

University of Pretoria etd – Rheeder, A (2005)

Recreation and play has direct implications on the health of an individual and the community. The project provides for both as well as a vegetable garden for nutritional needs and health education. The kitchen will provide both the children in the different programs, as well as staff and the community with nutritional meals. The facility is well ventilated and lighted by natural daylight. Strong connections with the outside are established with many areas functioning as transitional spaces between indoors and outdoors. Many spaces, including the meeting hall, day-care facility and after school facility have direct access to the outside.

Health

Part of the support of the community and the child is to create areas where less privileged people can utilize necessary facilities and services which they are unable to afford. The health of the community can be greatly increased by providing exercise and recreation areas, as well as providing health related services such as a nurse and a food scheme. Growing vegetables for supplementing the diet of undernourished kids also plays a role in educating people on the role of adequate nutrition. Creating a healthy environment for the kids and other users is paramount. Buildings should therefore be well ventilated and dry.



Fig 98 : Urban agriculture at Stanza Bopape training centre

The safety of children within the facility is achieved by exercising stringent control over access to such areas as the day-care facility and study area. The Living facility is only accessible through the house mother's unit or through the main entrance. Access to the day-care centre is only possible through the main entrance, while access to the play area is through the day care building only. Building edges which separate 'safe' areas from public areas are impermeable and definite. Thus the 'safe' areas are isolated and contained. Traumatized children need an environment where they can function free from the constraints and influence of the general public. These spaces do not contain hidden nooks, all parts are easily visible to a teacher or caregiver. The different safe areas are separated by clear boundaries. Thus the older children from the after school centre do not have access to the smaller children from the day care centre. The children from the orphanage also have their own separate play area to create a sense of belonging and safety. General safety systems include strong boundary edges, controlled access and protected openings.

Safety

In South Africa safety is of extreme importance, especially when it relates to the well being of children. The children facilities must all be well protected with restricted access. The different components of the facilities, such as a day-care center and after school center should be separate, because older children might be too rough and can hurt smaller kids. National Building Standards should be implemented in all aspects to ensure a safe building.

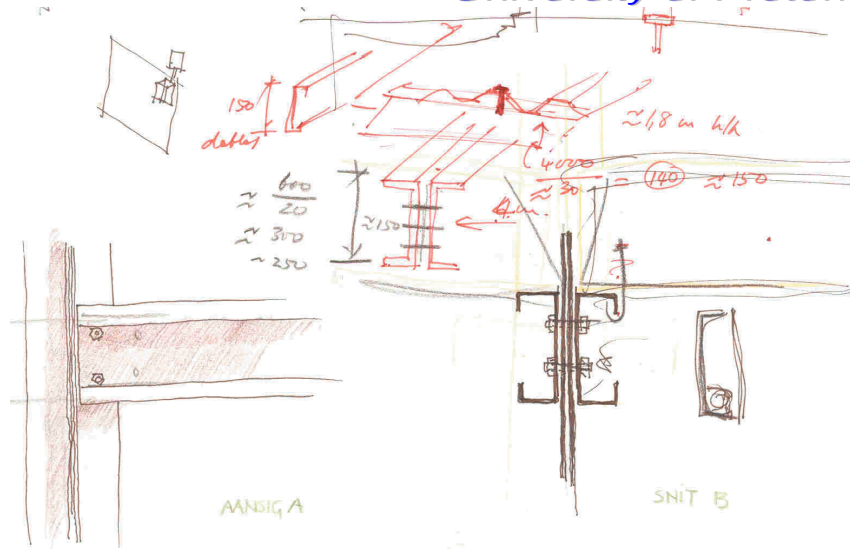


Fig 99 : Design concept sketches for steel structure.

As a rule community facilities do not function with economic gain as primary goal. Through the outsourcing of certain facilities such as the computer lab and through employment of cleaners, teachers, cooks, secretarial staff and by involving the community in the construction process, the centre will boost the local economy. The number of people drawn by the centre as well as the activities will start to generate economic spins-offs within the community. The centre could become an economic node, with small businesses springing up in close proximity. Construction contracts which will be awarded to the local community and local contractors include the manufacture of the steel structural elements, manufacture of the concrete blocks, mosaics and the construction of the concrete block infill walls,

Local Economy

According to Dewar and Uytendobogart, support of the local economy is very important in building a local community.

Utilizing local contractors, building materials and manufactured components will support the local economy and broaden the skills base. In a community facility the ownership which the community feel towards the building also increases if they are part of the process of construction. Using people from the community for maintenance and other services such as cleaning further creates jobs and prosperity inside the community. The transfer of skills is very important and needs to be facilitated.

Materials and finishes are robust and relatively maintenance free. Walls are finished with a pigmented plaster, which negates the need for future repainting. Security is dealt with in the design phase. Elements such as a single entrance and small and protected openings on outside facades combined with high enclosure walls reduce the need for added security systems.

The water catchment and reuse-system allows for a reduction in water bills, while the on site growing of vegetables decreases the amount spent on provisions.

Baseline^{economic}

Ongoing Cost

Community Buildings rarely have a huge budget for maintenance and other ongoing costs. Therefore the building and other structures need to be constructed with materials requiring low maintenance and cleaning.

It should not be necessary to add further security features later, although security is supposed to be dealt with during the initial design.

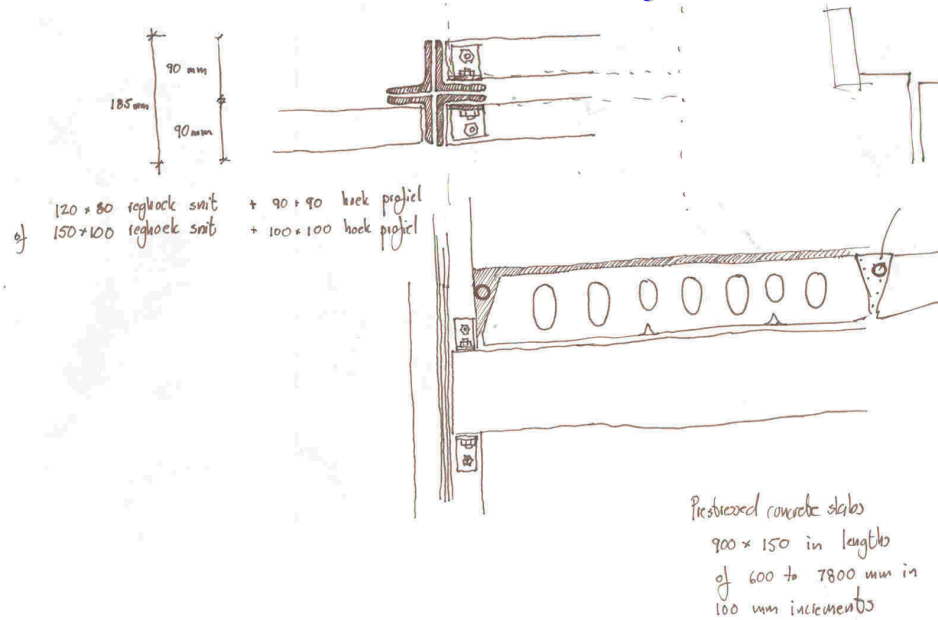
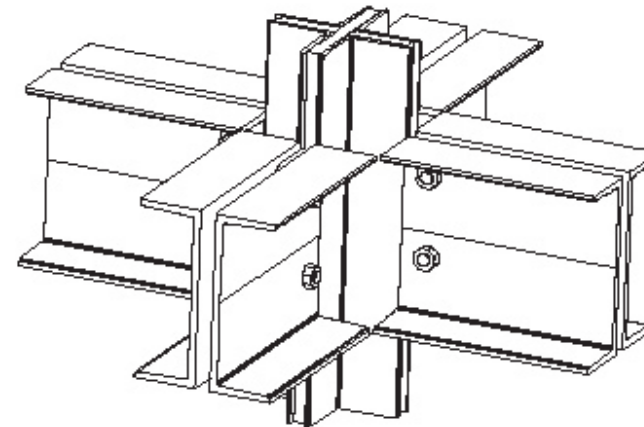


Fig 100 : Structural system indicating columns and slabs

One of the major concerns in this scheme namely flexibility, is addressed in a number of different aspects and systems. The building structure chosen is an support and in fill system consisting of a load bearing steel structure, on a modular grid, with concrete block in fill. One of the main reasons for choosing steel is its flexibility in terms of reuse and redesign. This concept is also applied in first hand mezzanine floor design which consist of prefabricate concrete slabs. Floating concrete slabs are used for foundations to allow for a level load bearing ground floor, which can accommodate a change in loads which might result from redesign.

Adaptability and Flexibility

Internal layouts need to be as flexible as possible and allow the greatest freedom in spatial flexibility were possible. Services like the wet core need to be grouped together, with easy access and maintenance. Electronic and technology services need to be designed for easy maintenance and replacement. Placement of structures on site must allow for extensions to the planned structure



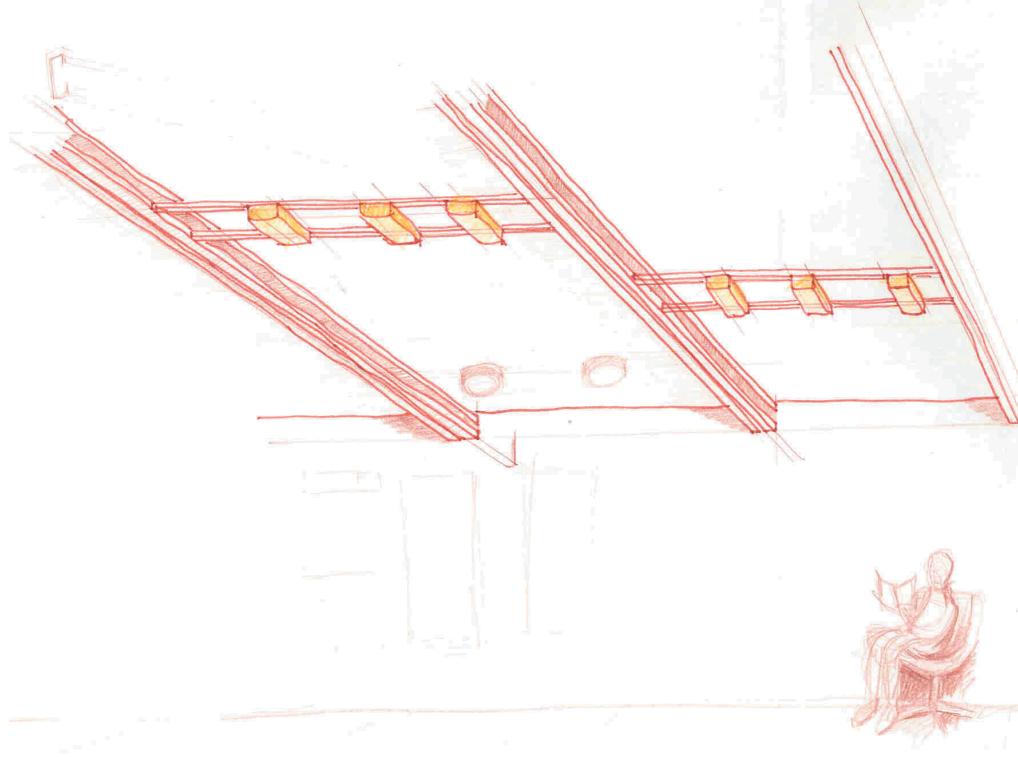
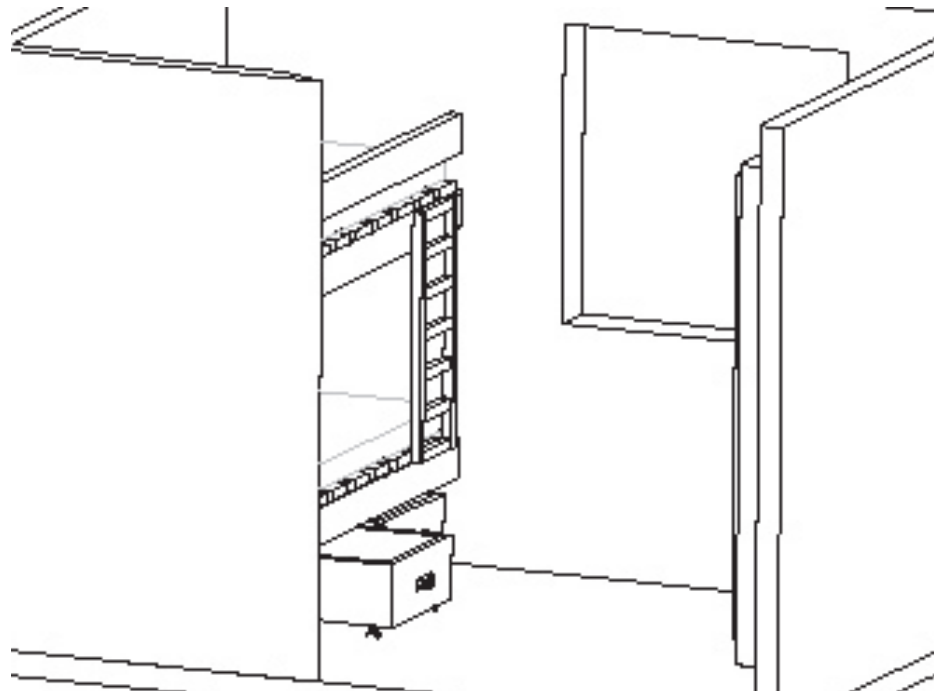


Fig 101 : Artificial lighting system

The electrical system, with special regards to artificial lightning allows for easy access and movement.

The use of spaces was carefully designed to allow for the maximum amount of flexibility in use. The spaces are able to accommodate different functions, which ensures a greater use factor. Storage is a key aspect and it has been considered in the easy and viable reuse of rooms. The main hall, which will accommodate several uses, provides substantial storage area and will hold all loose furniture such as chairs and tables. The vestry, which can be used as an additional class room for the Sunday School or day care contains an alcove for the storage of the vestry furniture, as well as enough cupboard space for both the church and day care class.

The structures are grouped with large open areas in between to allow for extension and future redesign.



The initial capital cost is reduced by utilizing low cost materials such as locally made concrete blocks and by using local labor. The centre is designed to be developed in multiple phases. This allows the managing body to build as funds become available, or as the need increases.

Cost is also reduced by using built in furniture in the orphanage. Clever design can minimize the floor space utilized, without compromising the integrity of the places created. Storage is an important factor. The design for the orphanage bedrooms include storage space underneath the beds. There are no desks in these rooms as it would be a repetition of what is provided in the study centre.

Capital Cost

It is not possible to use an existing structure, as there are almost no structures of permanent construction available. Most houses are temporary shelters constructed of sheet metal, wood and other diverse materials. A few institutions and organizations will share the initial cost. The running cost of the facility will also be shared and generated through different institutions.

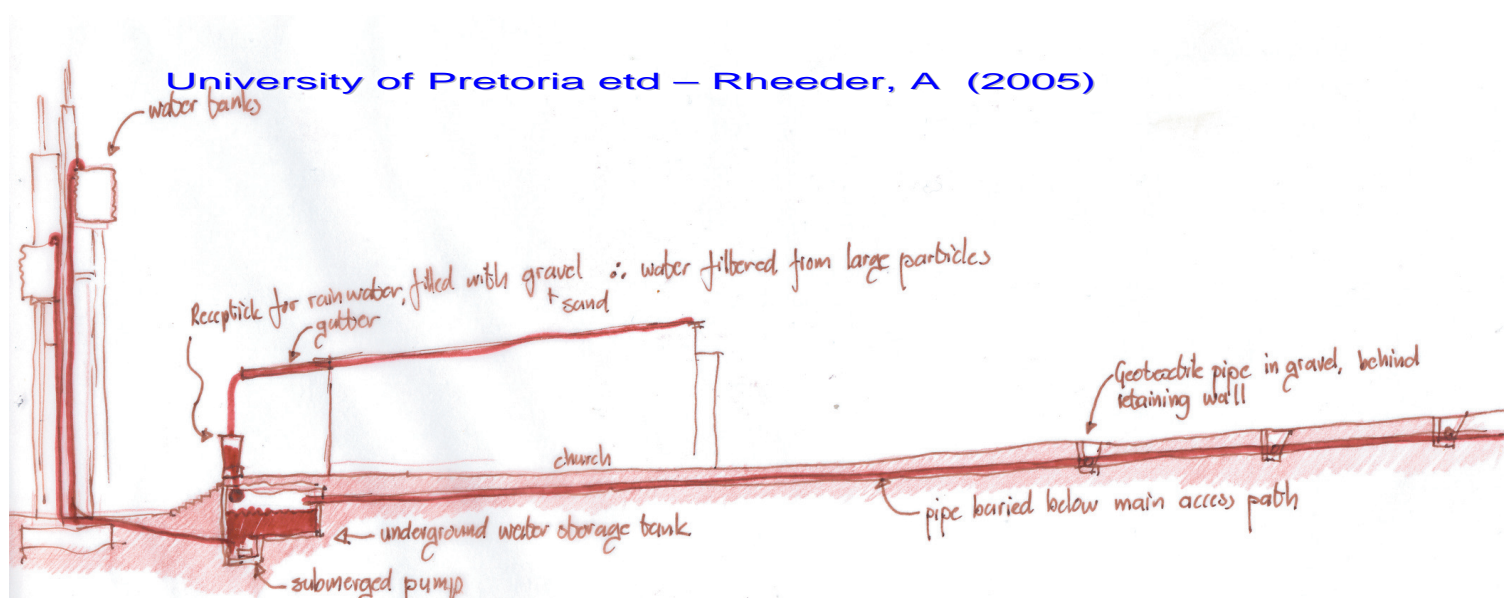


Fig 102 : Water tower.

Water

The site is situated in a water catchments area that drains into a nearby stream and wetland system. It is imperative to reduce the amount of pollutants that end up in the runoff and groundwater. The amount of runoff on site should be contained where possible for future use. The amount of water obtained from the municipality should be reduced by using all alternative sources such as rainwater, water efficient appliances, and by recycling on site where possible.

Water is one of the most precious natural commodities. Current projections indicate that it will be more so in future, it will only become more scarce. The project allows for rainwater to be collected and stored for irrigation use. The storage becomes a visual signature of the scheme to promote awareness of conservation of scarce resources. Elevating the water storage tanks provides a water pressure of 1.5 bar, which is sufficient for irrigation of the gardens through irrigation ditches.

A large amount of water is allowed to seep down to the water table, for the natural catchment area to be supported as a consideration of the people down stream. Through this system the amount of storm water run-off is reduced to a minimum, which both decreases the load on local infrastructure and increases the amount of water which joins the water table. Capturing water during surplus times, such as rainstorms, and by releasing the water during dry times by irrigation of gardens and vegetable patches, helps in maximizing the amount of water that eventually reaches the stream, river and dams.

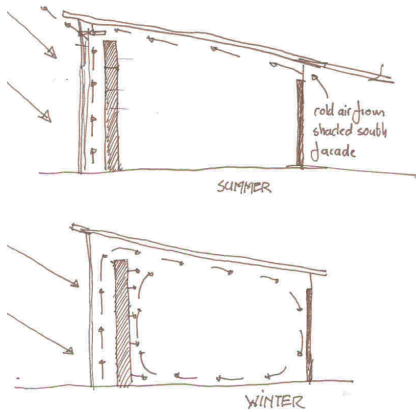


Fig 103 : Trombe wall system

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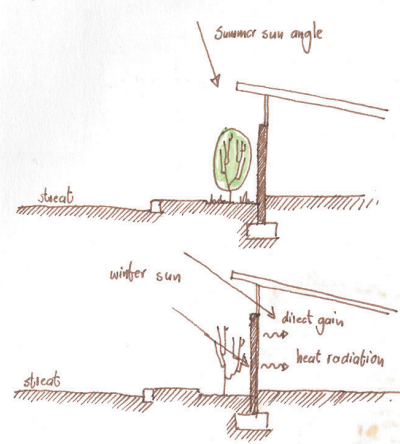


Fig 104 : Passive heating of day care centre

Due to functional and spacial requirements, orientation and location, many of the buildings face east/west. This complicates matters in terms of sun protection during the summer. The orientation is a bonus though when utilized for direct heat gain during the winter. Adjustable elements which allow for this are incorporated into the design. One such example is the revolving, sliding doors on the eastern facade of the meeting hall. A trombe wall is used to raise the indoor winter temperature of the library . Deciduous vegetation is used to screen walls during the summer . These walls act as heating panels during the winter. Being dark in color these walls absorb heat which is radiated towards the interior. The northern facade of the child care centre is an example of this system. Design solutions for the utilization of natural lightning and ventilation are discussed under the occupant comfort section of this document.

Energy

All renewable sources of energy available to the site should be studied to determine if any would be feasible to the project before returning to conventional methods if all else fails. Using energy efficient appliances and equipment will reduce the amount of energy needed. The design should be naturally ventilated and thermally controlled to reduce the amount of energy needed for occupant comfort levels.

Utilizing the maximum of natural light will also reduce energy levels. Once again it is important to have easy access to public transport in order to reduce energy for economic and environmental reasons.

Building waste is reduced by using prefabricated elements and recyclable materials such as steel.

Building rubble such as concrete blocks could be broken up and used as a fill for the underground water collection system.

Organic waste from the kitchen is collected for a compost heap, managed and used by the urban agriculture program. Containers for recyclable materials such as glass, paper and aluminum cans are prominently displayed at the entrance to increase public awareness of recycling, but also to facilitate easy use. The income generated through recycling augments the budget of the centre.

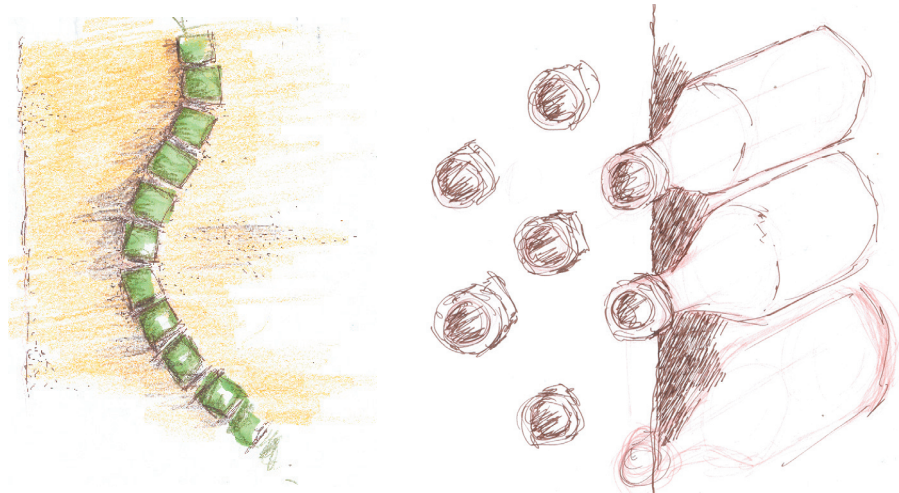
Waste

Only non-hazardous organic waste should be utilized on site. Recyclable waste containers, including glass and paper, will be in visible places to promote and encourage recycling.

See the design solutions as discussed under the energy and occupant comfort sections of this document.

Air

Especially during the winter months cheap sources of heat, including coal, is responsible for a large amount of air pollution. This project will explore alternative methods of heating which does not induce as much air pollution.



Materials and components

The project will strive to locate construction materials that are produced locally, with the least cost to the environment. Elements like photo voltaic sun panels cost more in energy and materials during manufacture, than the little energy that will be gained during the operation of the panel. Thus while they may appear environmental friendly, the embodied energy in the panel has a large impact on the natural environment. It is further important to consider the life span of the material in terms of recycling, reuse and maintenance.

Finishes are integral to the creation of pleasant viable places. The use of pigmented plaster in vibrant earth tones will create a base of warmth. Inlaying mosaic patterns in bright primary colors will increase the tactile and visual experience as well as allowing individual expression and communication. The use of glass bottles in some areas of construction will educate people on the different ways of recycling materials, will provide an interesting light source to the interior of the building, and form a pleasing decorative pattern on the outside walls.

The history of people's parks (discussed in the historic context) was based on a desire to remove rubbish, and to beautify the area's. This practice was lost during the struggle area, as the security forces targeted the parks due to them being named after resistance heroes. This practice will be reintroduced to Mamelodi, by using elements which is traditionally considered to be refuse, like used glass bottles, and broken pottery, as decoration. Sculptures can be created from refuse, and placed in the public open space. These sculptures will become elements of cultural and social expression, contributing to a sense of place and ownership.

From top;
Fig 105 : Mosaic set in pigmented plaster
Fig. 106 : wall constructed from glass bottles
Fig. 107 : Wooden slat screen

The City of Tshwane Metropolitan Municipality recently repealed the by-laws for Creches-cum-Nursery School (of 1973) and the by-laws for Pre-Schools institutions of 1992 with Notice 433/2004, By-laws for Child Care Services viz.

The new by-laws are more elemental than the previous laws. A set of basic requirements are set in terms of the size of class rooms and outdoor play areas, toilets and kitchen areas. A very basic guideline in terms of safety is provided, which mainly requires controlled access, continuous supervision and the separation of children younger than 3 from older kids. Individual storage for children and staff, and a sickroom with a first aid kit is also required. The requirements regarding the after school facility is much the same. Some of these facilities are combined with an office, staff toilet, store room, kitchen and sick room servicing both the day-care facility and the after school centre.

Compliance

The project includes a wide range of activities such as a day-care centre and library, of which the form and function are governed by external bodies and bylaws. Compliance to these requirements is essential in terms of registering the facility, applying for subsidies and leasing the space to the Municipality.