

Hydroblock

Annelot Wartna

The Why Factory Graduation Studio 2016-2017 P5 presentation

00. The Why Factory

What if...?

- ∂ > Site
- උ > Users
- ∂ > Programme
- ∂ > Mass & void
- ∂ > Structure
- δ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- රි ≻ Facade

The Why Factory What is the why factory?

PoroCity What is porosity?



- ∂ > Site
- ∂ > Users
- ∂ > Programme
- ∂ > Mass & void
- ∂ > Structure
- δ > Accessibility
- ∂ > Houses
- රි ≻ Climate
- රි ≻ Facade

The Why Factory What is the why factory?

Vertical Village Diversity of building typology



∂ > Site

∂ > Users

∂ > Programme

- ∂ > Mass & void
- ∂ > Structure
- δ > Accessibility
- ∂ > Houses
- රි > Climate
- රි ≻ Facade

The Why Factory What is the why factory?

EgoCity

Maximum desires, maximum density



The Why Factory

What is this years focus?

- ∂ > Site
- ∂ > Users
- ර ≻ Programme
- ර > Mass & void
- δ > Structure
- δ > Accessibility
- ර් > Houses
- δ > Climate
- ∂ > Facade

In the past 10 years, The Why Factory has explored -independently- a multitude of alternative approaches to the construction of the city and developed a wide array of scenarios: **Biodiversity** (Biodivercity), **Permeability** (Porocity), **Connectivity** (4minCity), **Automation** (Robotic City), **Density** (Vertical Village), **Sustainability** (Green Dream), **Freedom** (Anarcity), **Self Sufficiency** (Food City), **Flexibility** (Barba), **Customization**

(Egocity), Leisure (Absolute Leisure) and Inventions (World Wonders).



උ > Site

∂ > Users

- ∂ > Programme
- \eth > Mass & void
- δ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- ∂ > Facade

The Why Factory What is this years focus?

This year we will **combine** everything. On the scale of a home, a block, a neighborhood, a city, a region, the world.



The Why Factory How do we work?



∂ > Users

- ∂ > Programme
- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade

The Model Model Cities Program Onominanterinant The View Applications program

The Controller Software Program

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∂ > Site

- ර ≻ Users
- ∂ > Programme
- \eth > Mass & void
- δ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
- ∂ > Facade

The Why Factory How do we work?



The BlockMaker Hydroblock	The Why Fa The Blockma
ô > Site	
∂ > Users	
∂ > Programme	We use a S f

- ∂ > Mass & void
- රි ≻ Structure
- δ > Accessibility
- රි ≻ Houses
- රි ≻ Climate
- ∂ > Facade

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tep by Step method

Starting block

The BlockMaker Hydroblock	The Why Factory The Blockmaker			
රි > Site				
ට > Users				
∂ > Programme	To develop design opt i	ions		
ට > Mass & void				
∂ > Structure				
3 > Accessibility				
3 > Houses				

Twist 60°

Twist 90°

Twist 30°

Twist 0°

රි ≻ Climate

∂ > Facade

Twist 180°

Twist 135°

<u>11</u>

The BlockMaker Hydroblock	The Why Factory The Blockmaker					
∂ > Site						
∂ > Users						
∂ > Programme	We look at their corr	npactness				
ට් > Mass & void						
∂ > Structure						
∂ > Accessibility						
ර > Houses						
∂ > Climate		and the second s	and the	man A	and the	and the
∂ > Facade						

The BlockMaker	The Why Fa
Hydroblock	The Blockma
∂ > Site	

- උ > Users
- ∂ > Programme
- ð > Mass & void
- ∂ > Structure
- δ > Accessibility
- රි ≻ Houses
- රි ≻ Climate
- රි ≻ Facade

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We look at the **amount of light**



The BlockMaker Hydroblock	The Why Factory The Blockmaker
∂ > Site	
∂ > Users	
∂ > Programme	How close you are to a terrace
ට් > Mass & void	
ට ≻ Structure	
∂ > Accessibility	

- δ > Houses
- රි ≻ Climate
- ∂ > Facade

∂ > Site

∂ > Users

- ∂ > Programme
- δ > Mass & void
- ∂ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- රි ≻ Facade

The Why Factory The Blockmaker

And how well you can **look outside**

The BlockMaker
Hydroblock

∂ > Site

- ∂ > Users
- ∂ > Programme
- δ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- රි ≻ Climate
- ∂ > Facade

The Why Factory The Blockmaker

The results are **compared and evaluated**



<u>16</u>

The BlockMaker Hydroblock	The Why Factory The Blockmaker
∂ > Site∂ > Users	
ට් > Programme	The library of all design options, analysis and evaluators done this year is what we call The Blockmaker
 ô > Mass & void ô > Structure ô > Accessibility ô > Houses ô > Climate ô > Facade 	

The BlockMaker Hydroblock	The Why Factory The Blockmaker
∂ > Site	
∂ > Users	
∂ > Programme	In the video you sa
ට් > Mass & void	

∂ > Structure

 δ > Accessibility

∂ > Houses

රි ≻ Climate

∂ > Facade



mass

n the video you saw an **exploration on massing**

The BlockMaker Hydroblock	The Why Factory The Blockmaker
ô > Site	
∂ > Users	
∂ > Programme	A housing block is

- ∂ > Mass & void
- ∂ > Structure
- δ > Accessibility
- ර ≻ Houses
- රි ≻ Climate
- රි ≻ Facade

ck is about more, it has **a site, with a climate and users**





users

mass

The BlockMaker	The Why Factory
Hydroblock	The Blockmaker
∂ > Site	

- ර ≻ Users
- ∂ > Programme
- δ > Mass & void
- ∂ > Structure
- δ > Accessibility
- ∂ > Houses
- රි ≻ Climate
- රි ≻ Facade











climate

users

mass programme

houses

access

The BlockMaker Hydroblock	The Why Factory The Blockmaker
∂ > Site	
උ ≻ Users	
∂ > Programme	Finally we need a structure to build with and a facade to keep the rain out
ට් ≻ Mass & void	
∂ > Structure	
∂ > Accessibility	
∂ > Houses	
∂ > Climate	
∂ > Facade	$ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $

∂ > Site

- ∂ > Users
- ∂ > Programme
- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade



They all have their own set of **parameters**



plot







site climate location temperature climate humidity latitude topography typology longitude

users amount density age households distribution

calculation



houses

access position geometry type pattern clusters controls





facade

material principle grid calculator

structure

mass primitive transformation controls

<u>22</u>

programme primary secondary geometry pattern

clusters

controls

no. rooms area arrangement household

primary secondary geometry pattern clusters

shaders

∂ > Site

- ∂ > Users
- ∂ > Programme
- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade

The Why Factory The Blockmaker

To explore the relationship between the layers we apply a **scenario**





mass

<u>23</u>



solar



sport

houses





facade

structure

climate site

9

bio

infra



climate

The BlockMaker Hydroblock	The Why Factory The Blockmaker
ô > Site	
උ ≻ Users	
∂ > Programme	I'll be taking you through the Hydroblock
ට් > Mass & void	
∂ > Structure	
∂ > Accessibility	
∂ > Houses	bio food water solar sport infra climate access
∂ > Climate	
∂ > Facade	
	site climate users mass programme houses access facade structure
	locationtemperatureamountprimitiveprimaryno. roomspositionprimarymaterialclimatehumiditydensitytransformationsecondaryareageometrysecondaryprincipletopographylatitudeagecontrolsgeometryarrangementtypegeometrygridtypologylongitudehouseholdscalculationpatternhouseholdpatternpatterncalculatorplotdistributionclustersclustersclustersclustersclusterscontrolscontrolscontrolsshadersshaders

01. Hydroblock

What if we store water in an urban housing block?











The BlockMaker Hydroblock	Hydrobl e Research
ථ > Site	
ථ > Users	
∂ > Programme	
ර් > Mass & void	
∂ > Structure	
ô > Accessibility	
ô > Houses	
ô > Climate	
∂ > Facade	

∂ > Energy storage

 δ > Waterfalls

 \eth > Water purification

Iydroblock Research question

> What if an urban housing block **stores energy** in water reservoirs, **purifies used domestic water** and **offers the playful and scenic qualities** of water and its surrounding nature?

The BlockMaker Hydroblock	Hydroblock Collective starting point
උ > Site	
ථ > Users	
∂ > Programme	
ට් > Mass & void	
∂ > Structure	
∂ > Accessibility	
ට > Houses	
ට > Climate	
ට > Facade	
ට ≻ Energy storage	
∂ > Waterfalls	
∂ > Water purification	

						3517 kWh 0	100 m 0	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

The BlockMaker

Hydroblock

Site

What is the context?

$\partial \mathbf{\vee}$ Site

35 °C 100 x 100 m FAR 5.6

- δ > Users
- ර > Programme
- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- δ > Facade
- \Diamond > Energy storage
- δ > Waterfalls
- δ > Water purification

Reference projects

Plan Voisin, Paris Do Landtong, Bottordam	FAR 2.0
Standard block, Barcelona	FAR 5.6
Standard block, New York Standard block, Hong Kong	FAR 7.0 FAR 12.0

Location inputs

Demographics Density Climate

Water use per capita Energy use per capita

						7 kWh 0	m 0	nfull annoying good	0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

1 pa

💧 🗸 Site

35 °C 100 x 100 m FAR 5.6 ∂ ∨ Users 483 users

- 4 user groups ∂ > Programme
- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- රි > Houses
- ∂ > Facade
- ∂ > Energy storage
- ∂ > Waterfalls
- \Im > Water purification

Users

Who live in the Hydroblock?

85 m²

62 units

100 m²

40 units

130 m²

proximity light average light total terrace view 20 m view unobstructed potential energ water head household oustics
Hydroblock



Programme composition

What are the main programme layers?



100m o water head 100m potential energy proximity light average light total terrace view 20 m view unobstructed

/ household coustics

∂ > Water purification

3 > Waterfalls

Hydroblock

Site		
35 °C		
100 x 100 m	Λ	
FAR 5.6		Water
🕽 🗸 Users		
483 users		
4 user groups		
උ 🗸 Programme		
Water	\wedge	Housing
Housing		Tiousnig
උ 🗲 Mass & void		+ circulation
		+ construction
උ > Structure		
3 > Accessibility		
3 > Houses		Helofyte filters
		+ construction
3 > Climate		00110110001011

Solution
Solution</p

- ∂ > Energy storage
- ∂ > Waterfalls
- ∂ > Water purification

Programme composition What are the main programme layers?

266 000 m³

70 416 m³

101 223 m³



						3517 kWh 0	100 m 0	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock





- ∂ > Energy storage
- ∂ > Waterfalls
- \Im > Water purification

Programme composition

What are the main programme layers?

266 000 m³

70 416 m³

88 020 m³



						3517 kWh 0	100 m 0	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock



- ∂ > Facade
- \eth > Energy storage
- ∂ > Waterfalls
- δ > Water purification

Programme composition

What are the main programme layers?

266 000 m³

70 416 m³

88 020 m³

101 223 m³



						3517 kWh 0	100 m 0	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock





- ∂ > Climate
- ∂ > Facade
- ∂ > Energy storage
- ∂ > Waterfalls
- $\boldsymbol{\eth}$ > Water purification

Programme composition

+ construction

What are the main programme layers?



						3517 kWh 0	100 m 0	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock



- ථ > Houses
- δ > Climate
- δ > Facade
- ∂ > Energy storage
- δ > Water purification
- δ > Waterfalls

Programme composition

+ construction

What are the main programme layers?



1100 m³



						kWh 0	n 0	nfull[annoying] good	0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

1 3517 **The BlockMaker** (Y)our Block

02. Energy

What if we store energy with volumes of water?



system efficiency 60-70%





/ household
 acoustics
 potential energy
 proximity
 light average
 light total
 terrace
 view 20 m





water head potential energy proximity light average light total terrace view 20 m view unobstructed

/ household





/ household
 acoustics
 water head
 potential energy
 proximity
 light total
 terrace
 view 20 m
 view unobstructed





						3517 kWh 0	100 m 0	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

💧 🗸 Site 35 °C 100 x 100 m FAR 5.6 💧 🗸 Users 483 users 4 user groups ▲ ∨ Programme Water Housing Helofyte filters ∂ > Mass & void

- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade

\Diamond \checkmark Energy storage

- ∂ > Waterfalls
- \Im > Water purification

Energy storage What is the influence of height? Potential energy of 44 000 m³ water At 0 m height 7000 kWh 0 kWh



						3517 kWh 0	100 m	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

35 °C 100 x 100 m FAR 5.6

483 users 4 user groups

Water Housing

Helofyte filters

🔒 🗸 Site

💧 🗸 Users

▲ ∨ Programme

 ∂ > Mass & void

Energy storage What is the influence of height?

Potential energy of 44 000 m³ water





0 kWh

 ∂ > Accessibility

∂ > Structure

∂ > Houses

∂ > Climate

∂ > Facade

\bigcirc \checkmark Energy storage

∂ > Waterfalls

 ∂ > Water purification

35 °C 100 x 100 m FAR 5.6

483 users 4 user groups

Water Housing Helofyte filters

🔒 🗸 Site

💧 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

∂ > Structure

∂ > Houses

∂ > Climate

∂ > Facade

er Energy storage What is the influence of height?

Potential energy of 44 000 m³ water





- ô **∨ Energy storage**
- δ > Waterfalls
- δ > Water purification

35 °C 100 x 100 m FAR 5.6

483 users 4 user groups

Water Housing Helofyte filters

🔒 🗸 Site

💧 🗸 Users

▲ ∨ Programme

 ∂ > Mass & void

 ∂ > Accessibility

∂ > Structure

∂ > Houses

∂ > Climate

∂ > Facade

Energy storage What is the influence of height?

Potential energy of 44 000 m³ water

7000 kW
7000 kW
7000 kW
7000 kW
7000 1-747
7000 KVV



water head potential energy proximity light average light total terrace view 20 m view unobstructed

/ household
acoustics

∂ > Waterfalls

 \Diamond \checkmark Energy storage

 δ > Water purification

35 °C 100 x 100 m FAR 5.6

483 users

Water Housing

🔒 🗸 Site

💧 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

ර ≻ Structure

∂ > Houses

∂ > Climate

∂ > Facade

∂ > Waterfalls

 \bigcirc \checkmark Energy storage

 \Im > Water purification

Energy storage What is the influence of height?

Potential energy of 44 000 m³ water





water head potential energy proximity hight average hight total terrace view 20 m view unobstructed acoustics / household

35 °C 100 x 100 m FAR 5.6

483 users

Water Housing

💧 🗸 Site

♦ Vusers

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

ර ≻ Structure

∂ > Houses

∂ > Climate

∂ > Facade

∂ > Waterfalls

 \bigcirc \checkmark Energy storage

 \Im > Water purification

Energy storage What is the influence of height?

Potential energy of 44 000 m³ water





water head potential energy proximity hight average hight total terrace view 20 m view unobstructed acoustics / household

Energy storage

What is the influence of height?



- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- \Diamond \checkmark Energy storage
- δ > Waterfalls
- \eth > Water purification



♦ V Site 35 °C 100 x 100 m FAR 5.6 ♦ VUsers 483 users 4 user groups

- Programme
 Water
 Housing
 Helofyte filters
- \eth > Mass & void
- δ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- ∂ ► Energy storage
 3571 kWh
 ∂ > Water purification
- δ > Waterfalls

How much do we need?

Energy storage



One person 5401 kWh/year



384 persons 2 608 683 kWh/year



12-hour storage **3571 kWh: 14 600 m³ of water**



								infull[annoying] good	0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

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Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Water

∂ > Structure

 δ > Accessibility

රි ≻ Houses

 δ > Climate

 δ > Facade

∂ ➤ Energy storage 3571 kWh ∂ > Water purification

 ∂ > Waterfalls



Energy storage

How can create potential to integrate with other programme?

Walla







						3517 kWh	100 m	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Mass & void

∂ > Structure

 δ > Accessibility

∂ > Houses

 δ > Climate

 δ > Facade

∂ ➤ Energy storage 3571 kWh ∂ > Water purification

∂ > Waterfalls



Energy storage

How can create potential to integrate with other programme?



Skeleton



						3517 kWh	100 m	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Water Mass & void

∂ > Structure

 δ > Accessibility

රි ≻ Houses

 δ > Climate

 δ > Facade

∂ ➤ Energy storage 3571 kWh ∂ > Water purification

ර ≻ Waterfalls



Energy storage

How can create potential to integrate with other programme?



Nalls







						3517 kWh	100	painfull[annoying] good	1
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Mass & void

∂ > Structure

 ∂ > Accessibility

රි ≻ Houses

 δ > Climate

 δ > Facade

Ô **✓ Energy storage** 3571 kWh

 δ > Waterfalls

 δ > Water purification

Energy storage

How can create potential to integrate with other programme?











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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

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Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Mass & void

∂ > Structure

 δ > Accessibility

රි ≻ Houses

 δ > Climate

 δ > Facade

Ô **✓ Energy storage** 3571 kWh

 δ > Waterfalls

 δ > Water purification

Energy storage

How can create potential to integrate with other programme?





Valls







						3517 kWh		painfull[annoying] good	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock



- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- \Diamond \checkmark Energy storage 3571 kWh
- ∂ > Waterfalls
- ∂ > Water purification

Energy storage

What is the influence of height?







Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing

Helofyte filters Water **ð > Mass & void**

- δ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- ∂ **≻ Energy storage** 3571 kWh
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- \eth > Water purification

Energy storage How much do we need?



One person 5401 kWh/year



384 persons 2 608 683 kWh/year



12-hour storage **3571 kWh: 44 000 m³ of water**



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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage





- ∂ > Structure
- δ > Accessibility
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Hydroblock

Energy storage



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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage



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							100 m	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage

How can the water be integrated with other programme?



- \eth > Mass & void
- ∂ > Structure
- ∂ > Accessibility
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- Ô **✓ Energy storage** 3571 kWh
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Columns





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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage



- ∂ > Mass & void
- ∂ > Structure
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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage



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- ∂ > Structure
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- රි ≻ Houses
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view unobstructe	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	#/household

Hydroblock

Energy storage

How can the water be integrated with other programme?



රි > Structure

- ∂ > Accessibility
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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage

How can the water be integrated with other programme?



- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- \bigcirc \checkmark Energy storage 3571 kWh
- ∂ > Waterfalls
- δ > Water purification











								painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage

How can the water be integrated with other programme?



- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- \bigcirc \checkmark Energy storage 3571 kWh
- ∂ > Waterfalls
- δ > Water purification











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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household
Hydroblock

Energy storage

How can the water be integrated with other programme?



- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- \bigcirc \checkmark Energy storage 3571 kWh
- ∂ > Waterfalls
- δ > Water purification











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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage



- ∂ > Mass & void
- ∂ > Structure
- δ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- δ > Facade
- Ô **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- \Im > Water purification











								painfull[annoying] good	12
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage

How can the water be integrated with other programme?



- \eth > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- δ > Facade
- ∂ **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- \eth > Water purification











								annoying good	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

painful

Hydroblock

Energy storage

How can the water be integrated with other programme?



- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- δ > Facade
- ∂ **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification













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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

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Hydroblock

Energy storage



- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- δ > Facade
- ∂ **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification













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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage

How can the water be integrated with other programme?





∂ > Structure

 ∂ > Accessibility

රි ≻ Houses

∂ > Climate

 δ > Facade

Ô **✓ Energy storage** 3571 kWh

 δ > Waterfalls

 δ > Water purification



Walls









								painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage

How can the water be integrated with other programme?





∂ > Structure

- δ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- δ > Facade
- ∂ **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification













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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage

How can the water be integrated with other programme?



- ∂ > Mass & void
- ∂ > Structure
- δ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- δ > Facade
- ∂ **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification







Columns





								painfull[annoying] good	1
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage



- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- δ > Facade
- ∂ **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification













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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage





- ∂ > Structure
- δ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- δ > Facade
- ∂ **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- \Im > Water purification













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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Energy storage

How can the water be integrated with other programme?



- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- δ > Facade
- Ô **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification













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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

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Hydroblock

Energy storage

How can the water be integrated with other programme?



- δ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- δ > Facade
- ∂ **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification











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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

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Hydroblock

Energy storage



- δ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- δ > Houses
- ∂ > Climate
- ∂ > Facade
- Ô **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification











								painfull[annoying] good		
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

Hydroblock



∂ > Structure

- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ∂ **≻ Energy storage** 3571 kWh
- δ > Waterfalls
- \Im > Water purification

Energy storage











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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

Hydroblock





- ∂ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- ∂ > Facade
- ∂ **≻ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification

Energy storage

How can the water be integrated with other programme?











/ nousenoid
 water head
 potential energy
 proximity
 light average
 light total
 terrace
 view 20 m
 view unobstructed

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Mass & void

- ∂ > Structure
- ∂ > Accessibility
- රි ≻ Houses
- δ > Climate
- δ > Facade
- Ô **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- \Im > Water purification

Energy storage











Site 35 °C 100 x 100 m FAR 5.6 VUsers 483 users 4 user groups VProgramme Housing Helofyte filters Water

- ර් > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- රි ≻ Houses
- δ > Climate
- δ > Facade
- ∂ **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification

Energy storage

How can the water be integrated with other programme?











/ household acoustics water head potential energy



- ∂ > Structure
- ∂ > Accessibility
- රි ≻ Houses
- δ > Climate
- δ > Facade
- ∂ **≻ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification

Energy storage

How can the water be integrated with other programme?









/ household acoustics water head potential energy



- ∂ > Structure
- ∂ > Accessibility
- රි ≻ Houses
- δ > Climate
- δ > Facade
- Ô **✓ Energy storage** 3571 kWh
- δ > Waterfalls
- δ > Water purification

Energy storage



03. Waterfalls

What if we would live in a waterfall block?

Hydroblock

roblock

Waterfalls

Add the rest of the programme

- ♦ ✓ Site 35 °C 100 x 100 m FAR 5.6
- 🔒 🗸 Users
 - 483 users 4 user groups
- 4 user groups
 ♦ V Programme
 - Housing Helofyte filters
 - Water
- \eth > Mass & void
- ∂ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
- $\Diamond \textbf{ \lor Waterfalls}$
- δ > Water purification



						3517 kWh 0	100 m	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

The BlockMaker Waterfalls Hydroblock What do we need? 🔒 🗸 Site 35 °C 100 x 100 m FAR 5.6 🔒 🗸 Users 483 users 4 user groups ▲ ∨ Programme Housing Helofyte filters Water Refreshment rate ∂ > Mass & void 20 % ර ≻ Structure Liters per hour per 10 cm 3600 Lph ∂ > Accessibility Flow thickness 25 mm ∂ > Houses Micro Francis turbine ∂ > Climate 70% efficiency ∂ > Facade ♦ V Energy storage 3571 kWh $\partial \sim Waterfalls$ 20 % 3600 Lph/10cm 25 mm ∂ > Water purification



/ household
 acoustics
 water head
 potential energy
 proximity
 light average
 light total
 terrace
 view 20 m
 view unobstructed

💧 🗸 Site

Waterfalls

How do we create height?

35 °C 100 x 100 m FAR 5.6 ♦ ✓ Users 483 users 4 user groups ♦ ✓ Programme Housing Helofyte filters Water

 δ > Mass & void

∂ > Structure

 ∂ > Accessibility

රි ≻ Houses

 δ > Climate

∂ > Facade

Energy storage 3571 kWh

 $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



						3517 kWh 0	100 m	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

💧 🗸 Site

Waterfalls

How do we create height?

35 °C 100 x 100 m FAR 5.6 ♦ ✓ Users 483 users 4 user groups ♦ ✓ Programme Housing Helofyte filters Water

 δ > Mass & void

∂ > Structure

 ∂ > Accessibility

රි ≻ Houses

 δ > Climate

∂ > Facade

Energy storage 3571 kWh

 $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

🔒 🗸 Site

Waterfalls

How do we create height?

35 °C 100 x 100 m FAR 5.6 ♦ ✓ Users 483 users 4 user groups ♦ ✓ Programme Housing Helofyte filters Water

 δ > Mass & void

∂ > Structure

 ∂ > Accessibility

රි ≻ Houses

 δ > Climate

∂ > Facade

Energy storage 3571 kWh

 \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



						3517 kWh 0	100 m	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

🔒 🗸 Site

Waterfalls

How do we create height?

35 °C 100 x 100 m FAR 5.6 ♦ ✓ Users 483 users 4 user groups ♦ ✓ Programme Housing Helofyte filters Water

 δ > Mass & void

∂ > Structure

 ∂ > Accessibility

රි ≻ Houses

 δ > Climate

∂ > Facade

Energy storage 3571 kWh

ô **∨ Waterfalls** 20 %

3600 Lph/10cm 25 mm

 δ > Water purification



						kWh 0	m	nfull annoying good	0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

351 100

🔒 🗸 Site

Waterfalls

How do we create height?

100 x 100 m FAR 5.6 ◆ ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water

35 °C

 δ > Mass & void

∂ > Structure

 ∂ > Accessibility

රි ≻ Houses

∂ > Climate

∂ > Facade

Energy storage 3571 kWh

 $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



						3517 kWh 0	100 1	painfull[annoying] good	1 0
view unobstructe	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	#/household

🔒 🗸 Site

Waterfalls

How do we create height?

100 x 100 m FAR 5.6 ♦ ∨ Users 483 users 4 user groups ♦ ∨ Programme Housing Helofyte filters Water

35 °C

 ∂ > Mass & void

∂ > Structure

 ∂ > Accessibility

රි ≻ Houses

∂ > Climate

∂ > Facade

Energy storage 3571 kWh

 $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



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view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

361 pa

The BlockMaker Waterfalls Hydroblock Apply the floor slabs 🔒 🗸 Site 35 °C 100 x 100 m FAR 5.6 🔒 🗸 Users 483 users 4 user groups ▲ ∨ Programme Housing Helofyte filters Water ∂ > Mass & void ∂ > Structure ∂ > Accessibility ∂ > Houses ∂ > Climate 100 m 10010 ∂ > Facade ♦ V Energy storage 3571 kWh \Diamond \checkmark Waterfalls 20 % 3600 Lph/10cm 25 mm ∂ > Water purification



2

Waterfalls

How can we create platforms?



- ∂ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

 \eth > Water purification





Shift single direction









Waterfalls

How can we create platforms?





- ∂ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification





Shift single direction









Waterfalls

How can we create platforms?





- δ > Accessibility
- ∂ > Houses

 δ > Climate

- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm ∂ > Water purification





Shift single direction









Waterfalls

How can we create platforms?



∂ > Structure

 ∂ > Accessibility

∂ > Houses

 δ > Climate

 δ > Facade

Energy storage 3571 kWh

 $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification





Shift single direction









Waterfalls

How can we create platforms?



- ∂ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm ∂ > Water purification





Shift single direction









Waterfalls

How can we create platforms?



- ථ > Structure
- \eth > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification





Shift single direction









Waterfalls

How can we create platforms?



- ∂ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm







Shift single direction








Waterfalls

How can we create platforms?



- δ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm







Shift single direction









Waterfalls

How can we create platforms?



- δ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\partial \sim Waterfalls$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification





Shift single direction









Waterfalls

How can we create platforms?



- δ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\delta \sim Waterfalls$

20 % 3600 Lph/10cm 25 mm







Shift single direction









Waterfalls

How can we create platforms?



- δ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification





Shift single direction









Waterfalls

How can we create platforms?



- ∂ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm







Shift single direction





Twist





Waterfalls

How can we create platforms?



- ∂ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm















Waterfalls

How can we create platforms?



- ∂ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification













Waterfalls

How can we create platforms?



- ∂ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification













Waterfalls

How can we create platforms?





- \eth > Accessibility
- ∂ > Houses

 δ > Climate

- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm















Waterfalls

How can we create platforms?



- \eth > Accessibility
- ∂ > Houses

 δ > Climate

- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm ∂ > Water purification













Waterfalls

How can we create platforms?



- \eth > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm ∂ > Water purification













Waterfalls

How can we create platforms?



- \eth > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm ∂ > Water purification













Waterfalls

How can we create platforms?



- δ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\partial \sim Waterfalls$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification













Waterfalls

How can we create platforms?



- δ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm ∂ > Water purification













Waterfalls

How can we create platforms?



- \eth > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification













35 °C 100 x 100 m FAR 5.6

483 users 4 user groups

Housing Helofyte filters

Water

🔒 🗸 Site

🔒 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

∂ > Structure

∂ > Houses

∂ > Climate

∂ > Facade

Waterfalls

How can we create platforms?



Energy storage 3571 kWh

∂ ✓ Waterfalls
 20 %
 3600 Lph/10cm
 25 mm
 ∂ > Water purification

Waterfalls

How can we create platforms?



- δ > Structure
- ∂ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- Ô ✓ Waterfalls 20 % 3600 Lph/10cm 25 mm
- ∂ > Water purification





Waterfalls

How can we create platforms?



- \eth > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- ∂ **∨ Waterfalls** 20 % 3600 Lph/10cm 25 mm
- ∂ > Water purification



Waterfalls

How can we create platforms?

potential energy



- රි ≻ Structure
- ∂ > Accessibility
- රි ≻ Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- ∂ **∨ Waterfalls** 20 % 3600 Lph/10cm
 - 25 mm
- \eth > Water purification









Waterfalls

How can we create platforms?



 ∂ > Accessibility

∂ > Houses

 δ > Climate

 δ > Facade

Energy storage 3571 kWh

 $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification









Waterfalls

How can we create platforms?



 ∂ > Accessibility

∂ > Houses

 δ > Climate

- δ > Facade
- Energy storage 3571 kWh

 $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

δ > Water purification





Double side





Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water

- \eth > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 \eth > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?











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 a coustics
 water head
 potential energy
 proximity
 light average
 light total
 terrace
 view 20 m

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water

- \eth > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 \eth > Water purification

Waterfalls













Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water

- \eth > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 \eth > Water purification

Waterfalls













Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water

- \eth > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 \eth > Water purification

Waterfalls













Site
 35 °C
 100 x 100 m
 FAR 5.6
 ✓ Users
 483 users
 4 user groups
 ✓ Programme
 Housing
 Helofyte filters
 Water

 \eth > Mass & void

∂ > Structure

 ∂ > Accessibility

 δ > Houses

 δ > Climate

 δ > Facade

Energy storage 3571 kWh

 $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?











yennullenroynel ood # / household pennullenroynel ood accustics water head potential energy picximity light average light total terrace view 20 m view unobstructed



- ∂ > Mass & void
- ර ≻ Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ♦ Y Energy storage 3571 kWh
- $\partial \sim Waterfalls$

20 % 3600 Lph/10cm 25 mm

 ∂ > Water purification

Waterfalls















- ∂ > Mass & void
- ර ≻ Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ♦ Y Energy storage 3571 kWh
- $\partial \sim Waterfalls$

20 % 3600 Lph/10cm 25 mm

 ∂ > Water purification

Waterfalls















- ∂ > Mass & void
- ර ≻ Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ♦ Y Energy storage 3571 kWh
- $\partial \sim Waterfalls$

20 % 3600 Lph/10cm 25 mm

 ∂ > Water purification

Waterfalls















- ∂ > Mass & void
- ර ≻ Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ♦ Y Energy storage 3571 kWh
- $\partial \sim Waterfalls$

20 % 3600 Lph/10cm 25 mm

 ∂ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?











water head potential energy proximity light average light total terrace view 20 m view unobstructed acoustics / household



- ∂ > Mass & void
- ර ≻ Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ♦ Y Energy storage 3571 kWh
- $\partial \sim Waterfalls$

20 % 3600 Lph/10cm 25 mm

 ∂ > Water purification

Waterfalls













♦ ✓ Site 35 °C 100 x 100 m FAR 5.6 ♦ ✓ Users 483 users 4 user groups

Programme
 Housing
 Helofyte filters
 Water

- δ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 \eth > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?











yennulpungyngi good acoustics water head potential energy proximity light average light total terrace view 20 m

Waterfalls













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- ∂ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm



Waterfalls













♦ Site 35 °C 100 x 100 m FAR 5.6 ♦ VUsers 483 users

∂ > Mass & void

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Energy storage 3571 kWh

 $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?











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Energy storage 3571 kWh

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Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?











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 δ > Mass & void

∂ > Structure

 ∂ > Accessibility

 δ > Houses

 δ > Climate

 δ > Facade

Energy storage 3571 kWh

 $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?













Site
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 FAR 5.6
 ✓ Users
 483 users
 4 user groups
 ✓ Programme
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 Helofyte filters
 Water
 Mass & void

ර ≻ Structure

 ∂ > Accessibility

∂ > Houses

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Energy storage 3571 kWh

 \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

 δ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?













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 δ > Houses

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 δ > Facade

Energy storage 3571 kWh

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20 % 3600 Lph/10cm 25 mm

 δ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?











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- ර ≻ Structure
- ∂ > Accessibility
- δ > Houses
- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
- $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?











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 ∂ > Mass & void

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- ∂ > Accessibility
- δ > Houses
- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

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Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?











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- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- δ > Facade

Energy storage 3571 kWh

∂ ∨ Waterfalls 20 %

3600 Lph/10cm 25 mm

 δ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?





💧 🗸 Site 35 °C 100 x 100 m FAR 5.6 🔒 🗸 Users 483 users 4 user groups ▲ ∨ Programme Housing Helofyte filters Water ∂ > Mass & void

- ∂ > Structure
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- ∂ > Houses
- ∂ > Climate
- ∂ > Facade

♦ V Energy storage 3571 kWh

 $\partial \sim Waterfalls$ 20 %

> 3600 Lph/10cm 25 mm

 ∂ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?







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- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ♦ V Energy storage 3571 kWh
- $\partial \sim Waterfalls$ 20 % 3600 Lph/10cm
- 25 mm ∂ > Water purification

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?



/ household acoustics water head potential energy





- ට ≻ Structure
- ∂ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- ∂ ∨ Waterfalls 20 % 3600 Lph/10cm
 - 25 mm
- \eth > Water purification

Waterfalls

potential energy

How can we stack the elements to create terraces, coves and cantilevers?









Hydroblock

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?





- δ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification







Skeleton







Hydroblock

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∂ > Accessibility

∂ > Structure

∂ > Houses

 δ > Climate

 δ > Facade

Energy storage 3571 kWh

 $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification





Walls



Skeleton



Combination





Hydroblock

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?



- ∂ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification











Combination





Hydroblock

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?



∂ > Structure

 ∂ > Accessibility

∂ > Houses

∂ > Climate

∂ > Facade

♦ V Energy storage 3571 kWh

 $\partial \sim Waterfalls$

20 % 3600 Lph/10cm 25 mm



 ∂ > Water purification



Skeleton







Hydroblock

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?



∂ > Structure

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- ∂ > Houses

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Energy storage 3571 kWh

 $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification





Walls



Skeleton







Hydroblock

Waterfalls

How can we stack the elements to create terraces, coves and cantilevers?





∂ > Structure

- ∂ > Accessibility
- δ > Houses

 δ > Climate

- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm ∂ > Water purification





Walls



Skeleton







Impression

How does the water flows down?





- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- Ô ✓ Waterfalls 20 % 3600 Lph/10cm 25 mmÔ > Water purification



Waterfalls

How can we create platforms?



- ∂ > Structure
- ∂ > Accessibility
- රි ≻ Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- ∂ ∨ Waterfalls 20 % 3600 Lph/10cm
 - 25 mm
- \eth > Water purification







/ household acoustics water head potential energy

/ household acoustics water head potential energy

💧 🗸 Site

Waterfalls

How can we create platforms?

35 °C 100 x 100 m FAR 5.6 ♦ ✓ Users 483 users 4 user groups ♦ ✓ Programme Housing Helofyte filters Water

 δ > Mass & void

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∂ > Facade

Energy storage 3571 kWh

ô **∨ Waterfalls** 20 %

3600 Lph/10cm 25 mm

 δ > Water purification



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Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme

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- \eth > Mass & void
- ∂ > Structure
- ∂ > Accessibility

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- δ > Climate
- δ > Facade

Energy storage 3571 kWh

 \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



Can every apartment have a private

Waterfalls

waterfall?







Hydroblock

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∂ > Structure

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 δ > Climate

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Energy storage 3571 kWh

 $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



Can every apartment have a private

Waterfalls

waterfall?







water head potential energy proximity hight average hight total terrace view 20 m view unobstructed

Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water ♦ Mass & void

- ∂ > Structure
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- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



Can every apartment have a private

Waterfalls

waterfall?









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- ∂ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\Diamond \mathbf{\, \bigvee \, Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



Can every apartment have a private

Waterfalls

waterfall?







/ household
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Hydroblock

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- ∂ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
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Can every apartment have a private

Waterfalls

waterfall?







water head potential energy proximity light average light total terrace view 20 m view unobstructed

Hydroblock

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Energy storage 3571 kWh

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20 % 3600 Lph/10cm 25 mm

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Can every apartment have a private

Waterfalls

waterfall?





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> water head potential energy proximity hight average hight total terrace view 20 m view unobstructed

Hydroblock

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Energy storage 3571 kWh

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Can every apartment have a private

Waterfalls

waterfall?







water head potential energy proximity hight average hight total terrace view 20 m view unobstructed

Hydroblock

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∂ > Houses

- δ > Climate
- δ > Facade

Energy storage 3571 kWh

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20 % 3600 Lph/10cm 25 mm

 δ > Water purification



Can every apartment have a private

Waterfalls

waterfall?







water head potential energy proximity light average light total terrace view 20 m view unobstructed

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Hydroblock

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Energy storage 3571 kWh

 \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



Can every apartment have a private

Waterfalls

waterfall?







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Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water ⑦ > Mass & void

∂ > Structure

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 δ > Climate

 δ > Facade

Energy storage 3571 kWh

 \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

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Can every apartment have a private

Waterfalls

waterfall?







/ household
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Hydroblock

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Energy storage 3571 kWh

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Can every apartment have a private

Waterfalls

waterfall?







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Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Mass & void

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Energy storage 3571 kWh

 \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



Can every apartment have a private

Waterfalls

waterfall?







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Hydroblock

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Mass & void

∂ > Structure

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 δ > Climate

 δ > Facade

Energy storage 3571 kWh

 \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



Can every apartment have a private

Waterfalls

waterfall?







Waterfalls

Can every apartment have a private waterfall?



- ∂ > Mass & void
- ∂ > Structure
- δ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- δ > Facade
- Energy storage 3571 kWh
- $\bigcirc \mathbf{\lor Waterfalls}$

20 % 3600 Lph/10cm 25 mm

 \eth > Water purification





🔒 🗸 Site 35 °C 100 x 100 m FAR 5.6 🔒 🗸 Users 483 users 4 user groups ▲ ∨ Programme Housing Helofyte filters Water ∂ > Mass & void

- ර ≻ Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ♦ V Energy storage 3571 kWh

ට **∨ Waterfalls** 20 % 3600 Lph/10cm

25 mm

 ∂ > Water purification

Waterfalls

Can every apartment have a private waterfall?











Hydroblock



- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ♦ V Energy storage 3571 kWh
- $\partial \sim Waterfalls$ 20 %

3600 Lph/10cm 25 mm

 ∂ > Water purification



Waterfalls

waterfall?





Hydroblock

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∂ > Structure

 δ > Accessibility

රි ≻ Houses

- δ > Climate
- δ > Facade

Energy storage 3571 kWh

 \Diamond \checkmark Waterfalls

20 % 3600 Lph/10cm 25 mm

 δ > Water purification



Can every apartment have a private

Waterfalls

waterfall?







04. Water purification

What if the block would have a self sustainable water purification system?


0.05 m³

0.07 m³

0.08 m³

0.04 m³

3571 kWh

♦ ∨ Waterfalls 20 % 3600 Lph/10cm 25 mm

 ∂ \checkmark Water purification



water head potential energy proximity light average hight total terrace view 20 m view unobstructed coustics / household



3600 Lph/10cm 25 mm $\partial \mathbf{\vee}$ Water purification 57.3 m³



57 429 L **57.4** m³ Potable 23.2 m³ Grey 34.2 m³ Waste

Black

41.1 m³ 16.3 m³



water head potential energy proximity light average light total terrace view 20 m view unobstructed coustics / household



3600 Lph/10cm 25 mm ∂ \checkmark Water purification 57.3 m³

118,9 L 0.12 m³		
Potable	$0.05 \ {m^3}$	
Grey	0.07 m^3	
Waste		
Black		



57 429 L **57.4** m³ Potable 23.2 m³ Grey 34.2 m³

Waste

Black

41.1 m³ 16.3 m³



water head potential energy proximity light average hight total terrace view 20 m view unobstructed coustics / household



3600 Lph/10cm 25 mm $\partial \mathbf{\vee}$ Water purification 57.3 m³





57 429 L **57.4** m³ Potable 23.2 m³ Grey 34.2 m³ Waste

Black

41.1 m³ 16.3 m³



water head potential energy proximity light average light total terrace view 20 m view unobstructed coustics / household



3571 kWh ♦ ∨ Waterfalls 20 %

3600 Lph/10cm 25 mm $\partial \mathbf{\vee}$ Water purification 57.3 m³



57 429 L **57.4** m³ Potable 23.2 m³ Grey 34.2 m³ 41.1 m³ Waste 16.3 m³ Black



water head potential energy proximity light average light total terrace view 20 m view unobstructed coustics / household



Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Mass & void

- ∂ > Structure
- δ > Accessibility
- රි ≻ Houses
- ∂ > Climate
- δ > Facade
- Energy storage 3571 kWh
- ♦ ∨ Waterfalls

20 % 3600 Lph/10cm 25 mm Ô ✓ Water purification 57.3 m³

Water purification What do we need?





						7 kWh 0	m 0	nfull annoying good	0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

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- ∂ > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade

♦ V Energy storage 3571 kWh

♦ ∨ Waterfalls

20 % 3600 Lph/10cm 25 mm $\partial \mathbf{\vee}$ Water purification 57.3 m³

_	
Sewage ta	ar

167 m³

Water purification

What do we need?



Helofyte filters 957 m³

Potable Grey Waste

Black







	57.4 m ³
57.4 m ³	

/ 100 m 10010

> water head potential energy proximity light average light total terrace view 20 m view unobstructed coustics / household

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Mass & void

- δ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
- ♦ Waterfalls

 20 %
 3600 Lph/10cm
 25 mm
 ♦ Water purification
 57.3 m³



rage tank **m³**

Water purification

What do we need?

16.3 m³

957 m ³		
Potable		
Grey		57
Waste	57.4 m^{3}	
Black		

Reversed osmose filter **34.2 m³**

Potable		23.2 m ³
Grey	23.2 m ³	
Waste		
Black		



acoustics
 acoustics
 potential energy
 proximity
 light average
 light total
 terrace
 view 20 m





- δ > Structure
- δ > Accessibility
- ∂ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- ♦ Waterfalls

 20 %
 3600 Lph/10cm
 25 mm
 ♦ Water purification
 57.3 m³

Water purification













				İ		617 kWh 0	100 m 0	painfull[annoying] good	0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	



- ∂ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
- ♦ Waterfalls

 20 %
 3600 Lph/10cm
 25 mm
 ♦ Water purification
 57.3 m³

Water purification

Can we give every apartment their own treatment plant?













water head potential energy proximity light average light total terrace view 20 m view unobstructed

/ household coustics



- ∂ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- ♦ Waterfalls

 20 %
 3600 Lph/10cm
 25 mm
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 57.3 m³

Water purification

















- ∂ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
- ∂ > Facade
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- ♦ Waterfalls

 20 %
 3600 Lph/10cm
 25 mm
 ♦ Water purification
 57.3 m³

Water purification

Can we give every apartment their own treatment plant?













water head potential energy proximity light average light total terrace view 20 m view unobstructed

/ household acoustics



- ∂ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
- ∂ > Facade
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- ♦ Waterfalls

 20 %
 3600 Lph/10cm
 25 mm
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 57.3 m³

Water purification

















- ∂ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
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 20 %
 3600 Lph/10cm
 25 mm
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 57.3 m³

Water purification

Can we give every apartment their own treatment plant?













water head potential energy proximity light average light total terrace view 20 m view unobstructed

/ household acoustics



- ර > Structure
- ∂ > Accessibility
- ∂ > Houses
- ∂ > Climate
- ∂ > Facade
- ♦ V Energy storage 3571 kWh
- ♦ ∨ Waterfalls 20 % 3600 Lph/10cm 25 mm $\partial \mathbf{\vee}$ Water purification



57.3 m³

Water purification















- ∂ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
- ♦ Waterfalls

 20 %
 3600 Lph/10cm
 25 mm
 ♦ Water purification
 57.3 m³

Water purification













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- ∂ > Structure
- δ > Accessibility
- δ > Houses
- δ > Climate
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- ♦ Waterfalls

 20 %
 3600 Lph/10cm
 25 mm
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 57.3 m³

Water purification

















- ∂ > Structure
- ∂ > Accessibility
- δ > Houses
- ∂ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
- ♦ Waterfalls

 20 %
 3600 Lph/10cm
 25 mm
 ♦ Water purification
 57.3 m³

Water purification



05. Living with water

What if you would live in a hydroblock?

Housing

Graph type

Can we diversify the programme height?



Programme Housing Helofyte filters Water

- δ > Mass & void
- ∂ > Structure
- δ > Accessibility
- \Diamond \checkmark Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
 Waterfalls 20 % 3600 Lph/10cm 25 mm
- Water purification 57.3 m³









Square root





35 °C

100 x 100 m FAR 5.6

483 users 4 user groups

Housing Helofyte filters

Water

🔒 🗸 Site

🔒 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

ර ≻ Structure

∂ ∨ Houses

∂ > Climate

∂ > Facade

♦ V Energy storage

 \bullet VWater purification

 \bullet \checkmark Waterfalls

3571 kWh

3600 Lph/10cm

20 %

25 mm

57.3 m³

Housing

Can we diversify the programme height?







Parabolic



Square roo





35 °C

100 x 100 m FAR 5.6

483 users 4 user groups

Housing Helofyte filters

Water

🔒 🗸 Site

🔒 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

ර ≻ Structure

∂ ∨ Houses

∂ > Climate

∂ > Facade

♦ V Energy storage

 \bullet VWater purification

3571 kWh

3600 Lph/10cm

20 %

25 mm

57.3 m³

Housing

Can we diversify the programme height?









Square roo





Housing

Can we diversify the programme height?



gramme Housing Helofyte filters Water

- \eth > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- \Diamond \checkmark Houses
- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
 Waterfalls 20 % 3600 Lph/10cm 25 mm
 Water purification

57.3 m³









Square root



acoustics
 water head
 potential energy
 light average
 light total
 terrace
 view 20 m

Housing

Can we diversify the programme height?



gramme Housing Helofyte filters Water

- \eth > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- \Diamond \checkmark Houses
- δ > Climate
- δ > Facade





Lineair







Square root



acoustics water head potential energy light average light total terrace view 20 m

35 °C

100 x 100 m FAR 5.6

483 users 4 user groups

Housing Helofyte filters

Water

🔒 🗸 Site

🔒 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

ර ≻ Structure

∂ ∨ Houses

∂ > Climate

∂ > Facade

♦ V Energy storage

 \bullet \checkmark Water purification

3571 kWh

3600 Lph/10cm

20 %

25 mm

57.3 m³

Housing

Can we diversify the programme height?









Square root



/ household
acoustics
water head
potential energy
pioximity
light average
light total
terrace
view 20 m
view unobstructed

35 °C

100 x 100 m FAR 5.6

483 users 4 user groups

Housing Helofyte filters

Water

🔒 🗸 Site

🔒 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

ර ≻ Structure

∂ ∨ Houses

∂ > Climate

∂ > Facade

♦ V Energy storage

 \bullet \checkmark Water purification

3571 kWh

3600 Lph/10cm

20 %

25 mm

57.3 m³

Housing

Can we diversify the programme height?









Square root





35 °C

100 x 100 m FAR 5.6

483 users 4 user groups

Housing Helofyte filters

Water

🔒 🗸 Site

🔒 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

ර ≻ Structure

∂ ∨ Houses

∂ > Climate

∂ > Facade

♦ V Energy storage

 \bullet \checkmark Water purification

3571 kWh

3600 Lph/10cm

20 %

25 mm

57.3 m³

Housing

Can we diversify the programme height?









Square root





Housing

Can we diversify the programme height?



Programme Housing Helofyte filters Water

- δ > Mass & void
- ∂ > Structure
- ∂ > Accessibility
- \Diamond \checkmark Houses
- δ > Climate
- δ > Facade











Square root





35 °C

100 x 100 m FAR 5.6

483 users 4 user groups

Housing Helofyte filters

Water

🔒 🗸 Site

🔒 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ > Accessibility

ර ≻ Structure

∂ ∨ Houses

∂ > Climate

∂ > Facade

♦ V Energy storage

 \bullet \checkmark Water purification

3571 kWh

3600 Lph/10cm

20 %

25 mm

57.3 m³

Housing

Can we diversify the programme height?









Square root





Hydroblock



Housing



- ර ≻ Structure
- ∂ > Accessibility
- ථ ∽ Houses

6.0 m height

- ∂ > Climate
- ∂ > Facade
- ♦ Y Energy storage 3571 kWh \bullet \checkmark Waterfalls 20 % 3600 Lph/10cm 25 mm \bullet \checkmark Water purification 57.3 m³



Hydroblock

Structure

What is the construction principle?



- ∂ > Mass & void
- \Diamond \checkmark Structure
- Accessibility
- ♦ V Houses

6.0 m height

- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
- ♦ ∨ Waterfalls
 - 20 % 3600 Lph/10cm
 - 3600 Lp 25 mm
- ♦ V Water purification 57.3 m³



Rigid frame boxes

Columns & beams



ertical slabs (long rigid frame)



			ļ	ļ		3517 kWh 0	100 m 0	painfull annoying good	0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

Hydroblock

Structure

What is the construction principle?



- Accessibility
- မ ✓ Houses

6.0 m height

- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh

20 % 3600 Lph/10cm

- 25 mm
- Water purification 57.3 m³



igid frame boxes

Columns & beams



ertical slabs (long rigid frame)



l						3517 kWh 0	100 m 0	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Hydroblock

Structure

What is the construction principle?



∂ > Mass & void

- Vertical slabs
- Accessibility
- 🔒 🗸 Houses

6.0 m height

- ∂ > Climate
- ∂ > Facade
- ♦ Y Energy storage 3571 kWh
- \bullet \checkmark Waterfalls

20 %

- 3600 Lph/10cm 25 mm
- \checkmark Water purification
 - 57.3 m³





Vertical slabs (long rigid frame)





🔒 🗸 Site

Access

How do the residents reach their apartments?



- ∂ > Mass & void
- Structure Vertical slabs
- $\bigcirc \checkmark \textbf{Accessibility}$
- \bullet \checkmark Houses

6.0 m height

- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \bullet \checkmark Waterfalls
 - 20 % 3600 Lph/10cm
 - 25 mm
- Water purification 57.3 m³



*V*ertical access at centre, central corridor



*V*ertical access at centre single sided corridor



Vertical access at centre double sided corridor



				İ		3517 kWh 0	100 m 0	painfull[annoying] good	1 0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	
🔒 🗸 Site

Access

How do the residents reach their apartments?



- δ > Mass & void
- Structure Vertical slabs
- $\bigcirc \checkmark \textbf{Accessibility}$
- \bullet \checkmark Houses

6.0 m height

- δ > Climate
- ∂ > Facade
- Energy storage 3571 kWh
- - 20 % 3600 Lph/10cm
 - 25 mm
- Water purification 57.3 m³



Vertical access at centre, central corridor



Vertical access at centre single sided corridor



Vertical access at centre double sided corridor



			ļ	İ		3517 kWh 0	100 m 0	painfull[annoying] good	1 0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

💧 🗸 Site

Access

How do the residents reach their apartments?



- δ > Mass & void
- Structure
 Vertical slabs
- $\bigcirc \checkmark \textbf{Accessibility}$
- \bullet \checkmark Houses

6.0 m height

- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- \bullet \checkmark Waterfalls
 - 20 % 3600 Lph/10cm
 - 25 mm
- Water purification 57.3 m³



Vertical access at centre, central corridor



Vertical access at centre, single sided corridor



Vertical access at centre double sided corridor



			ļ	ļ		3517 kWh 0	100 m 0	painfull annoying good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

🔒 🗸 Site

Access

How do the residents reach their apartments?



- δ > Mass & void
- Structure Vertical slabs
- $\bigcirc \checkmark \textbf{Accessibility}$
- \bullet \checkmark Houses

6.0 m height

- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
- ♦ ∨ Waterfalls
 - 20 % 3600 Lph/10cm
 - 25 mm
- ♦ V Water purification 57.3 m³



Vertical access at centre, central corridor



Vertical access at centre single sided corridor



Vertical access at centre, double sided corridor



			ļ	İ		3517 kWh 0	100 m 0	painfull annoying good	1 0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

Housing

How many houses on one floor?

🔒 🗸 Site 35 °C 100 x 100 m FAR 5.6 🔒 🗸 Users 483 users

4 user groups ▲ ∨ Programme Housing Helofyte filters Water

 ∂ > Mass & void

Structure Vertical slabs ♦ ✓ Accessibility

Double sided corr.

ථ ∽ Houses

6.0 m height 192 dwellings

∂ > Climate

∂ > Facade

♦ V Energy storage 3571 kWh ♦ V Waterfalls 20 % 25 mm \checkmark Water purification



57.3 m³



 $\left\{ \right\}$



Cluster









			l	l		517 kWh 0	00 m	painfull[annoying] good	0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

Housing

How many houses on one floor?

♦ V Site 35 °C 100 x 100 m

FAR 5.6 Users 483 users

- 483 users 4 user groups
- Programme Housing Helofyte filters Water
- \eth > Mass & void
- Structure
 Vertical slabs
 Accessibility
- Double sided corr. ∂ ∨ Houses
 - 6.0 m height 192 dwellings
- ∂ > Climate
- δ > Facade
- Energy storage 3571 kWh
 Waterfalls 20 % 3600 Lph/10cm 25 mm
 Water purification

57.3 m³



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Housing

 $\langle \rangle$

How many houses on one floor?

♦ Site 35 °C 100 x 100 m FAR 5.6 ♦ VUsers 483 users

- 4 user groups ♦ ∨ Programme Housing Helofyte filters Water
- \eth > Mass & void
- Structure
 Vertical slabs
 Accessibility
- Double sided corr. $\delta \sim Houses$
 - 6.0 m height 192 dwellings
- ∂ > Climate
- δ > Facade
- Energy storage 3571 kWh
 Waterfalls 20 % 3600 Lph/10cm 25 mm
 Water purification

57.3 m³















Housing

 $\left\{ \right\}$

How many houses on one floor?

♦ Site 35 °C 100 x 100 m FAR 5.6 ♦ VUsers 483 users

 \eth > Mass & void

- Structure
 Vertical slabs
 Accessibility
 - Double sided corr.

∂ **∨ Houses** 6.0 m height

32 dwellings 3 > Climate

 δ > Facade

 Energy storage 3571 kWh
 Waterfalls 20 % 3600 Lph/10cm 25 mm
 Water purification

57.3 m³















Housing

How many houses on one floor?

◆ Site 35 °C 100 x 100 m FAR 5.6 ◆ Users 483 users 4 user groups

- Programme
 Housing
 Helofyte filters
 Water
- \eth > Mass & void
- Structure
 Vertical slabs
 Accessibility
 - Double sided corr.
- $\partial \vee Houses$

6.0 m height 192 dwellings

- δ > Climate
- δ > Facade
- Energy storage 3571 kWh
 Waterfalls 20 % 3600 Lph/10cm 25 mm
 Water purification

57.3 m³

















🔒 🗸 Site

Housing

How many houses on one floor?





✓ Users
 483 users
 4 user groups
 ✓ Programme
 Housing
 Helofyte filters
 Water

35 °C 100 x 100 m FAR 5.6

 ∂ > Mass & void

Structure
 Vertical slabs
 Accessibility

Double sided corr. $\eth \lor$ Houses

6.0 m height 192 dwellings

∂ > Climate

∂ > Facade

 Energy storage 3571 kWh
 Waterfalls 20 % 3600 Lph/10cm 25 mm
 Water purification 57.3 m³

<u>225</u>

🔒 🗸 Site

Housing

How many houses on one floor?





35 °C 100 x 100 m FAR 5.6

- Structure
 Vertical slabs
- Accessibility
 Double sided corr.
 Houses
 - 6.0 m height 192 dwellings
- ∂ > Climate
- δ > Facade
- Energy storage 3571 kWh
 Waterfalls 20 % 3600 Lph/10cm 25 mm
 Water purification 57.3 m³

Housing Impression living area



Housing Impression dining area



Housing Impression bathing area

R

The BlockMaker

35 °C 100 x 100 m FAR 5.6

Water

Hydroblock

✓ Site

🔓 🗸 Users

▲ ∨ Programme

∂ > Mass & void

♦ ✓ Accessibility

Structure

ථ ∽ Houses

∂ > Climate

∂ > Facade

Housing

Section helofyte filters & grey water storage





 \checkmark Water purification 57.3 m³

20 %

25 mm

35 °C 100 x 100 m

✓ Site

🔓 🗸 Users

♦ ✓ Structure

∂ ∨ Houses

∂ > Climate

∂ > Facade

Housing

Section helofyte filters & grey water storage





✓ Water purification 57.3 m³

Accessibility Can a public route be involved?

ryurobioc

Site 35 °C 100 x 100 m FAR 5.6 VUsers 483 users 4 user groups V Programme Housing Helofyte filters

Water ∂ > Mass & void

Structure Vertical slabs

 Accessibility Double sided corr.
 → Houses

uses 6.0 m height 192 dwellings

∂ > Climate

 δ > Facade

 Energy storage 3571 kWh
 Waterfalls 20 %

3600 Lph/10cm 25 mm ✓ Water purification

57.3 m³

Floor plan diagram



2 elevators at centre, double sided corridor, **2 emergency staircases**



2 elevators at centre, double sided corridor, **2 public stairs**



2 elevators at centre, double sided corridor, **2 public stairs**



2 elevators at centre, double sided corridor **2 public stairs**



			ļ	İ		3517 kWh 0	100 m 0	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

nyaropioCł

🔒 🗸 Site

35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups

- Programme Housing Helofyte filters Water
- \eth > Mass & void
- Structure
 Vertical slabs
- ∂ ∨ Accessibility Double sided corr.
- Houses
 - 6.0 m height 192 dwellings
- δ > Climate

 δ > Facade

 ✓ Energy storage 3571 kWh
 ✓ Waterfalls 20 %

> 3600 Lph/10cm 25 mm ✓ Water purification

57.3 m³

Floor plan diagram

Accessibility



Can a public route be involved?

2 elevators at centre, double sided corridor, **2 emergency staircases**



2 elevators at centre, double sided corridor,

2 public stairs



2 elevators at centre, double sided corridor, **2 public stairs**



2 elevators at centre, double sided corridor **2 public stairs**



			l	İ		3517 kWh 0	100 m 0	painfull[annoying] good	1 0
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household

Accessibility Can a public route be involved?

🔒 🗸 Site 35 °C 100 x 100 m FAR 5.6 💧 🗸 Users 483 users 4 user groups ▲ ∨ Programme Housing Helofyte filters Water

∂ > Mass & void

Structure Vertical slabs

 $\delta \sim \text{Accessibility}$ Double sided corr. မ ✓ Houses

6.0 m height 192 dwellings

∂ > Climate

∂ > Facade

♦ V Energy storage 3571 kWh ♦ V Waterfalls

> 20 % 3600 Lph/10cm 25 mm \checkmark Water purification

57.3 m³

Floor plan diagram



2 emergency staircases



2 public stairs



2 elevators at centre, double sided corridor, 2 public stairs



2 public stairs



			ļ	İ		3517 kWh 0	100 m 0	painfull[annoying] good	1 0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

Accessibility Can a public route be involved?

HYUIODIOCK

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water Mass & void

Structure Vertical slabs

Accessibility
 Double sided corr.

 ✓ Houses

ises 6.0 m height 192 dwellings

 δ > Climate

 δ > Facade

 Energy storage 3571 kWh
 Waterfalls 20 %

20 % 3600 Lph/10cm 25 mm ✓ Water purification

57.3 m³

Floor plan diagram



2 elevators at centre, double sided corridor, **2 emergency staircases**



2 elevators at centre, double sided corridor, **2 public stairs**



2 elevators at centre, double sided corridor, **2 public stairs**



2 elevators at centre, double sided corridor, **2 public stairs**



				İ	l	3517 kWh 0	100 m 0	painfull[annoying] good	1 0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

Site 35 °C 100 x 100 m FAR 5.6 ✓ Users 483 users 4 user groups ✓ Programme Housing Helofyte filters Water

Structure

Ô ✓ Accessibility Double sided corr. 2 emergency exits

🔒 🗸 Houses

6.0 m height 192 dwellings

∂ > Climate

∂ > Facade

Energy storage 3571 kWh

♦ Vaterfalls 20 % 3600 Lph/10cm

25 mm

Water purification 57.3 m³







/ household acoustics water head potential energy

/ household acoustics water head

Site

What do you give to the city?

∂ \checkmark Site

483 users 4 user groups

Programme

Housing Helofyte filters Water

 ∂ > Mass & void

Structure

Vertical slabs ô VAccessibility Double sided corr. 2 emergency exits

♦ V Houses 6.0 m height 192 dwellings

∂ > Climate

∂ > Facade

 Energy storage 3571 kWh
 Waterfalls 20 % 3600 Lph/10cm 25 mm
 Water purification 57.3 m³ Site plan diagram



Public park



Public swimming pool



Changing rooms Restaurant Inside pool



			ļ	İ		3517 kWh 0	100 m 0	painfull[annoying] good	1 0	
view unobstructed	view 20 m	terrace	light total	light average	proximity	potential energy	water head	acoustics	# / household	

35 °C 100 x 100 m FAR 5.6

483 users 4 user groups

Housing Helofyte filters

Water

Vertical slabs

6.0 m height

192 dwellings

3571 kWh

20 %

∂ ∨ Site

💧 🗸 Users

▲ ∨ Programme

∂ > Mass & void

 ∂ v Accessibility

▲ ∨ Structure

🔒 🗸 Houses

උ > Climate

∂ > Facade

Site

What do you give to the city?





25 mm ▲ ∨ Water purification 57.3 m³

Energy storage

▲ ∨ Waterfalls

Site

What do you give to the city?



05. Reflections

What if I could do this again?

Reflection

Learning from Hydroblock



∂ > Structure

♦ ✓ Accessibility central shaft double sided cor. ♦ ✓ Houses

192 dwellings

 δ > Climate

 δ > Facade

Energy storage 3571 kWh

♦ ∨ Waterfalls

 \bullet \checkmark Water purification



The BlockMaker is an iterative study in progress, but at the same time a design method we applied on our graduation projects.

For me, the BlockMaker is mainly a conceptual design tool that generates options.

The sequences on the mass transformation level are clear and generic and therefore make our different scenario's comparable.

Energy storing building, but it is all in concrete...



Thank you