



## CONCLUSION

In conclusion, this dissertation intended to highlight the great disparities that exist between public and private healthcare delivery sectors in this country despite healthcare being a constitutional right for all people living in South Africa. The overarching research question aimed to investigate how primary healthcare delivery may be reconsidered in order to make healthcare a more accessible amenity to all. However, the solution to this proved to be a much larger programmatic issue than what could be investigated in this dissertation, and so the research process focused in on what is currently being proposed from a governmental approach and from a community driven approach, in order to understand how architecture may then be used to spatially support these proposals.

In order to achieve this, a number of valuable precedent studies into past and present healthcare models, both programmatic and spatial were undertaken. These precedent studies highlighted the importance and advantages of a largely preventative approach to healthcare, where health is defined as not only being free from disease or infirmity, but rather a complete state of mental, physical and social well being. Another important result from these studies was the preference for a de-centralised model as opposed to a hospital centric model in order to effectively spread resources across the healthcare delivery sector. This is what informed the approach adopted throughout the project, namely the consideration of how this de-centralised preventative approach to healthcare may be used to support the larger healthcare model.

The resulting project aimed to reconsider the way healthcare facilities are currently being designed in South Africa, in order to create a physical environment which assists, rather than inhibits the healing process and where healthcare awareness is taken out into the surrounding community, not only provided within the facility walls. The project was considered as a spatial intermediate between the top down and bottom up approaches where not only the visitors to the facility were considered, but also the larger community as a whole passing by the facility in order to design a holistic healing environment for the community at large. Historical healthcare models, and the existing built context and space making principles present in Plastic View and other informal settlements, proved to be viable precedents in informing the architectural language of the project, resulting in a more intimate architecture for the facility.

The main conclusions drawn from the research process in this dissertation, are that the current healthcare models evident in the South African context, are not currently providing an environment that is conducive to healing. Instead, these facilities provide machine like efficient, inhumane environments with the sole aim of delivering curative healthcare often under strained resources which, in poorer communities such as Plastic View, has been proven to make people less healthy.

If this is to change in order to make holistic healthcare a more accessible amenity to all, this model needs to be re-interpreted in order to return to a model which considers the dignity and experience of the user by adopting a primarily preventative approach to healthcare, supplemented by a small scale curative aspect, in order to introduce facilities that are designed to promote healing.

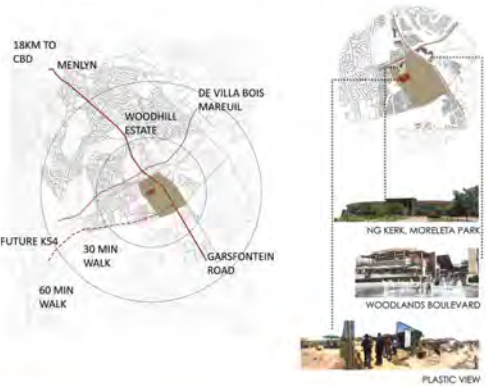
## FINAL EXAM IMAGES

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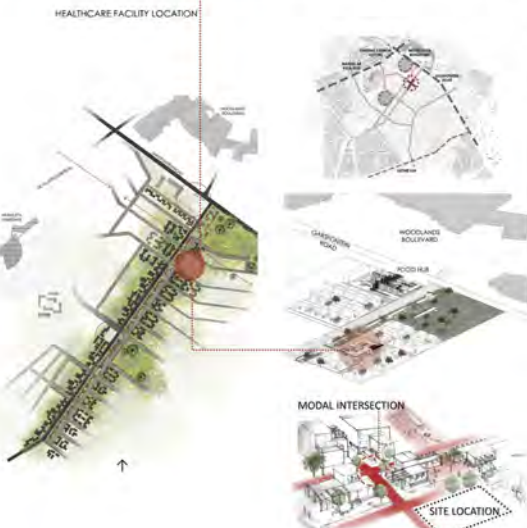


# CONTEXT & SITE LOCATION

AS THE SITE EXISTS TODAY

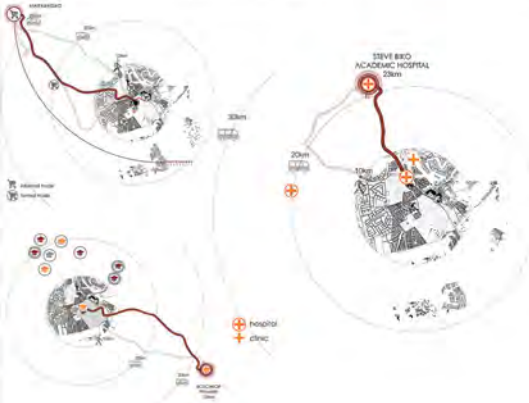


## THE PROPOSED CONCEPTUAL DEVELOPMENT OF THE SITE



# ISSUES

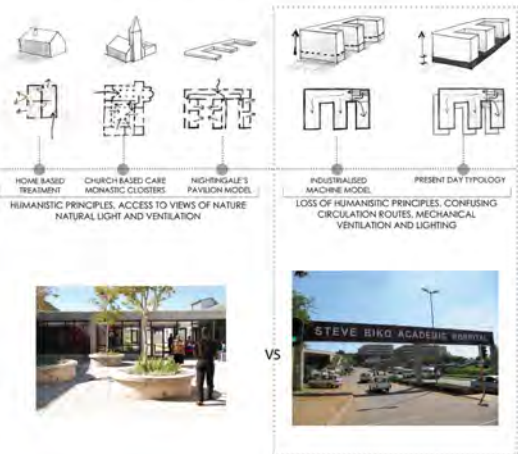
GENERAL ISSUE: ACCESS TO BASIC AMENITIES



URBAN ISSUE: THE FRAGMENTED URBAN FABRIC AND SOCIO-ECONOMIC DIVIDE



ARCHITECTURAL ISSUE: THE ROLE OF ARCHITECTURE IN THE HEALING PROCESS



# INTENTIONS

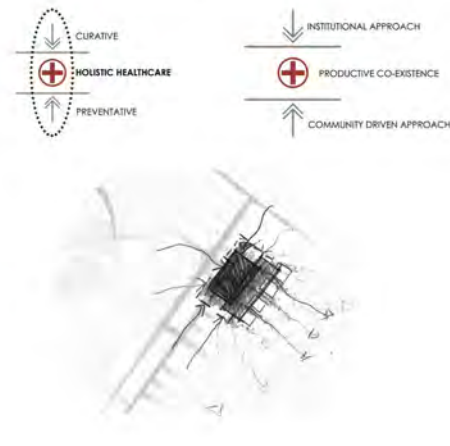
URBAN INTENTION: STITCHING THE URBAN FABRIC AND OVERCOMING THE SOCIO-ECONOMIC DIVIDE



GENERAL INTENTION: IMPROVE ACCESS TO BASIC AMENITIES

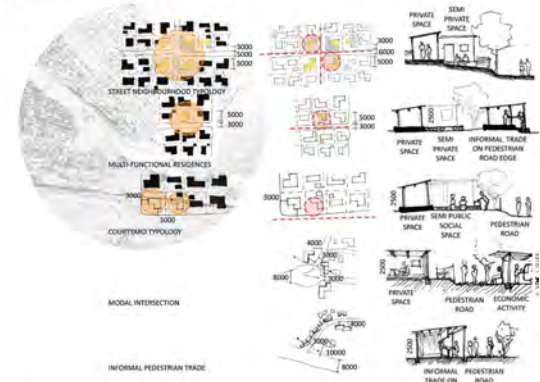


ARCHITECTURAL INTENTION: A HOLISTIC HEALING FACILITY

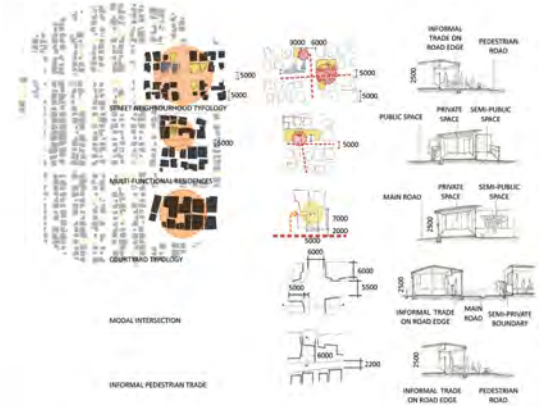


# SPATIAL PRECEDENTS

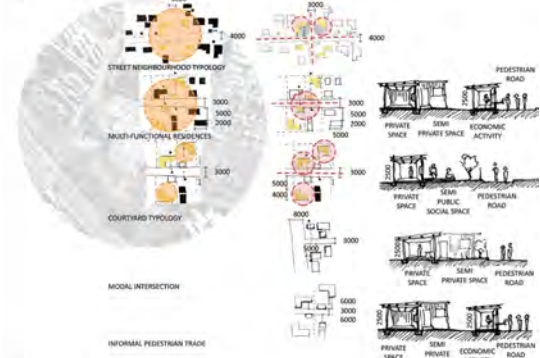
ALASKA



PLASTIC VIEW



SLOVO PARK



CONCLUSIONS

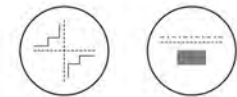


Figure 80. Final exam presentation pages (Author 2016).



# STRUCTURAL PRECEDENT



BUILT EXAMPLES IN PLASTIC VIEW



EXPOSED

HIDDEN



STRUCTURE EXPLODED

HIDDEN EXPOSED

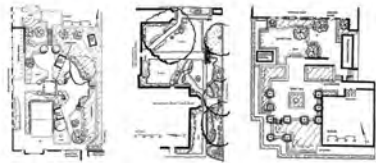
## CONCLUSIONS



# THEORY



## THE HEALING POWER OF PLACE AND SPACE



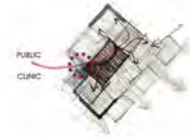
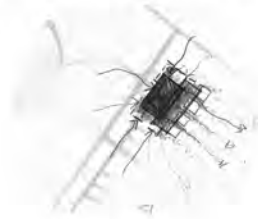
## THE SIDEWALK EXPERIENCE



## CONCLUSIONS



# DIAGRAMMATIC DEVELOPMENT



# EXPLANATORY DIAGRAMS

## MOVEMENT AND ACCESS



## WAYFINDING



## PUBLIC AND PRIVATE THRESHOLDS





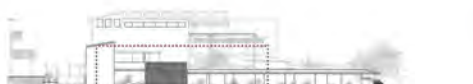
THESE INTENTIONS WERE FULLY ACTIVE FACILITY IN THE PUBLIC REALM WHERE POSSIBLE, AND A COMMUNITY AND USER ORIENTED APPROACH TO PREVENTATIVE HEALTHCARE, FOR VISITORS TO THE FACILITY AS WELL AS THE LARGER COMMUNITY.



THE NORTHERN FACADE IS THE MOST INTERACTIVE WITH THE PUBLIC PASSING BY AND SITUATED ADJACENT TO THE PEDESTRIAN BOULEVARD ACROSS THE SITE THEREFORE ALL RESEARCH CONCLUSIONS WERE CONSIDERED IN THIS ITERATION. DESPITE THESE INTENTIONS, THE RESULT IN THIS ITERATION WAS A VERY UNWELCOMING, NON-INTERACTIVE FACADE.



THIS FACADE WAS INTENDED TO SCREEN THE USERS FROM THE SERVICE SIDE OF THE FACILITY. IT IS THE LEAST INTERACTIVE WITH THE PUBLIC PASSING BY. THE RESULT IN THIS ITERATION PRODUCED A VERY REPETITIVE FACADE WHICH DID NOT SUPPORT THE INITIAL INTENTIONS OF THE PROJECT.



THIS FACADE SCREENS THE SEMI PRIVATE CLINIC ACTIVITIES FROM THE QUIETER PEDESTRIAN STREET ADJACENT TO IT. THEREFORE A NUMBER OF THRESHOLDS AND EXPERIENCES WERE CONSIDERED FOR BOTH THE INHABITANTS OF THE FACILITY AND THE PASSERBYS. THE RESULT AGAIN WAS A VERY INSTITUTIONAL, REPETITIVE FACADE.



THIS FACADE IS THE NEXT MOST INTERACTIVE WITH THE PUBLIC PASSING BY AND ENTERING THE BUILDING AND SO THE SIDEWALK EXPERIENCE WAS A VERY INFLUENTIAL DESIGN GUIDANCE IN THIS INSTANCE. THE RESULT HOWEVER DID NOT SUPPORT THESE INTENTIONS.



THESE WERE THEN ITERATED BY CONSIDERING THE STRUCTURAL PRECEDENT CONCLUSIONS FROM PLASTIC VIEW IN THE FACADE DESIGN. HERE THE STRUCTURE ALTERNATES BETWEEN BEING HIDDEN AND EXPOSED



THIS PROCESS WAS UNDERTAKEN FOR EVERY FACADE OF THE FACILITY.



THE PURPOSE OF THIS WAS TO BETTER RELATE THE DESIGN TO THE INITIAL INTENTIONS OF THE DISSERTATION.



THESE INTENTIONS WERE A FULLY ACTIVE FACILITY IN THE PUBLIC REALM WHERE POSSIBLE, AND A COMMUNITY AND USER ORIENTED APPROACH TO PREVENTATIVE HEALTHCARE, FOR VISITORS TO THE FACILITY AS WELL AS THE LARGER COMMUNITY.



ON THE NORTHERN FACADE THE PUBLIC ENTRANCE AREA OF THE FACILITY BECAME MORE WELCOMING, INTERACTIVE AND VISUALLY ACCESSIBLE. THE CLINIC SIDE OF THE FACADE PROVIDES THE NECESSARY PRIVACY WHILST ALSO PROVIDING A VISUALLY INTERACTIVE FACADE FOR THE PUBLIC PASSING BY.



THE SOUTHERN FACADE STILL SCREENS THE USERS FROM THE SERVICE AREA OF THE FACILITY HOWEVER THE OVERLAY OF STRUCTURE BEING HIDDEN AND EXPOSED PRODUCED A LESS REPETITIVE AND INSTITUTIONAL AESTHETIC.



BY EXPLORING A NUMBER OF DIFFERENT APPROACHES TO THRESHOLDS AND SIDEWALK EXPERIENCE, THIS FACADE HIGHLIGHTS THE NECESSARY ELEMENTS TO BE RECOGNISED BY THE PUBLIC WHILST PROVIDING THE NECESSARY PRIVACY FOR THE CLINIC SIDE OF THE FACADE.



THE CONSIDERATION OF VISUAL AND PHYSICAL EASE OF ACCESS BY THE PUBLIC PASSING BY ON THIS FACADE LED TO THE DEVELOPMENT OF A FACADE WHICH LENDS ITSELF TO THE INITIAL INTENTIONS OF THE DISSERTATION.

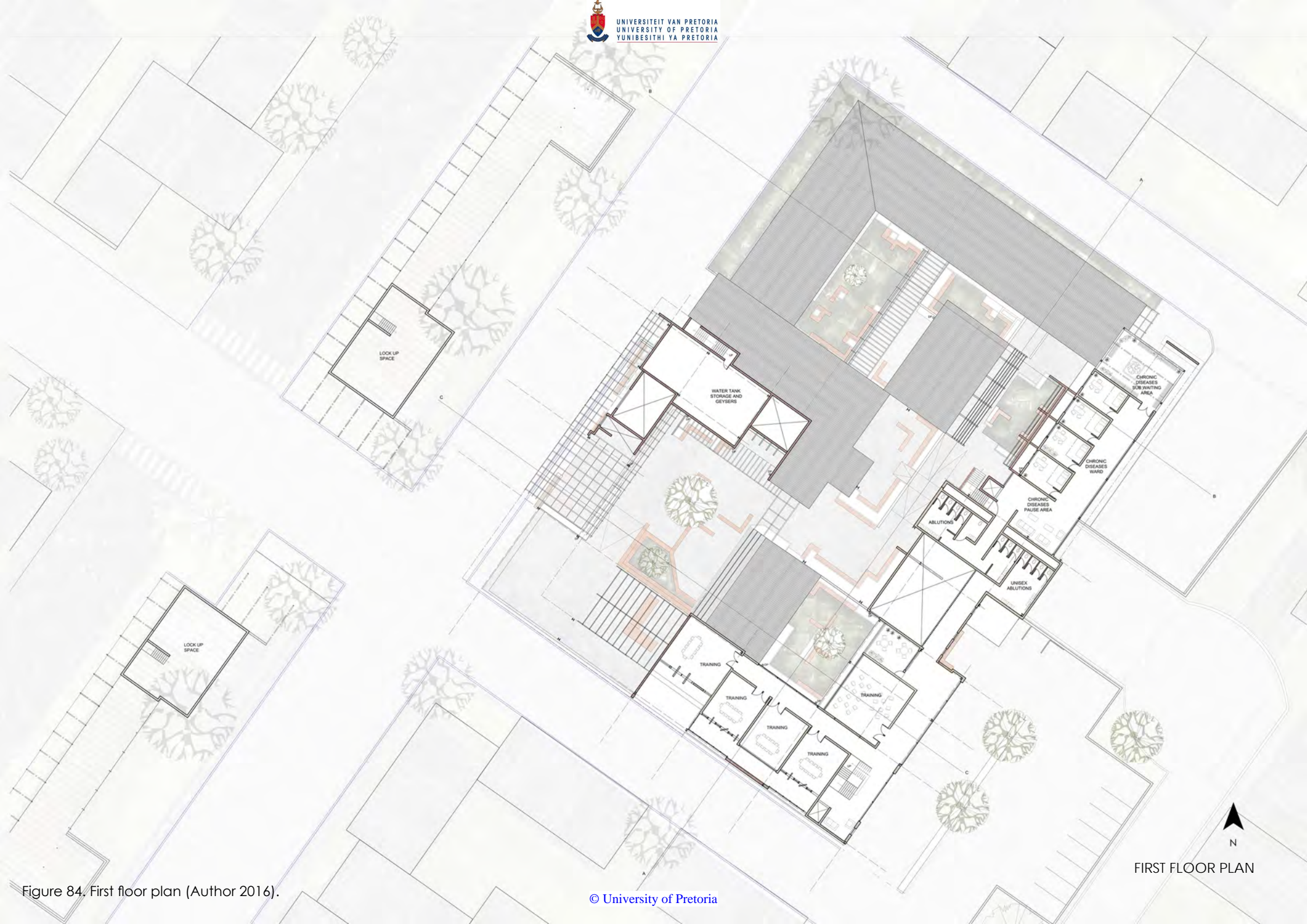






Figure 83. Ground floor plan (Author 2016).





FIRST FLOOR PLAN

Figure 84. First floor plan (Author 2016).





SECOND FLOOR PLAN

Figure 85. Second floor plan (Author 2016).





Figure 86. Section A-A (Author 2016).







Figure 87. Section B-B (Author 2016).





SECTION B-B



Figure 88. Section C-C (Author 2016).





SECTION C-C





NORTH ELEVATION



SOUTH ELEVATION



EAST ELEVATION



WEST ELEVATION

Figure 89. Elevations (Author 2016).



# TECTONIC & STRUCTURAL INTENTION

# WALL SECTION

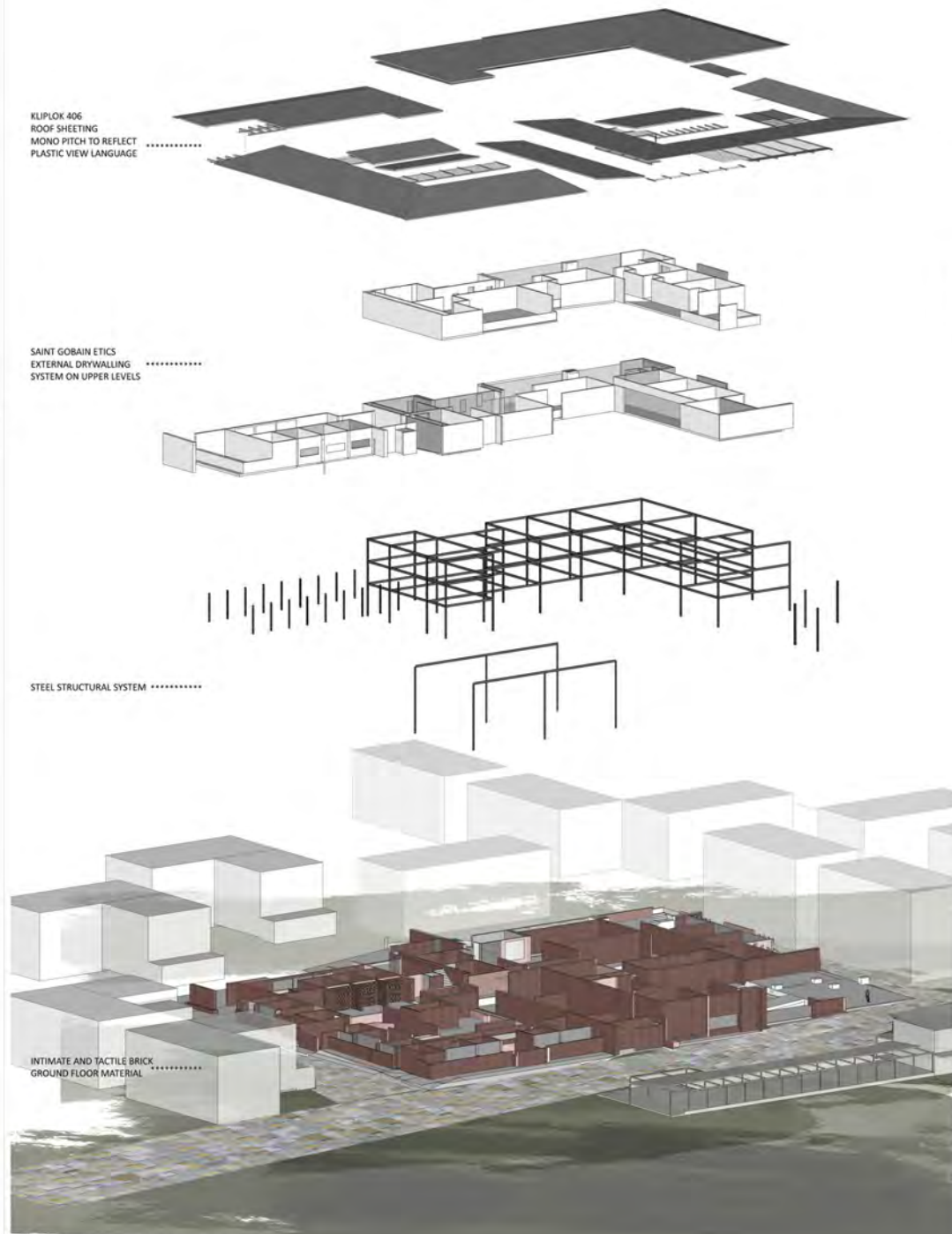
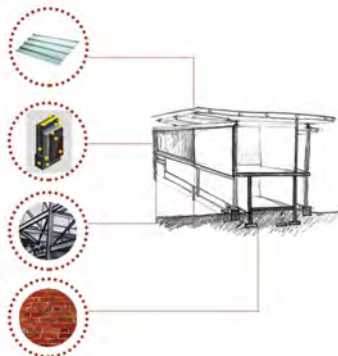
## TECTONIC CONCEPT



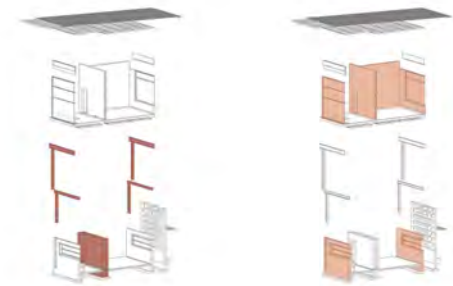
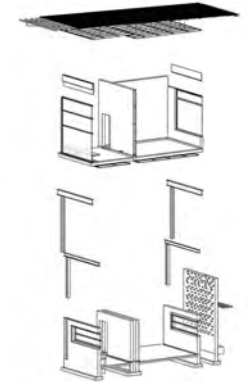
## STRUCTURAL INTENTION



## TECTONIC INTENTION

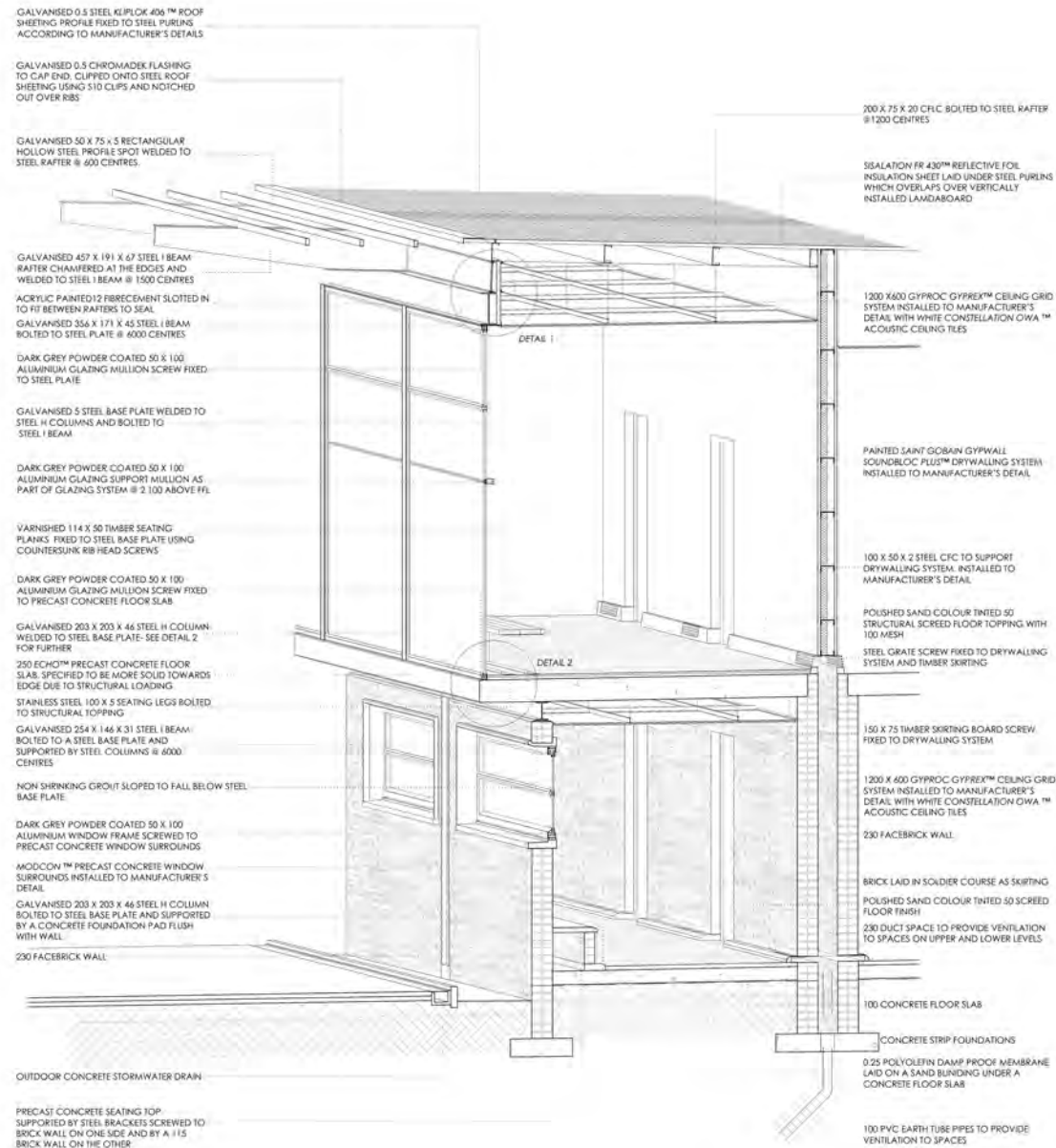


SECTION THROUGH CHRONIC DISEASES AND EMERGENCY WING



STRUCTURE

INFILL





GALVANISED 0.5 STEEL KLIPLOK 406™ ROOF SHEETING PROFILE FIXED TO STEEL PURLINS ACCORDING TO MANUFACTURER'S DETAILS

GALVANISED 0.5 CHROMADEK FLASHING TO CAP END, CLIPPED ONTO STEEL ROOF SHEETING USING S10 CLIPS AND NOTCHED OUT OVER RIBS

STEEL RAFTER

GALVANISED 200 X 75 X 20 CFLC BOLTED TO STEEL RAFTER @1200 CENTRES

ACRYLIC PAINTED 12 FIBRECEMENT SLOTTED IN TO FIT BETWEEN RAFTERS TO SEAL

GALVANISED 10 X 10 SOLID STEEL SECTION SPOT WELDED TO STEEL RAFTER FLANGE

GALVANISED 25 X 25 CF STEEL ANGLE SECTION SPOT WELDED TO STEEL RAFTER FLANGE

GALVANISED 356 X 171 X 45 STEEL I BEAM BOLTED TO STEEL PLATES ABOVE AND BELOW @ 6000 CENTRES

GALVANISED 5 STEEL BASE PLATE BOLTED TO STEEL H COLUMNS AND STEEL I BEAM

MATT BLACK POWDER COATED 50 X 100 ALUMINIUM GLAZING MULLION SCREW FIXED TO STEEL PLATE

GALVANISED 203 X 203 X 3500 STEEL H COLUMN, BOLTED TO STEEL BASE PLATE AND CONCRETE FLOOR SLAB @ 6000 CENTRES

POLYCLOSURE FIXED TO SEAL

SISALATION FR 430™ REFLECTIVE FOIL INSULATION SHEET LAID UNDER STEEL PURLINS WHICH OVERLAPS OVER VERTICALLY INSTALLED LAMDABOARD

25 X 25 CF STEEL ANGLE SECTION SPOT WELDED TO STEEL RAFTER FLANGE

10 X 10 SOLID STEEL SECTION SPOT WELDED TO STEEL RAFTER FLANGE

40 X 40 STEEL L WELDED TO STEEL RAFTER

25 X 25 CF STEEL ANGLE SECTION SPOT WELDED TO STEEL RAFTER AND SCREW FIXED TO LAMDABOARD

50 LAMDABOARD INSULATION SCREW FIXED TO STEEL ANGLES AND PURLIN

GALVANISED 50 X 25 CF STEEL UNEQUAL ANGLE SCREW FIXED TO STEEL UNEQUAL ANGLE

GALVANISED 50 X 25 CF STEEL UNEQUAL ANGLE SPOT WELDED TO STEEL BASE PLATE

1200 X 600 GYPROC GYPREX™ CEILING GRID SYSTEM INSTALLED TO MANUFACTURER'S DETAIL WITH WHITE CONSTELLATION OWA™ ACOUSTIC CEILING TILES

GALVANISED 203 X 203 X 46 STEEL H COLUMN  
BOLTED TO STEEL BASE PLATE AND PRECAST  
CONCRETE FLOOR

MATT BLACK POWDER COATED 50 X 100  
ALUMINIUM GLAZING MULLION SCREW  
FIXED TO CONCRETE FLOOR SLAB

GALVANISED STEEL BASE PLATE TO SUPPORT  
STEEL COLUMN, FIXED WITH ANCHOR  
THREADS THAT ARE DRILLED INTO PRECAST  
CONCRETE FLOOR SLAB AND EPOXY FILLED

250 ECHO™ PRECAST CONCRETE FLOOR  
SLAB. SPECIFIED TO BE MORE SOLID TOWARDS  
EDGE DUE TO STRUCTURAL LOADING

POLISHED SAND COLOUR TINTED 50  
STRUCTURAL SCREED FLOOR TOPPING WITH  
100 MESH

GALVANISED 254 X 146 X 31 STEEL I BEAM  
BOLTED TO A STEEL BASE PLATE AND  
STEEL COLUMNS @ 6000 CENTRES

NON SHRINKING GROUT SLOPED TO FALL BELOW STEEL  
BASE PLATE

1200 X 600 GYPROC GYPREX™  
SUSPENDED CEILING SYSTEM, WITH  
ALUMINIUM SHADOW SECTION TO  
MANUFACTURER'S DETAIL

230 BRICK INFILL WALL

VARNISHED 114 X 50 TIMBER SEATING  
PLANKS FIXED TO STEEL BASE PLATE USING  
COUNTERSUNK RIB-HEAD SCREWS

STAINLESS STEEL SEATING LEGS BOLTED TO  
STRUCTURAL TOPPING

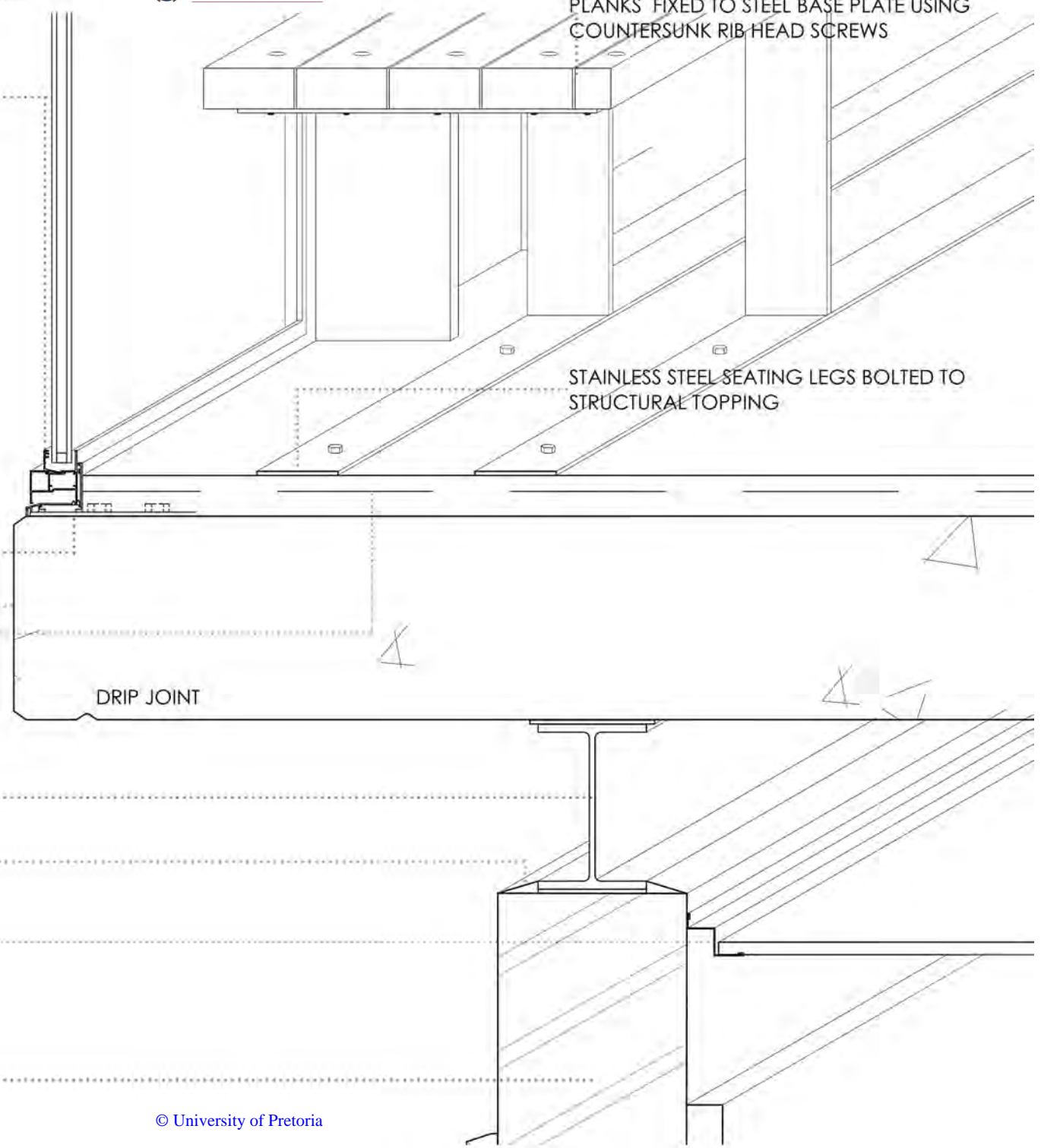
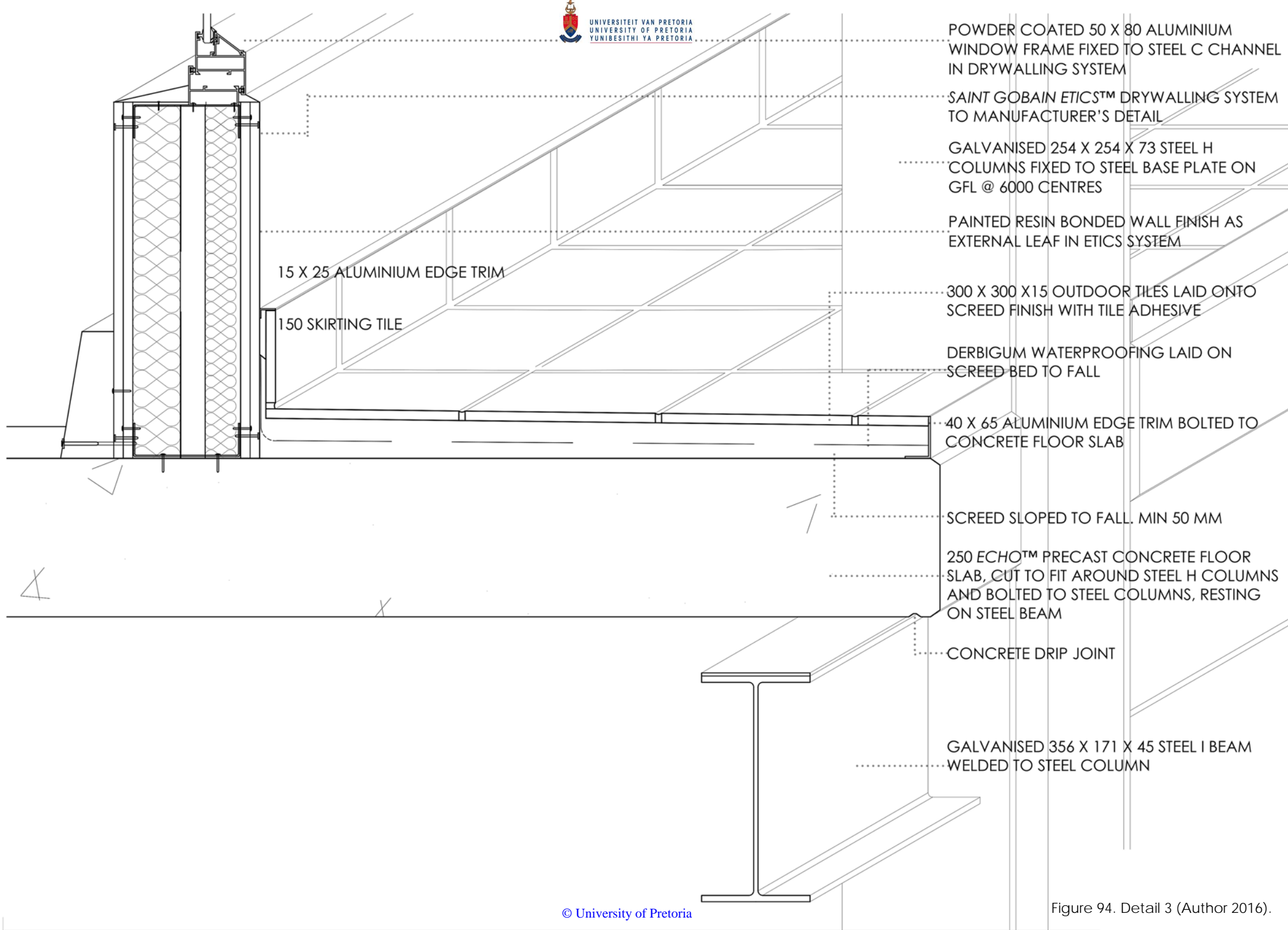


Figure 93. Detail 2 (Author 2016).





POWDER COATED 50 X 80 ALUMINIUM WINDOW FRAME FIXED TO STEEL C CHANNEL IN DRYWALLING SYSTEM

SAINT GOBAIN ETICS™ DRYWALLING SYSTEM TO MANUFACTURER'S DETAIL

GALVANISED 254 X 254 X 73 STEEL H COLUMNS FIXED TO STEEL BASE PLATE ON GFL @ 6000 CENTRES

PAINTED RESIN BONDED WALL FINISH AS EXTERNAL LEAF IN ETICS SYSTEM

15 X 25 ALUMINIUM EDGE TRIM

150 SKIRTING TILE

300 X 300 X 15 OUTDOOR TILES LAID ONTO SCREED FINISH WITH TILE ADHESIVE

DERBIGUM WATERPROOFING LAID ON SCREED BED TO FALL

40 X 65 ALUMINIUM EDGE TRIM BOLTED TO CONCRETE FLOOR SLAB

SCREED SLOPED TO FALL. MIN 50 MM

250 ECHO™ PRECAST CONCRETE FLOOR SLAB, CUT TO FIT AROUND STEEL H COLUMNS AND BOLTED TO STEEL COLUMNS, RESTING ON STEEL BEAM

CONCRETE DRIP JOINT

GALVANISED 356 X 171 X 45 STEEL I BEAM WELDED TO STEEL COLUMN

# SOLAR STUDY

# DAYLIGHTING



UNIVERSITEIT VAN PRETORIA  
UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA

# VENTILATION



**CONCLUSIONS:**

WHILST THE SHADE IS WELCOME IN SUMMER, THE OVER SHADED AREAS IN WINTER, AS SHOWN OPPOSITE, MAY BECOME TOO COOL. THE USE OF THERMAL MASSING SUCH AS RETAINING WALLS IS INTENDED TO PROVIDE WARMTH IN SUCH SPACES

STRATEGIC PLANTING OF SEASONAL VEGETATION IN COURTYARDS TO PROVIDE REQUIRED SHADE IN OVER HEATED COURTYARDS



**ITERATION 1**

- THE WINDOWS ON THE NORTHERN FACADE OF THIS SECTION PROVED TO BE TOO SMALL WITH TOO MUCH SHADING.
- THE SOUTHERN FACADE WAS OVERLIT BY WINDOWS THAT WERE TOO LARGE.

**ITERATION 2**

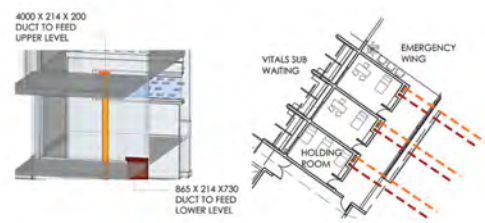
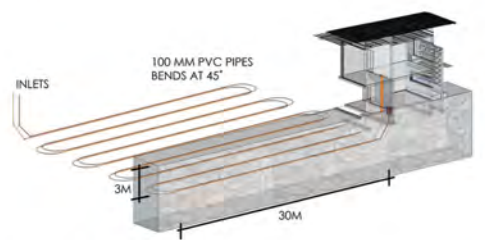
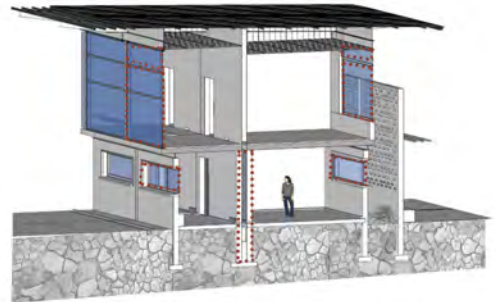
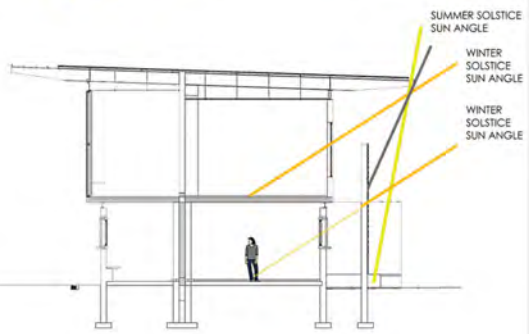
- THE WINDOWS ON THE NORTHERN FACADE OF THIS SECTION WERE ALSO TOO SMALL WITH TOO MUCH SHADING.
- THE SOUTHERN FACADE EXHIBITED BETTER LIGHTING QUALITIES WITH THIS ITERATION.

**ITERATION 3**

- THE WINDOWS ON THE NORTHERN FACADE ARE STILL TOO SMALL WITH TOO MUCH SHADING.
- THE SOUTHERN FACADE EXHIBITED BETTER LIGHTING QUALITIES WITH THIS ITERATION AND A BETTER SPACE.

**ITERATION 4**

- IN THIS FINAL ITERATION, THE WINDOW SIZES ON THE NORTHERN FACADE WERE INCREASED AND THE SHADING WALL LOWERED.
- ON THE SOUTHERN SIDE THE WINDOW PANELS WERE CONSOLIDATED.



Principle used for calculating the duct size required to adequately ventilate the required spaces. (ASHRAE 2011)

Equation: Quantity of air (litre/s) of habitable space x Air change rate/person Floor occupation

Air change rate for consultation rooms: 11.5 l/s (ASHRAE 2011: 3)

(Note: As no consultation room was fitted, the space with a similar health, environmental quality was chosen for this calculation, namely a primary prep room)

1. Consultation room on Ground floor level: Quantity of air (litre/s) = 47.3 l/s  
therefore Duct Size = 865 deep x 214 wide x 365 long

2. Consultation room on first floor level: Quantity of air (litre/s) = 12.5 l/s  
therefore Duct Size = 4000 deep x 214 wide x 100 long

3. As the duct needs to serve the circulation space as well, which is half the width of the consultation rooms calculated above, the duct size for these spaces together may be seen to be 1.5 times the amount calculated in the equations above.

Therefore: Duct size for the first floor level = 4000 deep x 214 wide x 200 long  
Duct size for the ground floor level = 865 deep x 214 wide x 700 long

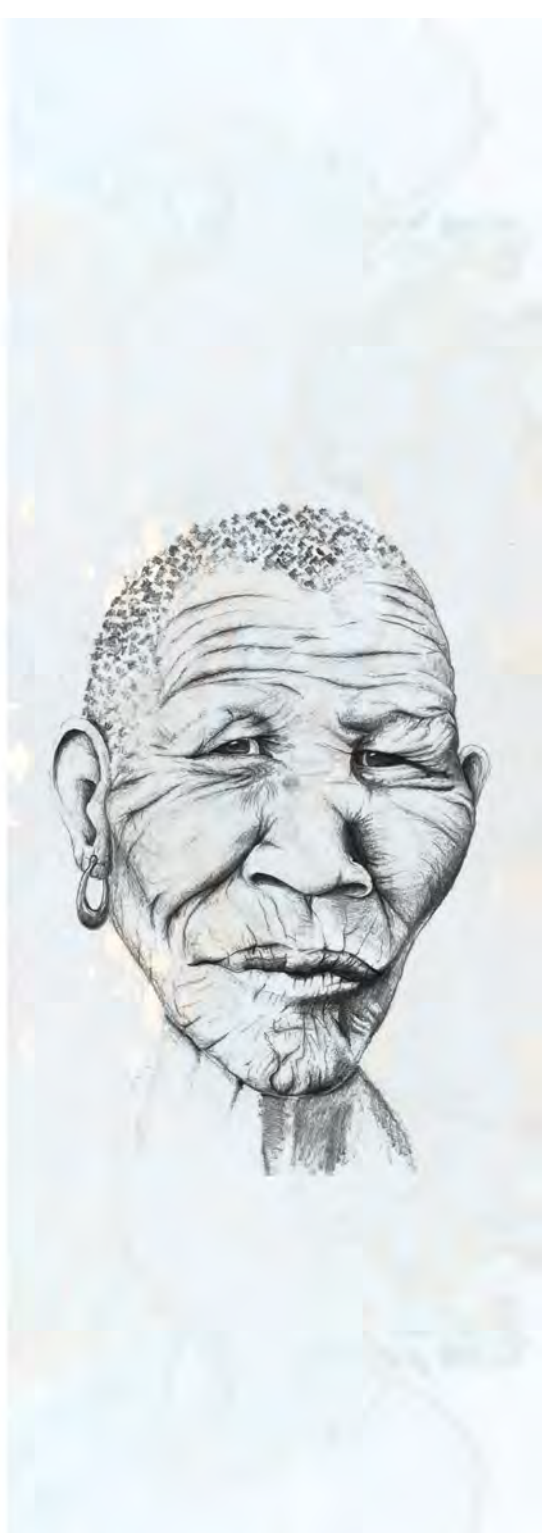
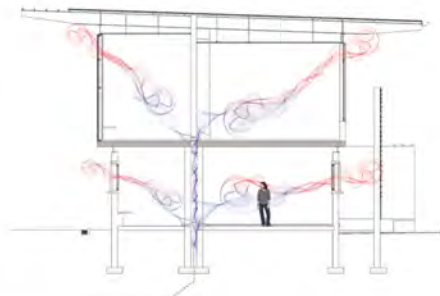


Figure 95. Final exam presentation pages (Author 2016).



# FRAMEWORK SYSTEMS

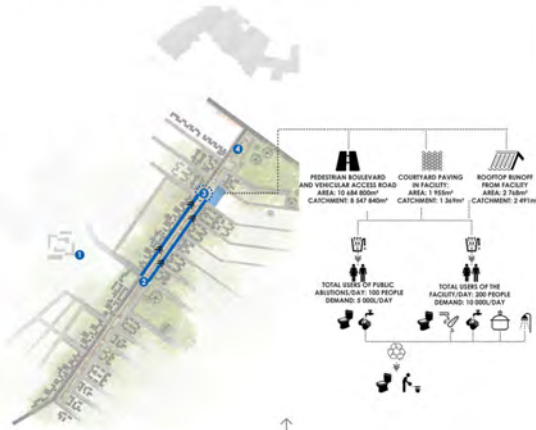
PRECEDENT: COLLABORATIVE SHARING OF RESOURCES AS PRESENT IN PLASTIC VIEW



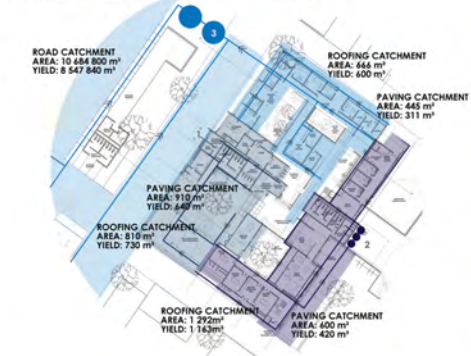
# FACILITY SYSTEM



## WATER COLLECTION AND SYSTEMS AT PRECINCT SCALE



## WATER COLLECTION AND SYSTEMS AT BUILDING SCALE



## WASTE COLLECTION AND ELECTRICITY PRODUCTION SYSTEMS AT PRECINCT SCALE



## WASTE COLLECTION AND ELECTRICITY PRODUCTION SYSTEMS AND LAYOUT AT BUILDING SCALE



Figure 96. Final exam presentation pages (Author 2016).







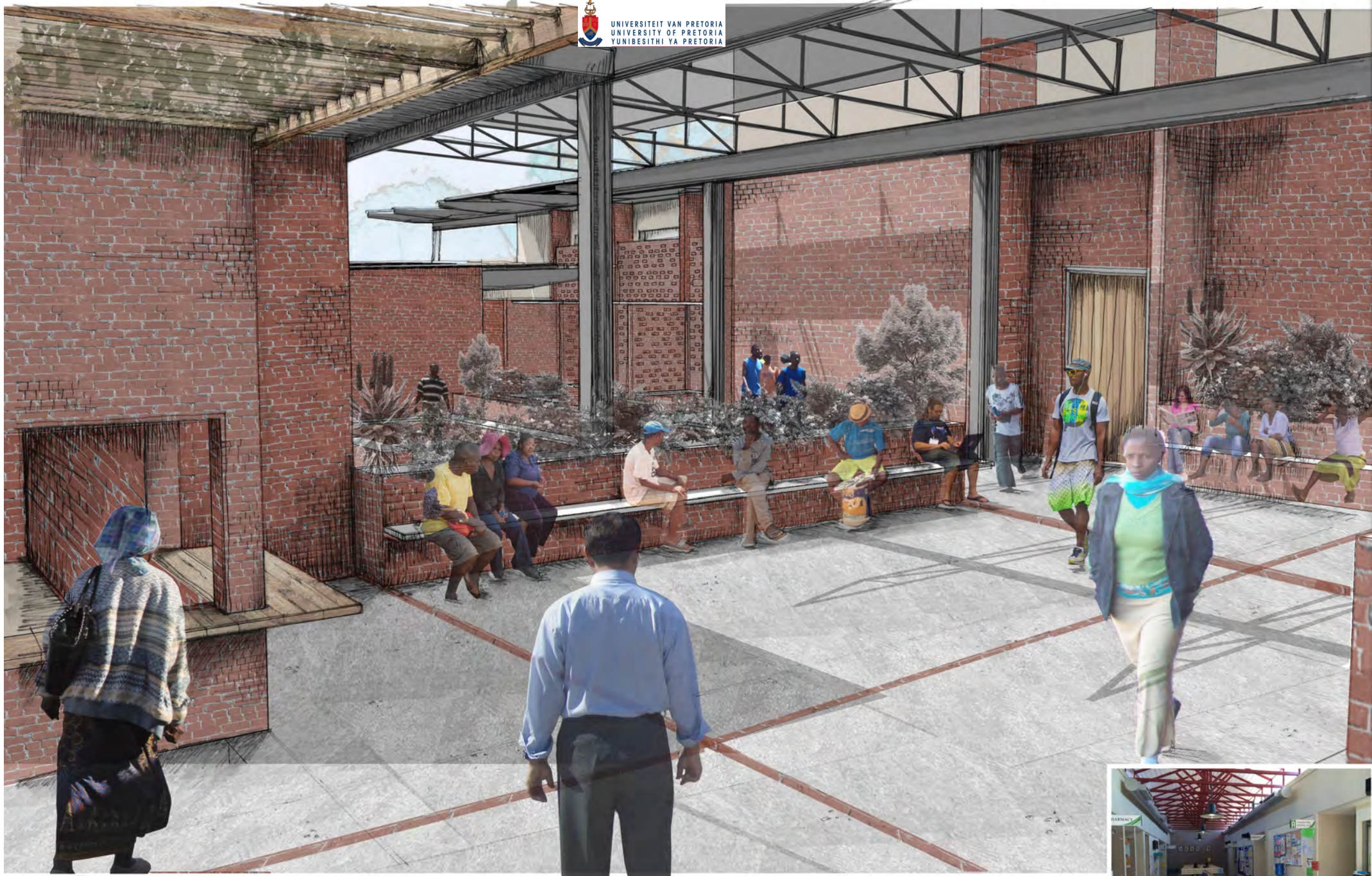
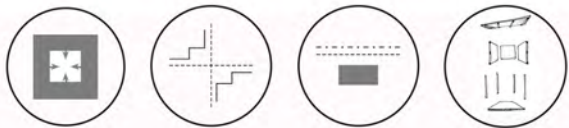
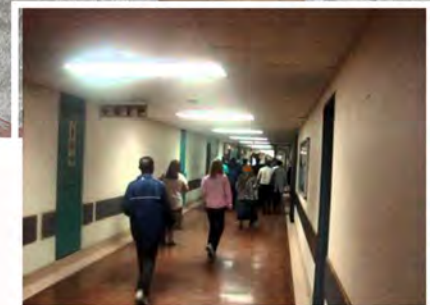


Figure 98. Perspective of Main Covered Public Waiting Area (Author 2016).





126  
Figure 99. Perspective of Vitals Sub Waiting Courtyard (Author 2016).



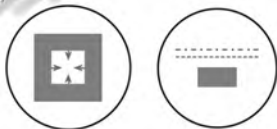


Figure 100. Perspective of Mother and Child Sub Waiting Courtyard (Author 2016).









Figure 102. External perspective of main entrance courtyard, an extension of the public street (Author 2016).



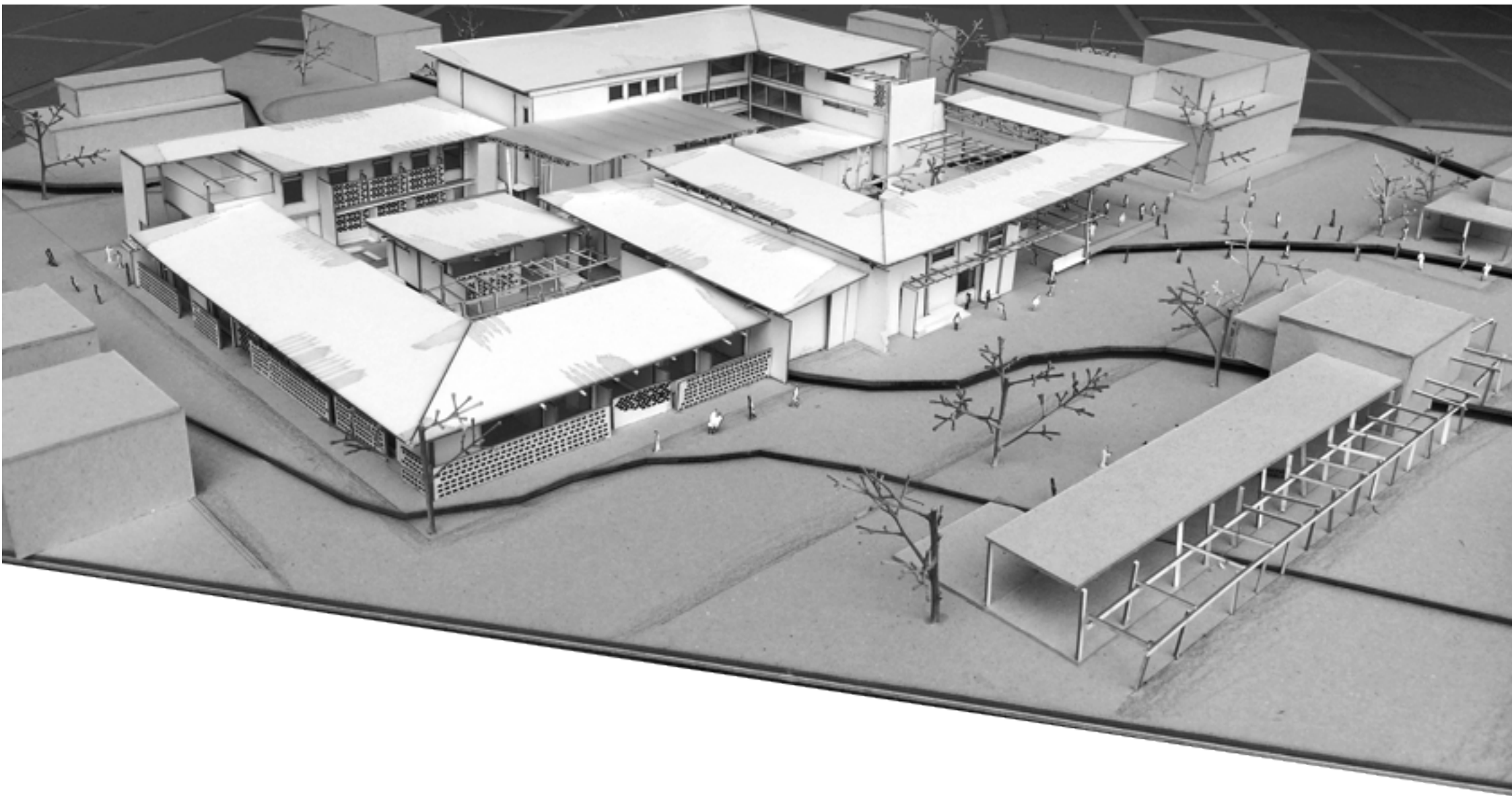


Figure 103. Model image, looking from the clinic side of the facility up to the community interaction section in the background (Author 2016).





Figure 104. Model image, looking from the main entrance and community section of the facility, across to the clinic section in the background (Author 2016).





Figure 105. Model image, looking from the staff entrance and ambulance access facade of the facility across to the northern facade in the background (Author 2016).





Figure 106. Model image, looking from the staff entrance and ambulance access facade of the facility across to the northern facade in the background (Author 2016).





Figure 107. Model image, looking from the taxi/ bus drop off point towards the main public entrance to the facility (Author 2016).



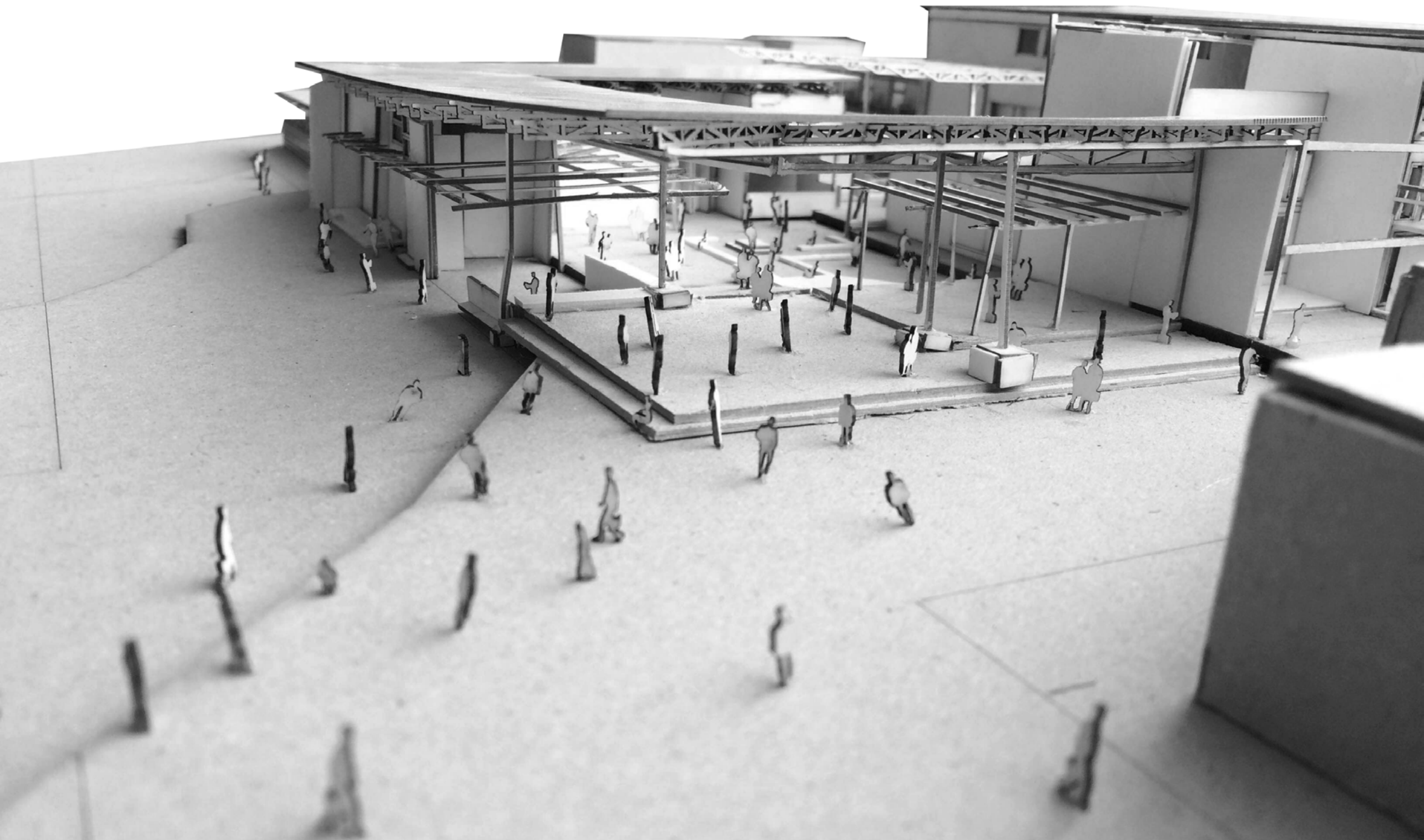


Figure 108. Model image, view through the main entrance into the main public waiting courtyard, refer to figure 97 (Author 2016).





Figure 109. Image of final exam set up in the atrium of Boukunde (Author 2016).





Figure 110. And we're done! (Author 2016).



## REFERENCES



## LIST OF REFERENCES

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# APPENDIX

Item/Appliance	Power draw per item (W)	Amount of appliances:	Total Power draw (W)	Average hours run time per week:	Total hours run time per week:	Watt-Hours per week:
Computer screen	30	2	60	40	40	2400
Computer server	400	2	800	40	40	32000
Laser Jet Printer	500	2	1000	5	5	5000
Alarm System	40	2	80	84	84	6720
Wifi router	6	1	6	40	40	240
Cordless Phone	2	6	12	20	20	240
Laptop	60	30	1800	40	40	72000
Kettle	2000	2	4000	10	10	40000
Microwave	1000	2	2000	4	4	8000
Bar Fridge	77	1	77	56	56	4312
Fridge	400	1	400	56	56	22400
Freezer	400	1	400	56	56	22400
UV Water Purification System	45	2	90	50	50	4500
Cellphone Charger	28	15	420	15	15	6160
Washing Machine	2300	1	2300	8	8	18400
Projector	410	10	4100	10	10	41000
Solar Geyser	0	2	0	20	20	0
Incandescent Light Bulbs	60	7	420	84	84	35280
LED Lights ER Section	8	6	48	84	84	4000
LED Lights	8	74	640	7	7	4480
Stove Oven	3000	1	3000	35	35	105000
					<b>Total watt hours /week:</b>	<b>434532</b>

	Average W/hours per day
Appliances	62076
Lighting	0

	TOTAL Wh/day	62076
	TOTAL kWh/day	62,076



## WATER MANAGEMENT MODEL

### A WATER RESOURCE INFORMATION (YIELD, m<sup>3</sup>)

#### A1 RAIN WATER HARVESTING DATA

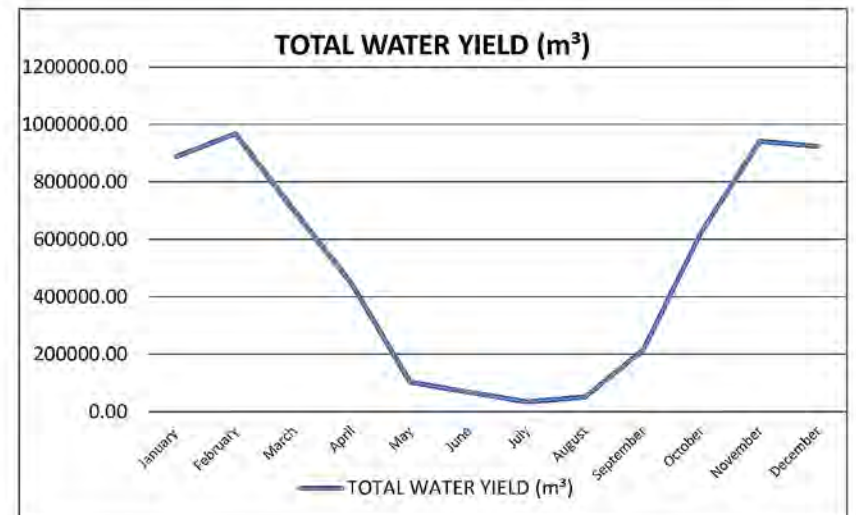
DESCRIPTION	AREA (m <sup>2</sup> )	RUNOFF COEFF. (C)
Roof structures	2768	0.9
Paving A	1955	0.7
Paving B	10684800	0.8
Lawn	385	0.1
Other	0	0
<b>TOTAL AREA (A)</b>	<b>10689908.00</b>	
<b>WEIGHTED C</b>		<b>0.80</b>

#### A3 TOTAL WATER YIELD

MONTH	AVE RAINFALL, P (m)	CATCHMENT YIELD (m <sup>3</sup> ) (Yield = PxAxC)	ALTERNATIVE WATER SOURCE (m <sup>3</sup> )	TOTAL WATER YIELD (m <sup>3</sup> )
January	0.10	887670.43	0.20	887670.63
February	0.11	967201.59	0.20	967201.79
March	0.08	701242.53	0.20	701242.73
April	0.05	444690.39	0.20	444690.59
May	0.01	102620.86	0.20	102621.06
June	0.01	68413.91	0.20	68414.11
July	0.00	34206.95	0.20	34207.15
August	0.01	51310.43	0.20	51310.63
September	0.03	213793.46	0.20	213793.66
October	0.07	624276.89	0.20	624277.09
November	0.11	940691.20	0.20	940691.40
December	0.11	923587.73	0.20	923587.93
<b>ANNUAL AVE.</b>	<b>0.70</b>	<b>5959706.35</b>	<b>2.40</b>	<b>5959708.75</b>

#### A2 RECYCLED / ALTERNATIVE WATER SOURCE

MONTH	Grey Water		No Source		TOTAL / MONTH (m <sup>3</sup> )
	WEEKLY YIELD (m <sup>3</sup> )	MONTHLY YIELD (m <sup>3</sup> )	WEEKLY YIELD (m <sup>3</sup> )	MONTHLY YIELD (m <sup>3</sup> )	
January	0.05	0.20	0	0.00	0.20
February	0.05	0.20	0	0.00	0.20
March	0.05	0.20	0	0.00	0.20
April	0.05	0.20	0	0.00	0.20
May	0.05	0.20	0	0.00	0.20
June	0.05	0.20	0	0.00	0.20
July	0.05	0.20	0	0.00	0.20
August	0.05	0.20	0	0.00	0.20
September	0.05	0.20	0	0.00	0.20
October	0.05	0.20	0	0.00	0.20
November	0.05	0.20	0	0.00	0.20
December	0.05	0.20	0	0.00	0.20
<b>ANNUAL AVE.</b>		<b>2.40</b>		<b>0.00</b>	<b>2.40</b>



## B WATER DEMAND

### B1 LANDSCAPE IRRIGATION DEMAND (m<sup>3</sup>)

DESCRIPTION:	LAWN (m <sup>2</sup> ):	385	AGRI (m <sup>2</sup> ):	76.55	PLANTING (m <sup>2</sup> ):	67.8	TOTAL MONTHLY IRR. DEMAND (m <sup>3</sup> )
MONTH	WEEKLY IRR. (m)	MONTHLY DEMAND (m <sup>3</sup> )	WEEKLY IRR. (m)	MONTHLY DEMAND (m <sup>3</sup> )	WEEKLY IRR. (m)	MONTHLY DEMAND (m <sup>3</sup> )	
January	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0
May	0.01	15.4	0.025	7.655	0.005	1.356	24.411
June	0.01	15.4	0.025	7.655	0.005	1.356	24.411
July	0.01	15.4	0.025	7.655	0.005	1.356	24.411
August	0.02	30.8	0.025	7.655	0.005	1.356	39.811
September	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0
<b>ANNUAL TOTAL</b>		<b>77</b>		<b>30.62</b>		<b>5.424</b>	<b>113.044</b>

### B2 DOMESTIC / ALT DEMAND

MONTH	PERSONS	WATER/ CAPITA/ DAY (l)	DOMESTIC DEMAND (m <sup>3</sup> /month)
January	165	50	255.75
February	165	50	231
March	165	50	255.75
April	165	50	247.5
May	165	50	255.75
June	165	50	247.5
July	165	50	255.75
August	165	50	255.75
September	165	50	247.5
October	165	50	255.75
November	165	50	247.5
December	165	50	255.75
<b>ANNUAL TOTAL</b>			<b>3011.25</b>

### B3 EVAPORATION LOSS (For 'open' reservoirs)

35mm - 45mm/week in summer

### B4 TOTAL WATER LOSS & DEMAND

MONTH	EVAPORATION RATE (m/week)	EVAPORATION RATE (m/month)	TOTAL LOSS (m <sup>3</sup> /month)
January	0.04	0.16	0
February	0.035	0.14	0
March	0.025	0.1	0
April	0.02	0.08	0
May	0.015	0.06	0
June	0.01	0.04	0
July	0.01	0.04	0
August	0.02	0.08	0
September	0.03	0.12	0
October	0.035	0.14	0
November	0.035	0.14	0
December	0.04	0.16	0
<b>ANNUAL TOTAL</b>	<b>0.32</b>	<b>1.26</b>	<b>0.00</b>



MONTH	TOTAL DEMAND (m <sup>3</sup> /month)
January	255.75
February	231.00
March	255.75
April	247.50
May	280.16
June	271.91
July	280.16
August	295.56
September	247.50
October	255.75
November	247.50
December	255.75
<b>ANNUAL TOTAL</b>	<b>3124.294</b>

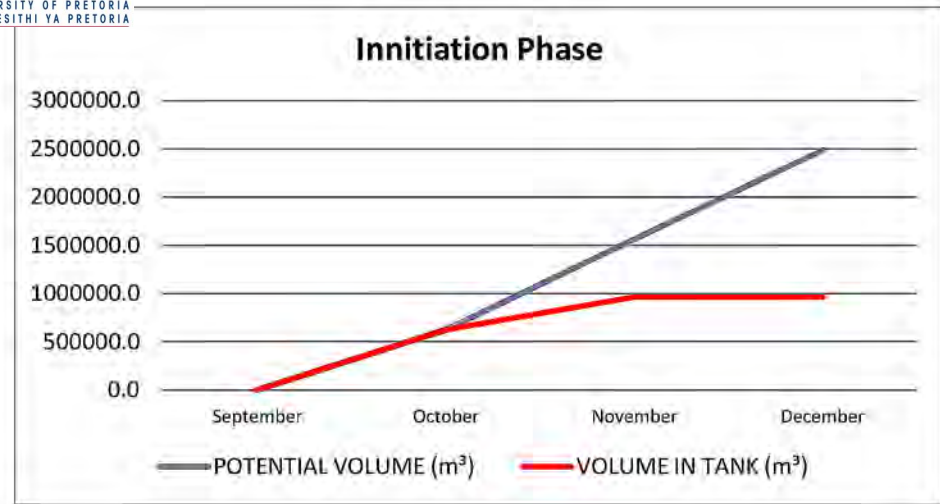


### C WATER BUDGET

TANK CAPACITY (m <sup>3</sup> ):	<b>967000</b>
MIN VOLUME (m <sup>3</sup> ):	<b>1434.5</b>

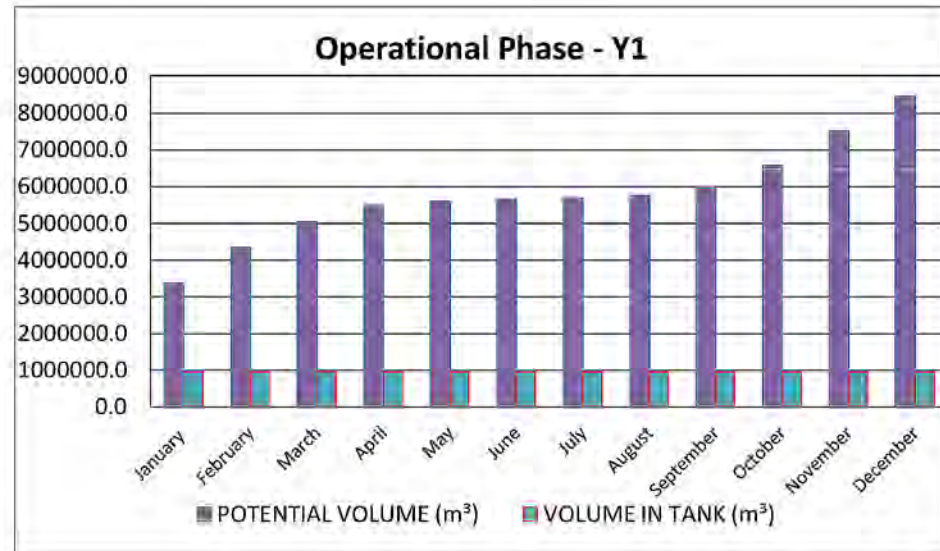
#### C1 WATER BUDGET INNIATION PHASE

MONTH	YIELD (m <sup>3</sup> /month)	DEMAND (m <sup>3</sup> /month)	MONTHLY BALANCE	POTENTIAL VOLUME (m <sup>3</sup> )	VOLUME IN TANK (m <sup>3</sup> )
September	213793.7	247.5	213546.2	0.0	0.0
October	624277.1	255.8	624021.3	<b>624021.3</b>	<b>624021.3</b>
November	940691.4	247.5	940443.9	<b>1564465.2</b>	<b>967000.0</b>
December	923587.9	255.8	923332.2	<b>2487797.4</b>	<b>967000.0</b>
	2702350.1	1006.5	2701343.6		



#### C2 WATER BUDGET YEAR 1

MONTH	YIELD (m <sup>3</sup> /month)	DEMAND (m <sup>3</sup> /month)	MONTHLY BALANCE	POTENTIAL VOLUME (m <sup>3</sup> )	VOLUME IN TANK (m <sup>3</sup> )
January	887670.6	255.8	887414.9	<b>3375212.3</b>	<b>967000.0</b>
February	967201.8	231.0	966970.8	<b>4342183.1</b>	<b>967000.0</b>
March	701242.7	255.8	700987.0	<b>5043170.1</b>	<b>967000.0</b>
April	444690.6	247.5	444443.1	<b>5487613.2</b>	<b>967000.0</b>
May	102621.1	280.2	102340.9	<b>5589954.0</b>	<b>967000.0</b>
June	68414.1	271.9	68142.2	<b>5658096.2</b>	<b>967000.0</b>
July	34207.2	280.2	33927.0	<b>5692023.2</b>	<b>967000.0</b>
August	51310.6	295.6	51015.1	<b>5743038.3</b>	<b>967000.0</b>
September	213793.7	247.5	213546.2	<b>5956584.5</b>	<b>967000.0</b>
October	624277.1	255.8	624021.3	<b>6580605.8</b>	<b>967000.0</b>
November	940691.4	247.5	940443.9	<b>7521049.7</b>	<b>967000.0</b>
December	923587.9	255.8	923332.2	<b>8444381.9</b>	<b>967000.0</b>
ANNUAL AVE.	5959708.8	3124.3	5956584.5		



**SB SBAT REPORT**

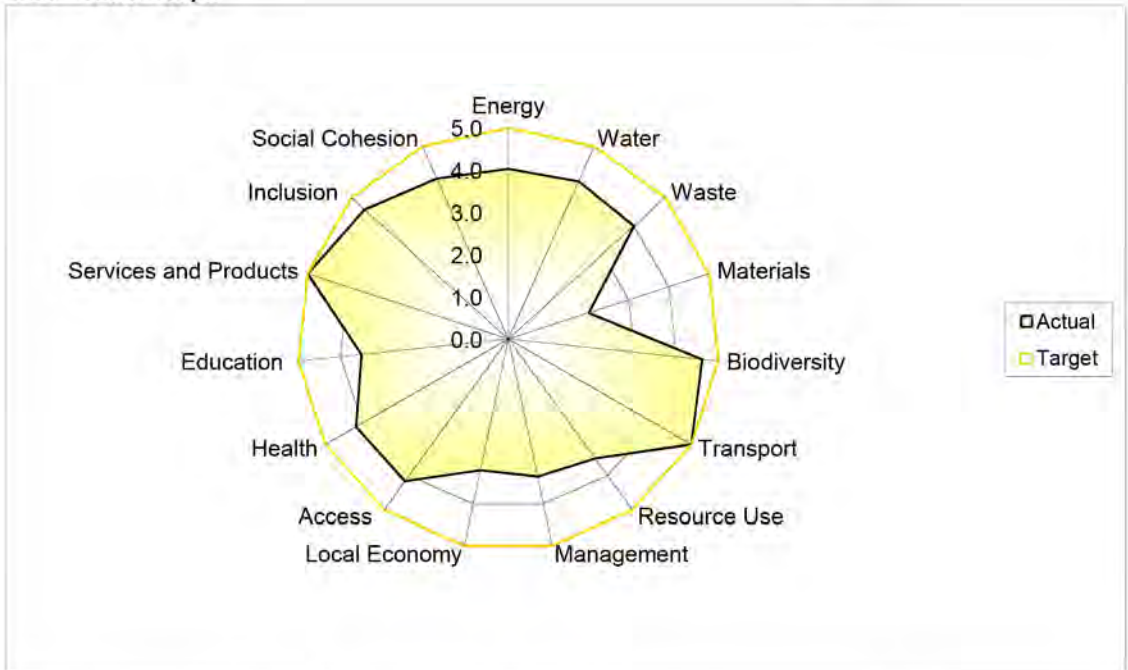
**SB1 Project**

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**SB2 Address**

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**SB3 SBAT Graph**



**SB4 Environmental, Social and Economic Performance**

	Score
Environmental	3.7
Economic	3.8
Social	4.3
<b>SBAT Rating</b>	<b>4.0</b>

**SB5 EF and HDI Factors**

	Score
EF Factor	4.0
HDI Factor	3.9

**SB6 Targets**

	Percentage
Environmental	75
Economic	77
Social	86

**SB7 Self Assessment:** Information supplied and confirmed by

Name	Michelle Whitaker	Date	20/10/2016
Signature			