Figure 9.0: Final Presentation, Photograph, Author (2016)
Final Presentation
Common Ground
Finding commonality in an integrative communal educational environment

Site location

Site location in relation to Moreleta Park

Issues

Entities in isolation

Site of contestation

Lack of access to basic amenities

Urban Intentions

Integration of entities

Site of conciliation

Access to basic amenities
Project Intentions

Strengthen currently active learning networks

Community school integrated within environment

Extroverted educational approach

Programmatic Intentions

Spaces of interaction

Urban Conditions

Multifunctionality

Architectural Intentions

A public square becomes a node from which street interact

Spaces of interaction

Urban Conditions

Multifunctionality

Contextual informants

Nodal intersection

Informal trade (Vehicular)

Multifunctional residences: Informal trade (Pedestrian)

Private edge with relation to courtyard

Public edge with relation to courtyard

Figure 9.2: Final Presentation page 2, Author (2016)
Theoretical support and conceptual development

The street as a socially cohesive element

A square expresses a sense of collectivity

The street as a socially interactive element

Learning environment seen as a micro city

Street in Alaska, Mamelodi - Street in Plastic View, Moreleta Park

Learning street

Educational facilities should consist of both streets and squares forming a small city which encourages the greatest amount of social contact between people. (Hertieberger 2008:123)

Programmatic approach

Central gathering space

Community meetings, exhibitions, market, cafe

Theoretical training: drawing, drafting, and chart, teaching space

Practical training: kitchen, workshop space, sewing, carpentry, tables, cabinets

Artisans industry and training comprising of sawing and carpentry

Meeting room, general study area, library, extra study material, computer room

Accommodation: shop, store, community members' homes

Business shop, sale of and support, products made on site

Perspectives and section

This first design proposal was an intuitive reaction to Hertieberger's (2008). It responds to the notion that public meeting spaces can act as a catalyst in order to find common ground between the users of the building and the surrounding community.

The model begins to explore how the free in-between space can be formed by walls and columns, level differences and thresholds, thus spatially exploring how a building frame becomes a space. The model also demonstrates how the edge conditions can be activated in order to draw people onto the site.

Design Iteration 1

Plan

Section

Parti Diagram

Perspectives and section

A rudimentary approach to this iteration was taken as the architectural intent was still being explored and discovered. This proposal explores how the roof can become a defining element. The roof is interpreted as an element which marks and defines space, where interaction can take place between people which relates back to theory on an extended school approach (Hertieberger's 2008).

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Design Iteration 2

In support of considering the facade of the building as a defining element, a relation is drawn to Leffebvre’s (1987) theory on the production of space. Leffebvre (1987) suggests that people shape space naturally, socially and simply by how they use it every day. It is then intended that the architectural form explored defines space and programme well not limiting the extent to which the structure can be inhabited, changed and appropriated by the users. Leffebvre’s (1987) theory of how space can be perceived suggests the notion of the facility as a microcosm of society where people are able to socially interact with one another in society.

Design Iteration 3

Model Development

Accommodation units

Theoretical training

Roof and furnace

South East Elevations

Plan

Accommodation units

Theoretical training

Roof and furnace

South East Elevations
Sefaira, which is a performance-based analysis, was used to pick up problem areas in the design. Sefaira is used to measure interior daylight factors, the energy usage and whether or not it is a cool or heat dominated space. The accommodation sections which face an undulated South East and North West angle were analyzed further.

Daylight factor

- Daylight factor of above 2% and below 5% indicating they are well lit.

Minimising heat loss

- Minimise roof construction heat
- Minimise planing construction heat
- Minimise floor construction heat
- Minimise window areas

Section of accommodation

Section scale 1:50

Coffers' chins were used throughout the design in order to express the design and structural intent, which was to bring light and define space throughout the structure. The idea was that the coffers' chins could be manipulated to shape space.

The critique received highlighted that the concrete coffers' chin walls made the spaces feel unnecessarily heavy and that a lighter weight roof structure should be considered.

Structural Iteration 2

Structural Intent

Social and academic activities take place

Residential and business condition

Meeting Room

Social and academic activities take place

Structural Iteration 3

Social and academic activities take place

Residential and business condition

Meeting Room

A circular hollow section (CHS) light weight roof structure and space frame structure were considered in this iteration. The light weight steel structure allowed more freedom with respect to the design of the roof.

The CHS light weight roof was found to be problematic at junctions where the internal structure needed to be closed from external conditions as thermal bridging would occur. It was proving difficult to fix components, the typical channel joist to the CHS frame structure.

The architectural language of the CHS exploits the idea of repetition and order throughout the facade, this repetition of elements signifies social cohesion. Therefore a roof that acts as a unified element is not needed at the ordered facade condition above this already. The roof becomes an extension of and talks off the facade of the building by expressing the individual components that make up the whole. The concrete roof in the facade, can also become a floor slab for a new level if more space is required.
Systems Calculations

Urban framework strategy

On site strategy

Application

Water

Energy

Water

Energy

Natural Ventilation

Stack Ventilation

Grey water strategy

Water catchment tank

Rainwater harvesting capacity: roof: 245 m³, 90% = 220.5 m³
Parking: 760 m³, 80% = 608 m³
Total: 760 m³, 90% = 110.4 m³

Total catchment area: 1315 m²
Annual rainfall: 1725 mm = 1315 m² = 871 000 L

Grey water:
1/10, 1/20, 1/40 = 400 - 500 L per day
To retain water: 400 L of the grey water per day.

Rain water harvesting tanks:
Required capacity: No. of month x flow rate: 5 x 38 360 L = 192 000 L
(2): Tank size = 8 m x 8 m x 2 m
(3): Tank size = 4 m x 4 m x 3 m

Total electricity demand: 253 kWh:
- Manure: 500 m³/animal
- Amount of people/animals per day: 50
- Manure: 102 x 1 = 0.53 m³
- Kitchen: 0.46 m³

Total water produced daily: 1254 m³/animal
- Kitchen: 3.5 x 4604 = 16 222 L
- Manure: 350 x 0.279 = 102 L

Total gas produced daily: 415 m³
- 100,000 L of gas gives you 9 kWh

Total energy produced per day: 415 x 9 = 3735 kWh
- Thermal energy 90% = 258 kWh
- Mechanical energy 40% = 171 kWh

Grid electricity needed: 253 - 127 = 81 kWh per day

Tank size (7 x 7 x 2 m)
Because water is wet, volume of daily waste: 2.396 x 49 = 110 m³

Table: Water consumption

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<th>Water consumption (L)</th>
<th>No. of persons</th>
<th>Water consumption (L) per day</th>
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<tr>
<td>Personal</td>
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<td></td>
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</tr>
<tr>
<td>Tennis</td>
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<tr>
<td>Shower</td>
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<tr>
<td>Consumption</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Consumption</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SBAT rating:

Accommodation schedule:

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Figure 9.9: Ground floor plan, Author (2016)
**Figure 9.18: Details, Author (2016)**

### 1:10 Detail A
Concrete roof and upstand detail

- Aluminium window wall system, fixed to precast concrete sill. According to specified glazing to comply with SANS 10402-2 and safety glazing requirements.
- Power socket to be used to charge laptops, phones.
- Perforated flush 150mm concrete capping to be cast into concrete columns and run 2m between columns.
- 3:75 mm mortar parapet DPC under window sill.
- Precast concrete window sill.
- 250mm non-load-bearing brick wall.
- 3:75 mm mortar parapet DPC where brick wall and floor slab meet.
- 250mm reinforced concrete slab with power floated floor finish.

### 1:10 Detail C
Detail of public seating

- Aluminium window wall system, fixed to precast concrete sill. According to specified glazing to comply with SANS 10402-2 and safety glazing requirements.
- Precast concrete window sill.
- 0.375 mm mortar parapet DPC under window sill.
- 250mm structural brick wall with plaster and face finish.
- Precast concrete exterior seating as freestanding window seating to sit in front of concrete columns with intermediate concrete support @ every 5m.
- 0.275 mm mortar parapet DPC where brick wall and floor slab meets.
- Finishe concrete slip on parapet rear floor finish on 0.25 parapets 3mm and 25mm toed in on reinforced concrete slab.

### 1:10 Detail D
Parapet balustrade and walkway gutter

- 250mm D45 tube handrail, drawn through.
- 75x100mm GALB elbow, absorption support at intervals of max 1m.
- Mahogany GALB fat bar bolt fixed to concrete and welded to stanchions for support.
- Reinforced concrete up stand with Gyspore acoustite water resistant.
- Powercoat non-slip epoxy resin floor finish on 25mm screed to fall up 0.15 parapet E750 on reinforced concrete slab.
- Pre-cast kerb (0.5m) from brick capping for waterproofing membrane & eaves guttering.
- 550 x 550mm GALB exchange drain overflow, @ 2m intervals to run into concrete wall.

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View of kitchen training/cooking and cafe area
Figure 9.26: Final model, Photograph, Author (2016)
Figure 9.27: Final model, Photograph, Author (2016)
Finding commonality in an integrative communal educational environment
The dissertation concludes that an educational environment can be integrated within a public, mixed-use environment that encourages interaction and engagement to occur between learners and community. By creating an interactive and integrative learning environment, social cohesion and commonality between one another is proposed.

It is essential that citizenship education becomes a key component of the educational curriculum. The dissertation suggests an approach to how this policy can be implemented spatially, this is done by spatially and programmatically addressing and considering three main principles which include: spaces of interaction, the urban condition and multifunctionality. These principles would allow for the facility to merge with and form part of the community, while not limiting education to a formal learning environment but encouraging active community engagement.
References

Chapter 1


Chapter 2

Salat, S. 2011. Cities and Forms: on sustainable Urbanism. Urban Morphology Laboratory of CSTB.

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Chapter 3

Alexander,C. 1971. A pattern Language. Centre for Environmental structure: Berkley


Salat, S. 2011. Cities and Forms: on sustainable Urbanism. Urban Morphology Laboratory of CSTB.


Chapter 4


People opposed to Plastic view and Cemetery view facebook group. N.d. Facebook. [Online]


Salat, S. 2011. Cities and Forms: on sustainable Urbanism. Urban Morphology Laboratory of CSTB.


Chapter 5

Alexander,C. 1971. A pattern Language. Centre for Environmental structure: Berkley


Chapter 6


Chapter 7


Chapter 8


Lan, T. 1999. Space frame structures: Structural engineering handbook. http://3dspaceco.com/public/user_data/shok-ouh/%D9%85%D9%82%D8%A7%D9%84%D8%A7%D8%AA%20%D9%84%D8%A7%D8%A6%D8%8C%D9%86/13.pdf (Accessed 26 September 2016)


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