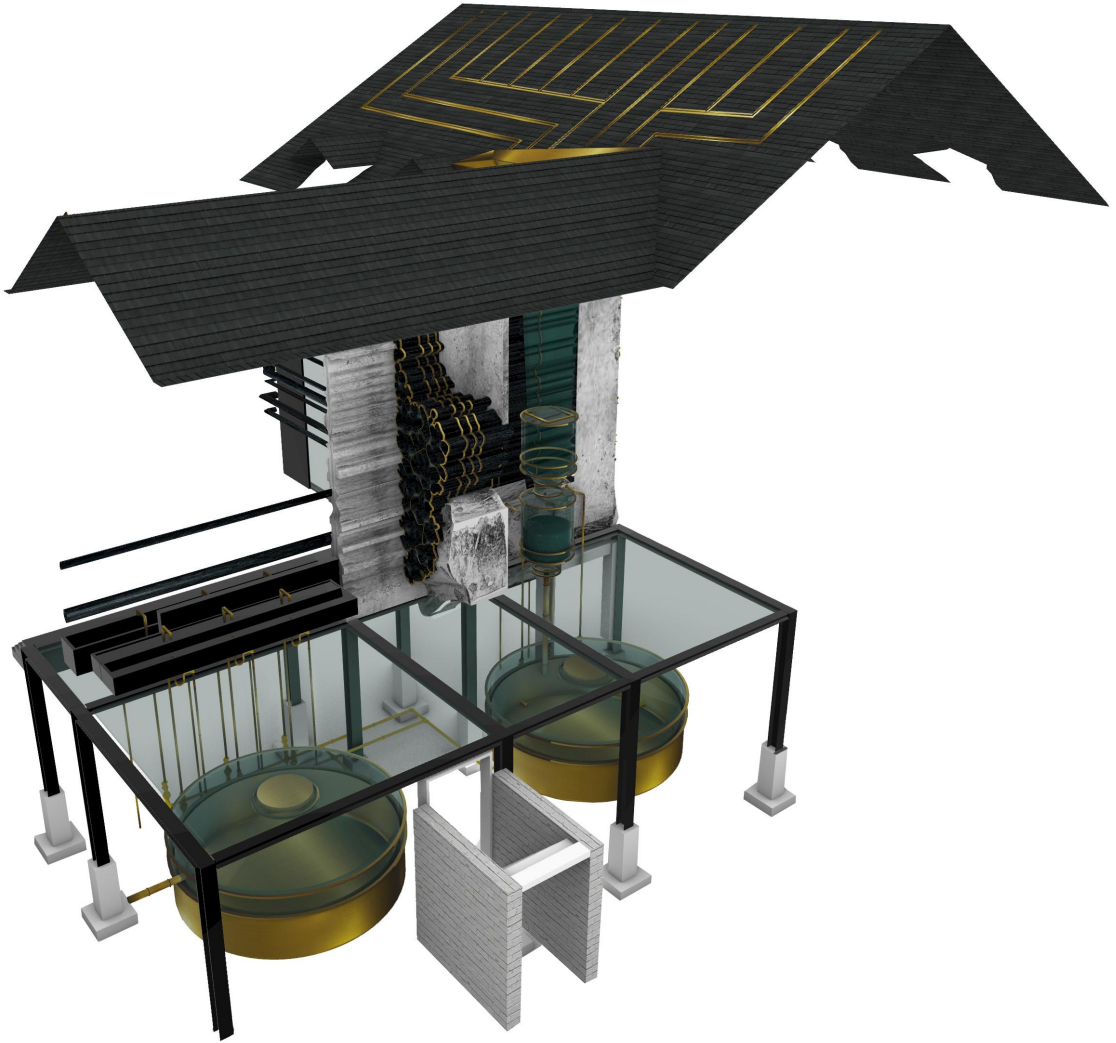
# The Carbon Rainwater Filtering

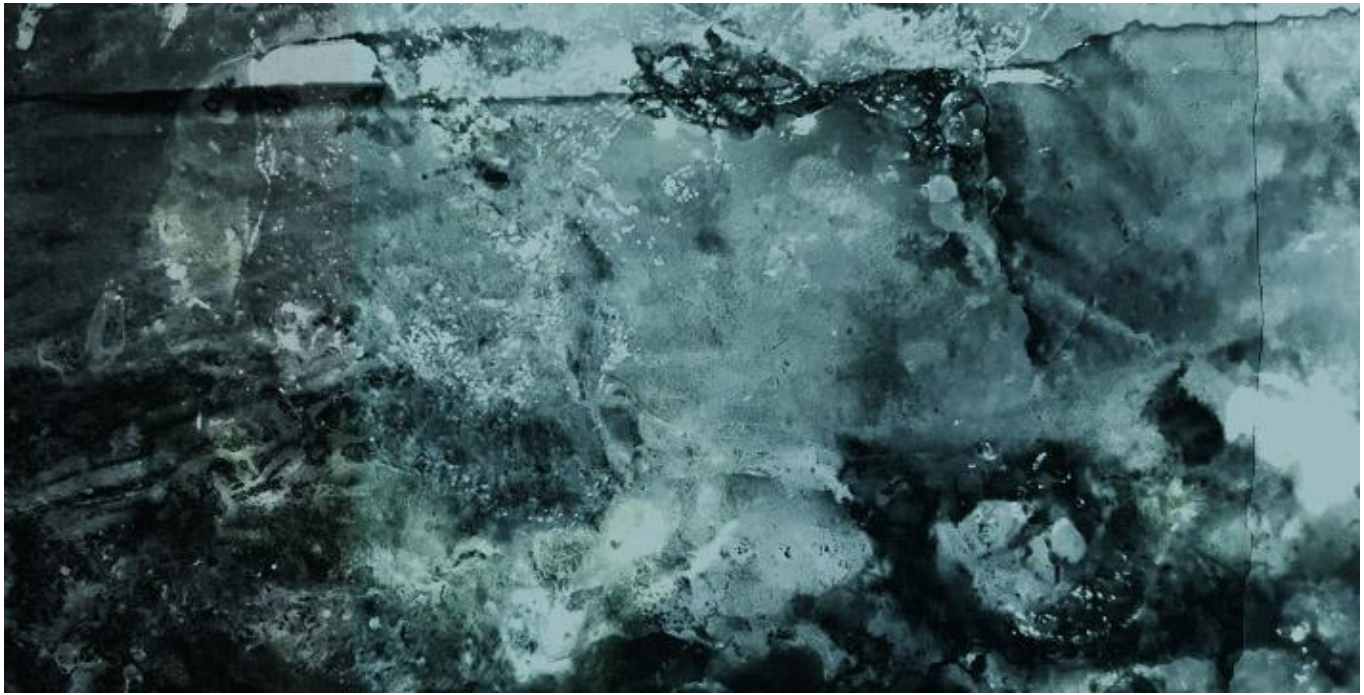
Governors Island, House 14

Kumsal Akdogan
Instructor: Ferda Kolatan, Angela Huang, Dorothy Tang, Alina Gorokhova



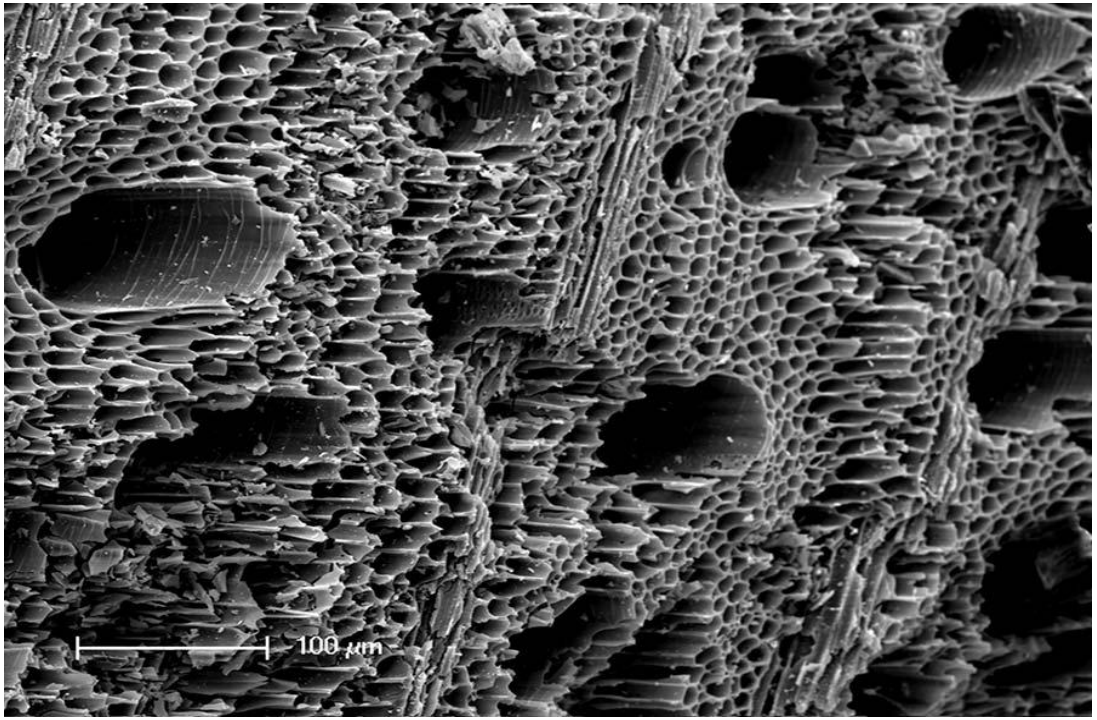
## RAINWATER//FRESHWATER

Description

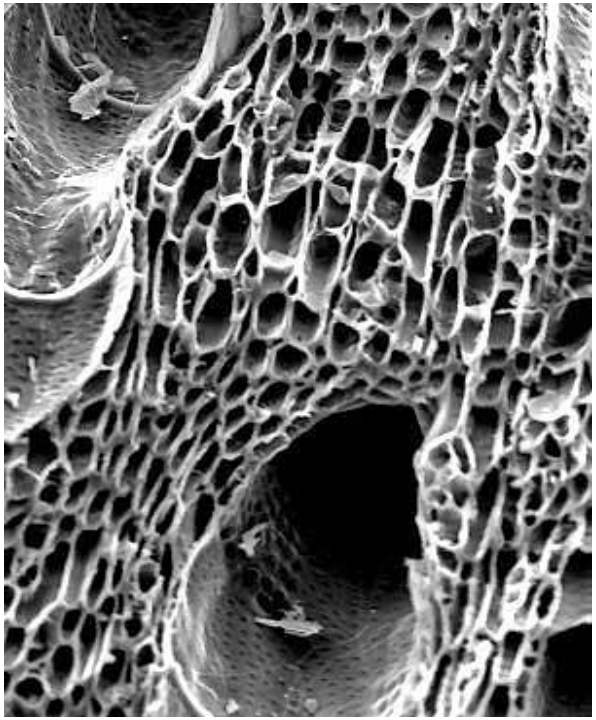


# CARBON

MAGNIFIED CARBON

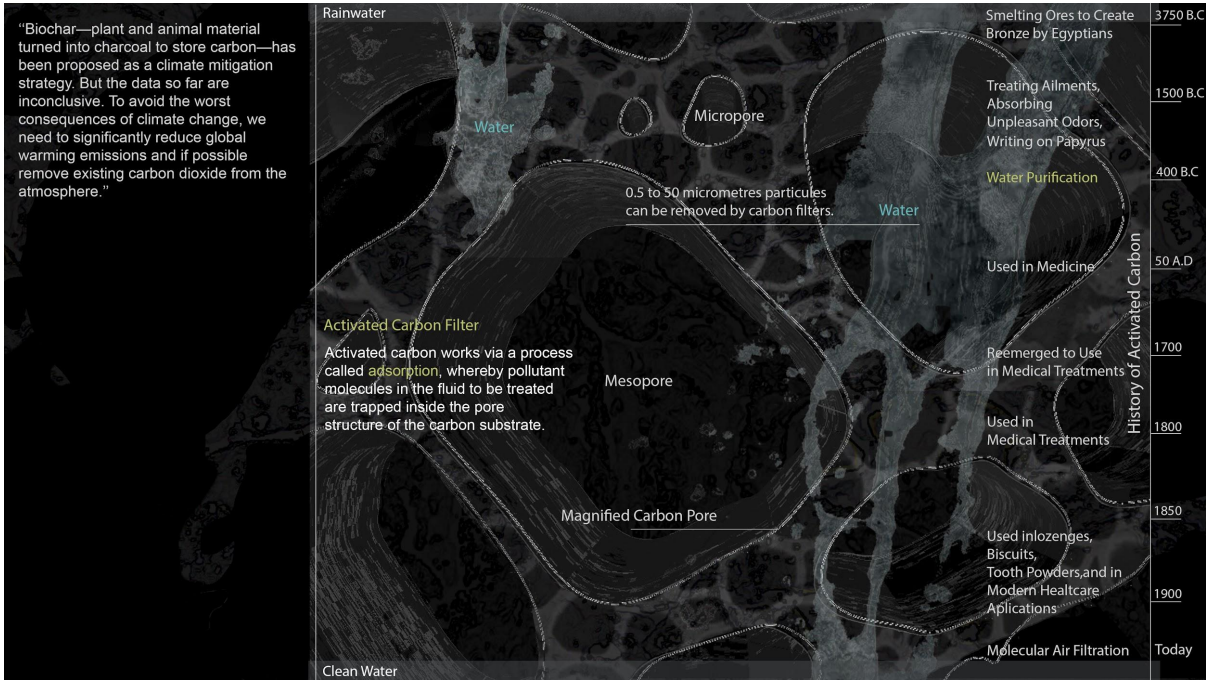


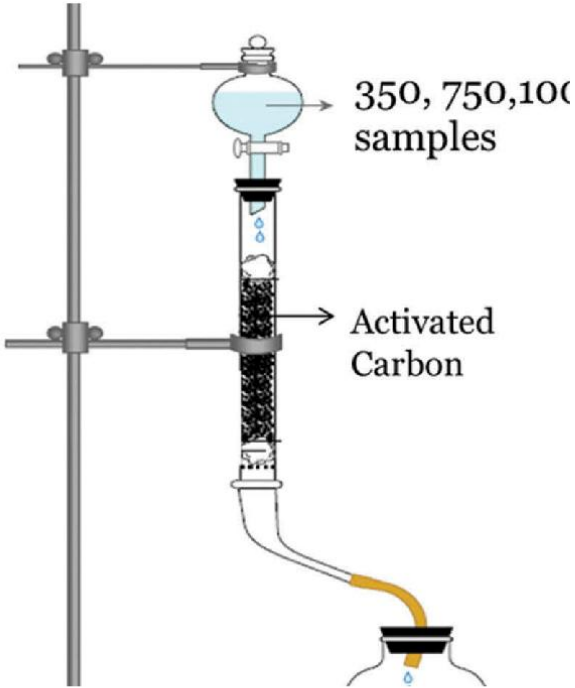

ACTIVATED CARBON BED, WATER FILTRATION



## PROJECT TITLE // DESCRIPTION

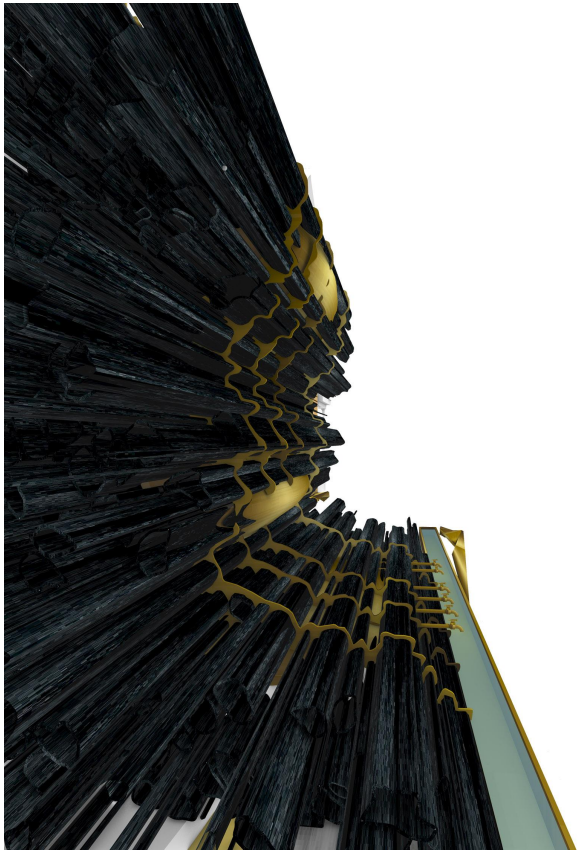
Description

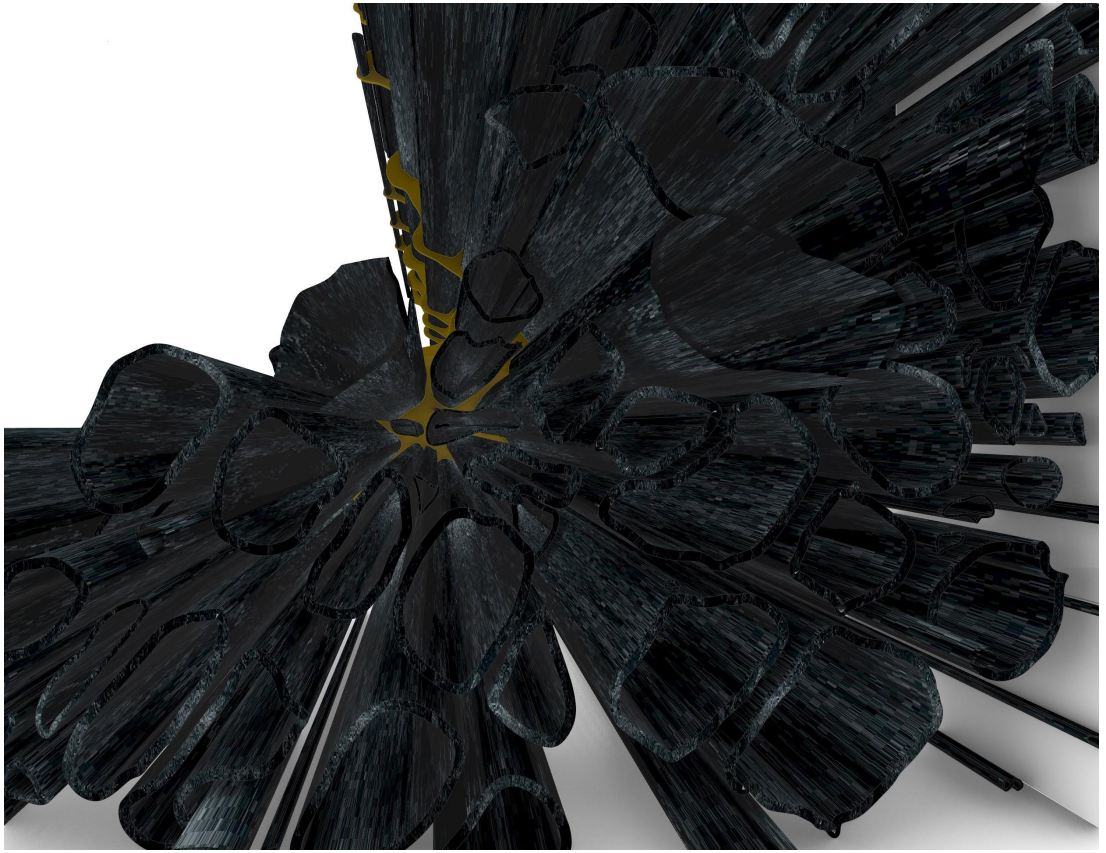


## THE PASSIVE BIOCHAR RAINWATER FILTERING//FALL SEMESTER STUDIO PROJECT

Description





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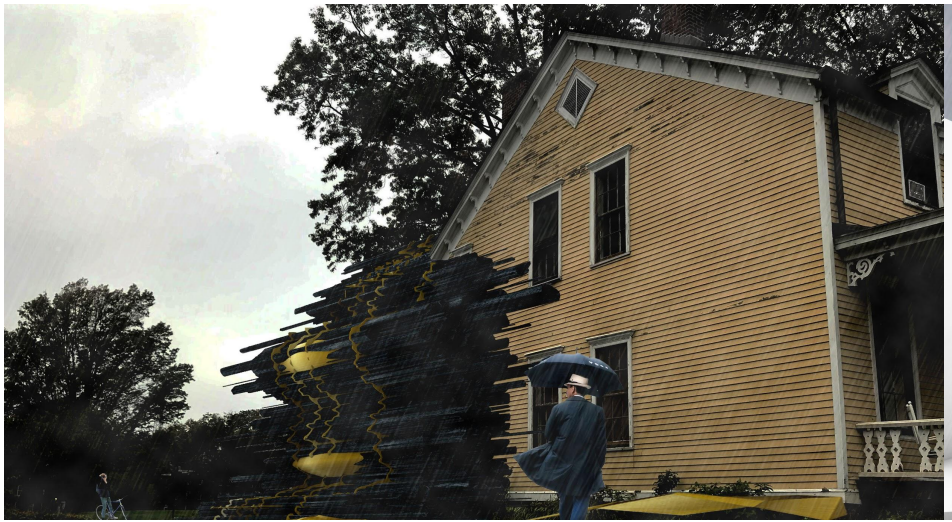

# SOIL WORKSHOP//SOIL BORINGS-LUB-HOUSE 14

Description

PHYSICAL PROPERTIES

## LUB - HOUSE 14

***PAST**/PRESENT/FUTURE*

*Kumsal Akdogan*

**LUB - Laguardia-Urban Land Complex, 3 to 8 percent slopes**

60% Laguardian (High amount of carbon)
25% Urban Land
Minor Components:
7% Ebbets
7% Greenbelt
1% Secaucus

**Laguardia**

**- Drainage class: Well drained**
**- Runoff class: Medium**
**- Depth to water table: more than 80 inches**
**- Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)**
**- Available water capacity Low (about 5.1 inches)**

**Urban Land**

**- Runoff class: Very high**
- Capacity of the most limiting layer to transmit water: Very Low
- Available water capacity: Very Low

*REFERENCES*

*Use Chicago Manual Style*

SCALE: AS NOTED

*LEGEND*

SAND
SILT
CLAY
WATER

*SOIL PROPERTIES*
*SCALE=10:1*


*SOIL BORING*
*SCALE=1:100*


*NOTES*

**SOIL**

40% Minerals (clay, silt, sand, gravel, stones).

**25% Water (the amount varies depending upon precipitation and the water-holding capacity of the soil).**

25% Air (an essential ingredient for living organisms).
5% Organic matter or humus (both living and dead organisms).

**Laguardia**
*Au - 0 to 8 inches: cobbly-artifactual coarse sandy loam
*BCu - 8 to 26 inches: very cobbly-artifactual coarse sandy loam
*Cu - 26 to 79 inches: very cobbly-artifactual coarse sandy loam

**Available water capacity**
**0 - 8 inches: 0.05 - 0.09 - 0.13**
**8 - 26 inches: 0.02 - 0.06 - 0.17**
**26 - 79 inches: 0.02 - 0.04 - 0.14**

**Soil susceptibility to surface sealing**
Low

**Soil susceptibility to compaction**
Rock Fragments, 0 - 12 inches
Value: 1.00
Soil structure grade, 0 - 12 inches
Value: 1.00
Subaerial
Value: 1.00
Soil Texture, 0 - 12 inches
Value: 0.50

Urban Land
M - 0 to 15 inches: cemented material
2*C - 15 to 79 inches: gravelly sandy loam

Ebbetts
*A - 0 to 7 inches: sandy loam
*Bwu - 7 to 27 inches: gravelly-artifactual sandy loam, silt loam, stony sandy loam
2*Cu - 27 to 72 inches: very gravelly- artifactual loamy coarse sand, artifactual silt loam
**- Runoff class: Medium**

Greenbelt
*A - 0 to 5 inches: loam
*Bw1 - 5 to 16 inches: cobbly sandy loam, silt loam, loam
*Bw2 - 16 to 30 inches: cobbly sandy loam, silt loam, loam
*C - 30 to 79 inches: cobbly sandy loam, silt loam, sandy loam
**- Runoff class: Medium**

Secaucus
*Au - 0 to 6 inches: gravelly-artifactual fine sandy loam
*Cu1 - 6 to 17 inches: very artifactual silt loam, extremely artifactual loamy coarse sand, very artifactual fine sandy loam
*Cu2 - 17 to 35 inches: extremely stony-artifactual loamy coarse sand, very gravelly-artifactual silt loam, extremely cobbly-artifactual fine sandy loam
*Cu3 - 35 to 65 inches: extremely stony-artifactual loamy coarse sand, very gravelly-artifactual silt loam, extremely cobbly-artifactual fine sandy loam
**- Runoff class: High**

PHYSICAL PROPERTIES

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***PRESENT**/FUTURE*

*Kumsal Akdogan*

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- Capacity of the most limiting layer to transmit water: Very Low
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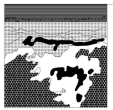
SAND
SILT
CLAY
WATER

*SOIL PROPERTIES*
*SCALE=10:1*




*SOIL BORING*
*SCALE=1:100*


*NOTES*

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*Bwu - 7 to 27 inches: gravelly-artifactual sandy loam, silt loam, stony sandy loam
2*Cu - 27 to 72 inches: very gravelly- artifactual loamy coarse sand, artifactual silt loam
**- Runoff class: Medium**

Greenbelt
*A - 0 to 5 inches: loam
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*Bw2 - 16 to 30 inches: cobbly sandy loam, silt loam, loam
*C - 30 to 79 inches: cobbly sandy loam, silt loam, sandy loam
**- Runoff class: Medium**

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*Cu3 - 35 to 65 inches: extremely stony-artifactual loamy coarse sand, very gravelly-artifactual silt loam, extremely cobbly-artifactual fine sandy loam
**- Runoff class: High**

PHYSICAL PROPERTIES

## LUB - HOUSE 14

***PRESENT**/FUTURE*

*Kumsal Akdogan*

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- Capacity of the most limiting layer to transmit water: Very Low
**- Available water capacity: Very Low**

*REFERENCES*

*Use Chicago Manual Style*

SCALE: AS NOTED

*LEGEND*

SAND
SILT
CLAY
WATER

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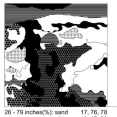
*SCALE=10:1*




*SOIL BORING*
*SCALE=1:100*


*NOTES*

**Frequency of flooding: none**

**SOIL**

40% Minerals (clay, silt, sand, gravel, stones).

**25% Water (the amount varies depending upon precipitation and the water-holding capacity of the soil).**

25% Air (an essential ingredient for living organisms).
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**0 - 8 inches: 0.05 - 0.09 - 0.13**
**8 - 26 inches: 0.02 - 0.06 - 0.17**
**26 - 79 inches: 0.02 - 0.04 - 0.14**

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Low

**Soil susceptibility to compaction**
Rock Fragments, 0 - 12 inches
Value: 1.00
Soil structure grade, 0 - 12 inches
Value: 1.00
Subaerial
Value: 1.00
Soil Texture, 0 - 12 inches
Value: 0.50

Urban Land
M - 0 to 15 inches: cemented material
2*C - 15 to 79 inches: gravelly sandy loam

Ebbetts
*A - 0 to 7 inches: sandy loam
*Bwu - 7 to 27 inches: gravelly-artifactual sandy loam, silt loam, stony sandy loam
2*Cu - 27 to 72 inches: very gravelly- artifactual loamy coarse sand, artifactual silt loam
**- Runoff class: Medium**

Greenbelt
*A - 0 to 5 inches: loam
*Bw1 - 5 to 16 inches: cobbly sandy loam, silt loam, loam
*Bw2 - 16 to 30 inches: cobbly sandy loam, silt loam, loam
*C - 30 to 79 inches: cobbly sandy loam, silt loam, sandy loam
**- Runoff class: Medium**

Secaucus
*Au - 0 to 6 inches: gravelly-artifactual fine sandy loam
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*Cu3 - 35 to 65 inches: extremely stony-artifactual loamy coarse sand, very gravelly-artifactual silt loam, extremely cobbly-artifactual fine sandy loam
**- Runoff class: High**

# SOIL WORKSHOP//SOIL BORINGS-LUA

Description

PHYSICAL PROPERTIES

LUA

***PAST**/PRESENT/FUTURE*

*Kumsal Akdogan*

**LUA - Laguardia-Urban Land Complex, 0 to 3 percent slopes**

60% Laguardian (High amount of carbon)
35% Urban Land
Minor Components:
7% Ebbets
7% Greenbelt
1% Bevaqua

**Laguardia**

**- Drainage class: Well drained**
**- Runoff class: Low**
**- Depth to water table: more than 80 inches**
**- Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)**
**- Available water capacity Low (about 3.1 inches)**

**Urban Land**

**- Runoff class: Very high**
- Capacity of the most limiting layer to transmit water: Very Low
- Available water capacity: Very Low

*REFERENCES*

*Use Chicago Manual Style*
*Surname, First name. Year. Title. Publisher. Website.*

SCALE: AS NOTED

*LEGEND*

SAND
SILT
CLAY
WATER

*SOIL PROPERTIES*
*SCALE=10:1*

*SOIL BORING*
*SCALE=1:100*

+MWL 0.0

8

26

79

26 - 79 inches(%): sand 17, 76, 78
silt 13, 17, 62
clay 3, 8, 27

*NOTES*

**SOIL**

45% Minerals (clay, silt, sand, gravel, stones).

**25% Water (the amount varies depending upon precipitation and the water-holding capacity of the soil).**

25% Air (an essential ingredient for living organisms).
5% Organic matter or humus (both living and dead organisms).

**Laguardia**

*Au - 0 to 8 inches: cobbly-artifactual coarse sandy loam
*SCu - 8 to 26 inches: Gravelly-artifactual silt loam, extremely stony-artifactual coarse sandy loam, very cobbly-artifactual coarse sandy loam
*Cu - 26 to 79 inches: Very cobbly-artifactual coarse sandy loam, very gravelly-artifactual silt loam, extremely stony-artifactual coarse sandy loam

**Available water capacity**

**0 - 8 inches: 0.85 - 6.08 - 0.13**
**8 - 26 inches: 0.62 - 8.06 - 0.17**
**26 - 79 inches: 0.02 - 0.04 - 0.14**

**Soil susceptibility to surface sealing**

Low

**Soil susceptibility to compaction**

Rock Fragments, 0 - 12 inches
Value: 1.00
Soil structure grade, 0 - 12 inches
Value: 1.00
Subsetal
Value: 1.00
Soil Texture, 0 - 12 inches
Value: 0.50

Urban Land

M - 0 to 15 inches: cemented material
2*C - 15 to 79 inches: gravelly sandy loam, silt loam

Ebbets

0 - 7 inches: Sandy Loam
7 - 27 inches: Stony sandy loam, silt loam, gravelly-artifactual sandy loam
27 - 72 inches: Artifactual silt loam, very gravelly-artifactual loamy coarse sand

**- Runoff class: Low**

Greenbelt

0 - 5 inches: Loam
5 - 16 inches: Loam,silt loam,cobbly sandy loam
16 - 30 inches: Loam, silt loam, cobbly sandy loam
30 - 79 inches: Sandy loam, silt loam, cobbly sandy loam

**- Runoff class: Low**

Secaucus

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35 - 65 inches: Extremely cobbly-artifactual fine sandy loam, very gravelly-artifactual silt loam, extremely stony-artifactual loamy coarse sand

**- Runoff class: Medium**

PHYSICAL PROPERTIES

LUA

***PRESENT**/FUTURE*

*Kumsal Akdogan*

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7% Greenbelt
1% Bevaqua

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*SOIL PROPERTIES*
*SCALE=10:1*

*SOIL BORING*
*SCALE=1:100*

+MWL 0.0

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79

26 - 79 inches(%): sand 17, 76, 78
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**0 - 8 inches: 0.85 - 6.08 - 0.13**
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Value: 1.00
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2*C - 15 to 79 inches: gravelly sandy loam, silt loam

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0 - 7 inches: Sandy Loam
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27 - 72 inches: Artifactual silt loam, very gravelly-artifactual loamy coarse sand

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**- Runoff class: Medium**

PHYSICAL PROPERTIES

LUA

*PRESENT/**FUTURE***

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*SCALE=10:1*

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*SCALE=1:100*

+MWL 0.0

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8 - 26 inches(%): sand 17, 76, 78
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*NOTES*

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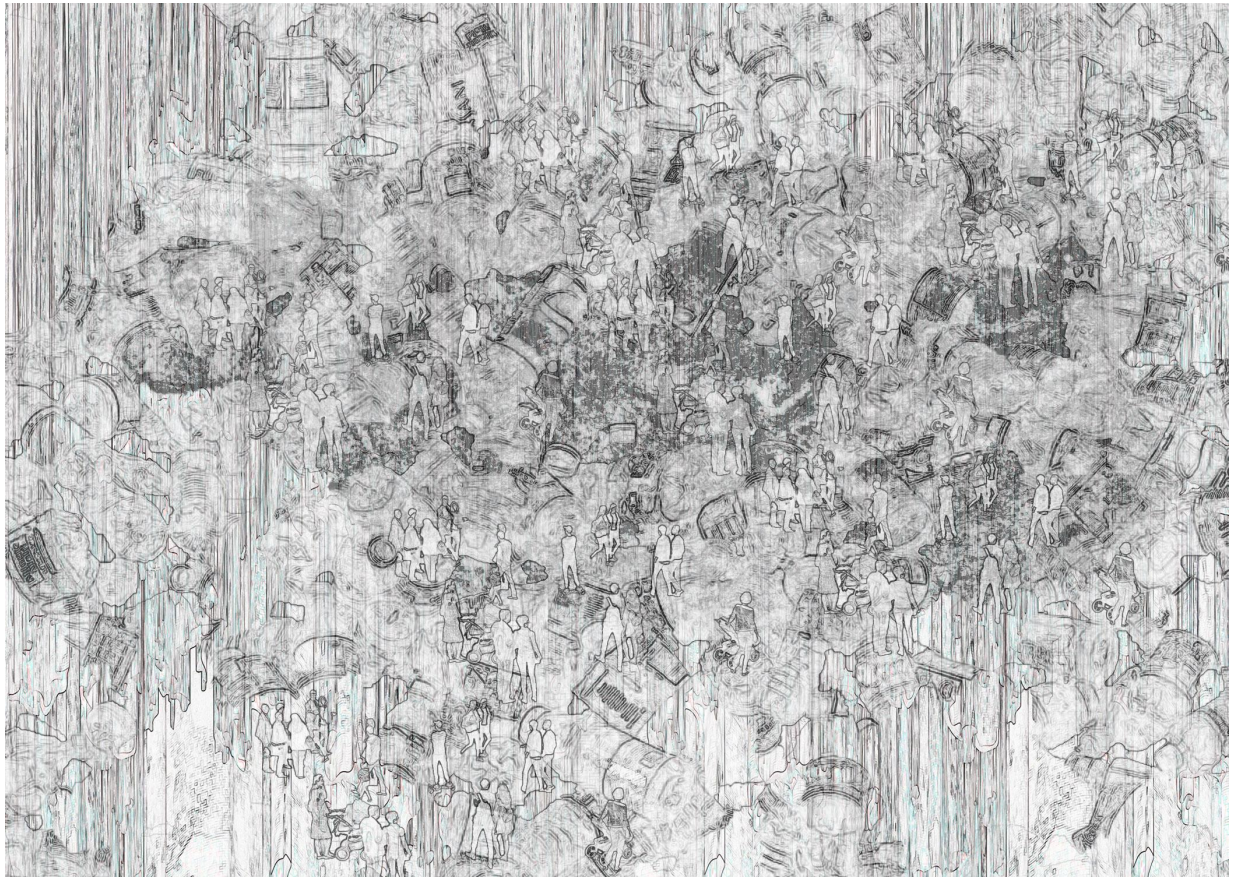
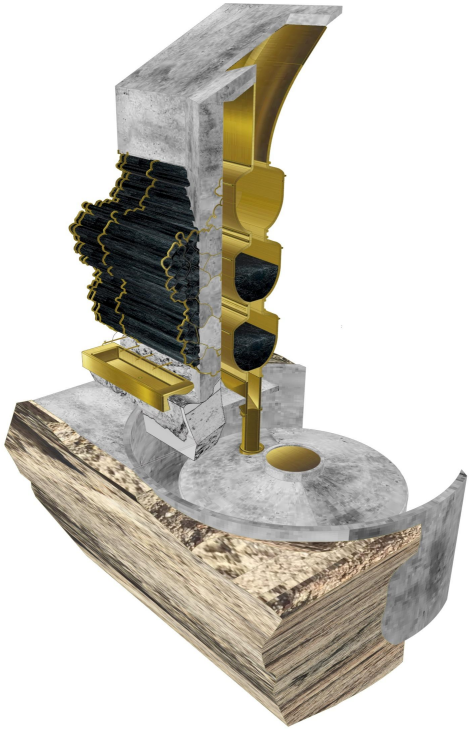
- Runoff class: Medium

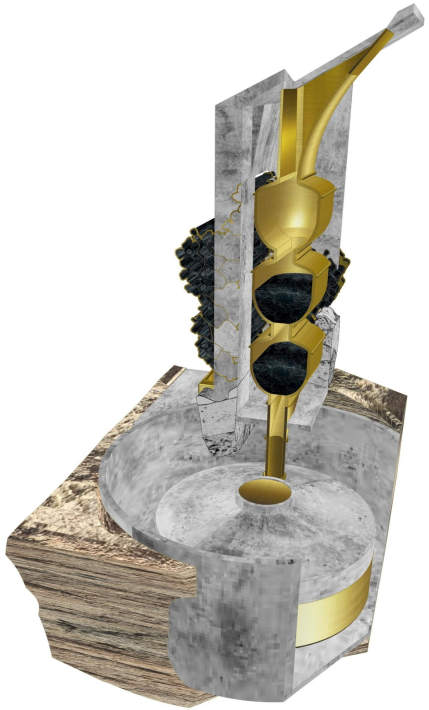
## SOIL WORKSHOP//SOCIAL POLITICAL DRAWING

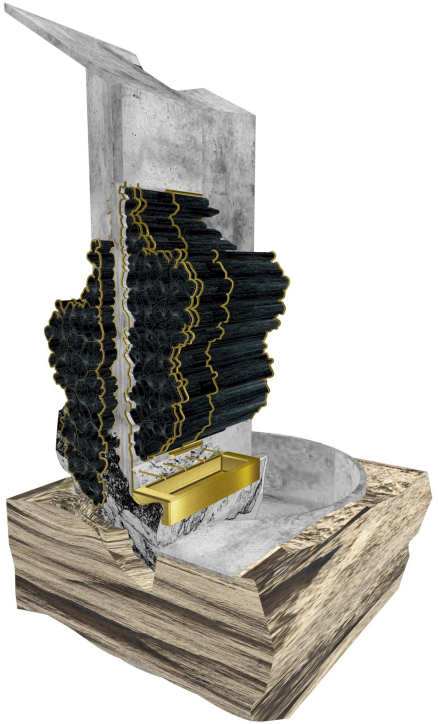
The earth in a loop in terms of Anthropocene, every act of a human being makes a negative footprint.
How do we engrave it, how do we shape it as humanity? Look at the small scale. There are so many choices.
The one you are going to choose will shape the route of life.
On a bigger scale, we shape humanity, society for life.
Are we doing a good job? The answer is contentious.
Humankind has developed rapidly since the agricultural revolution.
We reside in settlements, we have multiple technologies, we believe in progress in every field to achieve better living standards. But is this velocity constructive or destructive? The image shows the increasing precipitation, plastic bottles, human population, and soil to emphasize the things that connect each other. The cloud-like figure and depicted precipitation background create the effect to depict Anthropocene. And If all these are a loop by Anthropocene, harvesting rainwater to produce freshwater can crack one cycle.



## HYBRID MODEL

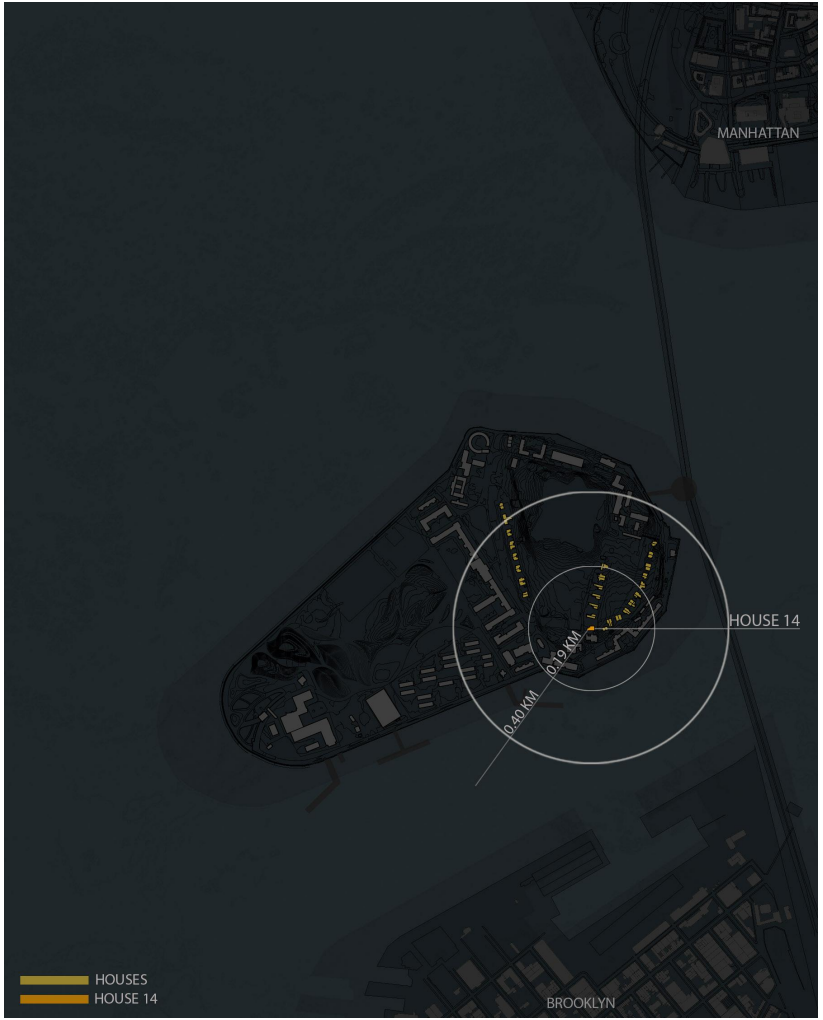






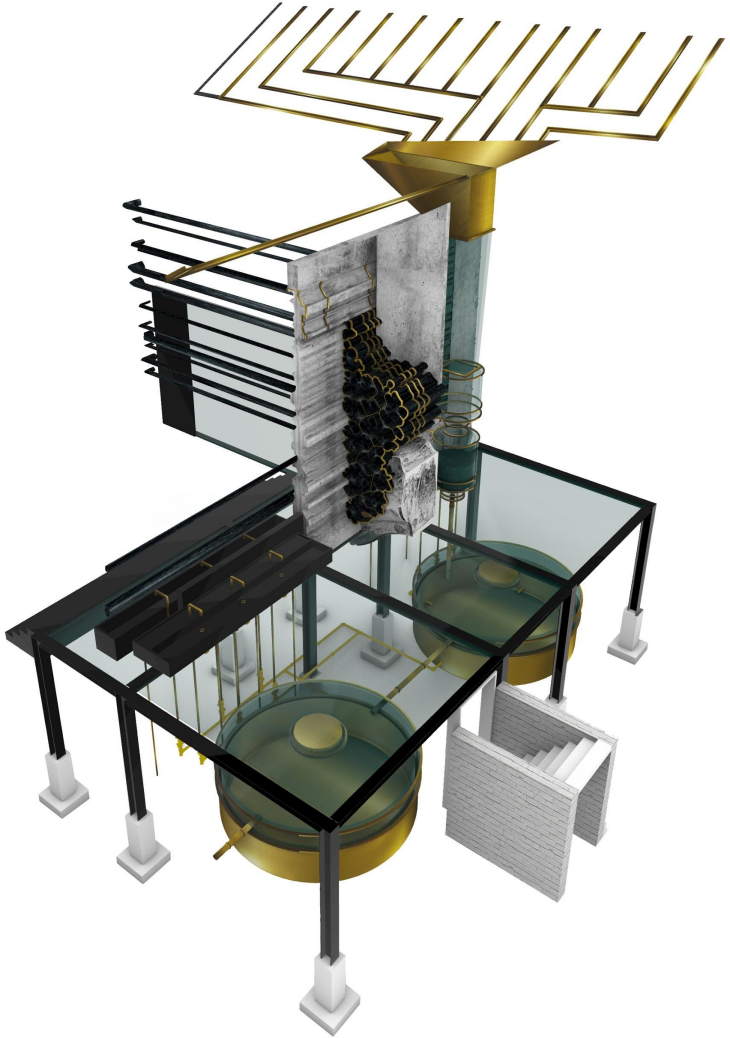
## GOVERNORS ISLAND//HOUSE 14

Description



## THE CARBON RAINWATER FILTERING// PROJECT

Description



## 2019 Precipitation Data, Monthly

Annual Precipitation in NYC, NOAA records

| 2019 | JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRECIPITATION (IN)** | 3.58 | 3.14 | 3.87 | 4.55 | 6.82 | 5.46 | 5.77 | 3.70 | 0.95 | 6.15 | 1.95 | 7.09 |
| NYC precipitation **53.03" (1346.962 mm)** in 2019, NOAA records | | | | | | | | | | | | |

https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USW00094728/detail

## THE SYSTEM-PRECIPITATION-FRESHWATER

Annual precipitation (2019): **1346.962 mm**
Precipitation/per month: apx. **112.24 mm**:
Roof Surface: 50 m²

112.25 mm * 50 m² = 5612.5 L = 5612000 cm³ (per month precipitation from the roof)
5612.5 L * 12 = 67350 L = 67350000 cm³ (annual precipitation from the roof)
5612.5 L * 6 = **33675 L** = 33675000 cm³ ( **6 months- season- precipitation from the roof**)

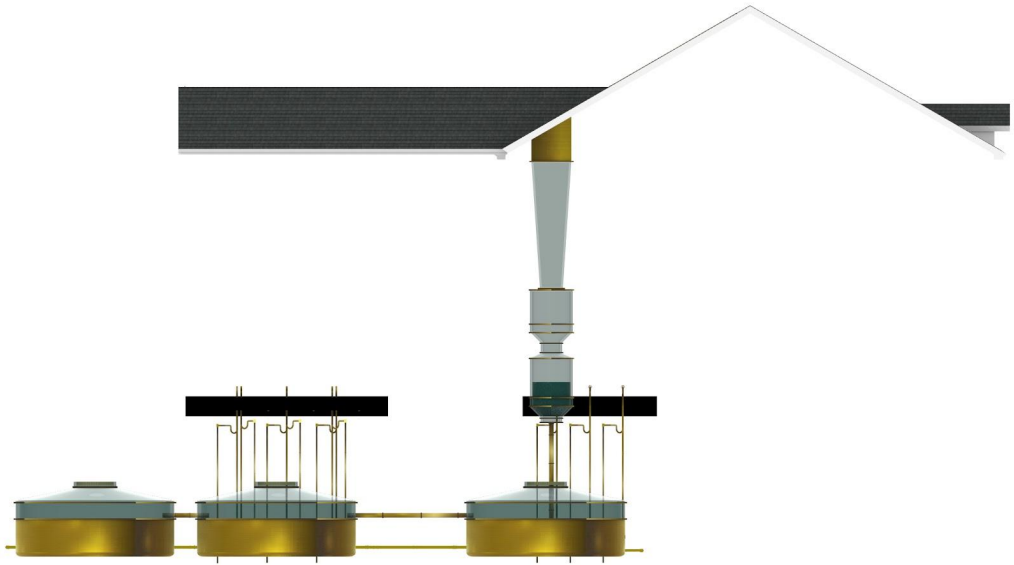
House 14 events happen in the season ( May to October).

RAIN HARVESTING FUNNEL FUNNEL

ACTIVATED CARBON BED INSIDE THE VESSEL (WATER FILTRATION)

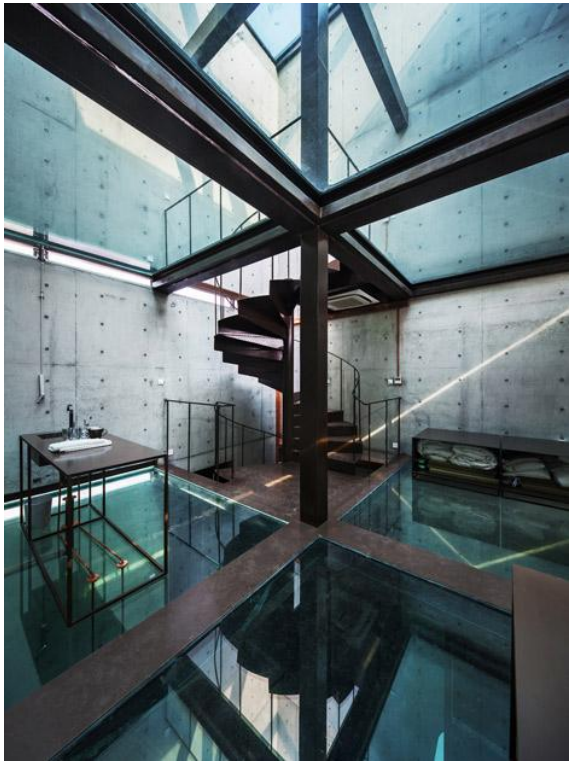
FAUCETS

WATER TANKS - 3 Water tanks reach **six months capacity**.



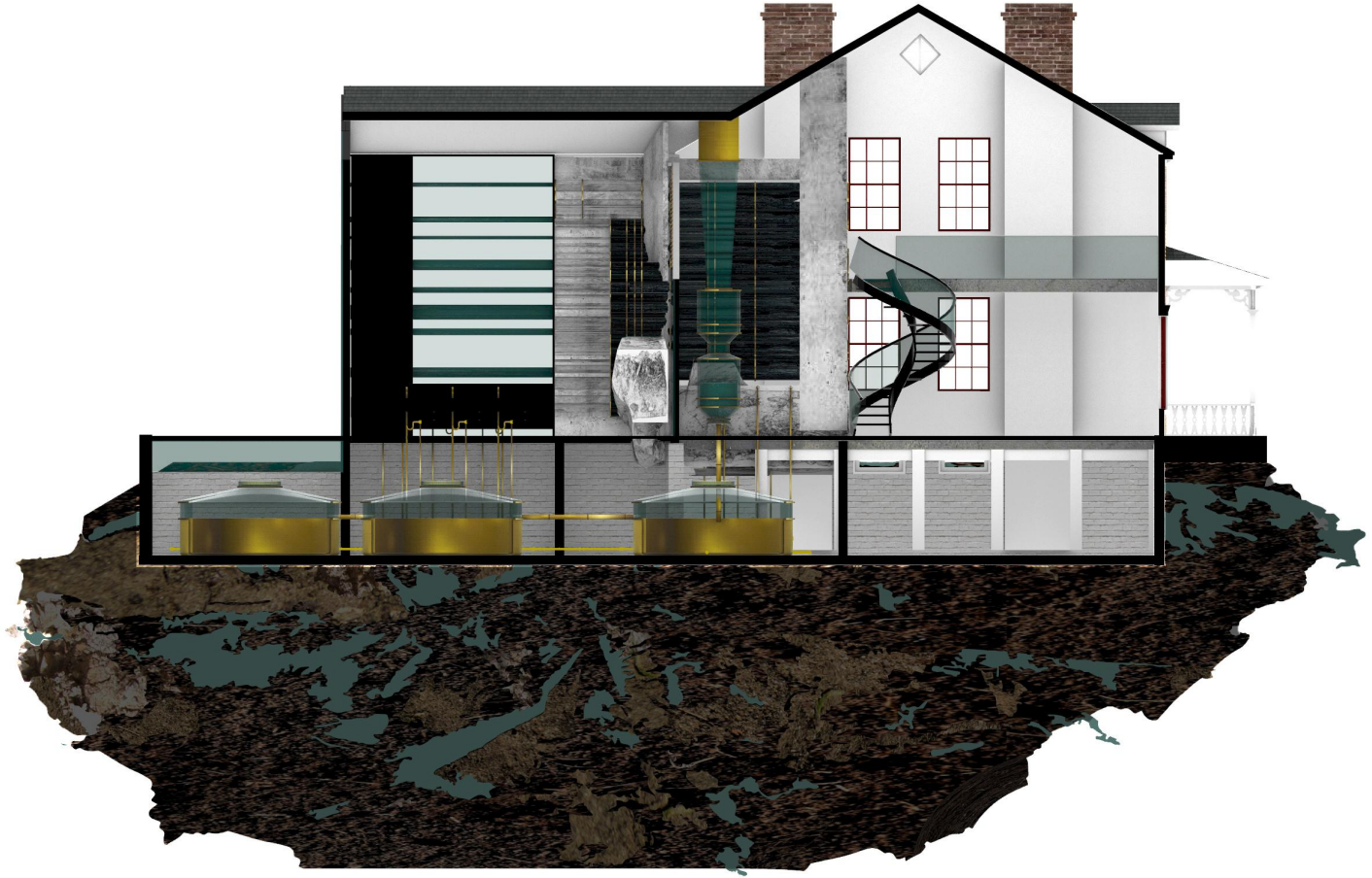
## PRECEDENT//Vertical Glass House by Atelier FCJZ

Description



## THE CARBON RAINWATER FILTERING//PROJECT

Description



## THE CARBON RAINWATER FILTERING//PROJECT

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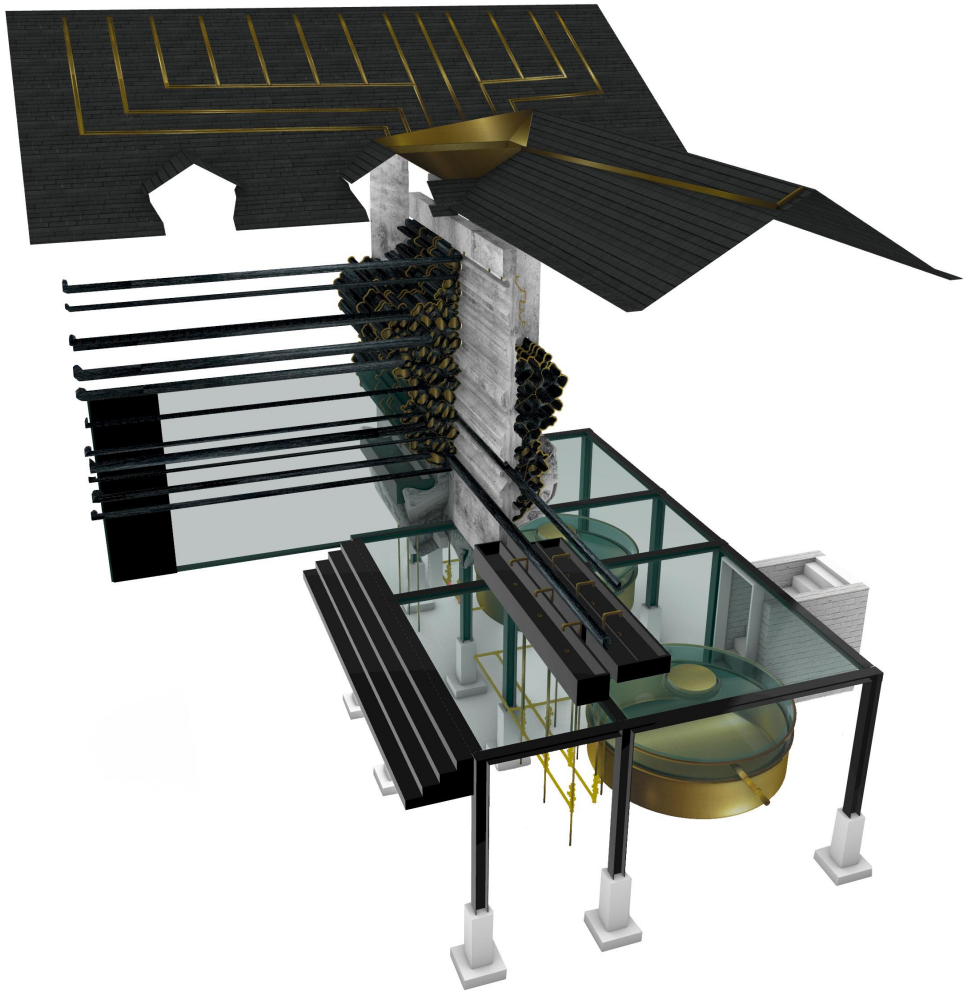

## THE CARBON RAINWATER FILTERING//PROJECT

Description

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Description