

A detailed microscopic image of plant cells, showing a network of cell walls forming various polygonal shapes. The cells are rendered in grayscale, with some areas in sharp focus and others blurred in the background. A dark green rectangular overlay is positioned on the left side of the image, containing white text.

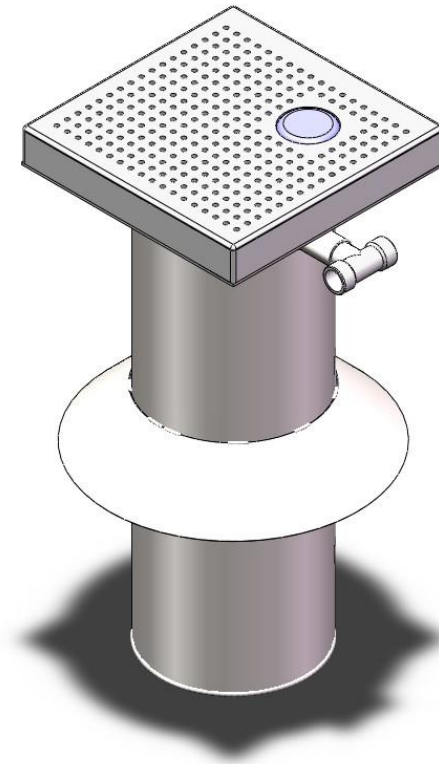
# ECO TUBE

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COPYWRICHT 2023 J.B.HOFSTEDE

# ECO TUBE PROJECT



## WHY AN ECO-TUBE

The trees in cities and villages are not doing well. caused by human actions, such as removing leaves that are essential as a source of nutrition. By removing the nutrients, there is hardly any soil life around the tree, which are necessary for breaking down the fallen leaves. Bacteria and fungi convert this humus into minerals and other substances that the tree needs to function. This is partly why it can convert  $\text{NO}_x$  and  $\text{CO}_2$  into oxygen via photosynthesis.

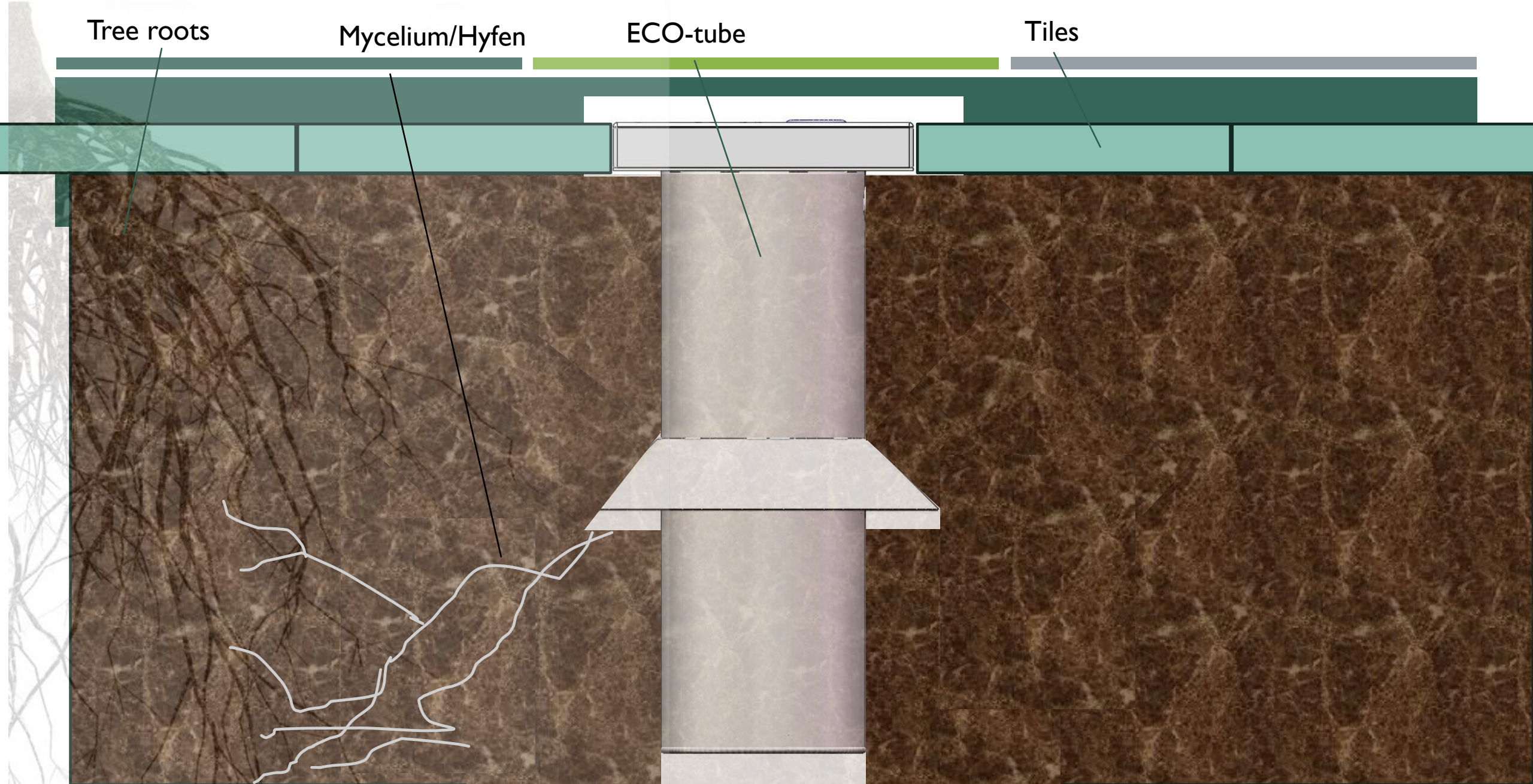
The function of the tree also ensures, among other things, filtration of  $\text{N}_2$ . If the tree is not healthy, this  $\text{N}_2$  center will increase because the tree gives priority to other essential minerals and elements.

Tree roots

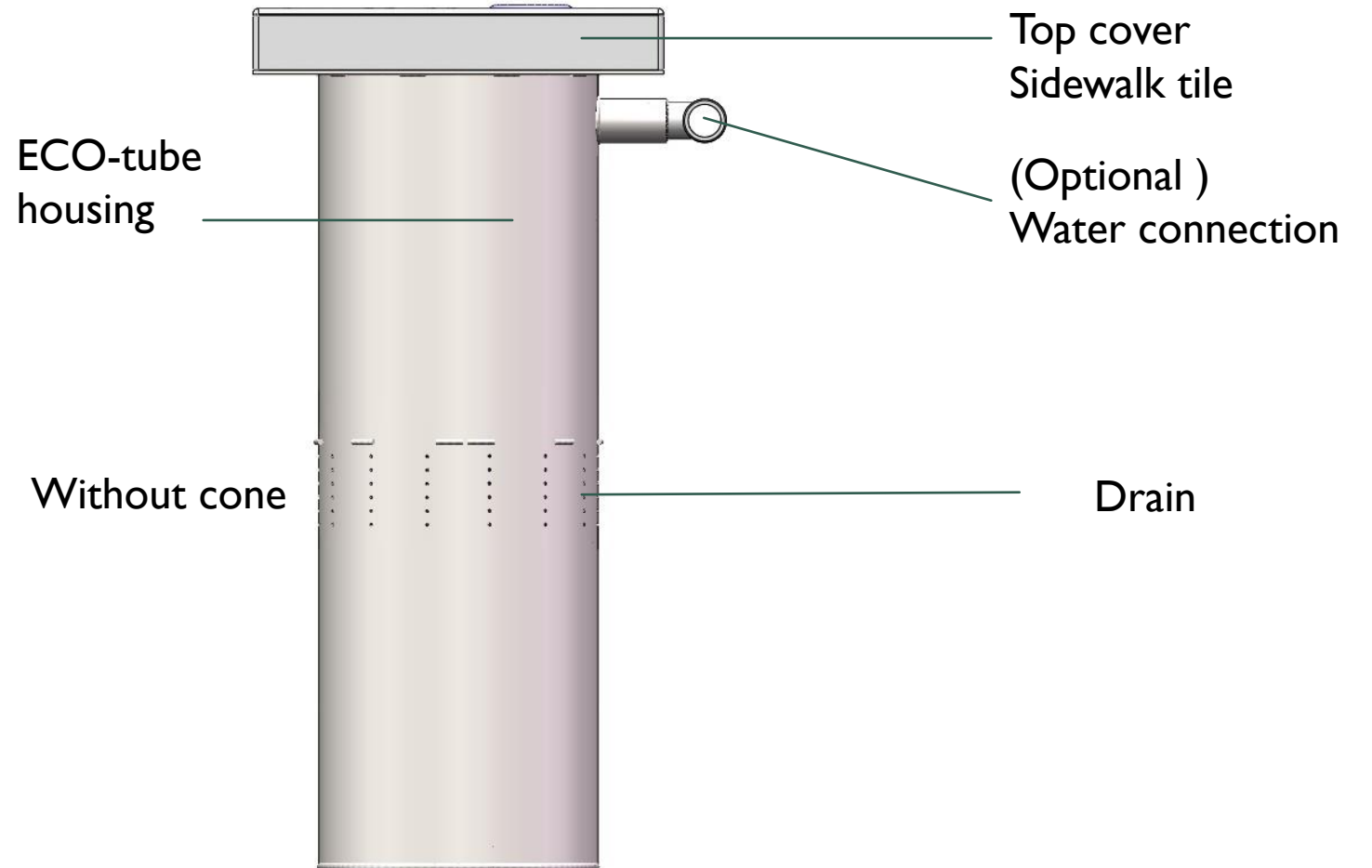
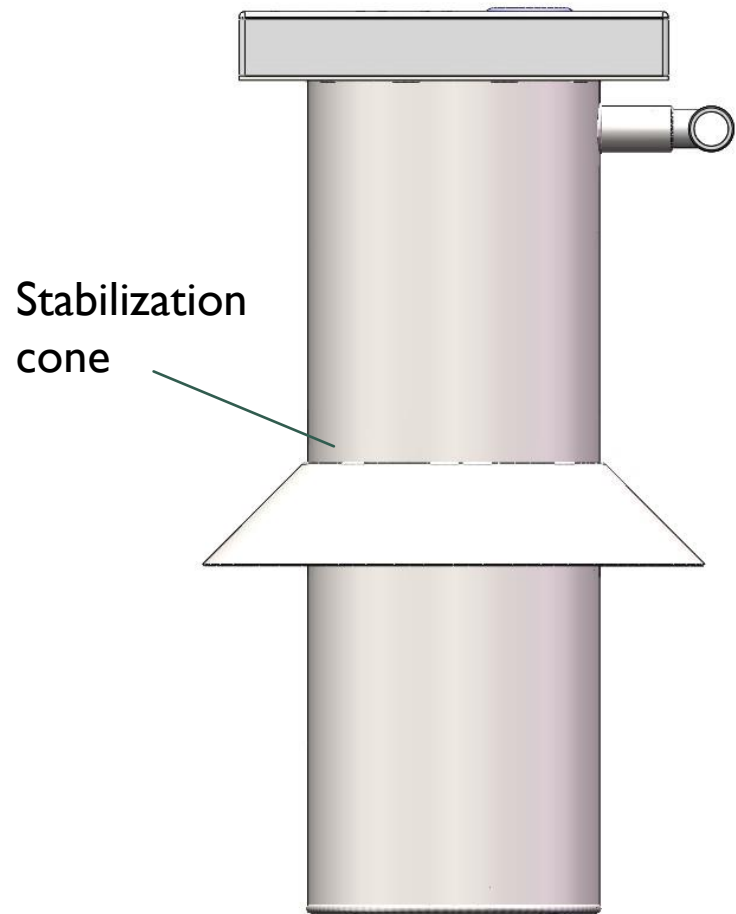
Mycelium/Hyfen

ECO-tube

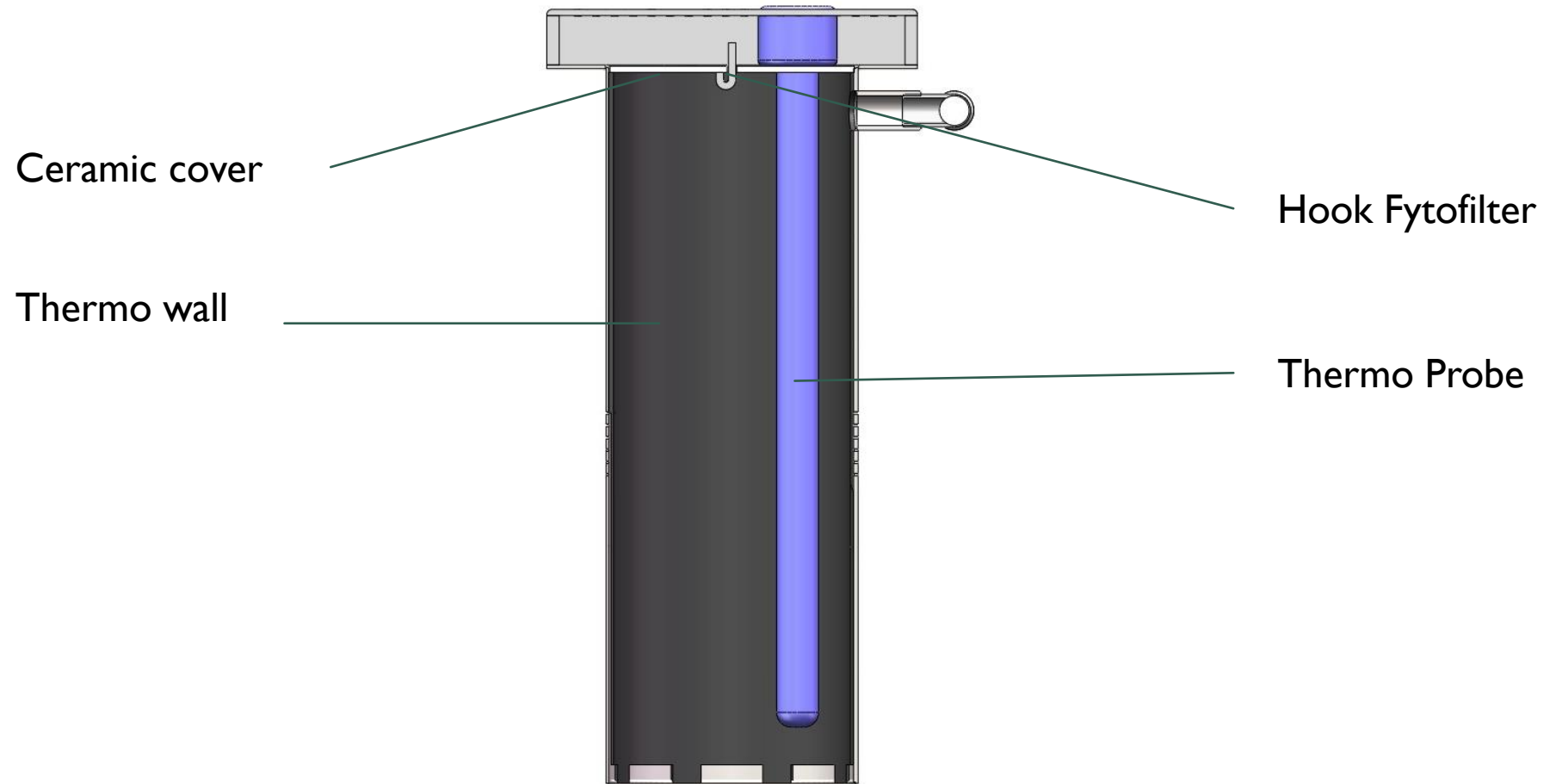
Tiles



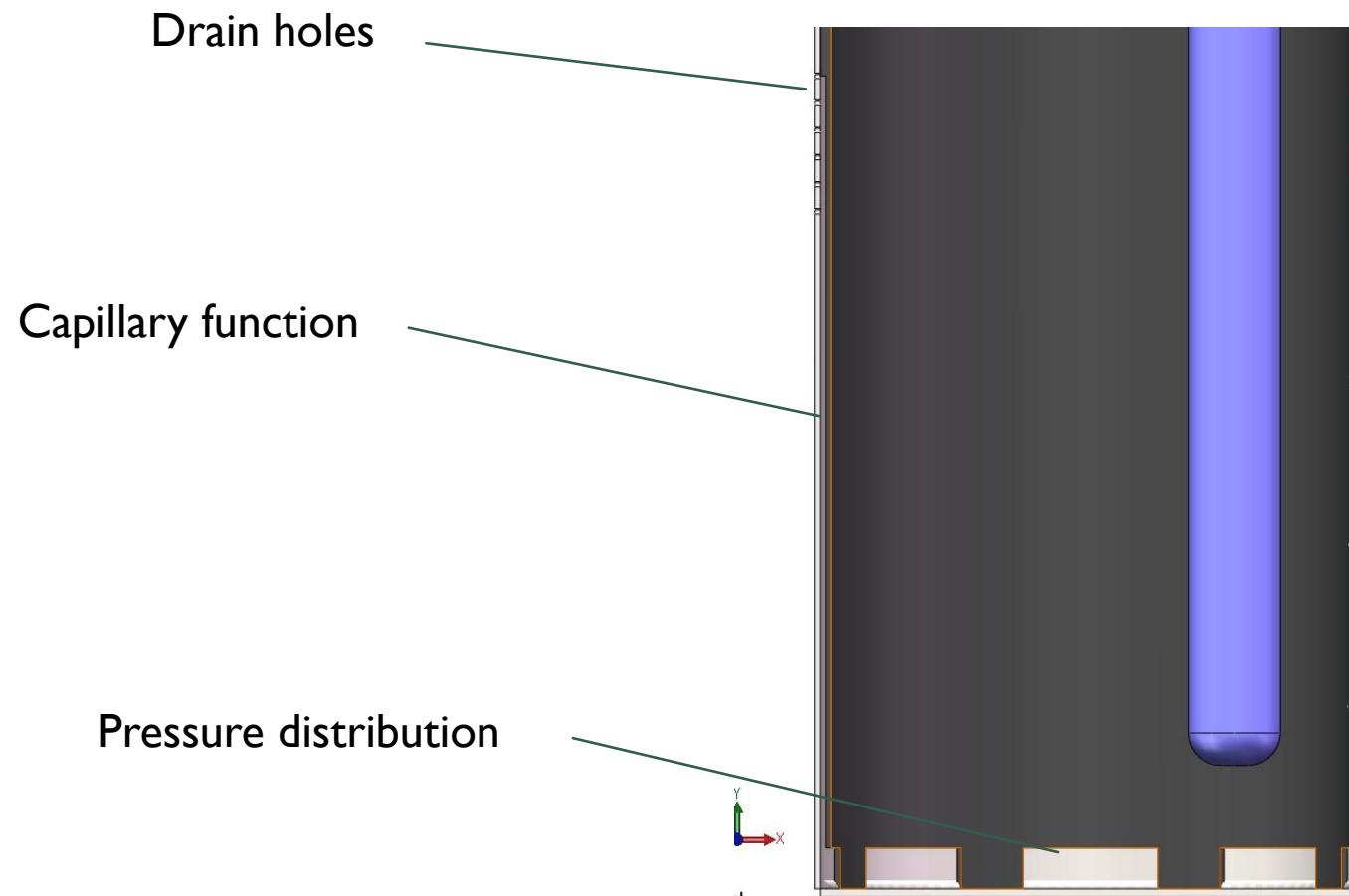
# DESIGN MODEL



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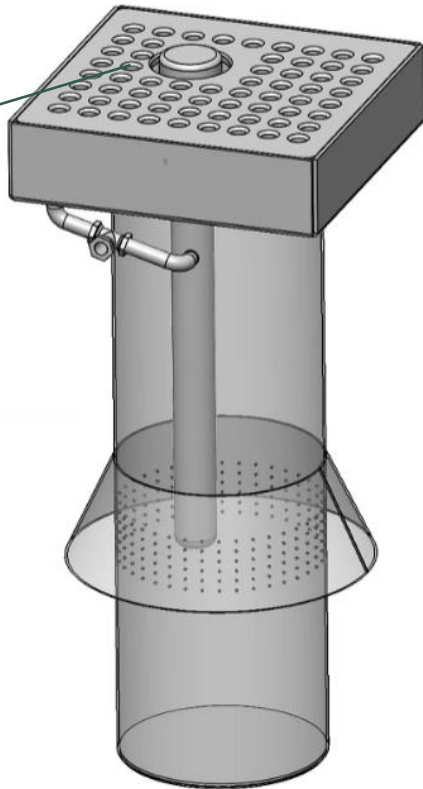


# DESIGN MODEL

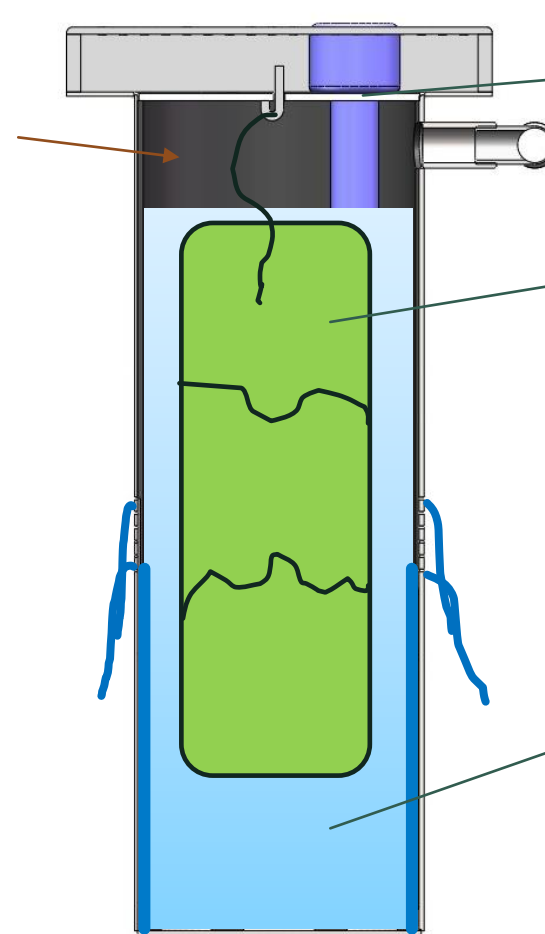


# PRINCIPLE

Filter  
rainwater



Overpressure  
chamber



Removable tile  
and ceramic cover

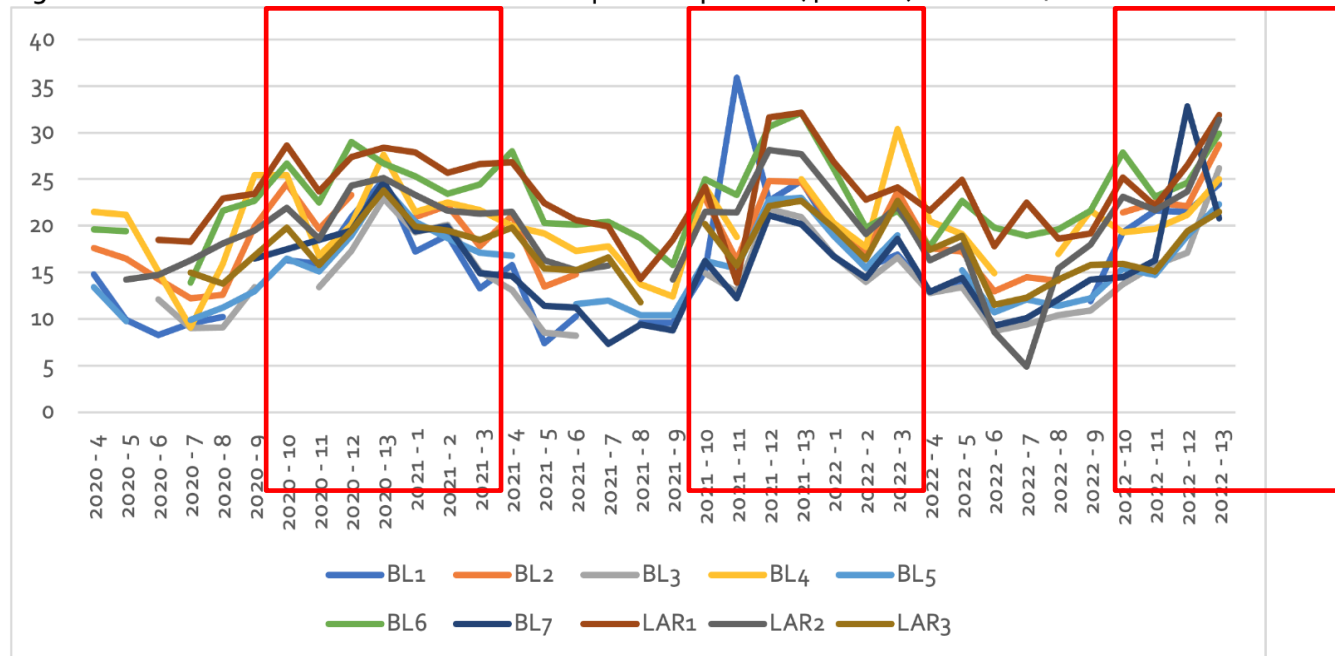
Fytofilter with raw  
materials

Water fill by rain



# END GOAL

Figuur 2. Gemeten concentraties stikstofdioxide per meetperiode (4 weken) van 2020 t/m 2022.



To reduce NO<sub>2</sub>, the tree needs to have chlorophyll (Photosynthesis). The picture show measurements of NO<sub>x</sub> concentrate eats month. In the winter months the NO<sub>x</sub> concentration is the highest. Because the trees have no leaf's, people drive more cars, instead bicycles . Gas consumption is higher ....etc.

# END GOAL



Now is the question, because the governments and people remove the leaves, Why should then the trees lose their leaves? Maybe it's possible to modify trees so that they not lost their leaves, and even in winter have "Green leaves with chlorophyll" to reduce more NO<sub>x</sub> with help of the ECO-tube?



# NEEDS FOR THE TEST

## ■ Test location:

- Test location : City .
- Test Location: Gardener.
- Test location : Forests

## ■ Test needs:

- Trees with ECO-tube, and the same tree species without ECO- tube
- Do the test with young trees and with same old tree species

## ■ The goal for the test is,

- To investigate if the mycelium grows and connect with the tree.
- To investigate healthy of the trees.
- To investigate if the mycelium is also active in winter.

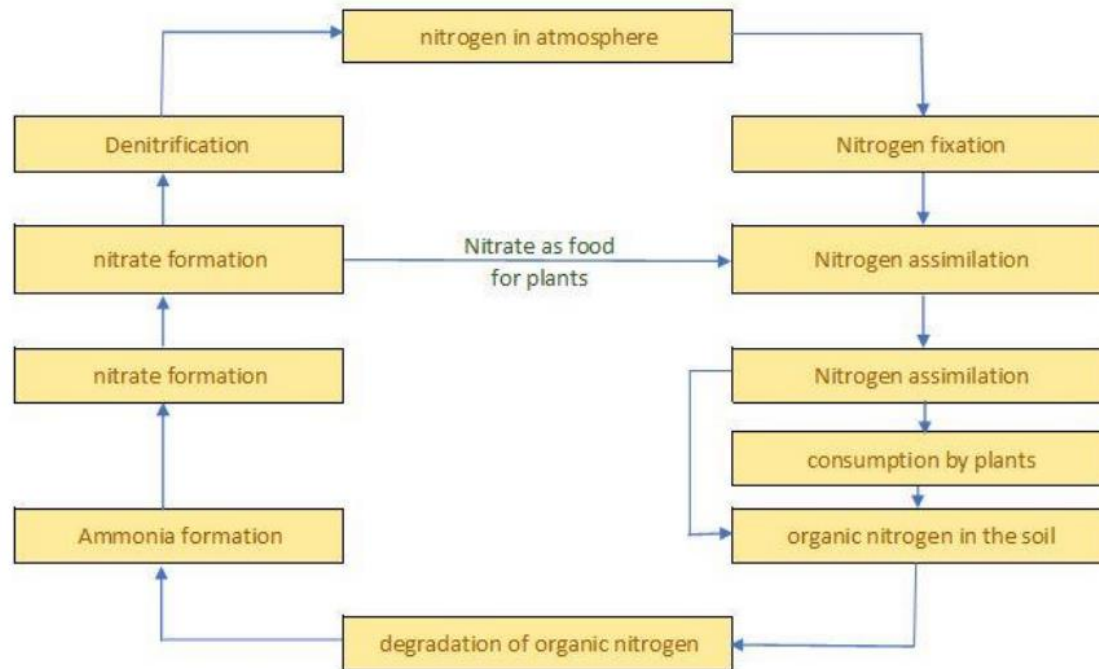
## Fytofilters

- Raw materials
- Mycelium/Hyfen
- Humitine
- Other materials

# RISK

- The test shows other results as wish.
- Waterlogging. ( is not a problem for the ECO-tube, but speeding up the delivery of raw materials)
- Thermal management does not give the desired effect.
- The Fytofilters rot.

# NO<sub>x</sub> CYCLE



# HUMITINE

Use Humitine for:

- Regenerate used substrate for a new growth and flowering cycle;
- Provides an improved soil structure;
- Upgrading new or used soil;
- Optimization of water availability for the plant;
- An increased buffering capacity of the soil;
- A reduction in nutrient leaching;
- Neutralization of the soil pH value back to 6.5;
- Improving the absorption of nutrients by the root system;
- Stimulation of growth, enzymes and cell division in the plant;
- Improvement of yield and quality;



# Tree spices vs type of Mushroom

	Gr.Oet	Tr.Oet	Bl.Oet	S	N	F	kl.Bu	Pop	Pr	EH
berk	X	X		X	X	X	X		X	
beuk	X	X	X	X	X	X	X		X	X
eik (inlandse)				X	X		X			X
els				X	X	X	X		X	
es					X	X	X			
esdoorn						X				
fruitsoorten										
haagbeuk	X			X	X	X				
hazelaar	X	X		X						
iep		X				X				
linde	X		X			X				
paardenkastanje	X				X	X			X	

plataan										X									
populier	X	X	X						X		X			X					
robinia									X		X						X		
tamme kastanje									X									X	
walnoot									X		X							X	
wilg	X	X	X						X		X	X	X						
zoete kers	X								X									X	

## Toelichting

X – Goed

x – Redelijk

Gr.Oet – Grijze Oesterzwam

Tr.Oet – Trechter oesterzwam

Bl.Oet – Bleke Oesterzwam

S – Shii-take

N – Nameko

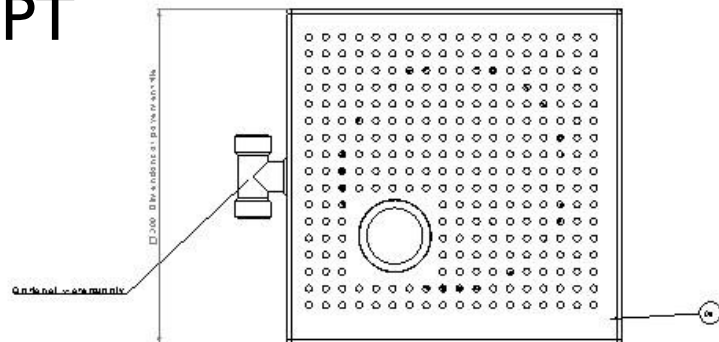
F – Fluweelpootje

Kl.Bu – Kleine bundelzwam

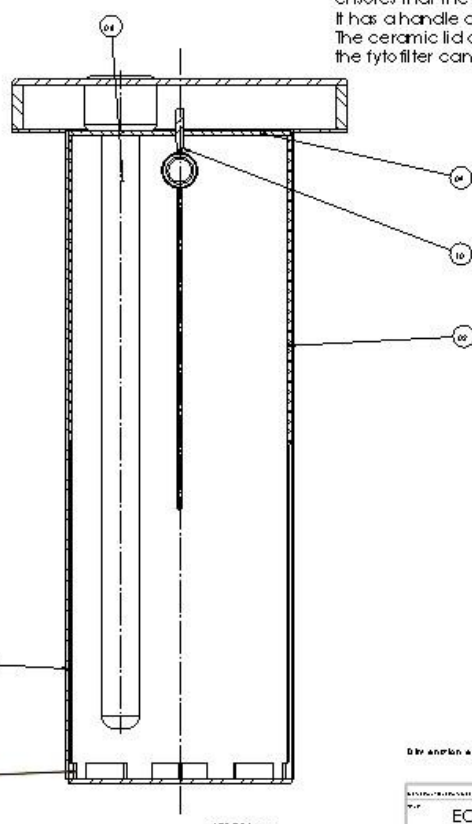
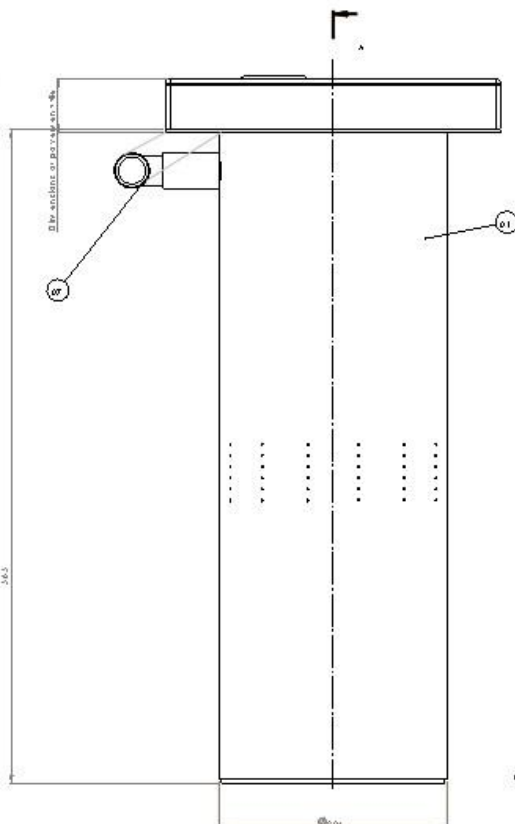
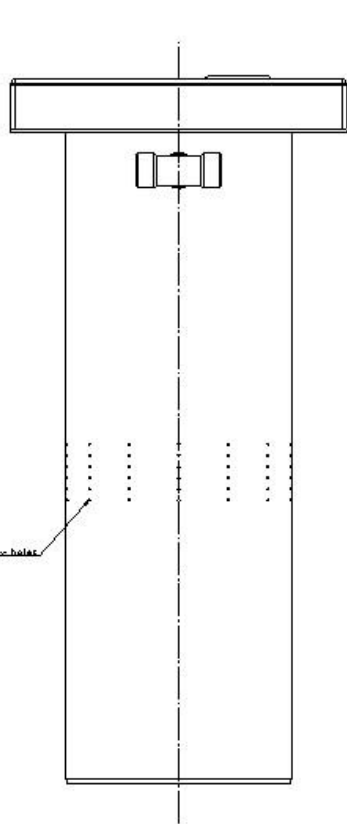
Pop – Populierenleemhoed

Pr – Pruikezwam

# CONCEPT DETAIL



- 01: The tube is made of stainless steel with an inner sheath of plastic (02) to maintain temperature management
- 03: Holes to feed the water passage through a capillary gap (04) to the outflow holes
- 05: a protective cone to protect the outflow holes against contamination and outflow. This will ensure that the nutrients/minerals/fungi are better distributed in the soil.
- 06: (Rain) water is drained through the top cover, which is transported to the ECO-tube via a filter and inlet pipe (07)
- 08: The vacuum tube with inner gas will provide the temperature required to conduct the tube/water temperature through the ECO-tube
- 09: A ceramic lid hermetically seals the ECO-tube and ensures that the heat cannot flow away quickly. It has a handle and a hook (10) to hang the tytofilter on. The ceramic lid can be removed via the handle and the tytofilter can be replaced.



Dit detail is symmetrisch om te sparen op de tekening

SECTION A-A  
SCALE 1:2

ECO-Tube		PPOP-01022024	
NO	REV	DATE	BY
1	0	15-01-2024	PP
2	0	15-01-2024	PP
3	0	15-01-2024	PP



Patent 06-02-2020  
121813  
J.B.Hofstede