

As the city of Maseru, capital of Lesotho, grows at an ever increasing rate, with population rising to the number of millions, a great change will occur. As it develops into a more sophisticated and complex society, that which will be able to compete in the world stage, a new form of urban fabric is the next logical step.

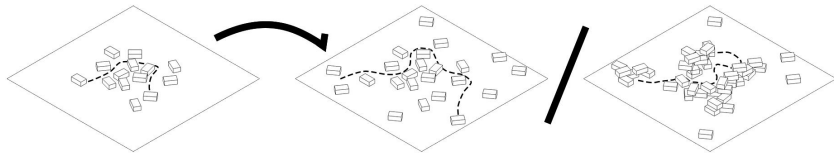
As the land gets scarcer each day because of the constant demand of new housing, currently the city of Maseru grows outward, claiming land on the periphery of the city, forming another layer of small streets and impromptu dirt streets for the much needed structure and circulation. An obvious solution to the ever growing housing scarcity is to create a form of social housing, but designing only a well-intentioned house may not be enough to help with the city's problem with urban sprawl and distribution of resources.

The design of multiple dwelling produced on a mass scale will address the subtle yet also real problems of the city: improving it as a whole, raising the quality of living for the common citizen, incubating progress for the city of Maseru.

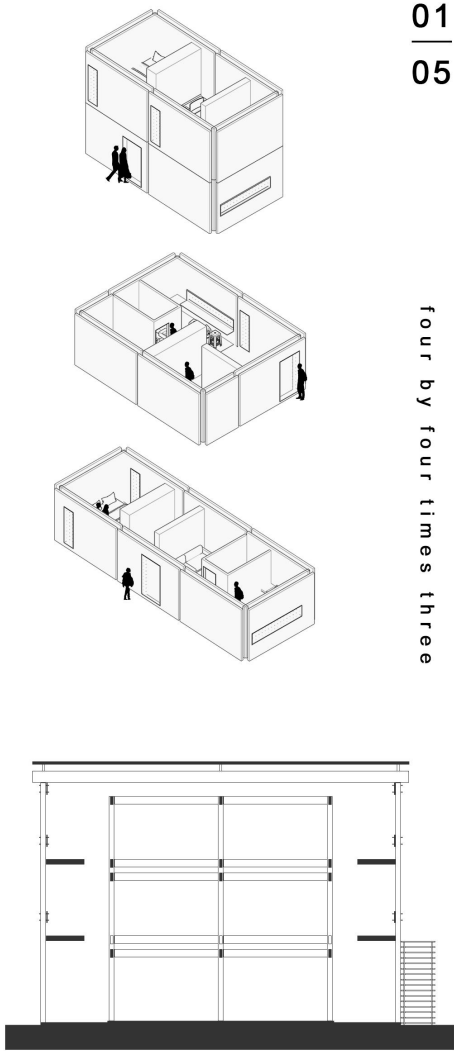
Through enabling extensive customization to its user, modular construction and addition, and adaptive features for tomorrow's demands, it hopes to create a sense of great belonging and responsibility, and most important of all, accepted as a new component of the people of Maseru.

## Four by Four times Three

colaborative vertical social housing



The current model of landed-oriented development may come now as cheap, self-managable, and culturally familiar to Maseru. But if left unturned, it may cause the city to spread out thin, making it hard to maintain and develop. By engaging the vertical dimension the city has more potential for growth and effectiveness. And by limiting it to only 3-4 story, it will still be able to maintain the humanistic scale of the current landed-housing.





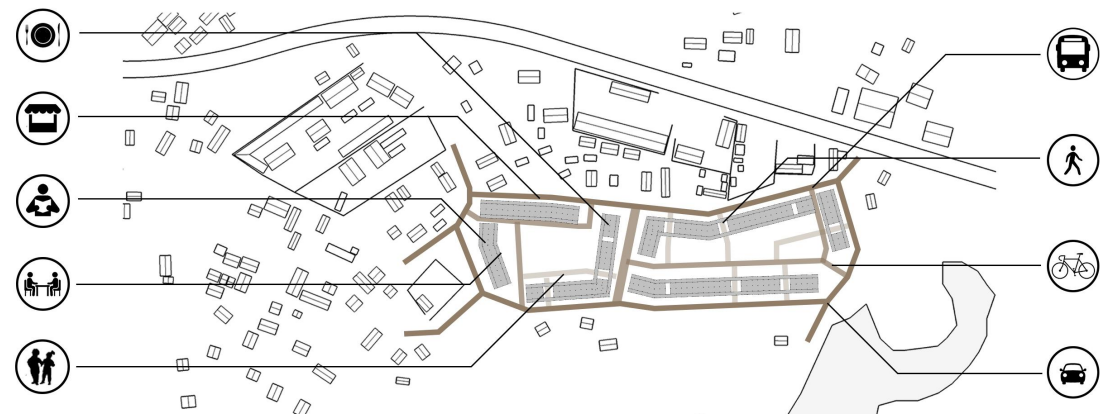


As a plan for mass housing with replicable feature, that may able to be situated with the various places and condition within the city of Maseru, the design is focused on its flexibility by making the modular unit small and simple. It does not provide a fixed design, yet a whole system of structure and programs.

The main idea is to create a shared structural system, which then people may buy plots on the grids, which then they may construct units of housing that suited to their own personal needs and preferences, and able to customize the space as they see fit.

With the basic grid of four by four metres times three floors, the masterplan only consists of the structural grid, forming an almost organic city block unto the existing road structures, and also able to be constructed on multiple stages, and expanded if need be.

Intended for urban use, peripheral but basic ammenities such as clinics, daycares, and schools are expected to be present within the complex. Other than that, the ground floor may also be used for various functions, such as markets, shops, and offices, integrating it to be an essential part of the block.



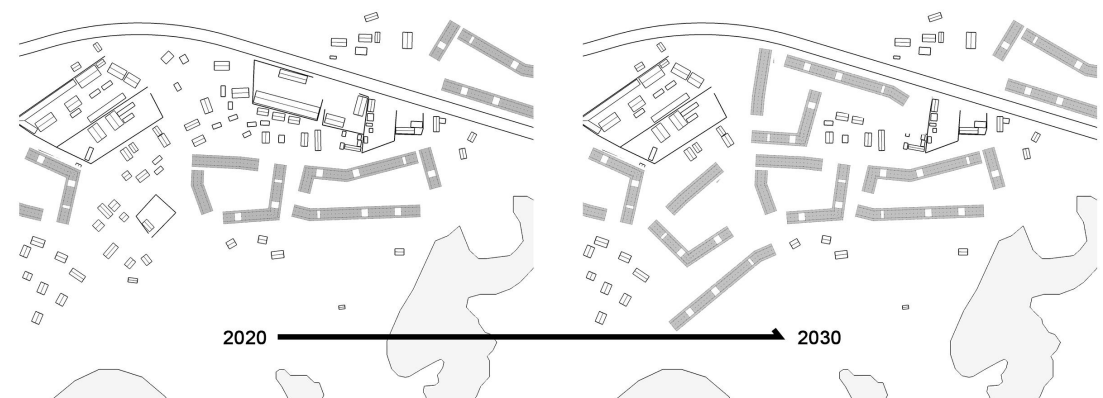
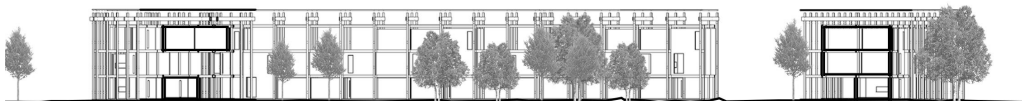
02  
05

four by four times three



With the diversification of function and activities on the ground level, the design hopes to create an atmosphere of active pedestrian, with shops and commercial zones made reachable by simply walking nearby, rather than driving a car, facing traffic across the city.

Economically, this may also help the growth of small to middle sized enterprises, creating a great opportunity of economic growth, expanding the jobs on Maseru to a more service-oriented occupancy, rather than the low yield of manufacturing and mining. By introducing the new, city block-like structure, upon the city of Maseru, may it leave a good impression and ideas of the next development, changing the form of the city forever, orienting it to the mid-rise habit.

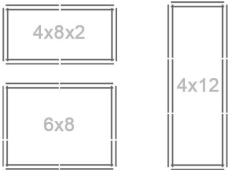




Each unit only contains a basic construction package, which will enable its users to customize according not to only their needs but also their preference. As the economy grows, and each family's welfare rises, they are able to change and reshape their own units and plots as far as they are able to.

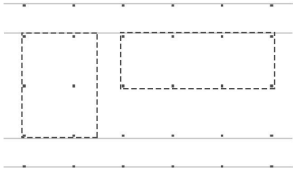
This feature is essential so that it may provide a sense of belonging to the people and help integrate it further as Maseru's new urban scape. As the whole piece grows organically, it will seem natural and evolving through each year, as each units appearance may change over time.

Having an emphasis on flexibility and adaptability, every available space are not limited to esidential use. Commercial and community oriented functions are also meant to take place on strategic spots around the complex, especially the ground level, which may promote a livelier activity on the street.



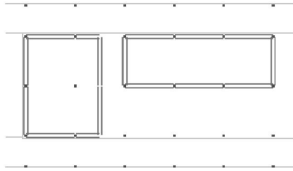
①

Choose a unit type from the main three basic options, suiting to the needs regarding the unit area ( $\pm 48$  sqm) and its proportion



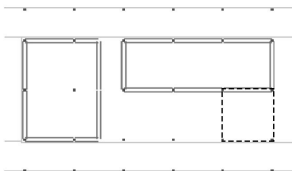
②

Select a plot from the available part of the grid. The selected plot is allowed to be larger than the ordered unit for future expansion.



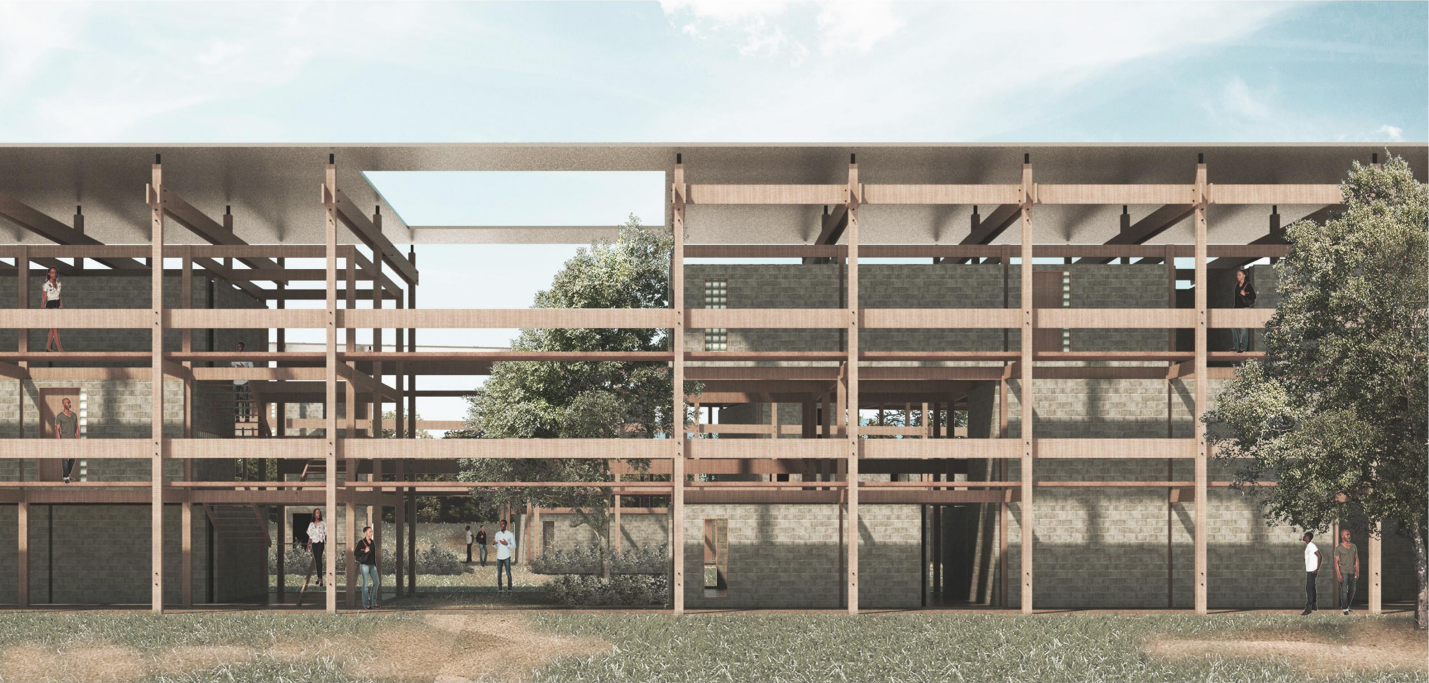
③

Construction of the unit in the selected place, in which each segment of walls are also able to be customized



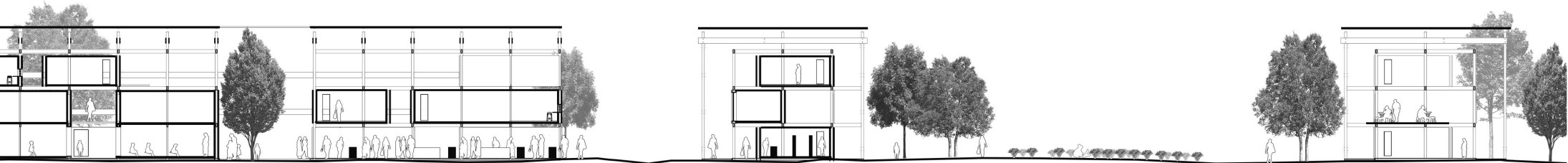
④

As time passes, the unit is allowed to be expanded to the reserved adjacent grids according to the growing needs



03  
05

four by four times three



**School / Playground**

Some parts of the complex could be used as schools, playgrounds, or daycares, as it provides a secure place and situated near residential areas

**Marketplace**

With great proximity to residential area, flexibility to expand, and high pedestrian traffic, it may reinforce the whole place into a more livelier one

**Shop / Convenience Store**

The availability of shops , clinics, and convenience stores will be able to provide jobs and also support basic residential needs.

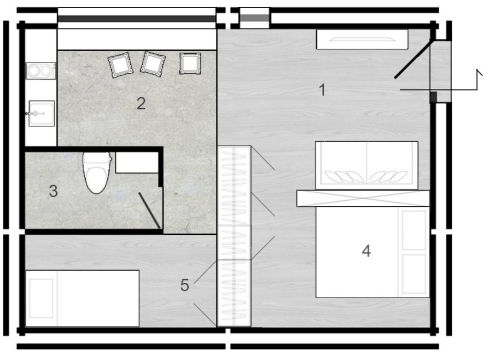
**Garden Plot**

outdoor plots are also available to be owned and developed as gardens, parks, and other types of activities by its inhabitants.

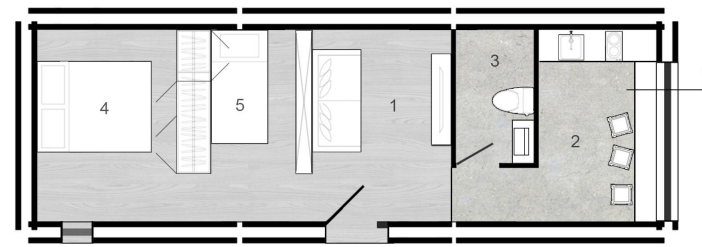
**Communal Space**

Some few spaces may also be reserved as a community funded, communal space for small gatherings and socialization.

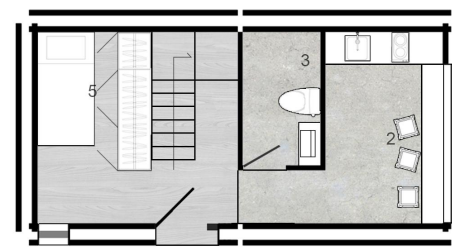




6 x 8  
nett LSL 29,888  
semigross LSL 44,292

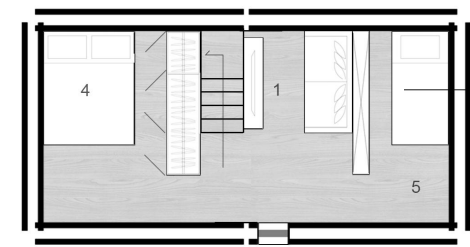


4 x 12  
nett LSL 29,894  
semigross LSL 44,298



4 x 8 x 2  
nett LSL 26,209  
semigross LSL 45,415

first floor



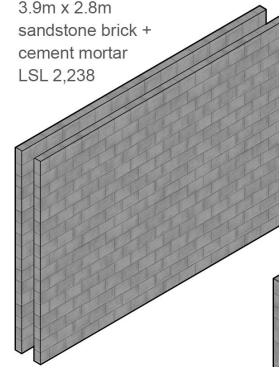
second floor



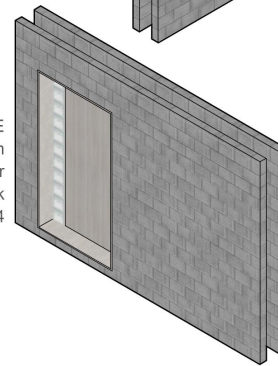
04  
05

four by four times three

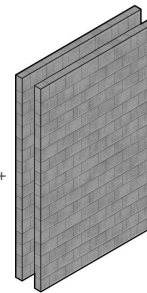
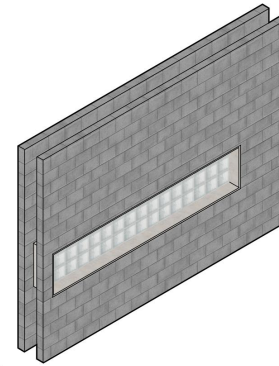
wall A  
3.9m x 2.8m  
sandstone brick +  
cement mortar  
LSL 2,238



wall E  
1.95m x 2.8m  
sandstone brick + cement mortar  
pine wood plank + glass block  
LSL 3,104

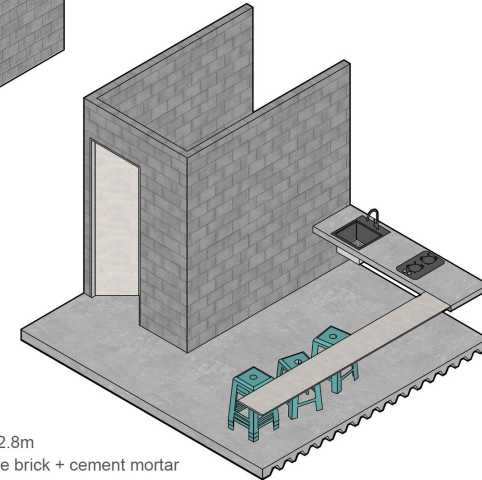


wall C  
1.95m x 2.8m  
sandstone brick +  
cement mortar  
pine wood plank sills +  
glass block  
LSL 6,772

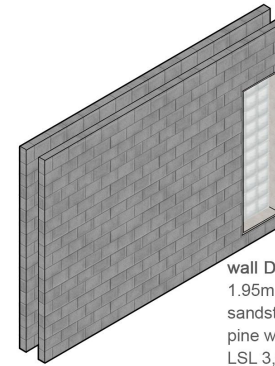


wall B  
1.95m x 2.8m  
sandstone brick +  
cement mortar  
LSL 1,119

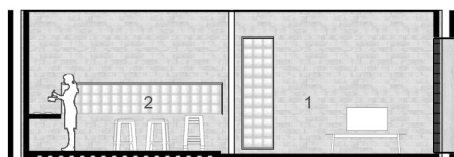
wet area module  
3.85m x 3.60m x 2.80m  
sandstone brick + cement mortar  
corrugated metal + concrete  
reinforced concrete plate  
pine wood planks  
LSL 7,070



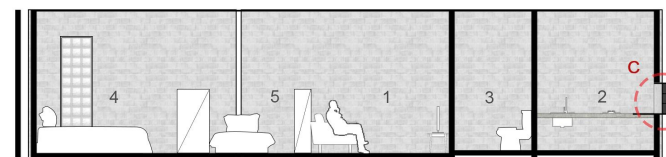
wall D  
1.95m x 2.8m  
sandstone brick + cement mortar  
pine wood plank + glass block  
LSL 3,541



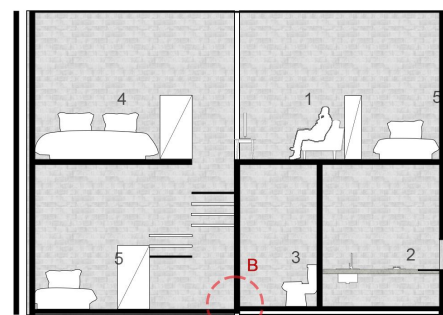
- 1 living area
- 2 kitchen + dining area
- 3 common bathroom
- 4 master bedroom
- 5 bedroom



6 x 8



4 x 12



4 x 8 x 2

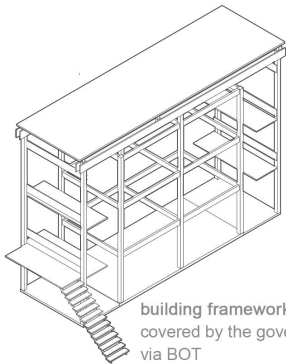
Variety of unit types will help achieve a sense of choice for its habitants, and therefore increase a sense of belonging to the whole development. As there is no roofing per unit, budgets can be allocated to making units of a bigger floor area. The absence of interior walls saves invaluable spaces which is then replaced by storage racks as partitions. Double-layered walls acts as thermal insulation, utility chases, as well as boundaries from its neighboring units.



The whole development relies on two major systems: the structural grid as formative framework and the individual dwellings inserted within. Each of these two systems might be funded separately and differently. Costs for housing units will come from the residents themselves, be it in the form of money or of raw materials.

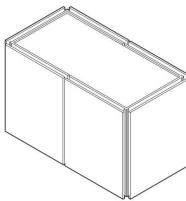
Meanwhile, costs for building framework can be covered temporarily by the government (with a public-private partnership: build-operate-transfer system) which will then be paid in installments by the residents.

This system of funding shall be flexible to possibilities of making the development only for renting.

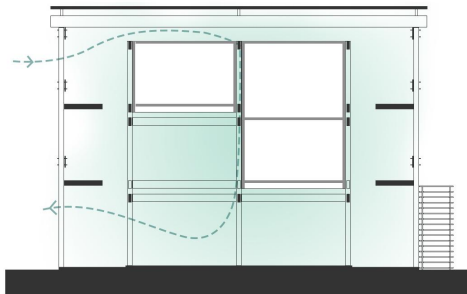


building framework  
covered by the government  
via BOT

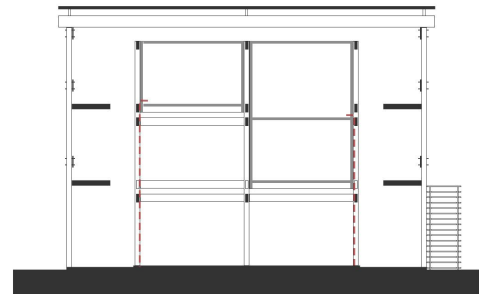
+



units  
covered by residents

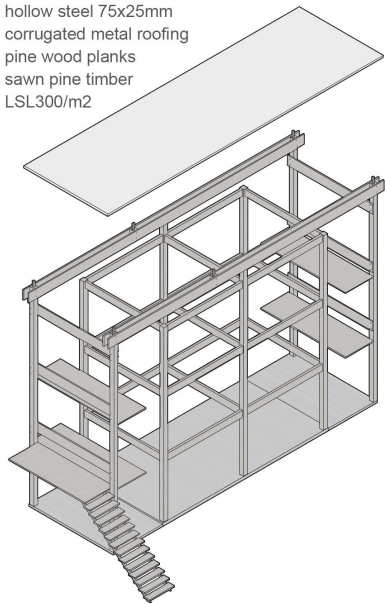


air space between walls as thermal insulator



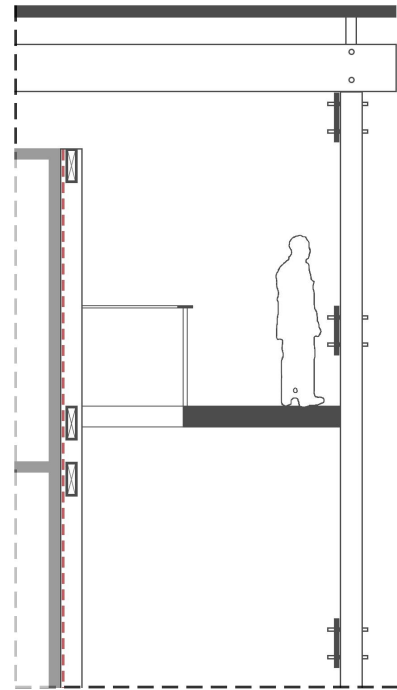
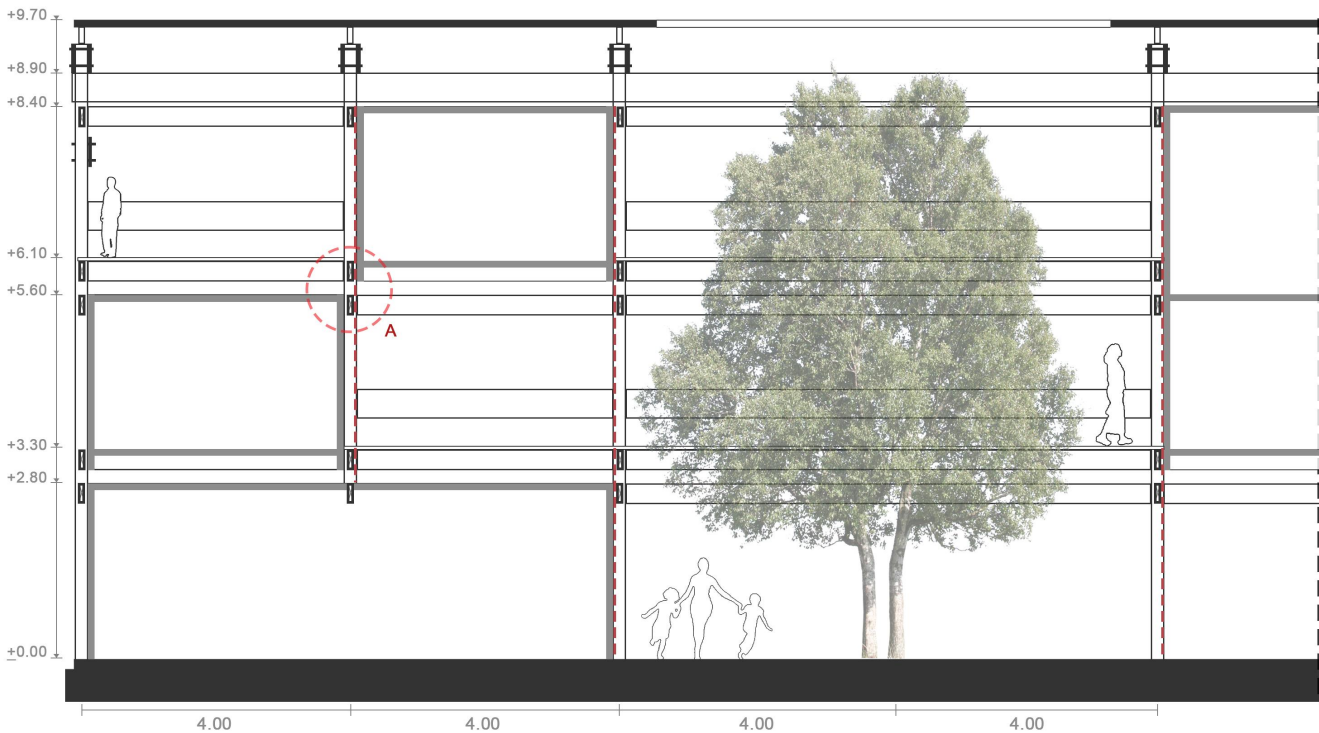
utilities will run through insulated chases along  
columns and beams, electricity will heat the chases  
in case of freezing weather.

building framework  
12.5m x 4m  
hollow steel 100x50mm  
hollow steel 75x25mm  
corrugated metal roofing  
pine wood planks  
sawn pine timber  
LSL300/m2



05  
05

four by four times three

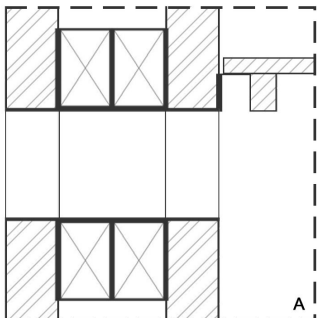


#### materials

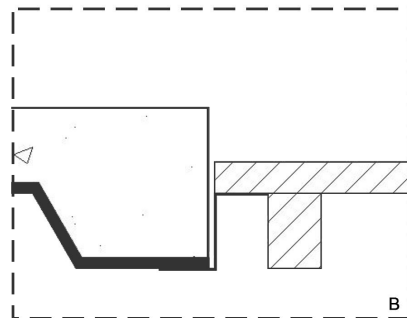
reinforced concrete LSL 1685/m2 local	corrugated metal roofing sheet LSL 140/m2 local	sawn pine timber rafter LSL 24/m local
sandstone block + cement mortar LSL 205/m2 local	reinforced concrete LSL 1685/m2 local	corrugated metal roofing sheet LSL 140/m2 local
sawn pine timber rafter LSL 24/m local	sandstone block + cement mortar LSL 205/m2 local	

Standardized and vernacular components are considered key to ease of construction which will cut construction budget substantially. As families expand, additions to the original unit can be formed within the limits of these components.

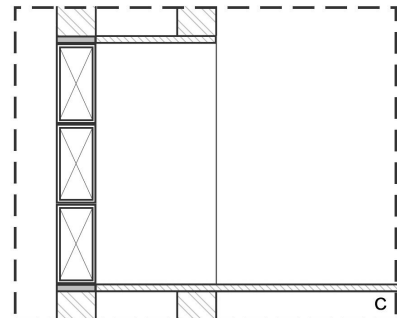
Within the limits of LSL 50,000, the use of prefabricated components is considered too costly. Much of the budget is allocated into materials & construction for the framework, whereas the units should rely on local material & manual labor.



threshold between walls of different units  
section detail  
scale 1 : 10



threshold between pine deck and concrete deck  
section detail  
scale 1 : 5



glassblock window and pine dining table  
section detail  
scale 1 : 10

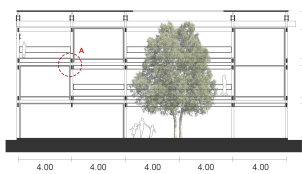


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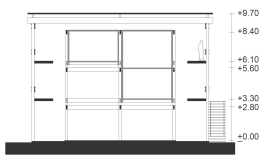
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Base structure section  
scale 1:200



Base structure section  
scale 1:200

A1  
four by four times three



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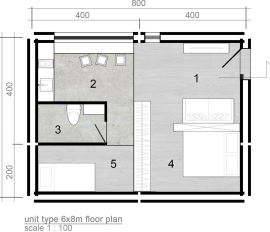
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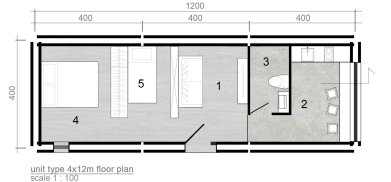


	elevation	floor finishes
1 living area	+0.00	pine decking
2 kitchen	+0.05	concrete - textured finish
3 bathroom	+0.00	concrete - exposed
4 main bedroom	+0.00	pine decking
5 bedroom	+0.00	pine decking

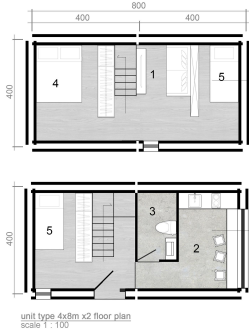
	unit 6x8m	unit 4x12m	unit 4x8m x2
nett	LSL 29,888	LSL 29,894	LSL 26,209
gross	LSL 44,292	LSL 44,298	LSL 45,415



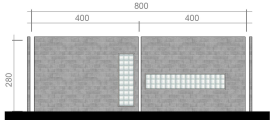
unit type 6x8m floor plan  
scale 1:100



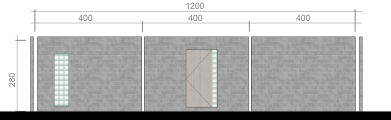
unit type 4x12m floor plan  
scale 1:100



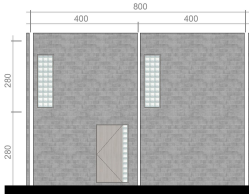
unit type 4x8m x2 floor plan  
scale 1:100



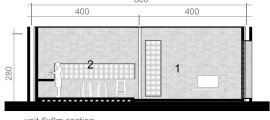
unit 6x8m elevation  
scale 1:100



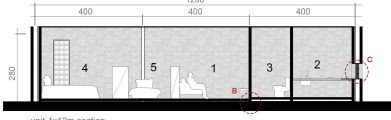
unit 4x12m elevation  
scale 1:100



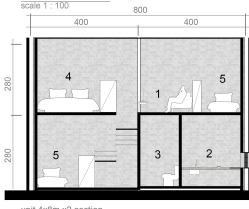
unit 4x8m x2 elevation  
scale 1:100



unit 6x8m section  
scale 1:100



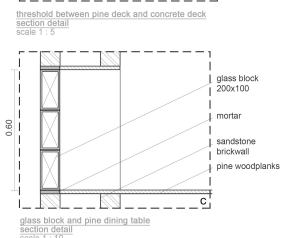
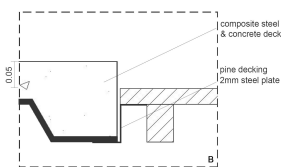
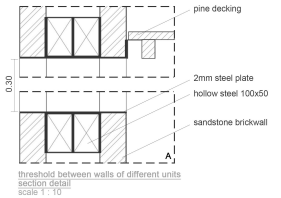
unit 4x12m section  
scale 1:100



unit 4x8m x2 section  
scale 1:100

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Within the limits of LSL 50,000, the use of prefabricated components is considered too costly. Much of the budget is allocated into materials & construction for the framework, whereas the units should rely on local material & manual labor.





## **Four by Four Times Three**

### **RISE in The City Competition 2018**

*Four by Four Times Three* offers an integrated system of flexible, adaptable social housing development emphasizing the celebration of personal autonomy to each of its inhabitants. Based on a gridded superstructure grid and a canopy roof, various types of units and features are able to be built, expanded, and repurposed, enabling it to grow organically and gradually with its users. The aim is to not only provide a suitable and affordable dwelling, but also to transform the city scape to be able to accommodate Maseru's future growth.



FOUR BY FOUR TIMES THREE  
BILL OF QUANTITY

ITEM		MATERIAL	SIZE	QTY	UNIT COST	TOTAL COST	
ROOFING & CORRIDOR	Roofing	Corrugated Metal	334.6	m2	1	140.00	46,844.00
	Portal Structure	Hollow Steel Tube 100x50	131.6	m	22	380.00	8,334.67
		Hollow Steel Tube 75x25	89.6	m	15	260.00	3,882.67
		Hollow Steel Tube 75x25	142.8	m	24	260.00	6,188.00
	Bolts			pcs			
	Corridor Floor Plate	Pine Wood Planks	34	m2	1	24.00	816.00
	Corridor Floor Structure	Sawn Pine Timber	1.4	m	20.25	24.00	680.40
	Stairs Floor Plate	Pine Wood Planks	0.27	m2	28	24.00	181.44
Stairs Structure	Sawn Pine Timber	0.9	m	28	24.00	604.80	
UNIT ASSEMBLY STRUCTURE	Coloumn	Hollow Steel Tube 100x50	177.45	m	30	380.00	11,238.50
	Beam	Hollow Steel Tube 75x25	259.8	m	43.3	260.00	11,258.00
	Pedestal	Concrete Slab	30	m3	1	200.00	6,000.00
		Gravel	12.1	m3	1	0.00	0.00
TOTAL COST OF BUILDING							96,028.47
AVERAGE AREA							320.00
AVERAGE BUILDING COST PER M2							300.09

TYPICAL WET AREA	Floor	Corrugated Metal & Concrete Composite	2.079	m3	1	1695.00	3,523.91
	Bathroom - Wall	Sandstone Brick + Cement Mortar 100mm thick	15.87	mm	1	205.00	3,253.35
	Bathroom - Door Opening	Pine Wood Planks	0.51	m2	1	24.00	12.24
	Kitchen - Counter	Reinforced Concrete Plate	0.132	m3	1	1695.00	223.74
	Dining - Table	Pine Wood Planks	2.38	m2	1	24.00	57.12
TOTAL COST OF TYPICAL WET AREA							7,070.36

TYPICAL WALL MODULES	A) No Opening 1 Bay	Sandstone Brick + Cement Mortar	10.92	m2	1	205.00	2,238.60
		Sandstone Brick + Cement Mortar	5.46	m2	1	205.00	1,119.30
	B) No Opening 1/2 Bay	Sandstone Brick + Cement Mortar	9.12	m2	1	205.00	1,869.60
		Pine Wood Planks	3.38	m2	1	24.00	81.12
	C) With Horizontal Opening	Glass Block	200x200	mm2	48	16.00	768.00
		Total Cost					6,076.62
		Sandstone Brick + Cement Mortar	9.72	m2	1	205.00	1,992.60
	D) With Vertical Opening	Pine Wood Planks	1.78	m2	1	24.00	42.72
		Glass Block	200x200	mm2	33	16.00	528.00
		Total Cost					2,563.32
	E) With Door Opening	Sandstone Brick + Cement Mortar	8.31	m2	1	205.00	1,703.55
		Pine Wood Planks	4.72	m2	1	24.00	113.28
		Glass Block	200x200	mm2	11	16.00	176.00
		Total Cost					1,992.83

UNIT TYPE 4X8X2 STORY	Building Cost		1	pcs	64	300.09	19,205.69
	Typical Wet Area		1	pcs	1	7070.36	7,070.36
	Wall Modules	Type A	1	pcs	2	2238.60	4,477.20
		Type C	1	pcs	1	6076.62	6,076.62
		Type D	1	pcs	2	2563.32	5,126.64
		Type E	1	pcs	1	1992.83	1,992.83
	Flooring	Pine Wood Planks	41.76	m2	1.0	24.00	1,002.24
		Sawn Pine Timber Rafter	3.6	m	19.3	24.00	464.00
	TOTAL COST OF MATERIAL						45,415.58

UNIT TYPE 6x8	Building Cost		1	pcs	48	300.09	14,404.27
	Typical Wet Area		1	pcs	1	7070.36	7,070.36
	Wall Modules	Type A	1	pcs	3	2238.60	6,715.80
		Type B	1	pcs	2	2238.60	4,477.20
		Type C	1	pcs	1	6076.62	6,076.62
		Type D	1	pcs	1	2563.32	2,563.32
		Type E	1	pcs	1	1992.83	1,992.83
	Flooring	Pine Wood Planks	28.67	m2	1.0	24.00	688.08
		Sawn Pine Timber Rafter	5.6	m	6.7	24.00	160.00
			1.74	m	6.0	24.00	144.00
TOTAL COST OF MATERIAL							44,292.48

UNIT TYPE 4X12	Building Cost		1	pcs	48	300.09	14,404.27
	Typical Wet Area		1	pcs	1	7070.36	7,070.36
	Wall Modules	Type A	1	pcs	5	2238.60	11,193.00
		Type B	1	pcs	0	2238.60	0.00
		Type C	1	pcs	1	6076.62	6,076.62
		Type D	1	pcs	1	2563.32	2,563.32
		Type E	1	pcs	1	1992.83	1,992.83
	Flooring	Pine Wood Planks	28.44	m2	1.0	24.00	682.56
		Sawn Pine Timber Rafter	3.6	m	13.2	24.00	316.00
	TOTAL COST OF MATERIAL						44,298.96

MATERIAL COSTS

MATERIAL	PRICE	SOURCE
Reinforced Concrete (/m3)	1695	RITC
6" Block Work + Cement Mortar (m2)	205	RITC
Sawn Pine Timber Rafter (/m)	24	RITC
Roof Sheet (/m2)	140	RITC
Pine Wood Planks	24	RITC
Hollow Steel Tube 100X50	380	steelpipeforafrica
Hollow Steel Tube 75x25	260	steelpipeforafrica
Hollow Steel Tube 50x38	211	steelpipeforafrica
Concrete Without Reinforcement	200	assumption
Glass Block 200x200mm	16	assumption