Television, radio and telephone available as needed
- Views of nature
  - Views of trees, flowers or mountains from lounges
  - Indoor landscaping
- Colour
  - Careful use of colour to create mood, lift spirit, and make rooms cheerful
- Texture
  - Introduce textural variety in wall surfaces, floors, ceilings, furniture, fabrics and artwork
- Accommodation for families
  - Provide place for family members to make them feel welcome, rather than intrusive
  - Provide visitors lounges and access to vending machines, telephones, and cafeteria

"As social beings with interests and values, planners do care about and are committed to bringing about a certain kind of world through their efforts. Planners are always affecting the world in a particular direction and closing off other directions."

5.3 Human Considerations

5.3.3 PHYSICAL CONSIDERATIONS

Inclusive design

Definition and premise of inclusive design:

Inclusive Design is a process that results in inclusive products or environments which can be used by everyone regardless of age, gender or disability. (adapted from Shipley 2002)

It is however an evolving and complex concept, whose definition can be extended to address not only age, gender and disability, but also race, income, education, culture etc. . . .

It is useful to supplement this open ended definition with an understanding of the basic premise, which lies behind inclusive design and its consequences, that is: the built environment can exclude and discriminate against certain groups in society at certain times.

Guiding principles

All people should:

- have full and equal access to all elements of society, in an inclusive way if they so choose, rather than in a way that subjects them to separate treatment or segregation;
- not encounter discrimination through the design and operation of the built environment;
- have the freedom to choose how they access the activities they wish to pursue and the premises in which they occur, according to their own personal requirements;
- expect the planning process, the building control system, and the law, to ensure that the built environment is accessible to disabled people over time;
- have the opportunity to influence the planning, design and operation of the built environment through meaningful consultation.

Design guidelines for the disabled:

- Public transport within 100m of the facility
- Routes must be smooth and even
- Levels - ramps at slope 1:12
- Toilets for the disabled should be accessible

5.3.4 PHYSIOLOGICAL CONSIDERATIONS

Way finding

Way finding can be defined in many ways; in this context it is an orientation or traffic management system for hospitals. Mentally ill sufferers can easily be disorientated by their surroundings. Guidelines can be used during the design stage to avoid confusion.

Way finding facilitators

Behavioural scientists generally agree on three major conditions that are prerequisites for ease of way finding (Garling 1984):

- Degree of differentiation: the degree of sameness or variation of interior spaces affects a person's ability to recognize it and use it as a landmark.
- Visual access: being able to see one part of the building from another or being able to see the lobby, an atrium, a bridge or another architectural feature enables a person to maintain a point of reference.
- Complexity of spatial layout: the number of possible routes to a destination and the frequency of intersections with jogs or odd angles.

Components of a way finding system

Four principle elements help to guide people through a hospital:

- Destination: a destination is the entrance to an inpatient or outpatient department or to a waiting room, cafeteria, or other public space.
- Main artery: the main artery corridor is the principle circulation spine connecting points of entry with various destinations and vertical circulations such as elevators or stairs.
- Landmark: a landmark is a highly memorable image that can be used as a point of reference when giving directions, and one that would be recalled by the exiting first-time user or the repeat visitor.
- Reinforcement: additional supporting elements that reassure way finder that he or she is on the right path.

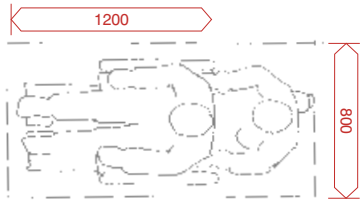


Figure 6.25: Wheelchair and attendant envelope

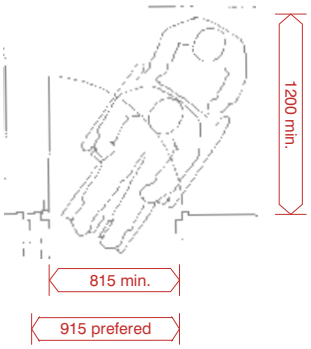


Figure 6.26: Wheelchair movement through door

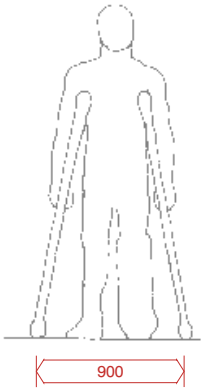


Figure 6.27: Use of cruches

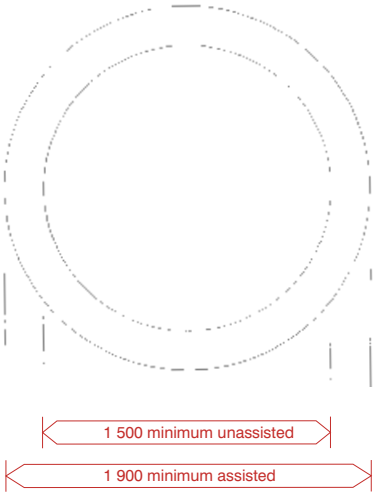


Figure 6.28: Turning circles for wheelchairs

Designing for the mentally ill

Design guidelines:

The following design guidelines are aimed at psychiatric inpatients facilities and are therefore applicable to the severely disturbed patient. Some of the proposals can, however, be kept in mind whilst designing for the recovering mentally ill user:

- Nothing sharp
- Tamper-proof hardware
- No glass or mirrors
- Tamper-proof grilles for heating, ventilation and air conditioning, locate in ceilings or high on walls
- Tamper-proof screws
- Avoid design details that can easily be destroyed
- No suspended ceilings
- Prevent patients from locking themselves in
- Door hardware with flush handles and hinges that swing in both directions
- Fire doors with alarm-release locks

Designing for the disabled

Many of the mentally ill that will visit the center will be wheelchair bound or using walking sticks or crutches. It is therefore essential to design for these individuals.

Walls:

- Rough finishes on walls can cause hand abrasions
- Objects projecting from walls should be kept to a minimum

Doors:

- Sliding doors are generally an obstacle to wheelchair users
- No revolving doors may be used
- A space less than 1981mm can become a wheelchair trap
- Doors must have openings of no less than 810mm
- Lever handles should be used on all doors
- Doors must open at a maximum of 3,6kg
- Bathroom doors should swing outwards

Floors

- Steps and curbs should be eliminated. The maximum threshold or curb height is 250mm
- No slippery floor finishes or uneven floors
- No grating should intervere with wheelchair travel

Space

- Wheelchair parking space is required (see accommodation p.69)
- Increased aisle space is required in cafeterias, restaurants and libraries
- Public toilets and phone booths should be spatious enough to accommodate wheelchairs

Reach

- Phones, drinking fountains, vending machines, light switches and fire alarms should be within reach. The hand reach zone is 914mm-1219mm as measured from the floor

Walkways and ramps

- The maximum recommended grade for walkways are 3% with 1219mm wide rest areas
- Ramps have a general grade of 5-8% with rest areas every 9m and handrails on both sides
- Ramps should be textured to provide non-skid surfaces

5.4 Environmental Considerations

Figure 6.29: Training auditorium
Weskoppies is a training hospital for the University of Pretoria. The auditorium is mainly used by for the students for lectures.

Figure 6.31: Gatehouse
The proposal is for a new gatehouse to be designed that will function as an appropriate gateway forming an established entry node and facilitating services such as a bus stop and ablution.

Figure 6.32: Historic house
The house is currently occupied by staff members, but the proposal is for it to serve as a museum for the hospital and tea garden in the gateway precinct. The concept is to preserve the historic context and create a point of interest for the community.

Figure 6.33: Site context

Figure 6.30: Outpatients facility
The outpatient facility is used as a support to patients who have been released. The facility is insufficient in capacity.

Figure 6.34: Family and child care unit
The facility houses children on the campus and also functions as the information desk for the hospital. The accommodation of both functions, in a single building, is not ideal.

5.4.1 SITE CONTEXT

The site is surrounded by buildings that date from different periods, and all of them are, architecturally, fairly insignificant.

There exist no relation between the buildings and the challenge would be to create a co-herancy through the new intervention.

Figure 6.35: View point 2

Figure 6.36: View point 4

The site consists of rolling, green lawns and large clusters of trees. Many of these trees are exotic and are being removed. A strategy for replacing these trees should thus considered in the planning and design of the new complex. The setting of the site is public in its location, at the gate, but peaceful and tranquil in its nature.

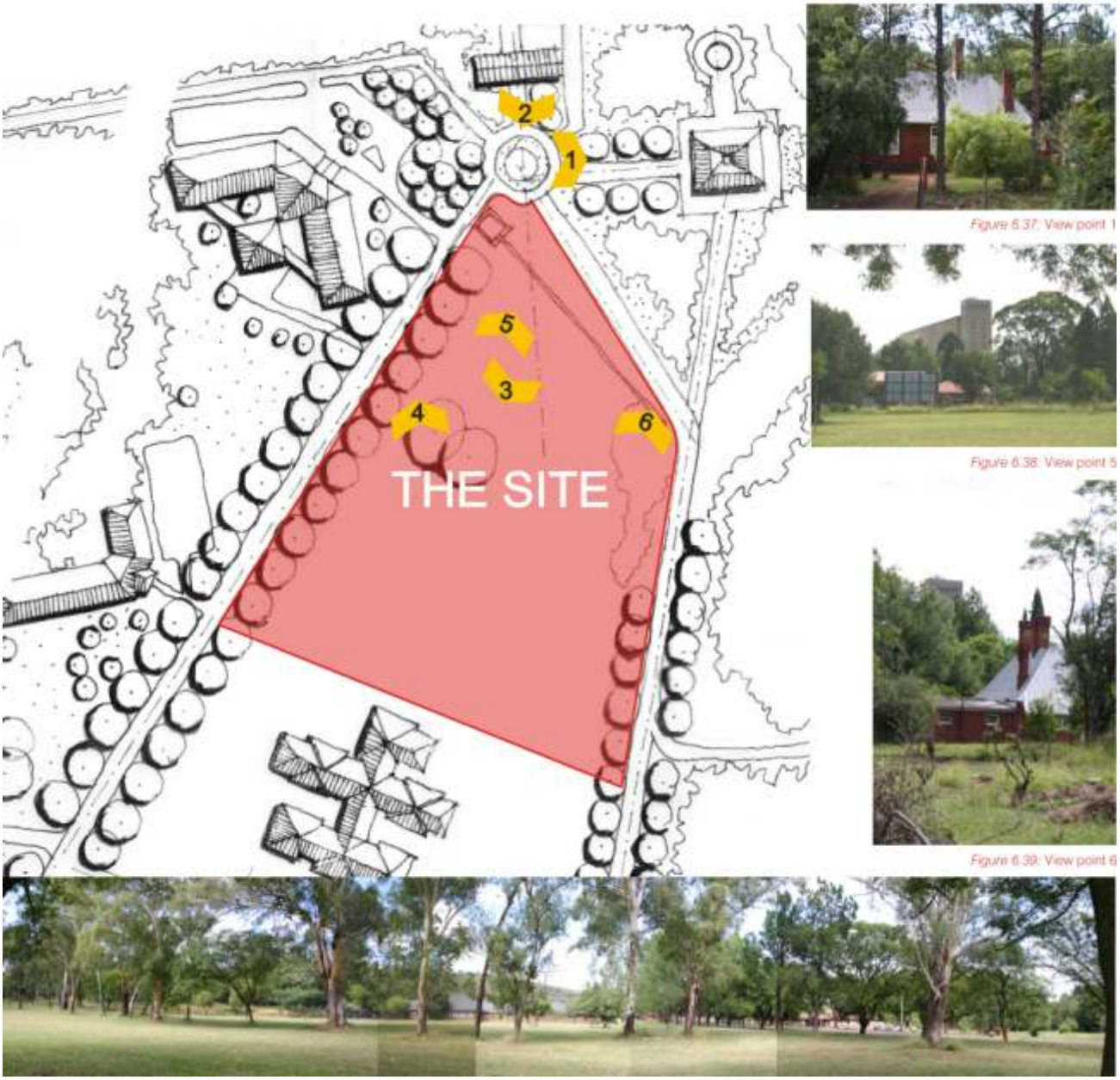


Figure 6.37: View point 1

Figure 6.38: View point 5

Figure 6.39: View point 6

Figure 6.40: View point 3

Guiding principles:

- Create co-herancy between existing buildings through new intervention.
- Maintain and enhance natural aspects of the site.

5.4 Environmental Considerations

5.4.2 SITE

The site is not a virgin site, but can certainly not be considered a brownfield site either. The vegetation has been estimated as a zone 2, which means that it has low to medium environmental value and that the planting of indigenous trees on a large scale should be encouraged.

Extensive vegetation on site will thus be cultivated, which supports the concept of creating a park on the site. This will provide a habitat for birds, of which there are numerous on site.

Planning and design

During planning and design, the regional and microclimatic conditions of the site, existing vegetation, topographical conditions, the intended use, desires of the owner, and the zoning of plant materials according to their water needs, need to be taken into account.

Planning:

- Design of floor plans and foundations should reflect the site topography.
- Because the building orientation is not on a east-west axis, special care will have to be taken in regards to the treatment of the western and eastern elevations. Shading devices, and the channeling of wind for natural ventilation will decrease energy demands for cooling, particularly when combined with proper placement of shade producing plants.
- Preserve and protect as much existing vegetation as possible. Incorporate existing trees when locating structures and powerlines, allowing room for them to grow if they are not at mature size.
- If areas around trees must be paved, use pervious materials or, at a minimum, leave large holes spaced at regular intervals in the tree's root zone (openings will help give trees needed air and water).

Carefully planned building placement should:

- Minimize storm water runoff
- Minimize habitat disturbance
- Protect open space
- Reduce the risk of erosion
- Save energy by providing for passive solar, natural ventilation, and daylighting.

Design to minimize impacts to site

- Natural Site Features
  - Preserve natural drainage systems.
  - Locate driveways, parking, entrances, and loading docks on the building's south side.
  - Minimize ground-level wind loads.

- Vegetation
  - Minimize native vegetation disruption.
  - Minimize visual impacts. Use natural vegetation and adjust the building plan to diminish the visual impact of facilities and to minimize imposition on environmental context.

- Hydrology
  - Avoid hydrological system contamination.
  - Allow precipitation to naturally recharge groundwater.
  - Provide ample planting to reduce flow of surface water.
  - Trees reduce impact of heavy rainfall on surface, cutting down erosion.
  - Trees keep ground damp longer and reduce evaporation.
  - Soakage trenches are spread over a wide area to cope with heavier downfalls, to give good subterranean distribution.
  - Berms dam excessive surface water allowing it to percolate over a longer period.

- Geology/Soils
  - Minimize excavation and disturbance to groundcover.
  - Minimize erosion. Avoid large impervious surface areas and building footprints that collect rain and create concentrated runoff onto site.

- Heat Island Effect
  - Use trees for shade, use fewer pavements, reduce or avoid air conditioning use and use reflective coatings on pavement and roofs to help reduce a building's contribution to the heat island effect.

Site Development

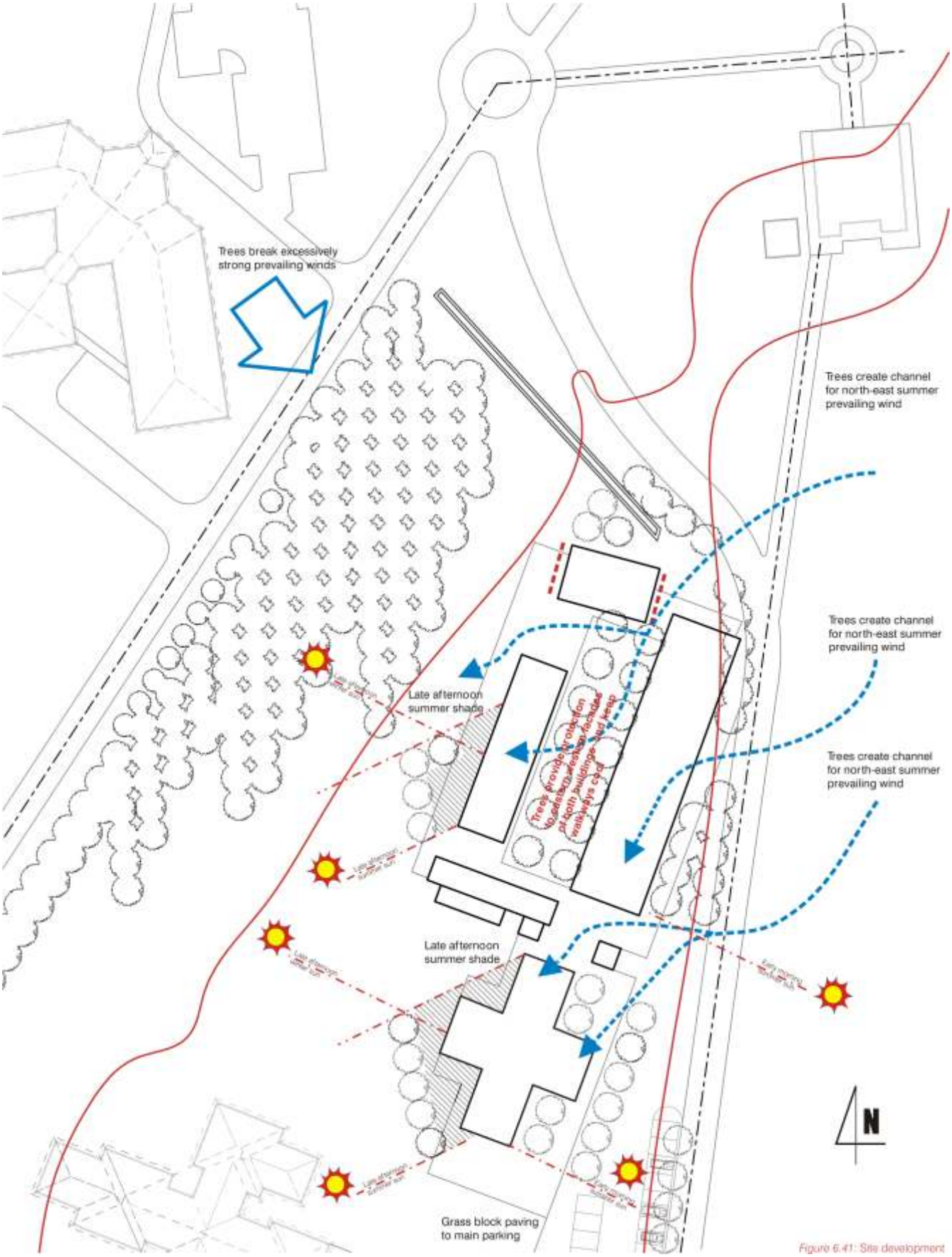


Figure 6.41: Site development

5.4 Environmental Considerations

Landscaping for energy saving

It is possible to achieve as much as a 30% reduction in cooling and heating costs through careful landscape planning. Landscaping can reduce direct sun from striking and heating up building surfaces and create enough shade to lower roof and wall temperatures by up to 20 degrees. It can prevent reflected light carrying heat into a building from the ground or other surfaces. By reducing wind velocity, an energy conserving landscape slows air leakage in a house. Additionally, the shade created by trees and the effect of grass and shrubs will reduce air temperatures adjoining the building and provide evaporative cooling. The use of dense tree and shrub plantings on the west and south-west sides of a building will block the summer setting sun. This is the most effective landscape planting strategy.

Shading

Trees are primary in an energy conserving landscape. Trees can have a canopy large enough to shade roofs, reducing cooling costs and increasing comfort.

The best locations for deciduous trees are on the north, west and east sides of a house. When these trees drop their leaves in the winter, sunlight can reach the house to help in heating the home. Note: Even without leaves, trees can block as much as 60% of the sun, making placement of trees critical to effectiveness. Evergreen trees on the west side afford the best protection from the setting summer sun.

Windbreaks

Characteristics of an effective windbreak:

- The windbreak extends to the ground.
- Foliage density on the windward side is optimally 60%.
- Two to three rows of evergreen trees in staggered order should be used. If using deciduous trees, there should be five to six rows.
- The length of a windbreak should be 11.5 times the mature width of the stand of trees.
- The tree heights within the windbreak should be varied.

Vines for Shading

When trees are young and not providing much shade, vines can be used to provide shading on walls and windows. Some vines such as English Ivy will cling to any wall surface. This can harm wood surfaces. Trellises placed close to the walls can be used to support vine growth without touching the walls. Using vines which lose foliage in the winter can be used for summer shading as long as vine stems do not significantly block winter sun. Evergreen vines will shade walls in the summer and reduce the effects of cold winds in the winter.

Absorbent and Reflective Materials

Groundcover and/or turf also have a cooling effect from evapotranspiration (the loss of water from the soil by evaporation and by the transpiration of the plants growing therein).

The temperature above a groundcover will be 10 to 15 degrees cooler than above a heat absorbent material such as asphalt or a reflective material such as light coloured gravel or rock.

A heat absorbent material like asphalt will also continue to radiate heat after the sun has set. It is best to either minimize the use of heat absorbent and reflective materials near a house and/or shade them from any direct sun.

Paving

Pervious Paving Materials

Pervious materials permit water to enter the ground by virtue of their porous nature or by large spaces in the material.

Water-pervious materials such as gravel, crushed stone, open paving blocks or pervious paving blocks for driveways, parking areas, walkways, and patios minimize runoff from those areas, as well as increase infiltration. Some pervious paving options can retain turf and carry autos and trucks evenly without creating tracks or other heavy traffic wear signs.

Parking areas

The approach taken in regards to the parking is that of cars in a park. The parking areas will be covered in natural vegetation and hardened surfaces is only provided for wheel tracks and wheelchair parking bays.

Trees must not shed damaging or staining fruit or leaves on vehicles.

Site Water

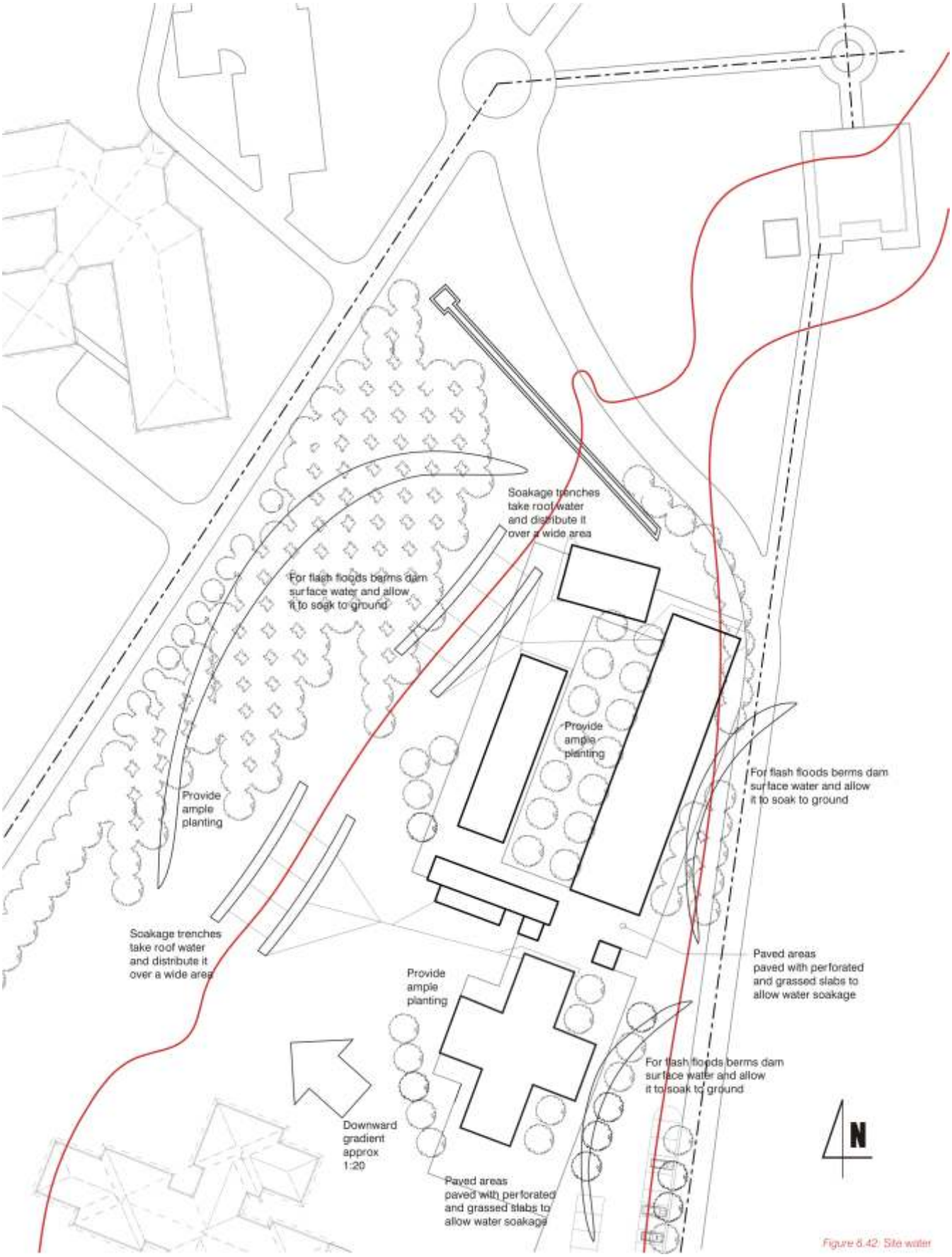


Figure 5.42: Site water

Figure 6.43: Low rise community buildings

Figure 6.44: Smaller building size

Figure 6.45: Spring Harbour Psychiatric Facility - smaller sized low rise unitswere designed for the facility that are not only energy conserving, but also lends a domestic and human scale to the complex. (MorrisSwitzer - Environments for health - Westbrook)

5.4 Environmental Considerations

5.4.3 RESOURCES

Energy

Low rise building:

Low rise buildings are envisaged for the center as they are responsive to the changing social and demographic profiles of community building arrangements.

Low rise buildings are flexible, efficient and can be environmentally responsive. The organization of low rise buildings is adaptable to urban as well as to rural settings.

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Smaller building size:

A group of smaller buildings could be more energy efficient as they could more easily be designed to make more efficient use of interior spaces while retaining solar and ground access. In turn, these buildings have smaller footprints which help to create a more compact, efficient and affordable community development.

The benefits for both the low rise buildings and smaller building size include:

- lower impact on the natural environment
- more compact and accessible developments which promote community
- reduced infrastructure expenditures
- reduced costs for materials and construction
- reduced servicing, maintenance and energy expenditures (life-cycle costs)

Natural ventilation:

Natural ventilation serves to provide both comfort and health to indoor environments. Using natural ventilation can result in both capital cost and energy savings and reduce the need for mechanical ventilation and air conditioning systems. It serves two functions with differing airflow requirements, namely: to maintain acceptable indoor air quality by replacing indoor air with fresh indoor air and to provide thermal comfort (comfort ventilation).

The main design features that will be incorporated in the design, which will affect the indoor ventilation conditions are:

- Narrow building section to allow easy cross ventilation
- Windows at ceiling level for the escape of hot air
- Total area of openings
- Operable windows
- Use of casement windows, as they offer better air flow
- Minimizing interior obstructions
- Slightly larger wind outlets

Passive solar heating

Passive heating is a system that collects solar heat, without the use of external mechanical power to distribute it. The building itself is designed as a solar collector with windows acting as the collection source. Solar collection may be either direct (solar radiation entering directly into a space) or indirect (solar radiation heats as area which then continues to heat the area when the solar exposure has passed).

Solar heating depends upon:

- proper siting of building with 50 - 60% of the building glazing oriented to the sun
- thermal mass - materials for indirect solar collection should relate to the window size and the volume of the space being heated
- systems for controlling heat in the space including, awnings, louvers, blinds, and shutters

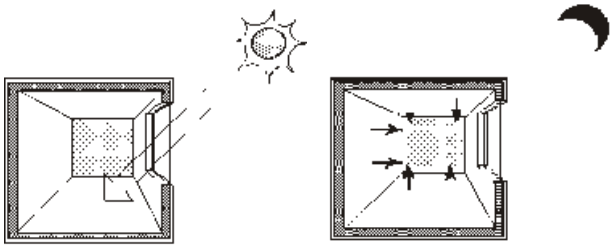


Figure 6.46: Thermal mass in the interior absorbs the sunlight and radiates the heat at night

Figure 6.47: An indoor room receiving daylighting through a skylight

Passive solar cooling

Design strategies that minimize the need for mechanical cooling systems include proper window placement and daylighting design, selection of appropriate glazings for windows and skylights, proper shading of glass when heat gains are not desired, use of light-colored materials for the building envelope and roof, careful siting and orientation decisions, and good landscaping design.

Shading Strategies:

- Fixed shading devices, using correctly sized overhangs and patios. Fixed shading devices, which are designed into a building, will shade windows throughout the solar cycle. The depth and position of fixed shading devices will be carefully engineered to allow the sun to penetrate only during predetermined times of the year. In the winter, overhangs will allow the low winter sun to enter. In the summer, the overhangs will block the higher sun.
- Plant trees and/or bushes to shade the windows at the right time of day and season.
- Exterior shutters. Vertical shutters on the western facade can be designed to eliminate late summer sun in the building, while still allowing visual access from the building.

Cooling Strategies

- The building will be designed to take advantage of natural ventilation. Natural ventilation uses the passive stack effect and pressure differentials to bring fresh, cooling air through a building without mechanical systems. This process cools the occupants and provides comfort. Features will include fresh air inlets located near floor level, use of ceiling fans, and the increase of floor to ceiling height with hot air outlets at ceiling level.

Daylighting:

Daylighting has become increasingly important to reduce the energy demands of a building and to create healthier interior environments. Electric lighting accounts for approximately 25% of the total electrical energy used in buildings.

A goal is to reduce the electric lighting requirements wherever possible. As a design feature, the use of daylighting within a building produces a more pleasant and stimulating atmosphere for its inhabitants.

Generally, north, east and west facing windows can be controlled for good daylighting while south facing windows can provide uniform daylighting without controls. Because different wall orientations receive different amounts of sunlight throughout the day and throughout the seasons, optimal window design will differ for each orientation as will the lighting controls.

Daylighting strategies must consider heat gain, glare and variations in light availability and solar penetration. These are addressed through aperature size and spacing, shading devices, glazing materials and surface reflectance characteristics.

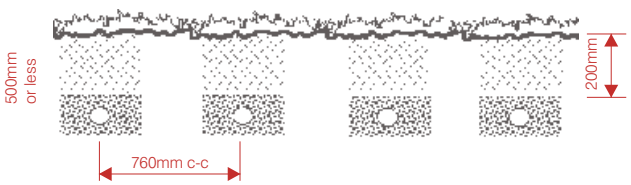
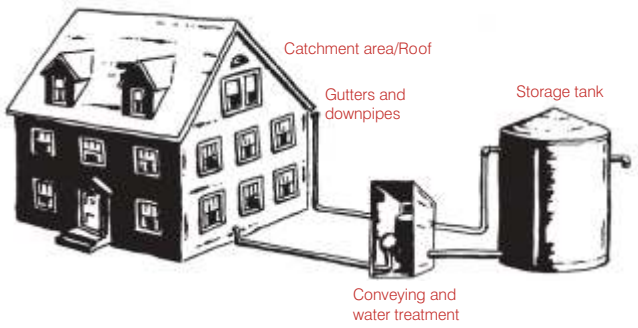


Figure 6.48: Shallow trench section view



5.4 Environmental Considerations

Water

Greywater

The mesotropic and red soil on the site is of favourable texture, structure, drainage and permeability for a greywater system. The site is also not at risk of flooding, which further renders it acceptable for greywater irrigation. However, because the slope of the site is beyond 15%, additional design and engineering work may be needed.

Greywater used for irrigation on this project will be wastewater produced from the health hydro's jet baths, pools and showers, linen washers, and wash hand basins from the project as a whole. The wastewater generated by toilets, kitchen sinks, and dishwashers is called blackwater and can not be used for irrigation. The use of greywater for irrigation requires separate blackwater and greywater waste lines in the building. This is not a difficult task in new construction.

The primary method of greywater irrigation that will be implemented is through sub-surface distribution, or more specifically, shallow trenches.

In this system, greywater flows from the building through pre-treatment and is piped into shallow trenches (pipe placed 200mm deep). These pipes are placed close enough to the surface to feed the plant roots.

The distinction between a conventional septic tank system and a shallow trench subsurface landscape irrigation system occurs in the absorption field design. Conventional septic tank systems are designed for disposal only; therefore, the distribution pipes are usually placed too deep for efficient irrigation and the spacing of the trenches is sometimes too wide. Consequently, irrigation gaps may occur which will need additional watering to prevent a lawn from having a striped effect.

Rainwater harvesting

Rainwater harvesting systems are required by law in new construction in Bermuda and the US Virgin Islands. California offers a tax credit for rainwater harvesting systems and financial incentives are offered in cities in Germany and Japan.

Harvested Rainwater is rainwater that is captured from the roofs of buildings. Harvested rainwater will be used for irrigation purposes, which simplifies the system in terms of conveying and water treatment. Rainwater collection systems can be costly, with the primary expense being the storage tank.

Capacity

- The capacity of a rainwater harvesting system depends on the amount of rainfall, size of collection area, storage capacity, and the demand for water.

Rainwater for Irrigation

The largest need for irrigation water is during the summer when temperatures are at their highest. This also happens to be during the time of highest rainfall and therefore no water will need to be captured and stored prior to summer.

- The size of the storage system may be prohibitive for using rainfall for the sole source of irrigation water in large or water-intensive landscapes, therefore a low water demanding landscape is envisaged.

Materials

Local materials

A goal of sustainable buildings is to integrate the use of local building materials as well as local building sources and practices.

The embodied energy of materials factors in costs related to the transport and distribution of building materials which, in some cases, is costly. Recognizing the continuation of traditional / local building techniques with regional resources helps to foster local economies and can contribute significantly to creating a sense of place.

Local materials such as stone, clay (brick) and wood can be used in most forms of smaller scale construction, such as the buildings envisaged for the project. These materials are labour-intensive rather than energy-intensive and can reduce the life-cycle costs of a building.

A decentralized construction industry could help to recognize and to facilitate the use of local building materials and practices.

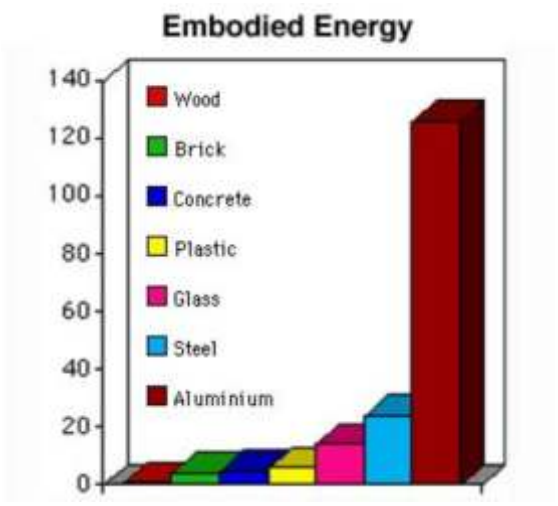


Figure 6.51: Embodied energy of materials

Figure 6.52: Pre-fab modular components

5.4 Environmental Considerations

Embodied energy

Embodied energy is the amount of direct and indirect energy needed to produce a certain type of material. Direct energy is associated with the extraction of natural resources, transportation to the factory, processing the material (molding, forming, etc.), transportation back to the construction site, and placing the processed material in the structure. Indirect energy is associated with the quantity of energy required to manufacture the equipment and materials needed to produce a certain material. Both direct and indirect energy has a proportion of their energy invested in the processed material.

Low embodied energy materials require less direct and indirect energy to extract, transport, process, manufacture, construct, maintain and dispose of. There is a strong correlation between the embodied energy in the extraction and manufacture of common materials and its return to the earth before refinement. In other words, if the material needs very little effort in processing or extracting, it is likely to be a low energy material. Materials such as sand, gravel, wood, concrete, sand-lime brickwork, and lightweight concrete are examples of low energy materials. Plasterboard, common brickwork, cement, mineral fiber insulation, and glass are medium energy materials. High energy materials such as plastics, steel, lead, copper, and aluminum require the most energy output.

Medium energy materials:
- plasterboard 1.0
- brickwork 1.2
- cement 2.2
- mineral fibre insulation 3.9
- glass 6.0

High energy materials:
- plastics 10.0
- steel 10.0
- lead 14.0
- copper 16.0
- aluminum 56.0

Pre-fab modular components:

Prefabricated modular and componentized buildings have been growing in use over the last century. Today, off or on site prefabrication is directed to: a more efficient use of materials; the reduction of energy (production and construction); the reduction of waste; the reduction of construction time on site and; increasing quality control. Economies of scale are achieved through mass production which helps to address housing affordability.

Modular structures are typically factory finished and only need to be connected on site, where they are connected to each other or to other building systems. Componentized structures are made from wall panels, roof trusses, partitions, floor assemblies, mechanical cores, and so on. Single and multi unit dwelling configurations, modular and componentized, are growing in availability as are other building types.

Recycling building products:

Used building materials can be remanufactured and reused in a variety of ways. There are economic and ecological benefits to reusing building materials such as reducing material mass in landfills and reduced extraction and refinement of resources. These include: dimensional lumber and timbers, doors, cabinetry and other wood items: precast and prestressed concrete slabs; steel structural members and cladding; glazing, and; other modular construction elements.

Figure 6.53: Patrick H. Dollard Discovery Health Center, New York state, Catskill Mountains - Guenther 5
The impact of the development on both land and water reserves was minimised as part of a strategy of environmental restoration. Considerations include optimised energy performance, use of recycled materials and intelligent use of resources.

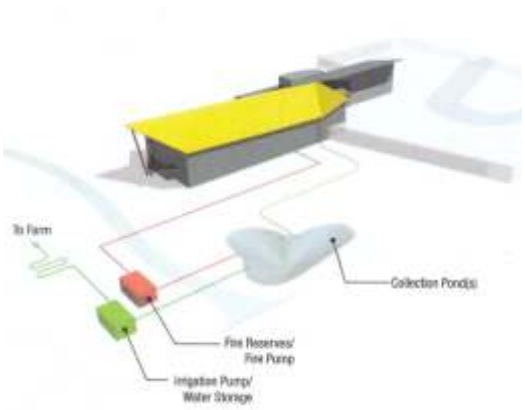


Figure 6.54: Water strategy minimises impact on reserves

Figure 6.55: Geothermal design cuts heating and cooling costs

5.4.4 Recycling and reuse

Compost System

Compost is created by the decomposition of organic matter such as yard waste. Compost systems confine compost so that it can receive air and create suitable temperatures for proper decomposition into fertilizer.

Composting results in:

- saving landfill space
- saving energy for transporting the material
- the creation of a high quality fertilizer at the location where it can be used (thereby again saving energy)
- saving plastic garbage bags

"...a clear correlation between environmental health and patient well-being."

Construction Waste

Construction waste recycling is the separation and recycling of recoverable waste materials generated during construction and remodeling. Packaging, new material scraps and old materials and debris all constitute potentially recoverable materials. In renovation, appliances, masonry materials, doors and windows are recyclable.

4 Tons of waste are typically thrown into the landfill during the construction of a 186m² home.

Materials that can be recycled include:

- Appliances and fixtures
- Brush and Trees
- Cardboard and Paper
- Lumber and Plywood (in reusable form)
- Masonry (in reusable form or as fill)
- Metals
- Plastics - numbered containers, bags and sheeting
- Roofing (in reusable form)
- Windows and Doors

Inorganic waste

A built-in kitchen recycling center is a section of kitchen cabinetry designed to accommodate easy sorting of recyclables. A built-in recycling holding area is a location within the building complex that conveniently holds sorted recyclables until picked up or taken to a collection point.

The primary location in the building complex where refuse is received and collected is the kitchen. This is the best location to initially separate materials that can be recycled. Recycling is more likely if it can be accomplished in a neat convenient manner.

The recycling holding area is the next step for making recycling convenient and routine. After materials have accumulated in the kitchen, they can then be transferred to containers in an area convenient to conveying them to the street for pickup or car to be taken to a collection center.

Guidelines:

Kitchen Recycling Centers

- These are simply components inside a standard section of a kitchen cabinet that can hold multiple containers (usually three) and easily slide in and out or hinge out of the cabinet.
- They require only standard installation skills or procedures.

Recycling Holding Area

- This can be as simple as providing three trash containers with wheels (for locations with curbside pickup) in an assigned section in the kitchen that will not interfere with other activities in the kitchen.

5.5 Cultural Considerations

5.5.1 HISTORICAL

The Weskoppies campus has a very strong historical context that becomes tangible through its built form. The layering of time and event is intensely sensed through the *genius loci* of the campus.

As stated previously the original buildings were built in 1892 and the campus was developed over many years with additional building added as required. The historic buildings included the main administration building and a few historic houses of which some are located in close proximity to the proposed new project.

Addition to the campus should entail principles of conservation.
Policy that should be adopted for the design of any structures on the campus:

- The knowledge that the place is important
- An understanding of the significance of the place
- An understanding of the existing fabric
- The significance should guide decisions
- Design should relate in meaning and memory to the existing

Figure 6.59: Drill Hall, Johannesburg - Michael Hart Architects, Urban Designers cc
The transformation of the hall is an example of a responsible design intervention on a historical site. Elements from the original building was reintroduced, such as the form and the use of red brick, while the transformation of the hall is represented by the use of new materials such as off-shutter concrete and full-height glazing.

Figure 6.60: Administration building, Unisa satellite campus, Tshwane
The administration building is part of a series of additions to the original campus. The historic buildings are also of the Edwardian style. The new buildings continued in the traditional architectural language, but merely simplified certain aspects.

Figure 6.61: Edwardian: Travato, Wynberg, 1898

Figure 6.62: Edwardian: Travato, Wynberg, 1898

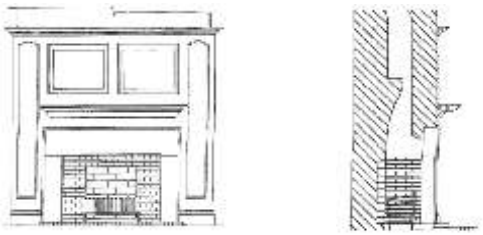


Figure 6.63: Edwardian: Welgelegen, 1899

Figure 6.64: Edwardian: Travato, Wynberg, 1898

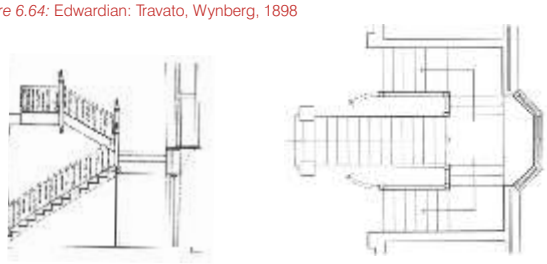


Figure 6.65: Edwardian: Vredenhof House, 1907 (Internal)

During the time when the original buildings of Weskoppies were designed, the British influence dominated. This was around 1806 - 1914. It included Georgian (1806 - 1840), Queen Anne, Regency, early Victorian, mid (1865 - 1883) and late (1884 - 1902) Victorian, Arts and Crafts and Edwardian styles.

Characteristics of the Edwardian style include:

Front doors

Three identifiable trends occur during this period: Neo Baroque, Arts and Crafts and Neo Georgian. The Arts and Crafts influence seemed to be widespread. Fanlights are usually small paned, lead lights, and the timber is 'chunky' or generous in proportion. Around 1900 the influence of Art Nouveau is also in evidence. Here stained glass, incorporating curvilinear organic forms, is also common.

Fireplaces

Chimney pieces were either Art Nouveau influenced or Tudor, so they ranged from being decorated with organically inspired tiles to having much plainer, brick-built English-inspired fittings.

Windows

In Britain, the Tudor revival as a true British style and a reaction to what was perceived to be an overzealous and enthusiastic response to European influences resulted in an increase of exposed timber on the exterior walls. Windows using a simplified, chunky but visually less busy 'surround' developed. The sizing of timber was increased in line with the medieval origin of this style. It was short-lived, however, as it was inevitably overshadowed by the forces of Internationalism and Modernism.

Stairs

During the Edwardian period, the staircase was often not highlighted as a separate element - it became incorporated into the structure. The stringer was closed, and the stairs became visually heavier or more solid, as part of the structure.

5.5 Cultural Considerations

5.5.2 INSTITUTIONAL

The values that an institution embraces should have a strong influence on its form.

The architecture should communicate the institutions nature and place in society. Through the expression of form and space, the occupant should understand the value and purpose of the institution and its facilities.

The community mental healthcare center planned for Weskoppies will embrace a set of values in serving society. Since the center is aimed at preparing people to better cope in society, it would be inherently wrong to remove the sufferer from society and confine them. Thus the emphasis on community involvement.

The fundamental reason for the facility is the belief that the mentally ill are individuals with the potential for growth and development and that mentally ill individuals have the right to self respect and deserve the opportunity of education and training.

The notion of healing, comfort and acceptance could be expressed through the use of warm material and human scale.
The application of high quality materials and design will convey the concept of a community and institution that values the mentally ill and their potential.
The sufferer will understand that he is trusted through an architecture that affords freedom, a concept far removed from the traditional institutional buildings with their window bars

"The institutions are the houses of the inspirators: schools, libraries, laboratories and gymnasia. The architect considers the inspiration before he can accept the dictates of a space desired. He asks himself what is the nature of one that distinguishes itself from another. When he senses the difference, he is in touch with its form. Form inspires design." Louis Kahn

Figure 6.66: Izingolweni clinic and community center, The farm 'Eden', Kwazulu Natal - Llew Bryan Architects and Ashworth Burke Partnership.

The center had to respond to the concept of rural community orientated architecture which revolves around two issues, community participation and utilisation of local labour and resources. The building has an institutional nature, but the architecture is appropriate to the community. The center is simple, versatile and functional and the architectural language vernacular.

Figure 6.67: Umkhumbane community health center, Durban - Robert Johnson Architect and Associates in association with ZAI Consultants cc

The purpose for this building was to create a 'place of wellness'. The architectural interpretation of this concept was that of a 'a shopping mall for health services'. The projection of this image was achieved through the use of industrial building technology.

Figure 6.68: Kotulong community center, Gauteng - cbs architects.

The main aim for the designers was to create a dignified space for terminally ill patients, as well as providing a nurturing environment for orphans. This intention was expressed through the generous use of light, within the buildings, as well as the use of colour and texture.

Figure 6.69: Perbál rehabilitation center for disabled young people, Perbál, Hungary - Támas Karácsony and Péter Janesch.

The center was designed for the accommodation of disabled and mentally retarded people. The basis for the architecture was that of 'poetic' dwelling. This notion was manifested in a complex of buildings that are intimate, but not confining. The center portrays a change in the attitude of charity organizations toward the mentally ill.

5.6 Temporal Considerations

5.6.1 GROWTH

The buildings for the mental health care facility should be of such a nature that it will be able to expand as the need for the facility changes. If the center becomes redundant, it must be designed in such a way that the buildings can be utilized for other functions.

5.6.2 CHANGE

The health care industry is of such a nature that spaces required for facilities change continually as technology develops. It is therefore necessary that the internal spaces be flexible to adapt to changing needs.

5.7 Economic Considerations

5.7.1 LOCAL ECONOMY

Local contractors

80% of the construction is to be carried out by contractors based within a 40km radius of the campus. This will facilitate upliftment of the community and increase employment for workers within the area.

Local building material and component supply

80% of construction materials and components is to be produced from local factories, other building products and components to be supplied within a 200km radius of the site.

Repairs and maintenance

All repairs and maintenance of the building to be carried out by contractors within a 200km radius of the site/local community members.

5.7.2 EFFICIENCY OF USE

Space use

Service areas should not make up more than 20% of total area. Reducing the space required for general service creates more usable space.

Occupancy schedule

The building and all working spaces will be occupied 80% of the time with a minimum of 40 hours a week. Workshop spaces can be used by support groups after hours.

Management of spaces

Spaces will be managed correctly to prevent wasted space. Correct management of the facility is crucial to ensure the effective productivity of the building.

Use of technology

The facility uses simple technology that will not require extensive user manuals. The connections to systems and internet will be operable from one protected server in the secretaries' office.

Disruption and downtime

This will not have a major effect on the facility, but generators will be on stand by.

5.7.3 ADAPTABILITY AND FLEXIBILITY

Vertical dimensions

No floor to ceiling heights are less than 3m, which ensures possible change of accommodation within spaces.

Internal partitions

The use of modular technology and movable divisions between spaces can be considered within the workshop spaces.

Services

Easy access to all services will be provided

5.7.4 ONGOING COST

Maintenance

Specification of materials to be such that maintenance cost are kept to a minimum. All components must be readily available and cost effective to replace.

Cleaning

All cleanable surfaces need to be accessible, such as windows.

Security and care taking

Cost needed for security will be limited through design.

Cost monitoring

Cost for insurance, water usage, energy and sewerage will be monitored and reported to users in order to create an awareness of wasted cost.

5.7.5 CAPITAL COST

Build-ability

The facility will utilize local construction methods in order for the buildings to build easily and cheaply. This will also be possible through simple design.

Construction

The project will be able to be executed in phases.

5.8 Safety Considerations

5.8.1 CRIMINAL

Strategies

Three categories of urban safety are identified and the strategies for designing out crime are the following:

- Awareness of the environment

Designing places with an understandable layout. This means the ability to see and understand the significance of what is around and what is ahead. Through adequate lighting, clear sight lines and elimination of entrapment spots, dangerous situations can be avoided.

- Visibility by others

Designing urban environments where people would not be isolated. This includes the ability to be seen, through reduction of isolation, improvements to the mixture and intensity of land use and the intelligent use of activity generators.

- Finding help

Designing environments in such a manner that people can get assistance from others. Providing clearly marked avenues to assistance (emergency exits) enabling people to escape from a dangerous situation and enabling individuals to get help through improved signage and legible design, are but a few examples of achieving this goal.

5.8.2 PUBLIC SAFETY

To ensure the safety of the general public, the facilities shall comply with Part D of the National Building Regulations.

5.8.3 FIRE

In this facility the fire regulations as set out in Part T of the National Building Regulations will be adhered to.

5.8.4 STRUCTURAL

The buildings will be designed to comply with the deemed-to-satisfy rules contained in Part B of the National Building Regulations.

5.9 Conclusion

The programme informs the project in three ways:

- General principles that outline the broad and conceptual directions design should take. Different facilities will require varying responses and will generate specific designs.
- Facility design guidelines provide conceptual design differences between building types.
- Accommodation and space standards give reference and information in establishing functional uses or environments.

This not only ensures that the design is up to standard, but steers the project to a unique and 'purpose made' solution.

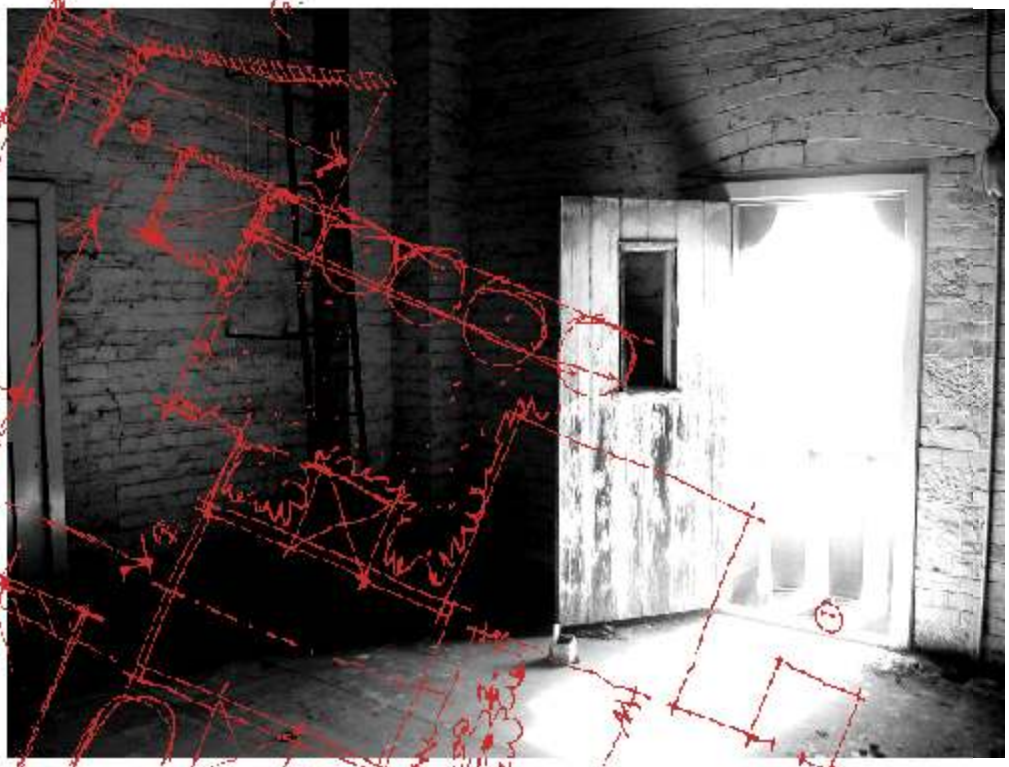


Figure 6.70: Inside the clock tower of the main administration building