

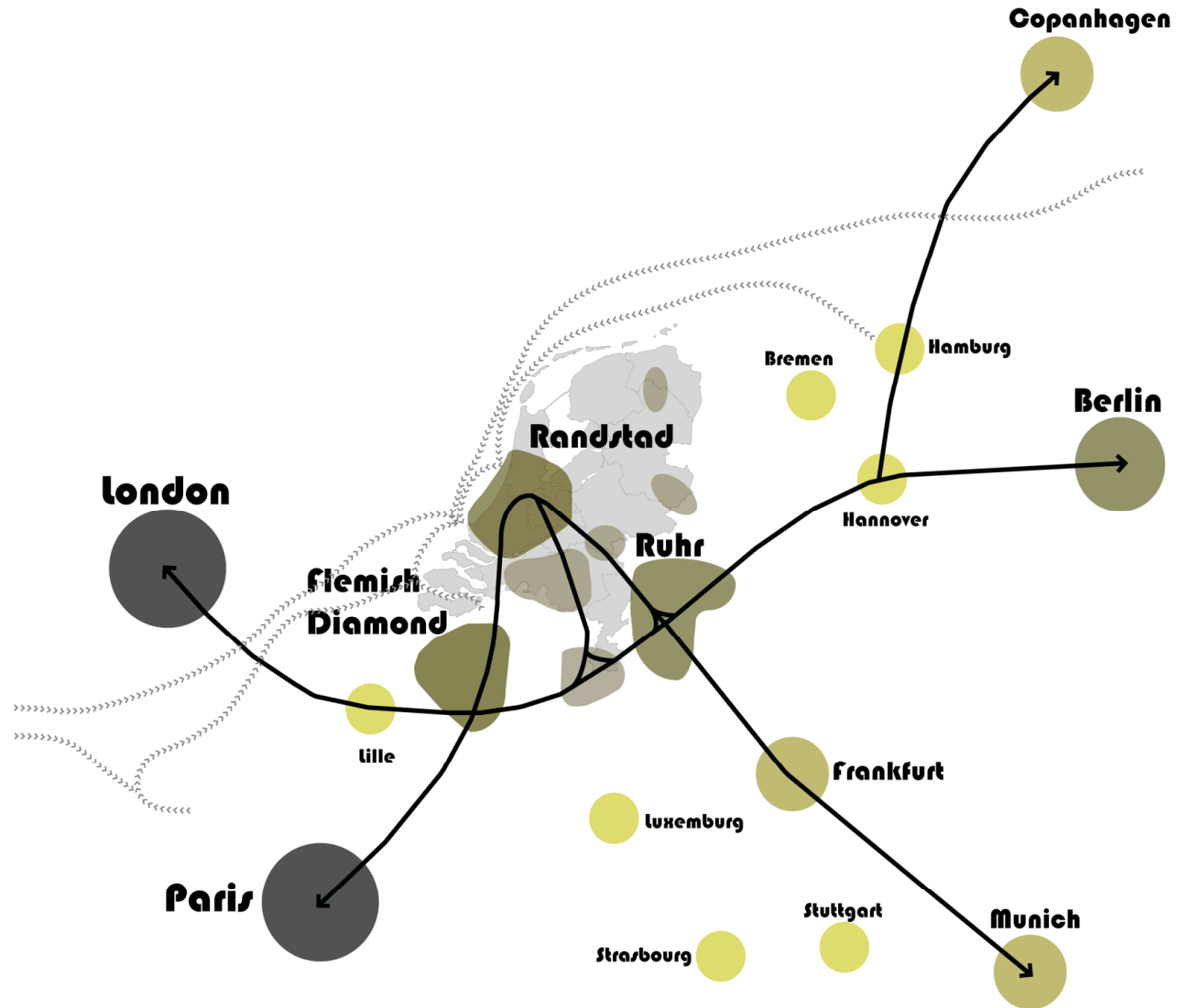
2009-2010 P5 presentation

# Computational Design and Fabrication Technologies in Architecture

Selen Ercan

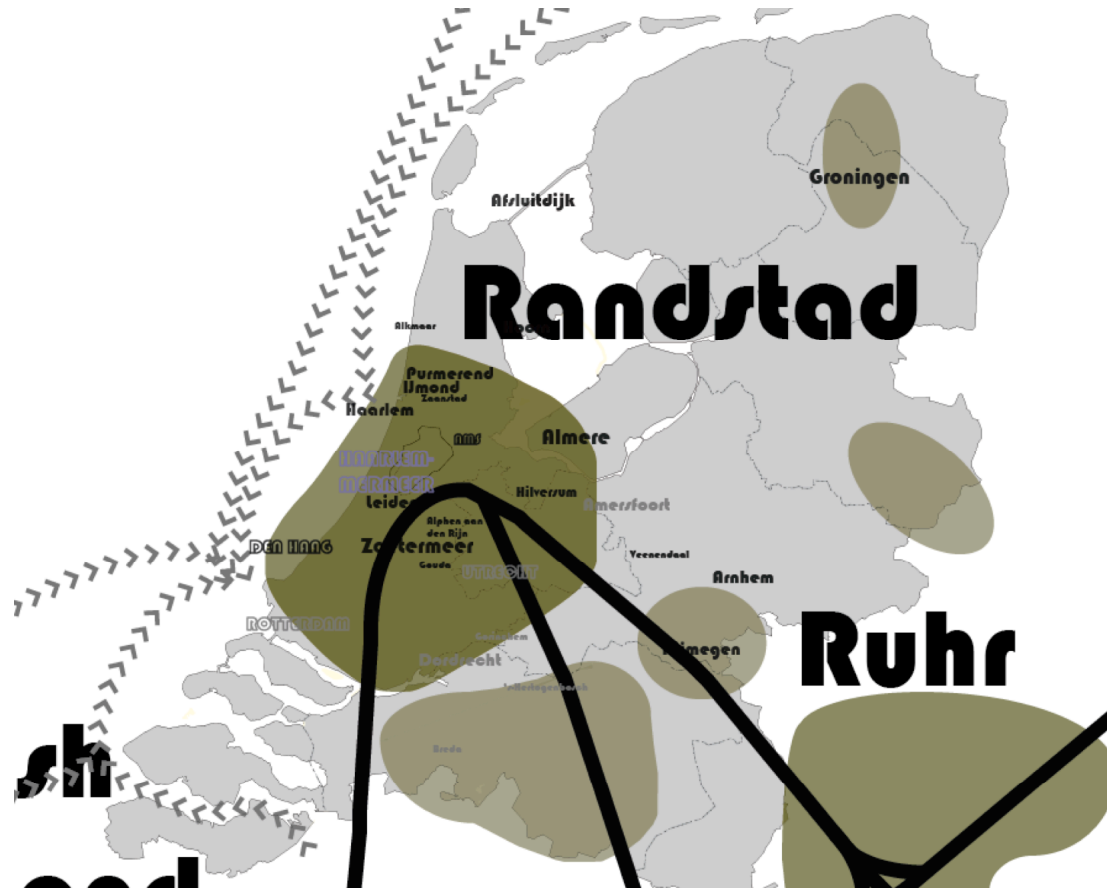
Haarlemmermeer | Mobility and Infrastructure  
Ir. H. Plomp | Ir. S. M. Mulders | Dr. ir. E. B. Tuncer

1 Mobility in the  
Randstad



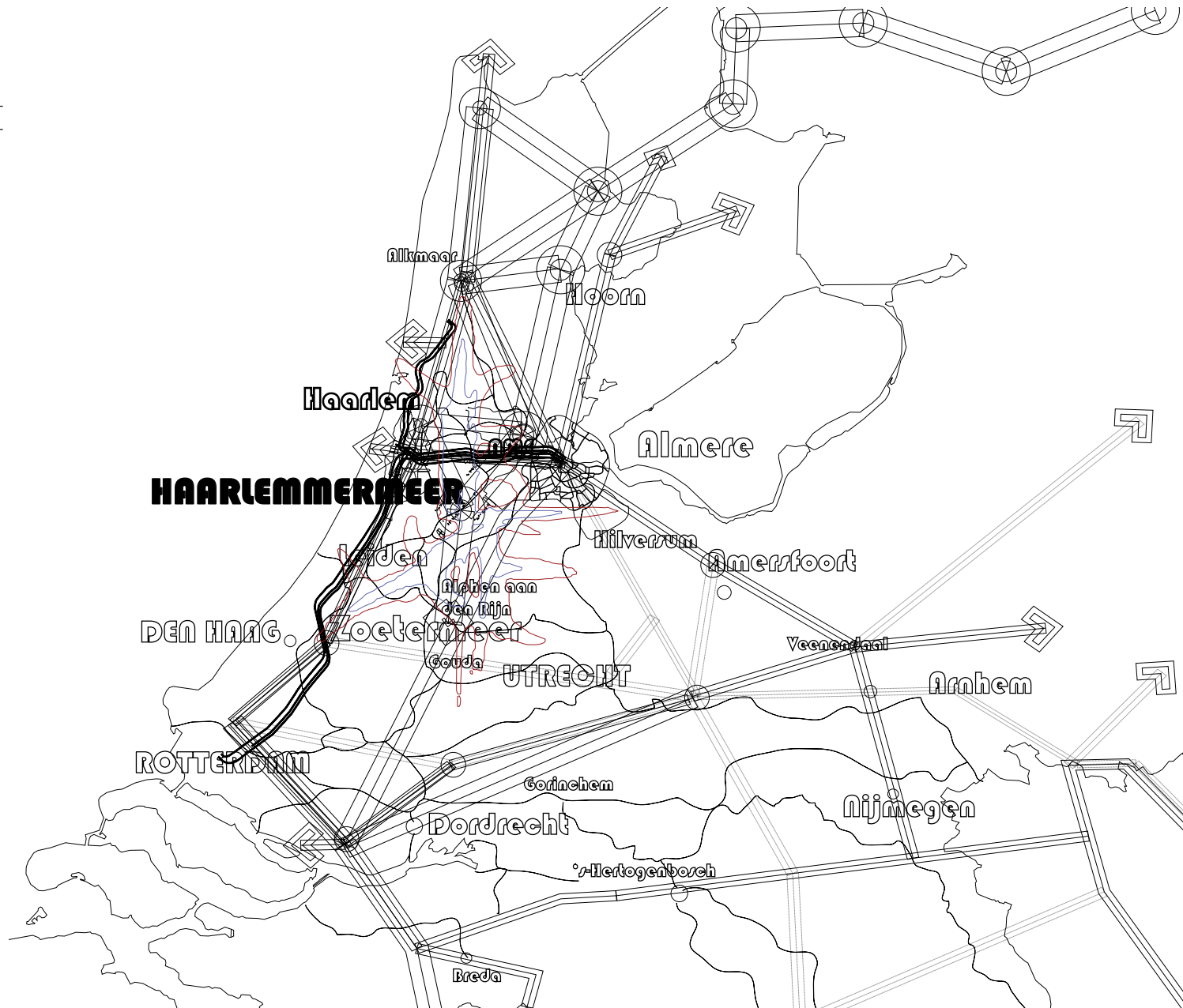
Mobility networks and major metropolis hierarchy within Europe

1 Mobility in the  
Randstad



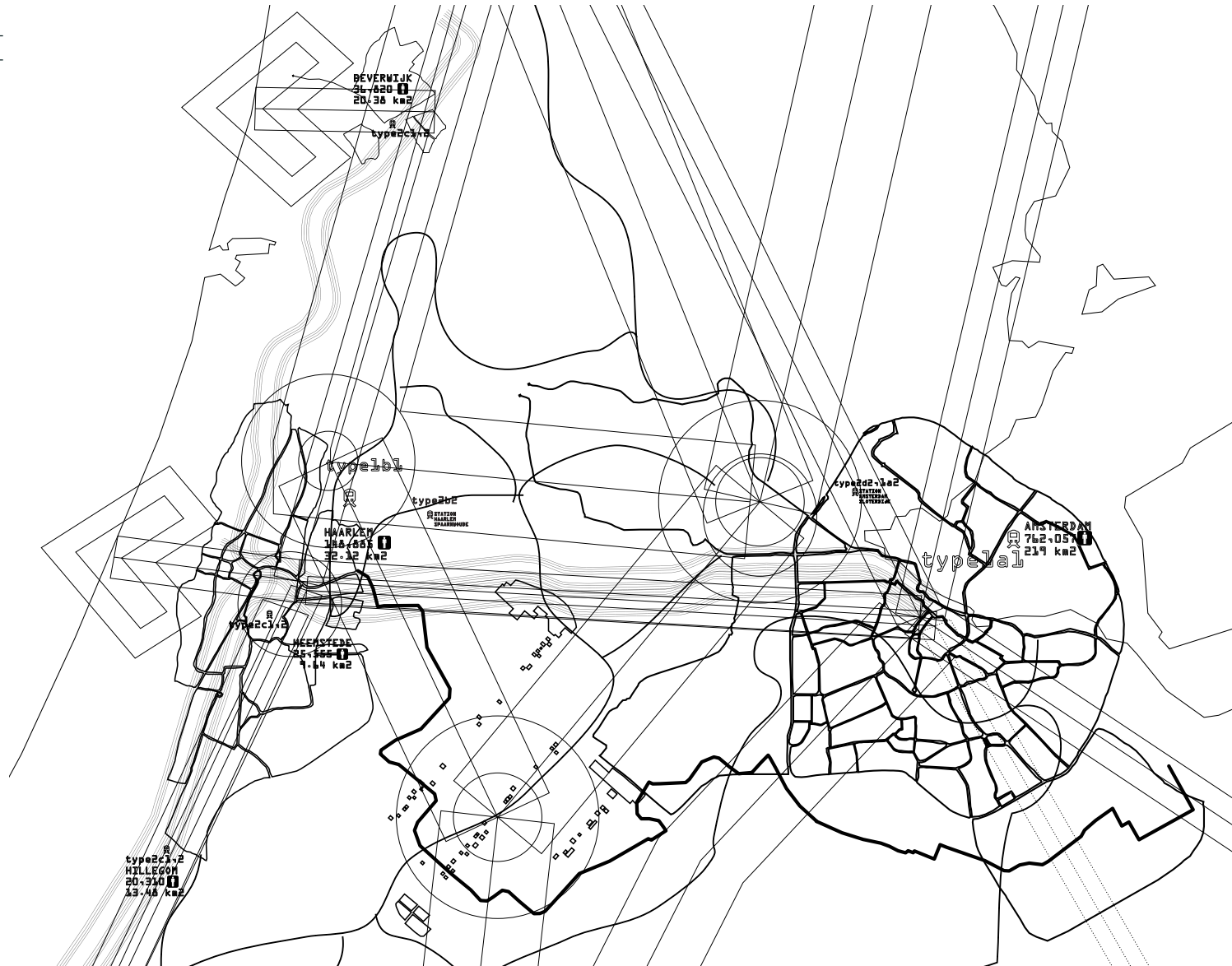
1 Mobility in the  
Randstad

The case of North Holland



# 1 Mobility in the Randstad

The case of North Holland



1 Mobility in the  
Randstad

The case of North Holland

The case of  
Haarlemmer(meer) - Schiphol

Why Schiphol?

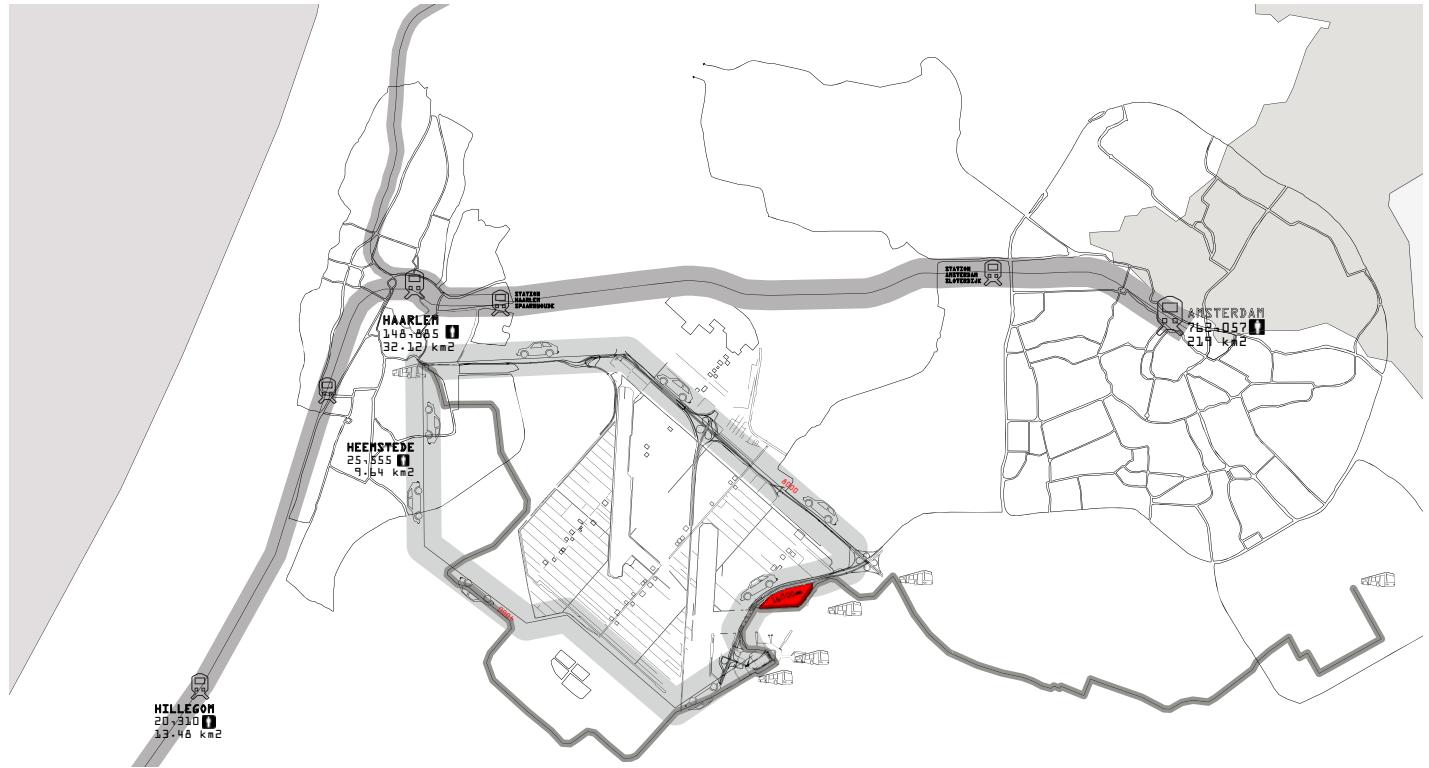
Because the growth is not caused by one central city in the Haarlemmermeer region. The reason of the major growth is Schiphol airport.\*

# 1 Mobility in the Randstad

The case of North Holland

The case of

Haarlemmer[meer] - Schiphol

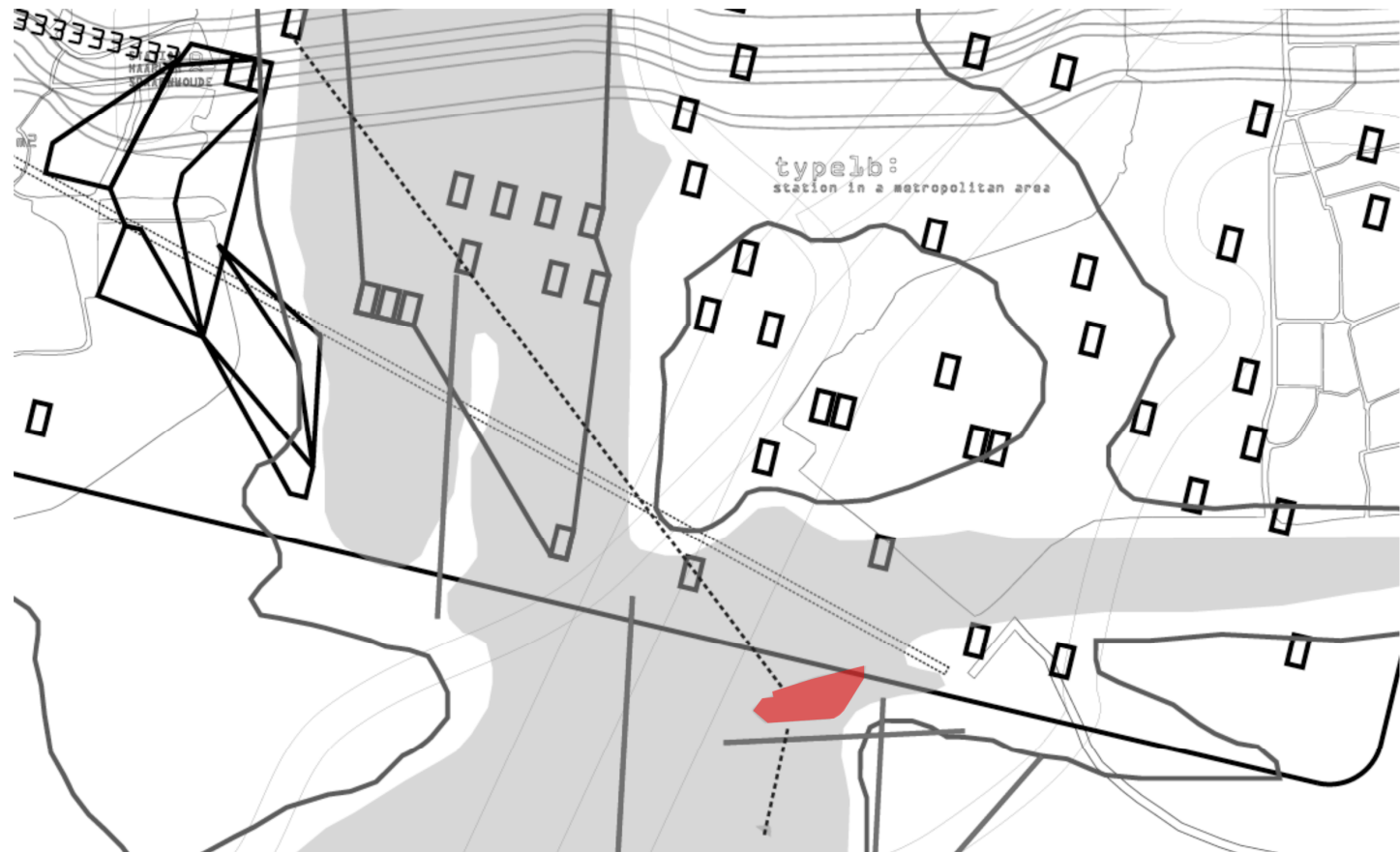


A transport hub or transport interchange is a location where passengers and cargo are exchanged across several modes of transport.

1 Mobility in the  
Randstad

The case of North Holland

The case of  
Haarlemmer(meer) - Schiphol





1 Mobility in the  
Randstad

The case of North Holland

The case of  
Haarlemmer(meer) - Schiphol



1 Mobility in the  
Randstad

The case of North Holland

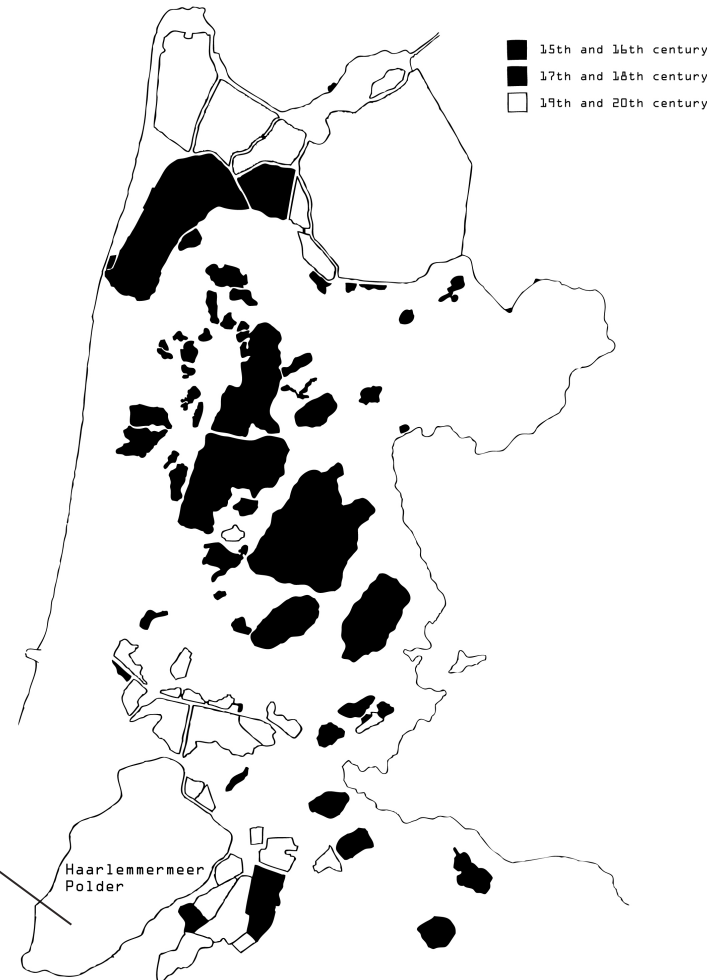
The case of  
Haarlemmer[meer] - Schiphol

2 The Scenario

Why to parameterize?

Transformation of  
Haarlemmermeer

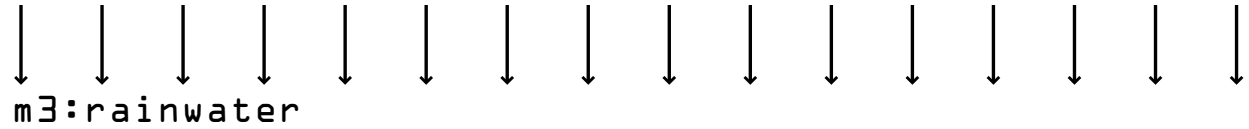
Reclamation of Haarlemmermeer polder: 1852



1 Mobility in the Randstad

The case of North Holland

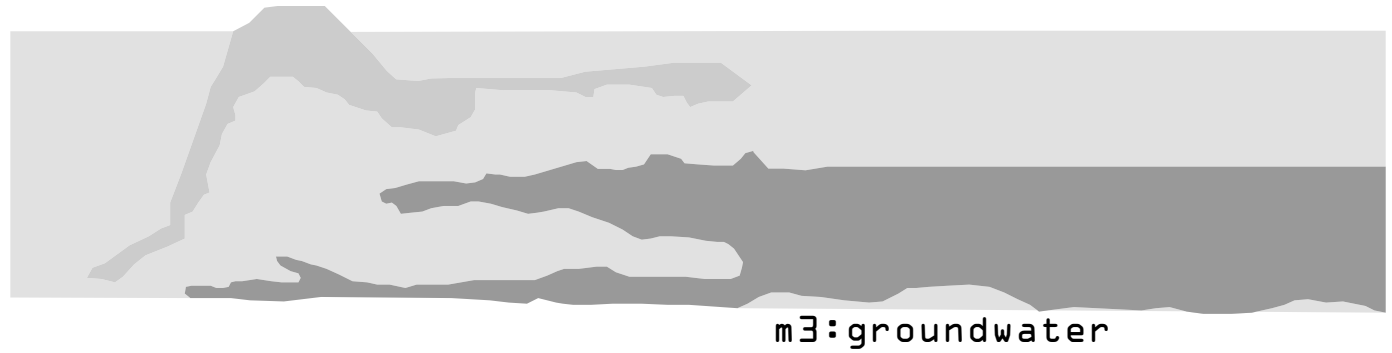
The case of Haarlemmer[meer] - Schiphol



2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer



1 Mobility in the Randstad

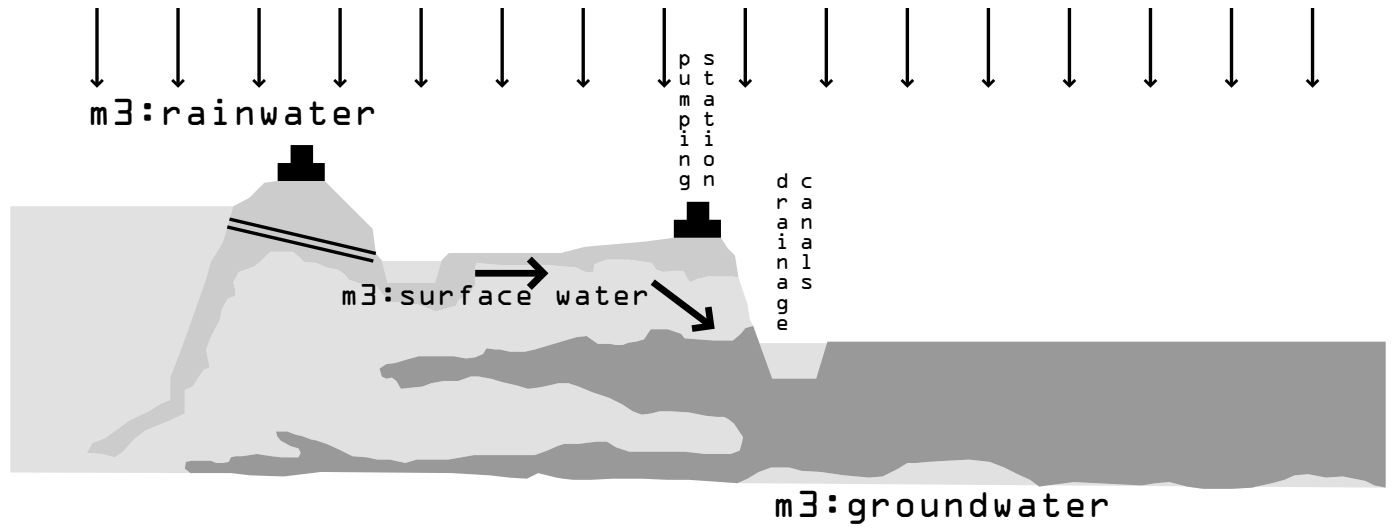
The case of North Holland

The case of Haarlemmer(meer) - Schiphol

2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer



1 Mobility in the Randstad

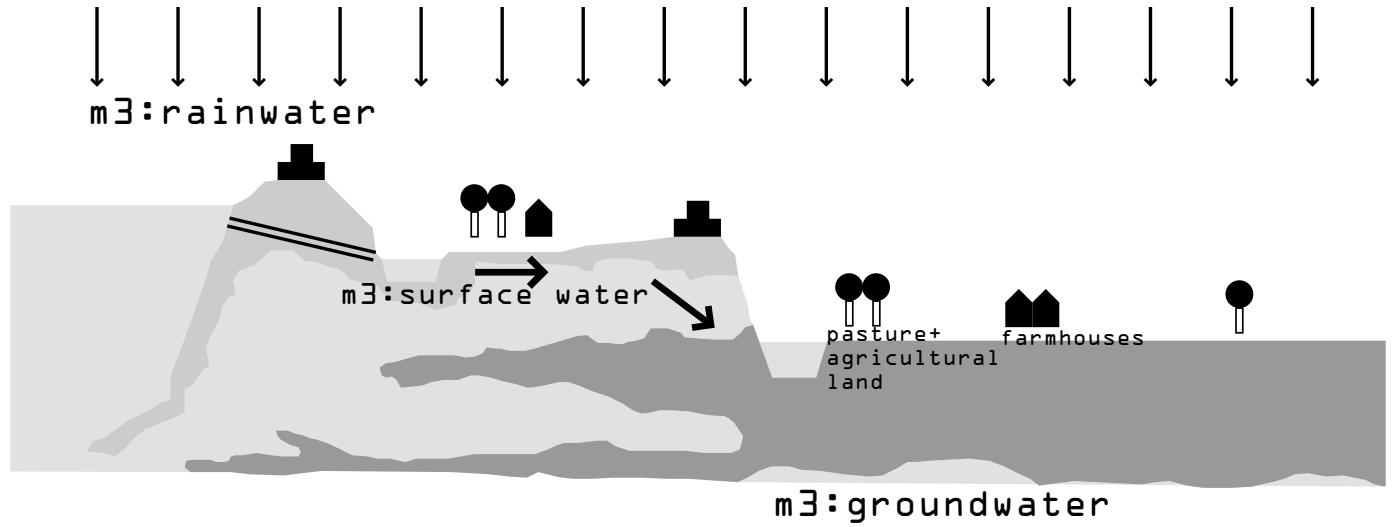
The case of North Holland

The case of Haarlemmer[meer] - Schiphol

2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer



1 Mobility in the  
Randstad

The case of North Holland

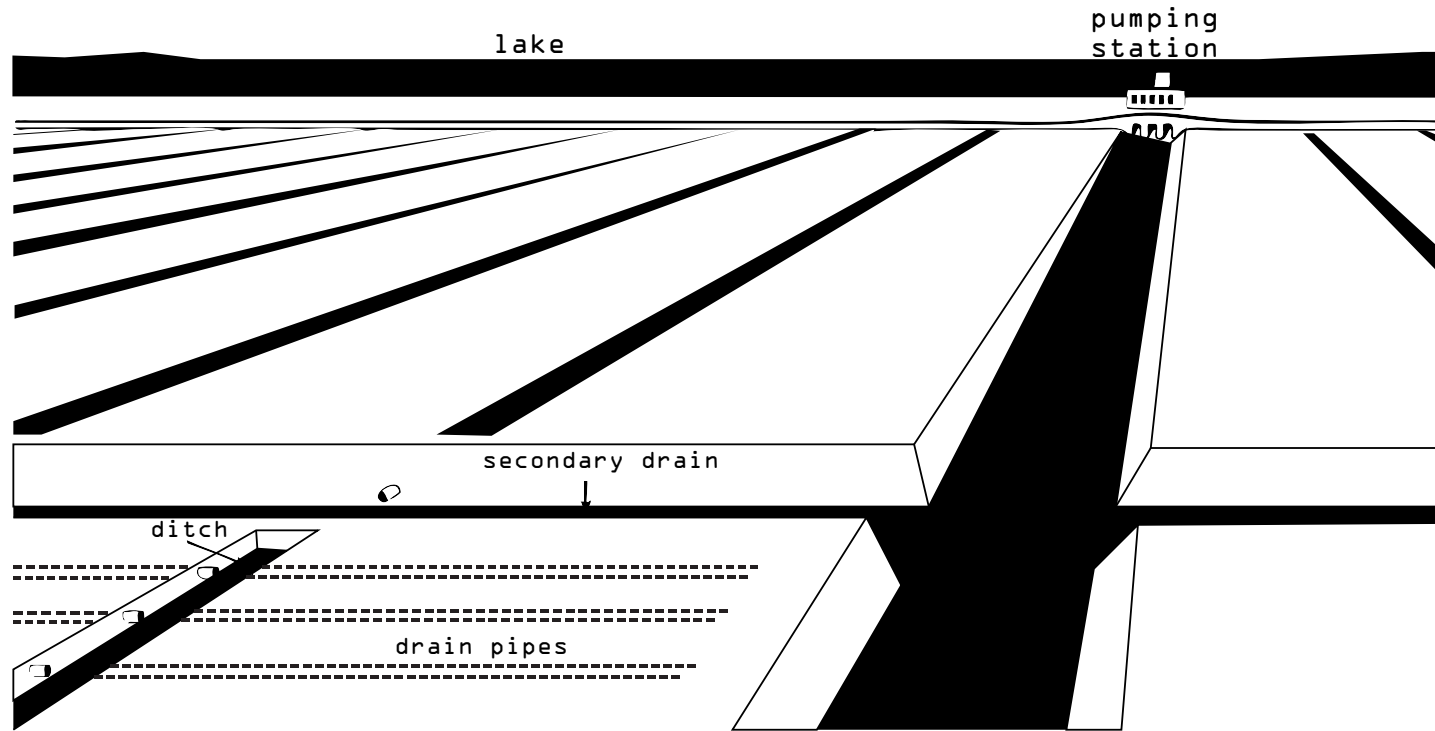
The case of

Haarlemmer(meer) - Schiphol

2 The Scenario

Why to parameterize?

Transformation of  
Haarlemmermeer



Landscape pattern in the polder system

1 Mobility in the  
Randstad

The case of North Holland

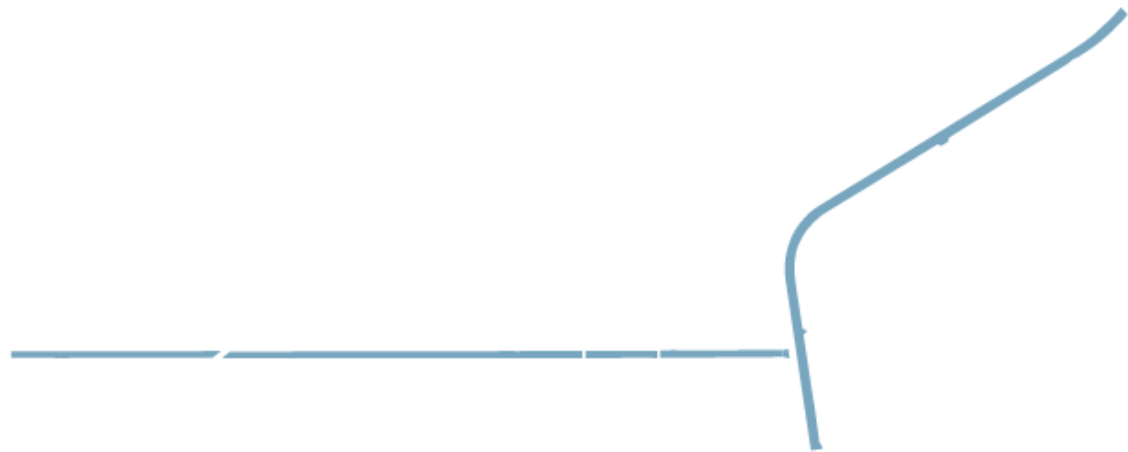
The case of  
Haarlemmer(meer) - Schiphol

2 The Scenario

Why to parameterize?

Transformation of  
Haarlemmermeer

# \_Hoofdvaart and Ringvaart



1 Mobility in the  
Randstad

The case of North Holland

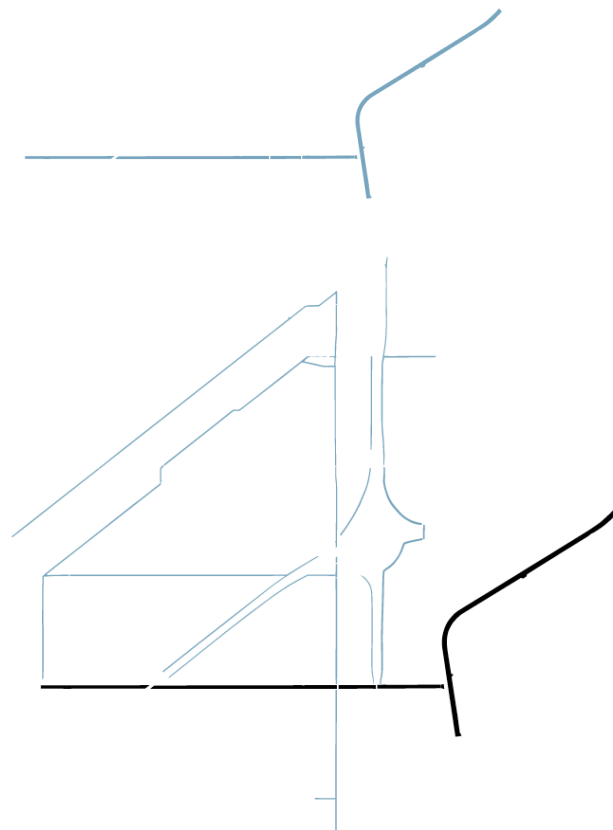
The case of  
Haarlemmer(meer) - Schiphol

2 The Scenario

Why to parameterize?

Transformation of  
Haarlemmermeer

Primary and Secondary Drains  
Hoofdvaart and Ringvaart





1 Mobility in the  
Randstad

The case of North Holland

The case of  
Haarlemmer(meer) - Schiphol

2 The Scenario

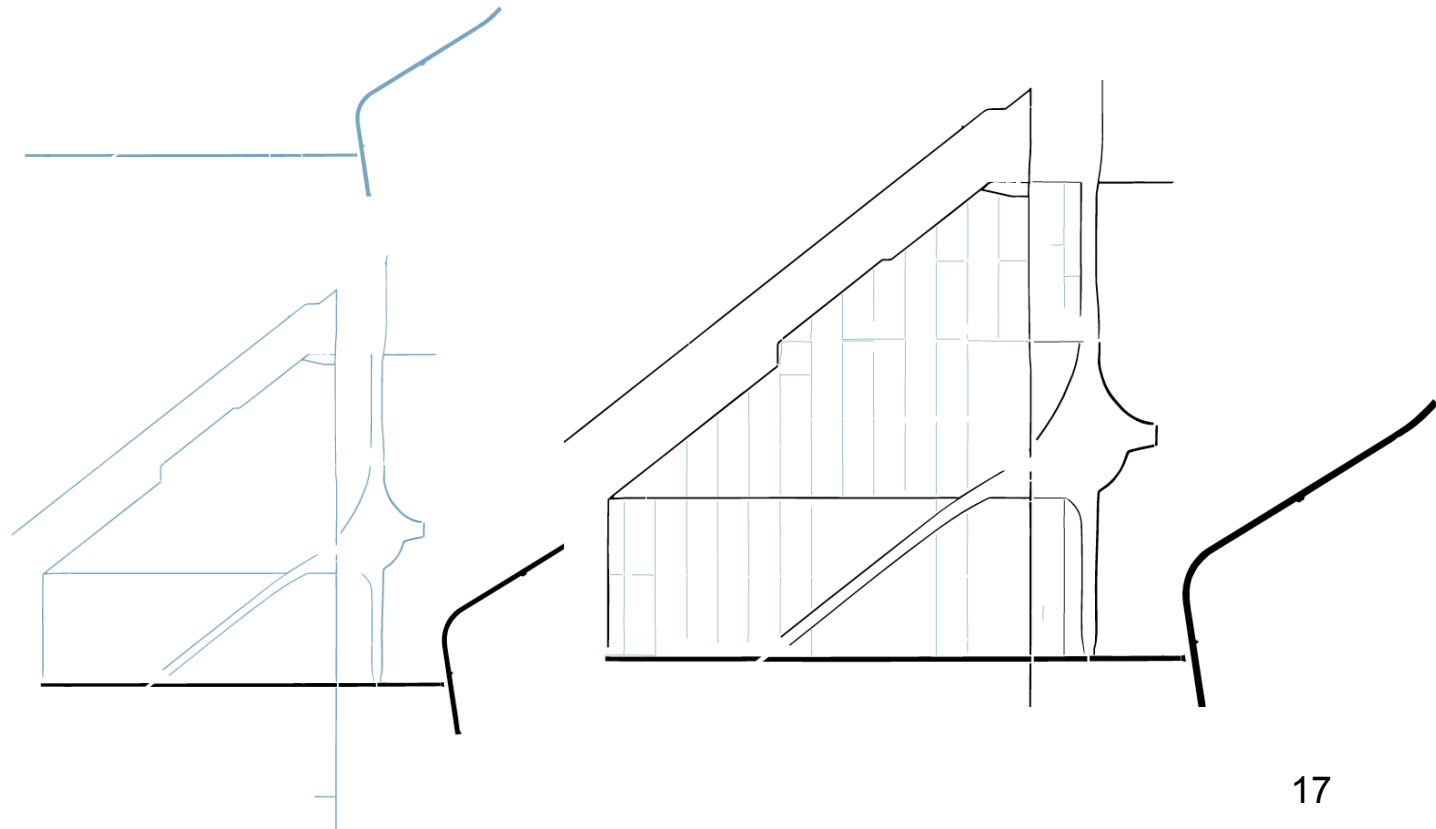
Why to parameterize?

Transformation of  
Haarlemmermeer

**\_Ditches**

**\_Primary and Secondary Drains**

**\_Hoofdvaart and Ringvaart**



1 Mobility in the  
Randstad

The case of North Holland

The case of  
Haarlemmer(meer) - Schiphol

2 The Scenario

Why to parameterize?

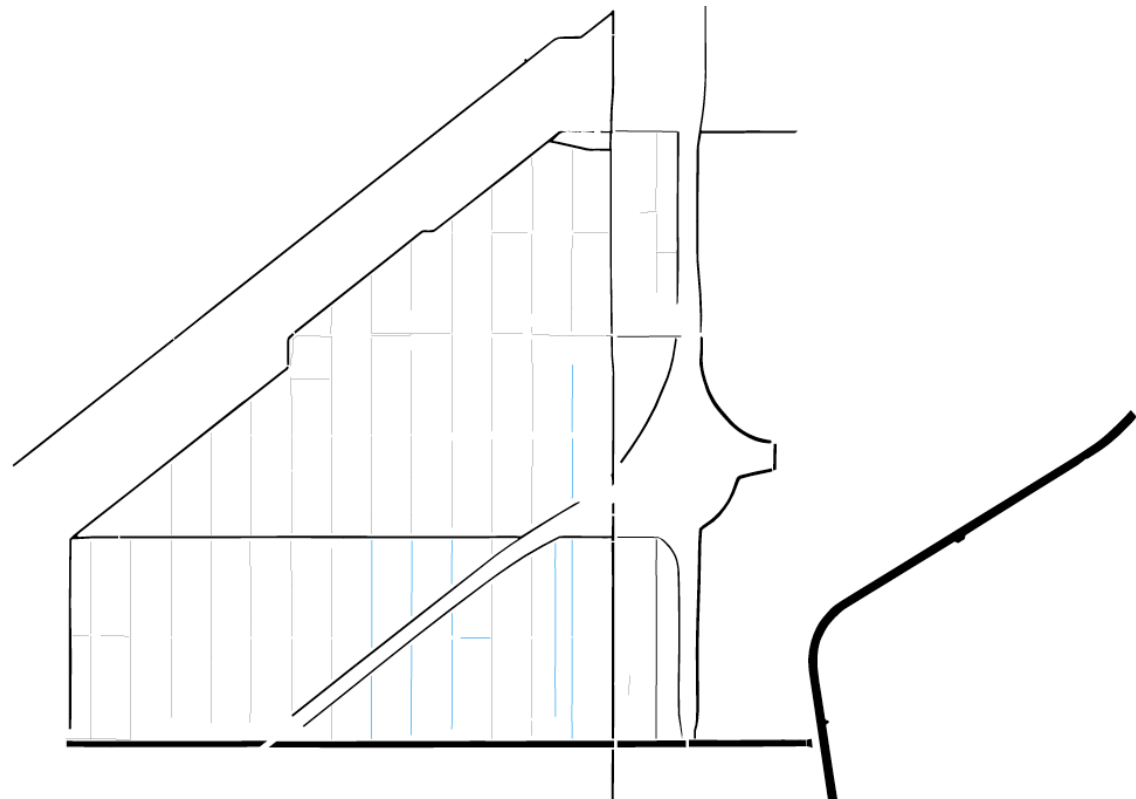
Transformation of  
Haarlemmermeer

\_Gully

\_Ditches

\_Primary and Secondary Drains

\_Hoofdvaart and Ringvaart



1 Mobility in the  
Randstad

The case of North Holland

The case of  
Haarlemmer(meer) - Schiphol

2 The Scenario

Why to parameterize?

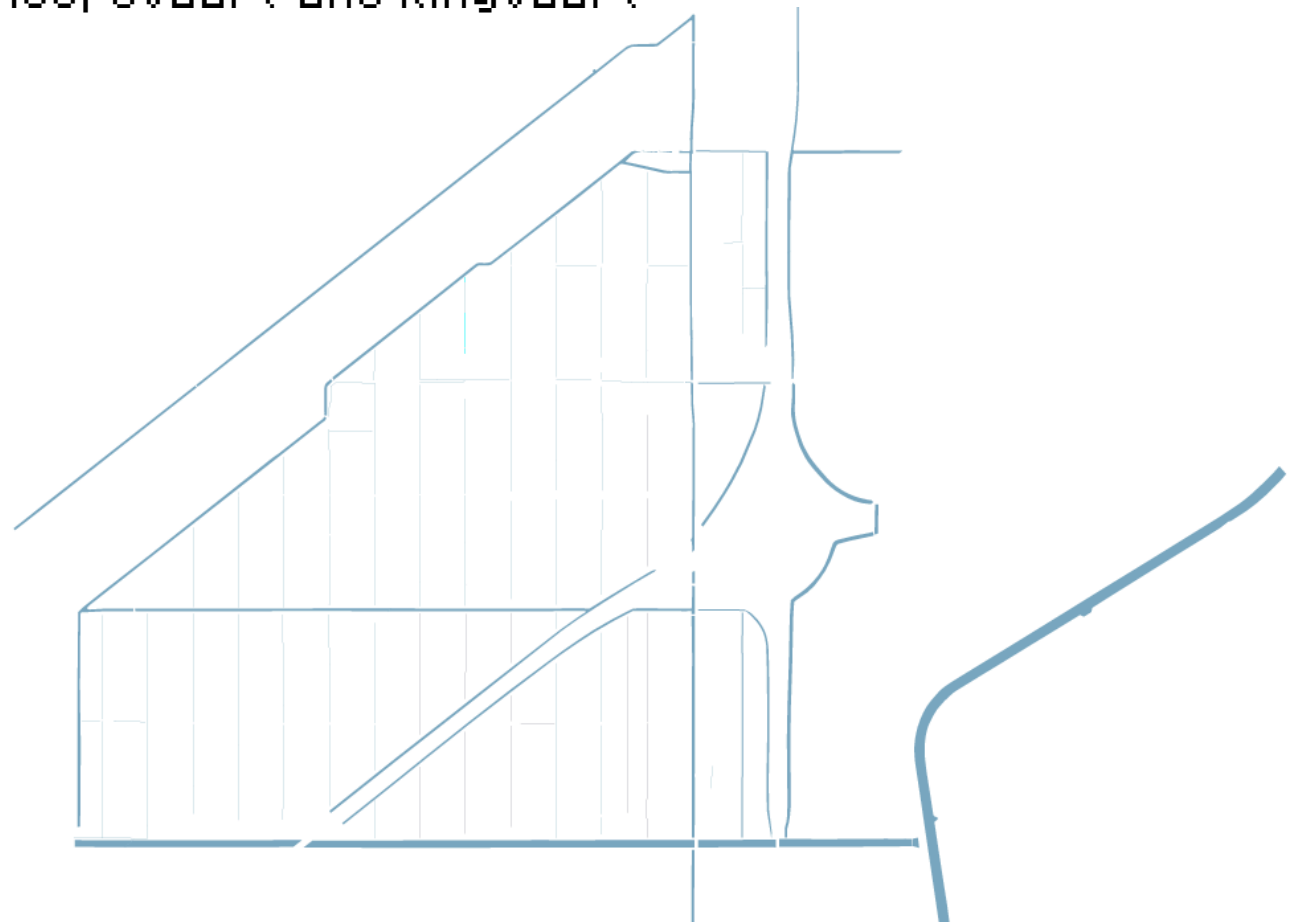
Transformation of  
Haarlemmermeer

\_Gully

\_Ditches

\_Primary and Secondary Drains

\_Hoofdvaart and Ringvaart



## 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer[meer] - Schiphol

## 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

1916 Haarlemmermeer:  $52^{\circ}18'29''\text{N } 004^{\circ}45'51''\text{E}$ , After the Haarlem Lake was reclaimed, Schiphol airbase was constructed.



1992 Haarlemmermeer:  $52^{\circ}18'29''\text{N } 004^{\circ}45'51''\text{E}$ .

# 1 Mobility in the Randstad

The case of North Holland

The case of

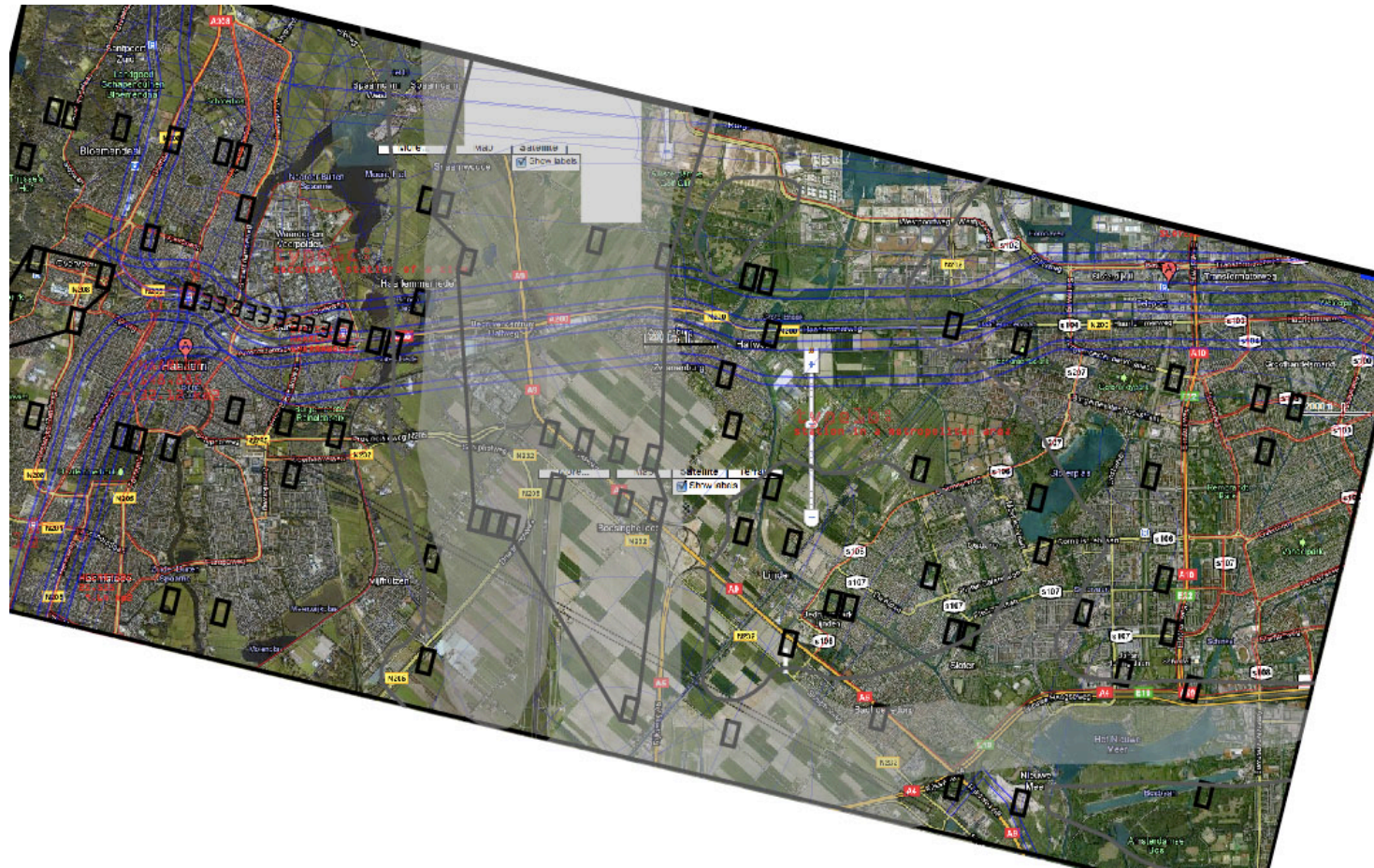
Haarlemmer(meer) - Schiphol

## 2 The Scenario

Why to parameterize?

Transformation of  
Haarlemmermeer

How to parameterize?



# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

How to parameterize?

infrastructure

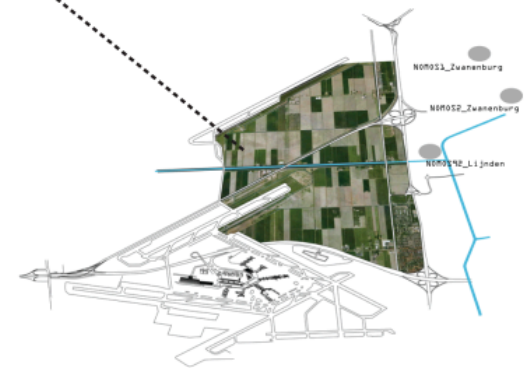
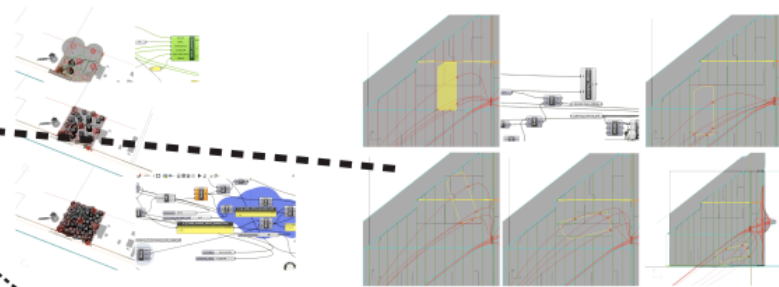
Schiphol

polder landscape

noise contour levels

dynamics of the water management system

m<sup>2</sup> of land occupied on agricultural land or pasture landscape



# 1 Mobility in the Randstad

The case of North Holland

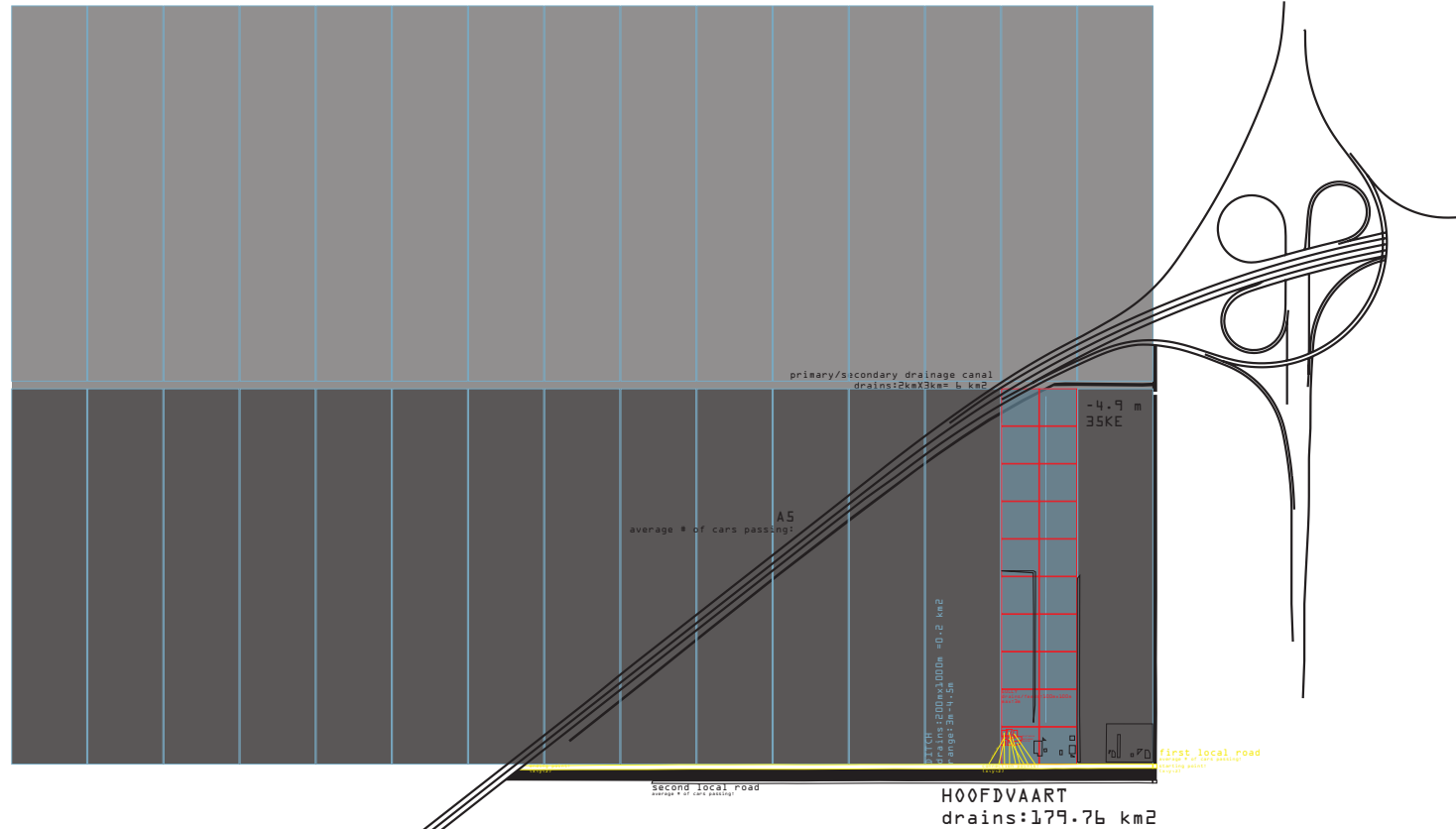
The case of Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

How to parameterize?



Polder Module

Polder Block

Polder Parcel

Project Plot

# 1 Mobility in the Randstad

The case of North Holland

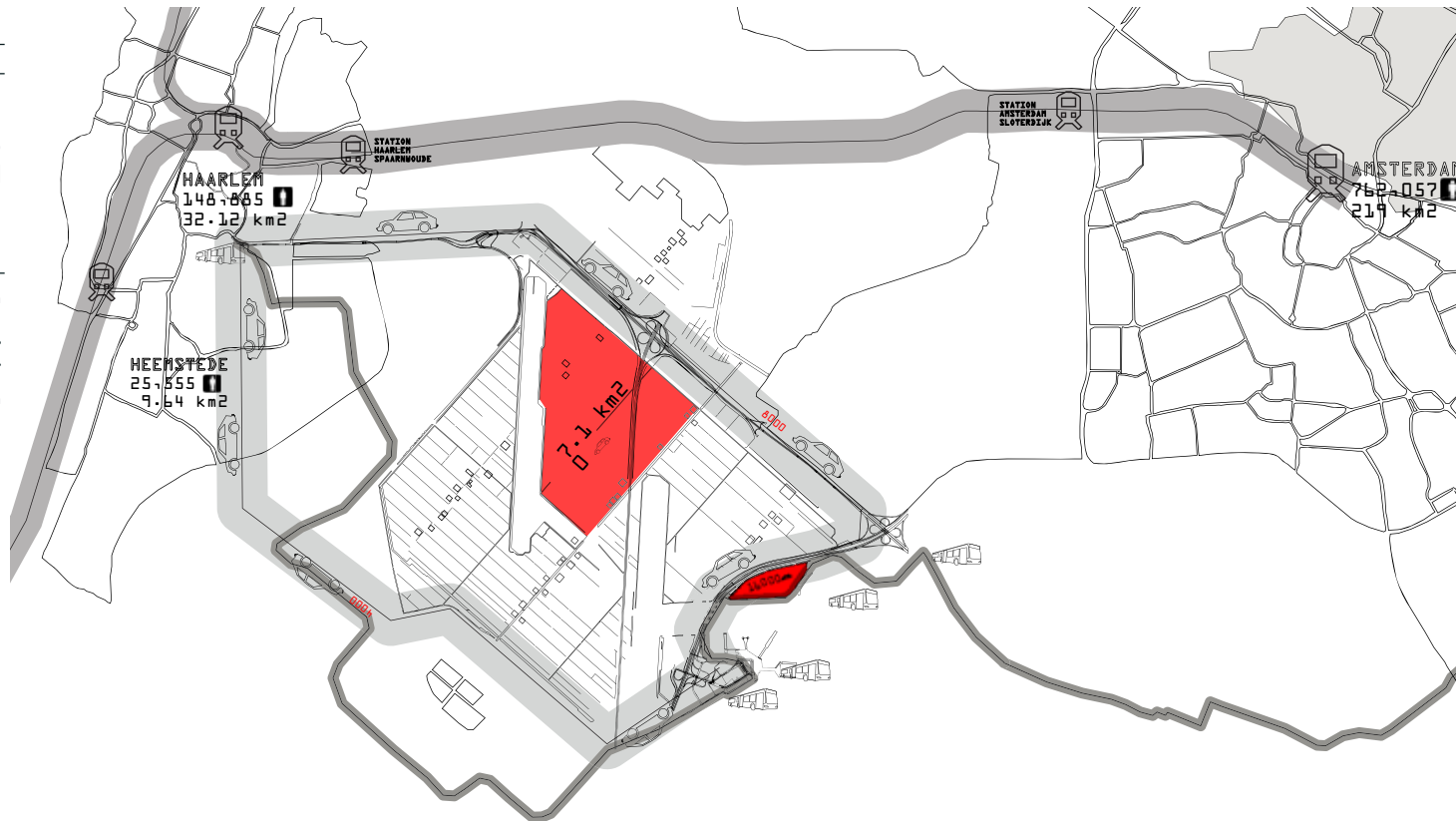
The case of Haarlemmer(meer) - Schiphol

## 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

How to parameterize?





# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

How to parameterize?



1 Mobility in the Randstad

The case of North Holland

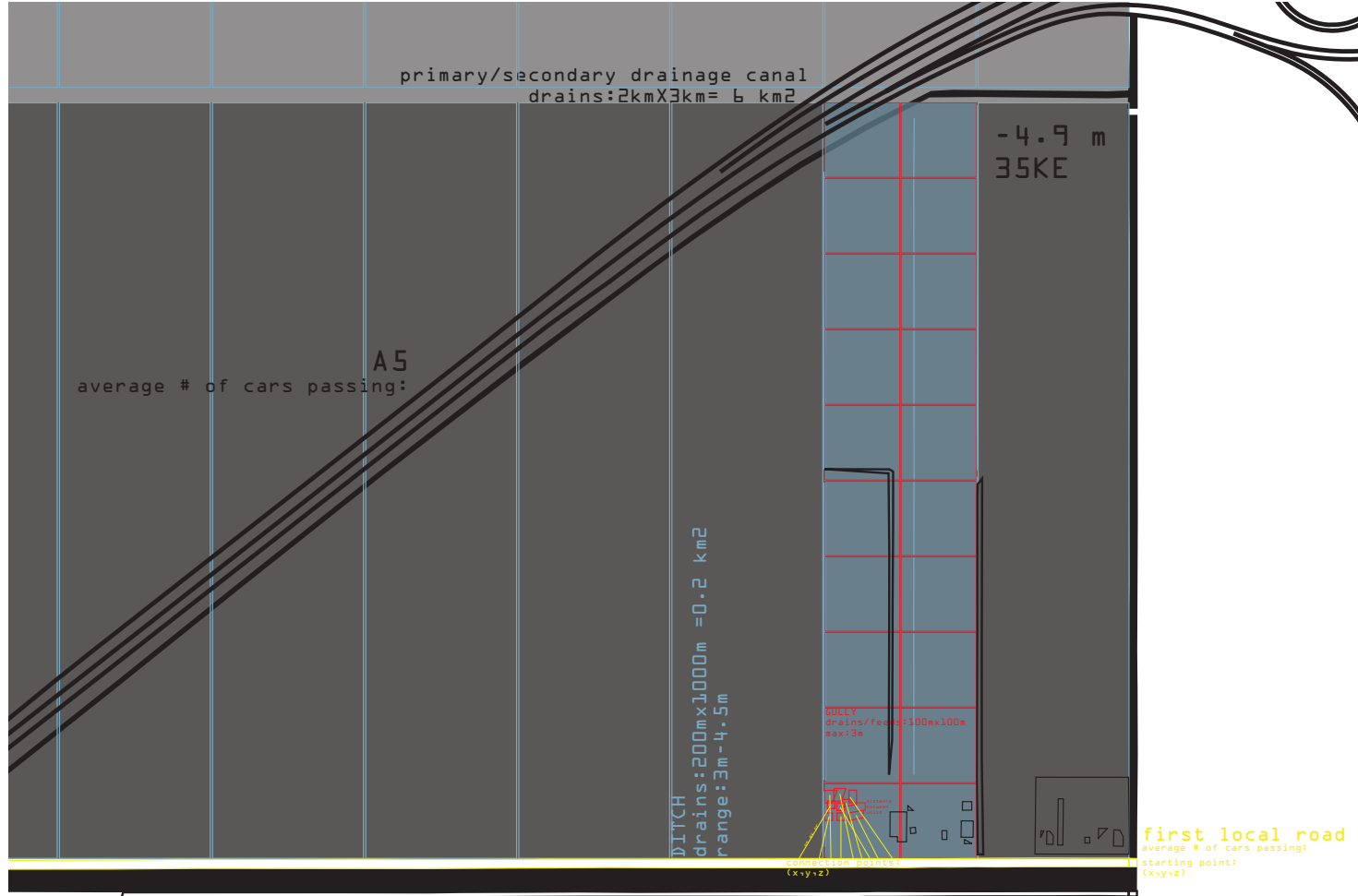
The case of Haarlemmer(meer) - Schiphol

2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

How to parameterize?



primary/secondary drainage canal  
drains: 2kmX3km= 6 km<sup>2</sup>

-4.9 m  
35KE

A5  
average # of cars passing:

DITCH  
drains: 200mX1000m = 0.2 km<sup>2</sup>  
range: 3m-4.5m

DOLLY  
drains/feet: 100x100  
rsv: 3m

connection points:  
(x,y,z)

first local road  
average # of cars passing:  
starting point:  
(x,y,z)

second local road  
average # of cars passing:

HOOFDVAART  
drains: 179.76 km<sup>2</sup>

# 1 Mobility in the Randstad

The case of North Holland

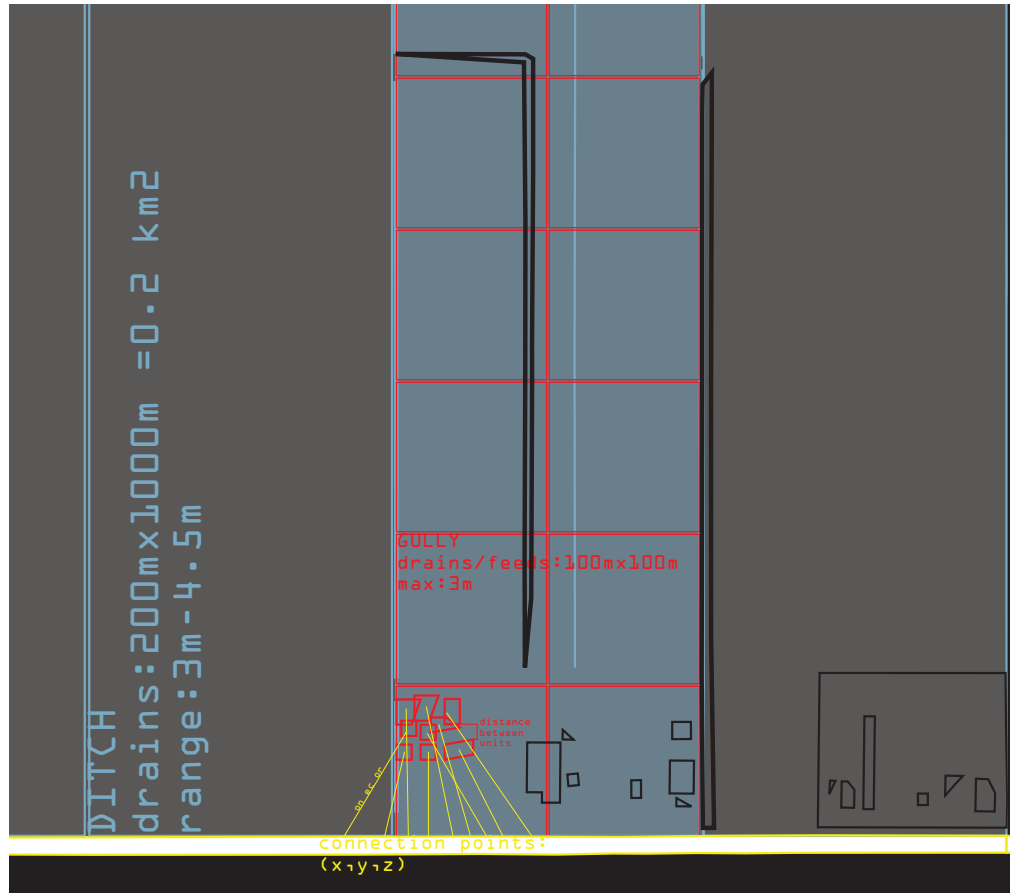
The case of Haarlemmer(meer) - Schiphol

## 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

How to parameterize?



first local road  
average # of cars passing:  
starting point:  
(x,y,z)

## 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

## 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

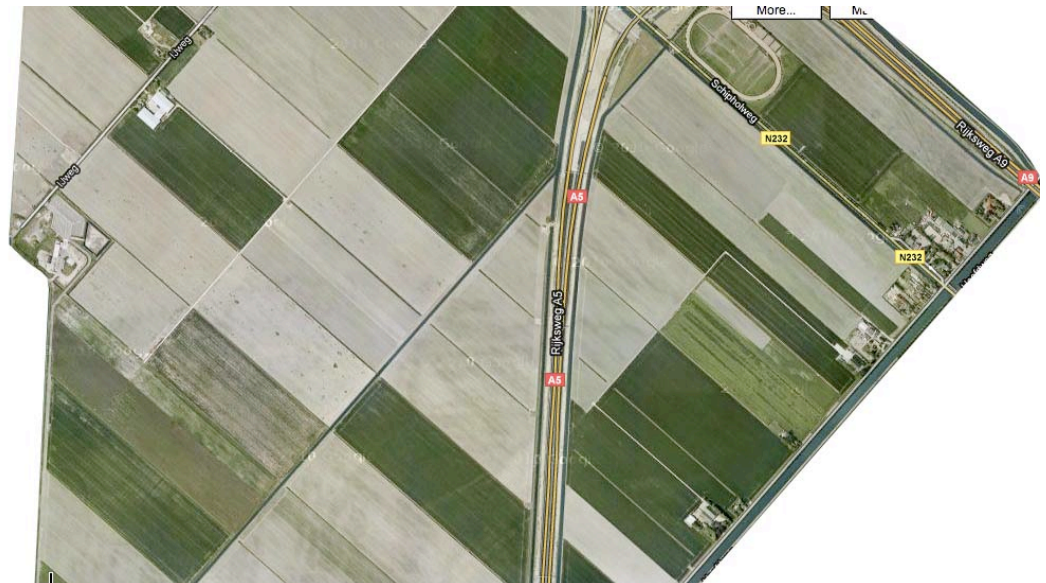
How to parameterize?

## 3 Design Generation

The Problem



National and International companies?,  
Different types of infrastructure: high-speed rail tracks to an Underground Logistics System,  
Single-family dwelling with garden and parking space for two cars?  
They need to find expression on the drained land.



So: spatial claims on the natural environment - on the agricultural and pasture land which has to be preserved within the dynamics of other urban functions.

## 1 Mobility in the Randstad

The case of North Holland

The case of

Haarlemmer(meer) - Schiphol

## 2 The Scenario

Why to parameterize?

Transformation of  
Haarlemmermeer

How to parameterize?

## 3 Design Generation

The Problem



National and International companies?,  
Different types of infrastructure: high-speed  
rail tracks to an Underground Logistics  
System,  
Single-family dwelling with garden and parking  
space for two cars?  
They need to find expression on the drained  
land.



The future scenario for co-existence?

So: spatial claims on the natural environment - on the agricultural and  
pasture land which has to be preserved within the dynamics of other urban  
functions.

## 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

## 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

How to parameterize?

## 3 Design Generation

The Problem



## 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

## 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

How to parameterize?

## 3 Design Generation

The Problem



# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

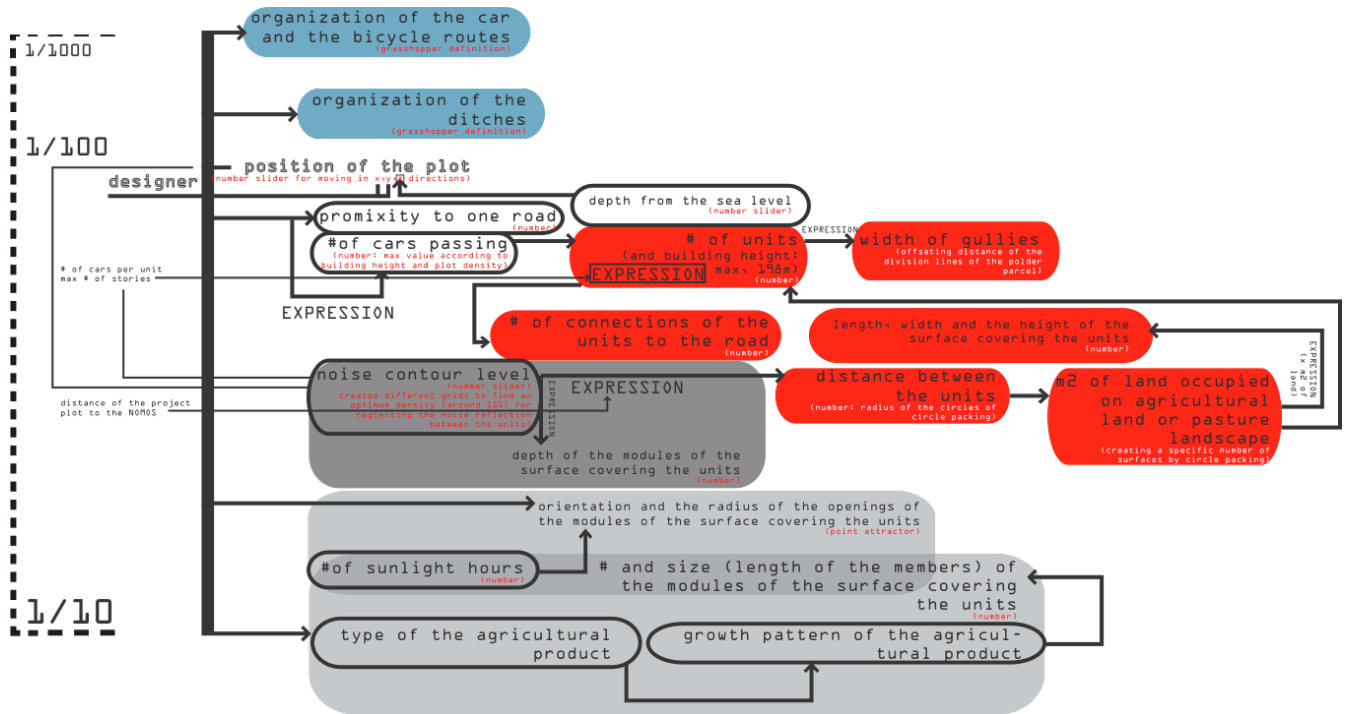
Transformation of Haarlemmermeer

How to parametrize?

# 3 Design Generation

The Problem

Argumentation



- already existing parameters represented via constraints for 1/100 scale (and for 1/10 and 1/1000 scales)
- already existing parameters for NCL represented via constraints for 1/10 scale (and for 1/100 and 1/1000 scales)
- already existing parameters for agriculture and pasture landscape represented via constraints for 1/10 scale (and for 1/100 and 1/1000 scales)
- design parameters defined and represented via constraints (design drivers) for 1/1000 scale (and for 1/10 and 1/100 scales)
- design parameters defined and represented via constraints (design drivers) for 1/100 scale (and for 1/10 and 1/1000 scales)
- design parameters defined and represented via constraints (design drivers) for 1/10 scale (and for 1/100 and 1/1000 scales) (related with NCL)
- design parameters defined and represented via constraints (design drivers) for 1/10 scale (and for 1/100 and 1/1000 scales) (related with agriculture and pasture landscape)



# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer[meer] - Schiphol

# 2 The Scenario

Why to parameterize?

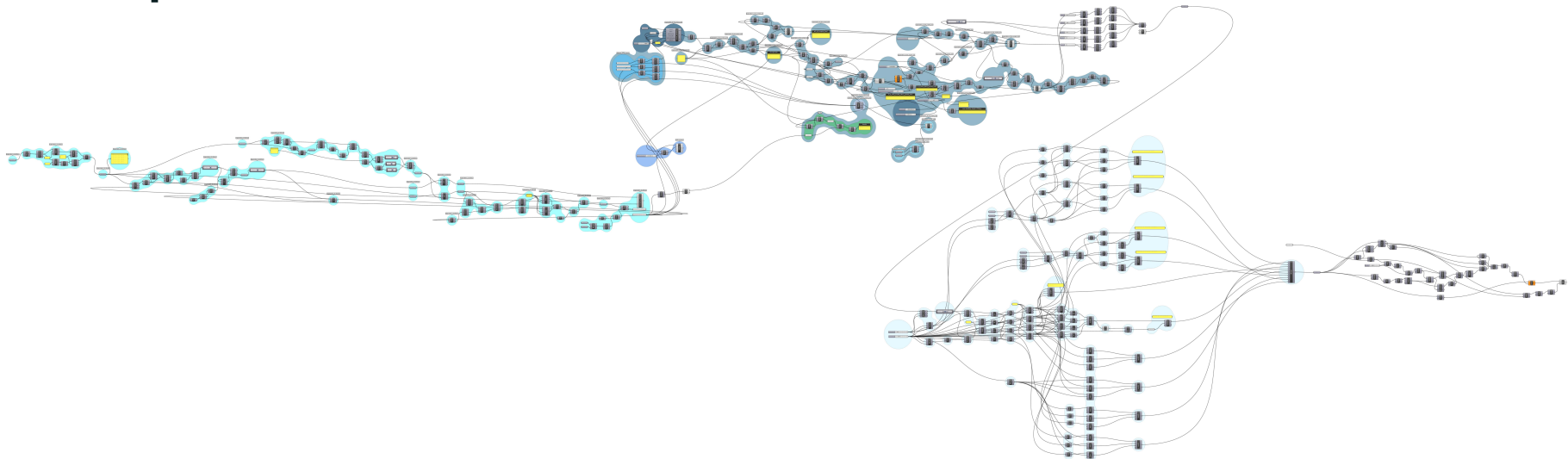
Transformation of Haarlemmermeer

How to parameterize?

# 3 Design Generation

The Problem

Argumentation



# 1 Mobility in the Randstad

The case of North Holland

The case of

Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

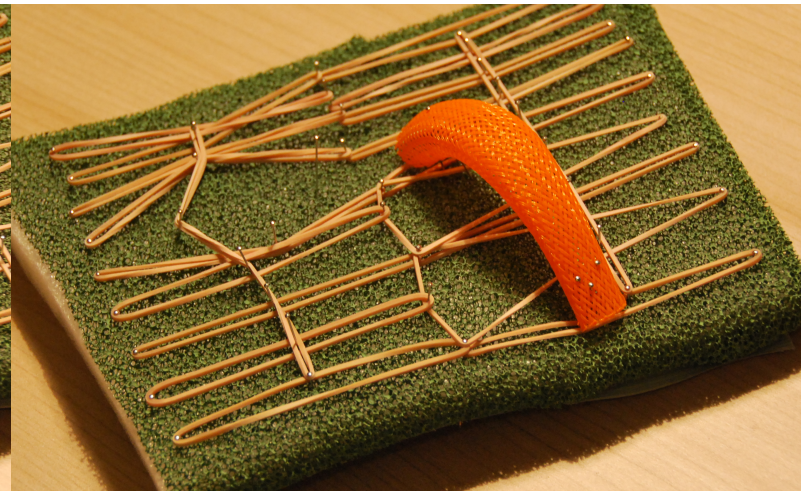
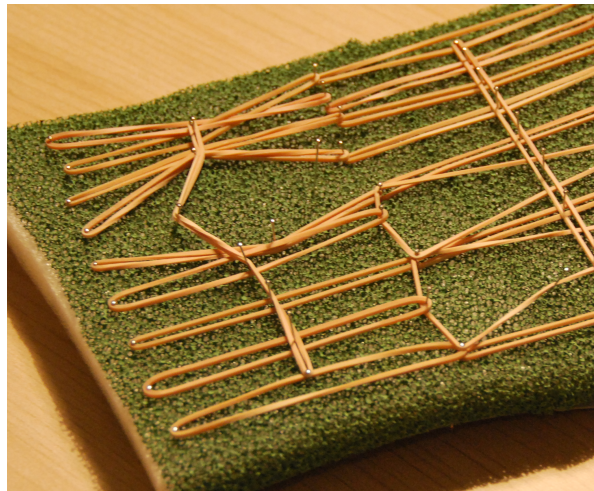
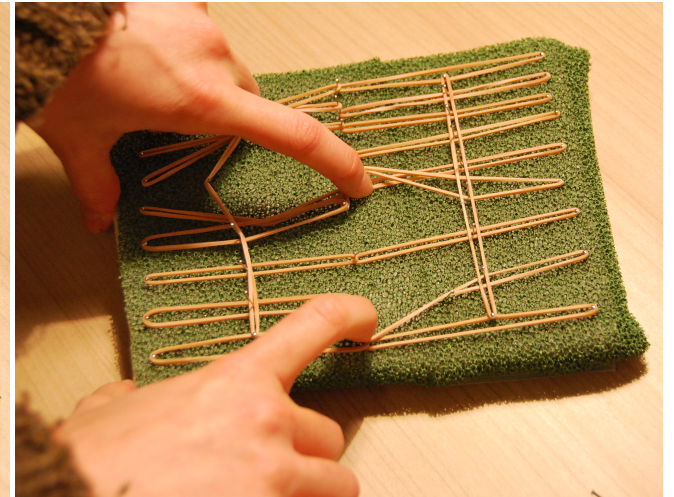
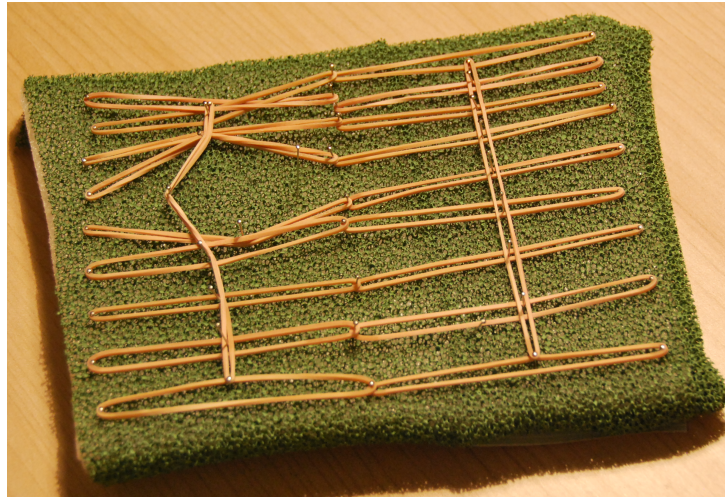
Transformation of  
Haarlemmermeer

How to parameterize?

# 3 Design Generation

The Problem

Argumentation



# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

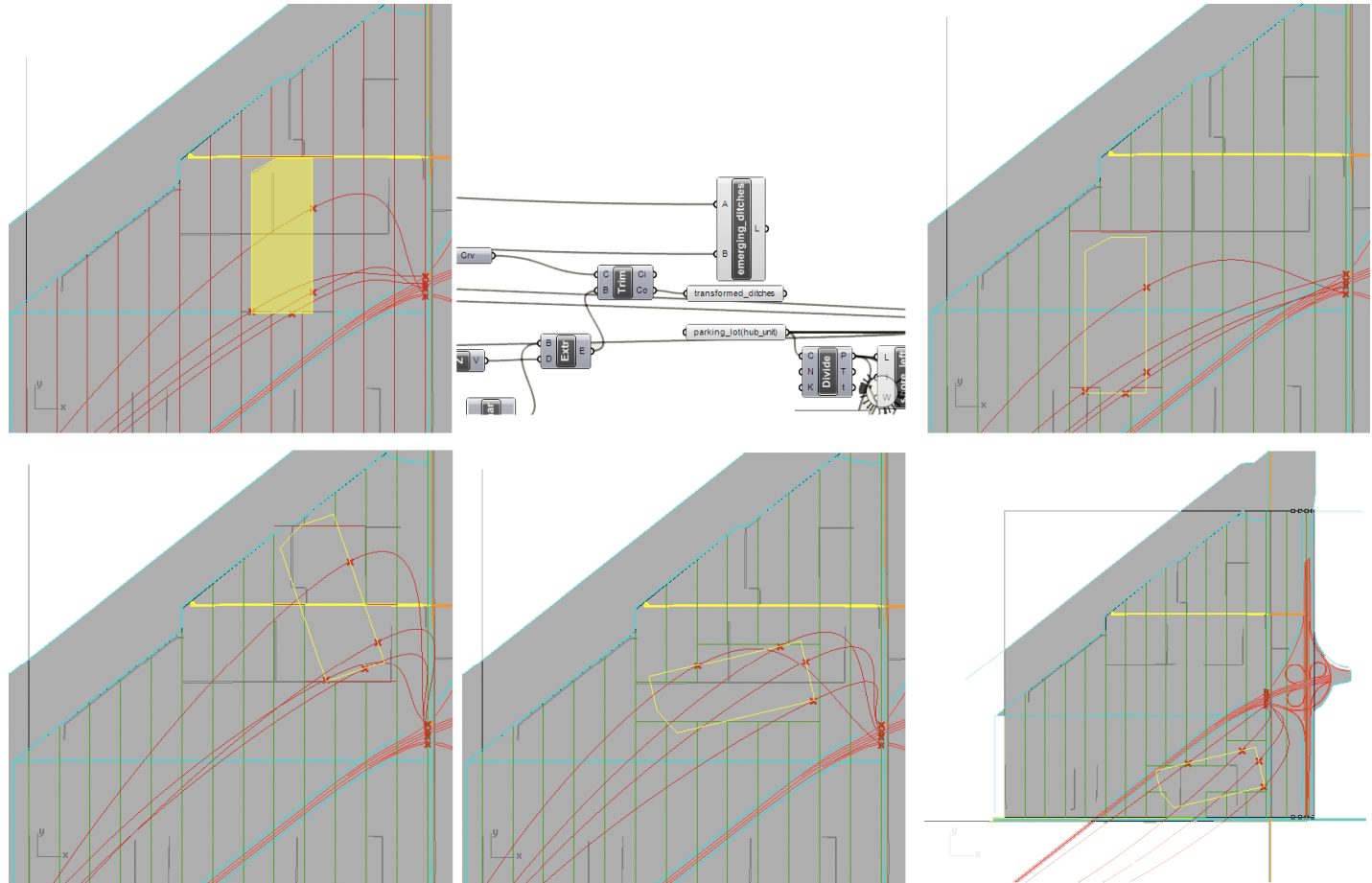
Transformation of Haarlemmermeer

How to parameterize?

# 3 Design Generation

The Problem

Argumentation



1/1000 - grasshopper definition

# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

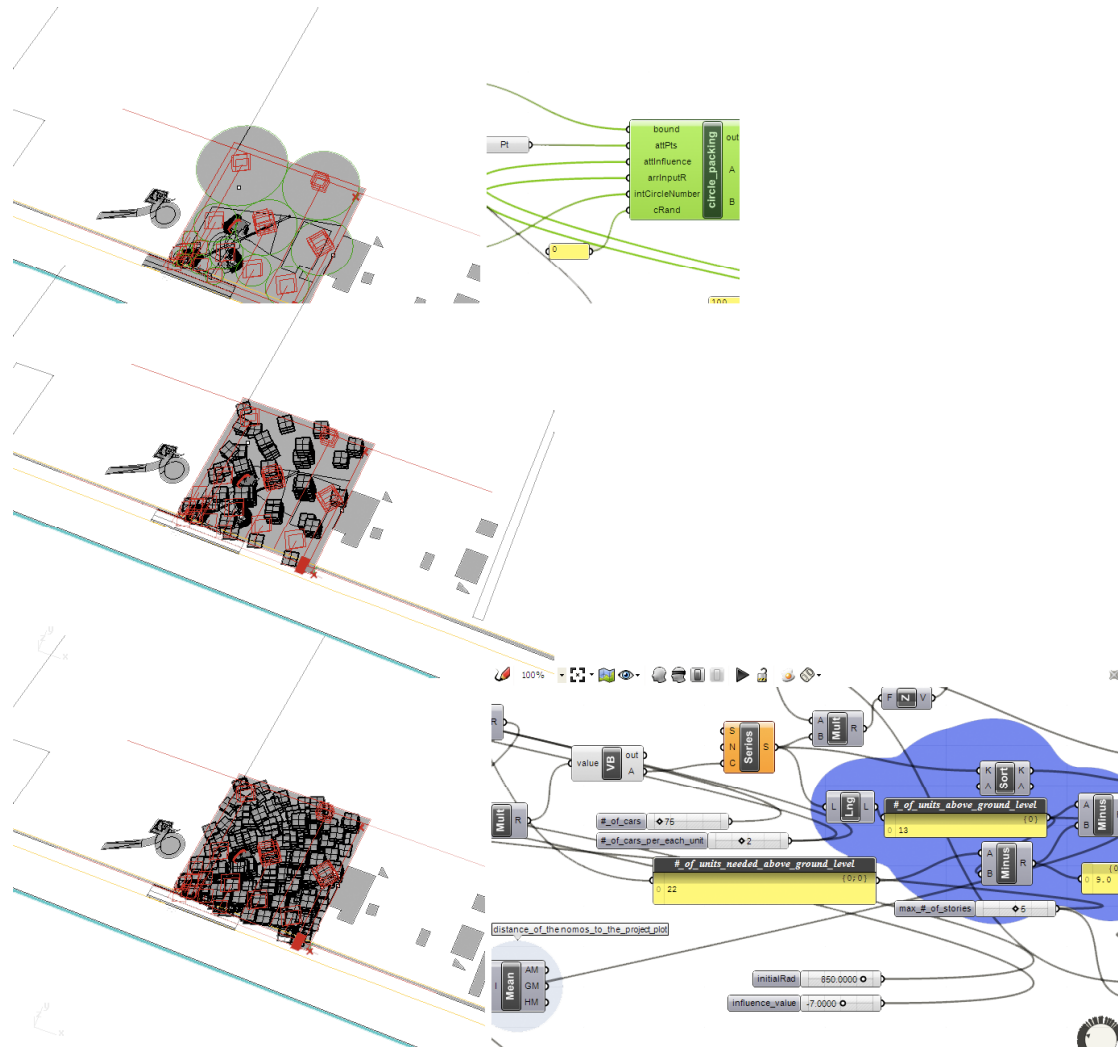
Transformation of Haarlemmermeer

How to parameterize?

# 3 Design Generation

The Problem

Argumentation



1/100 - grasshopper definition  
How the units are organized - #, position.  
Circle Packing.

# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

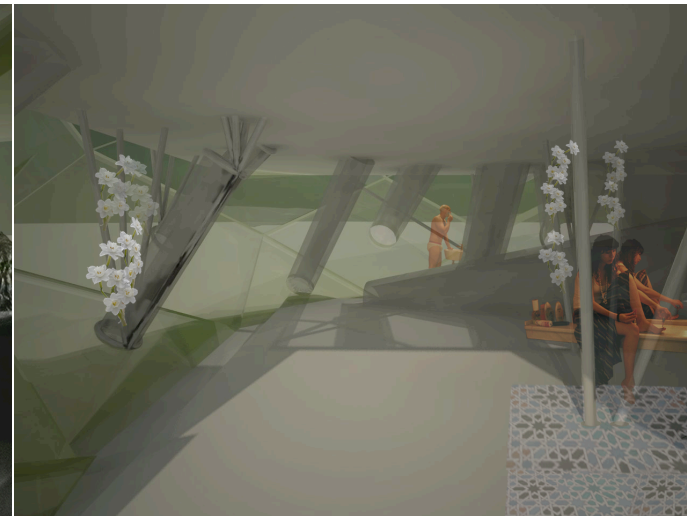
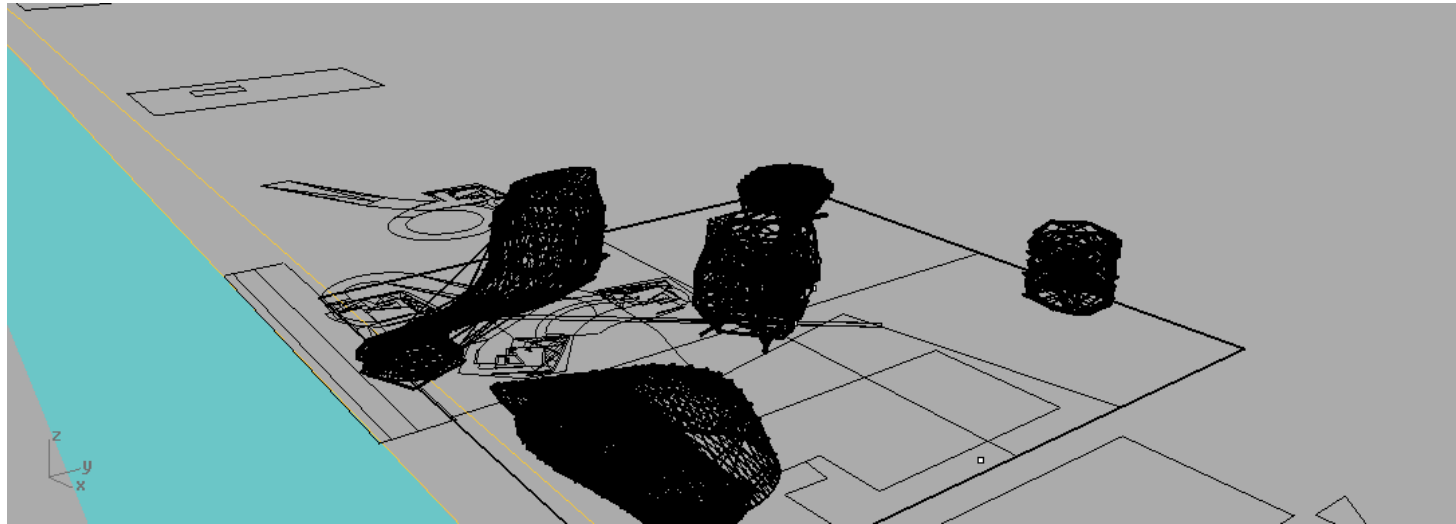
Transformation of Haarlemmermeer

How to parameterize?

# 3 Design Generation

The Problem

Argumentation



# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

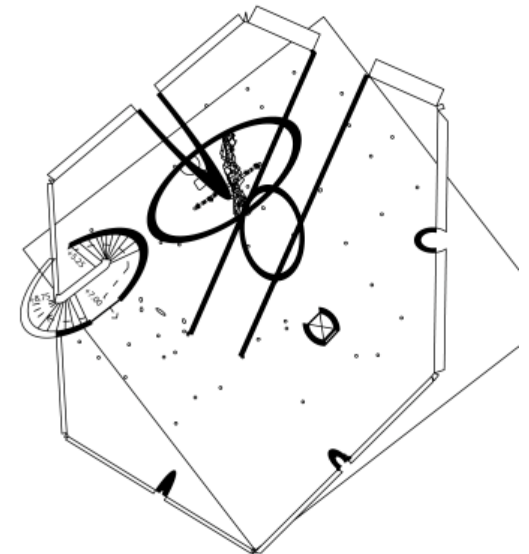
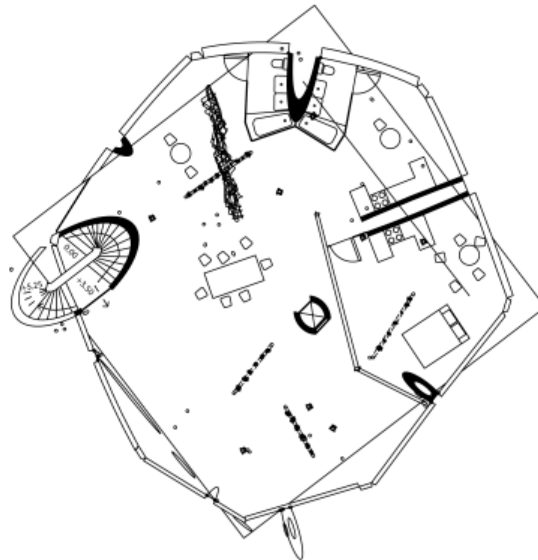
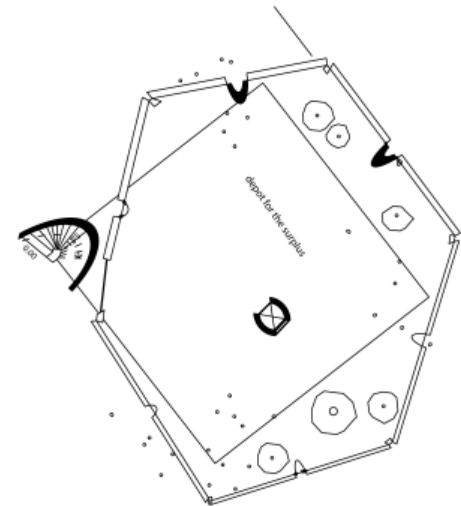
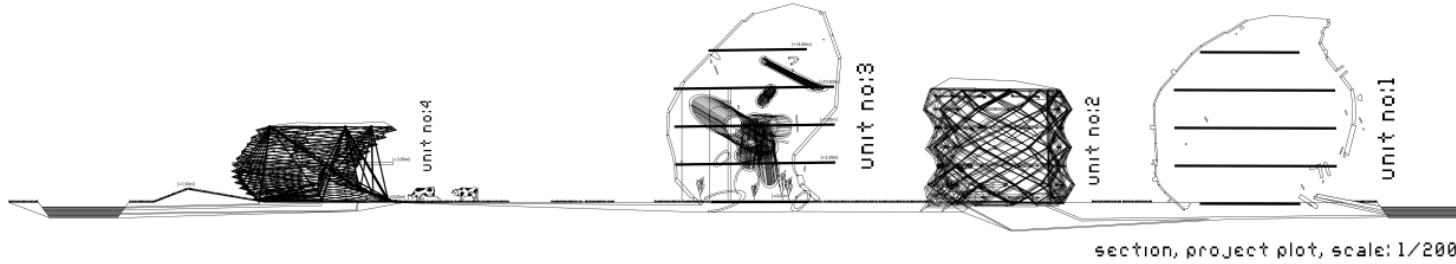
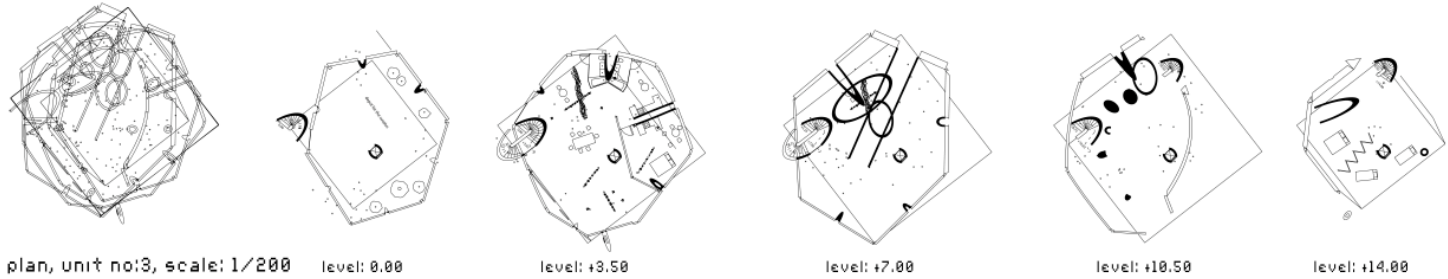
Transformation of Haarlemmermeer

How to parameterize?

# 3 Design Generation

The Problem

Argumentation



# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

# 2 The Scenario

Why to parameterize?

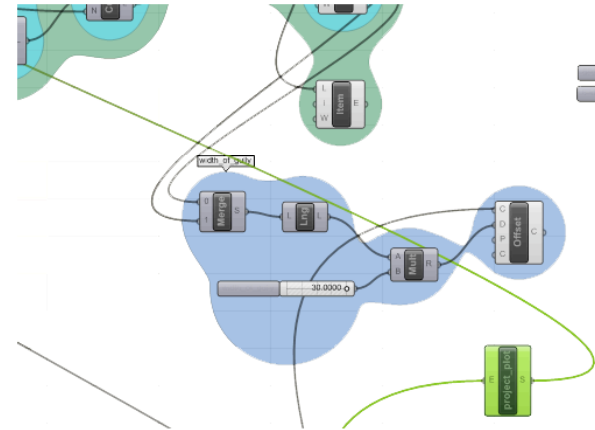
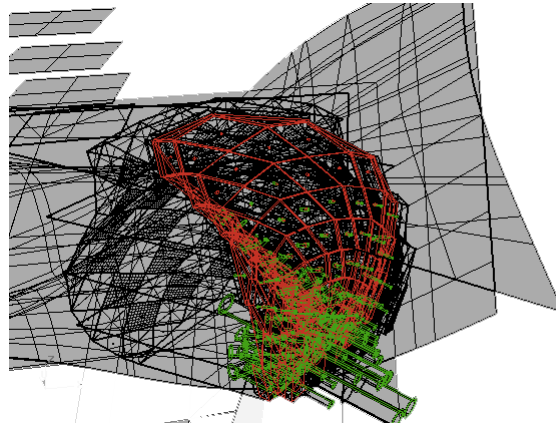
Transformation of Haarlemmermeer

How to parameterize?

# 3 Design Generation

The Problem

Argumentation



Design Pattern for 1/100, 1/10 - Grasshopper definition  
How is agriculture (and pasture landscape) preserved in the units?

# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

## 2 The Scenario

Why to parameterize?

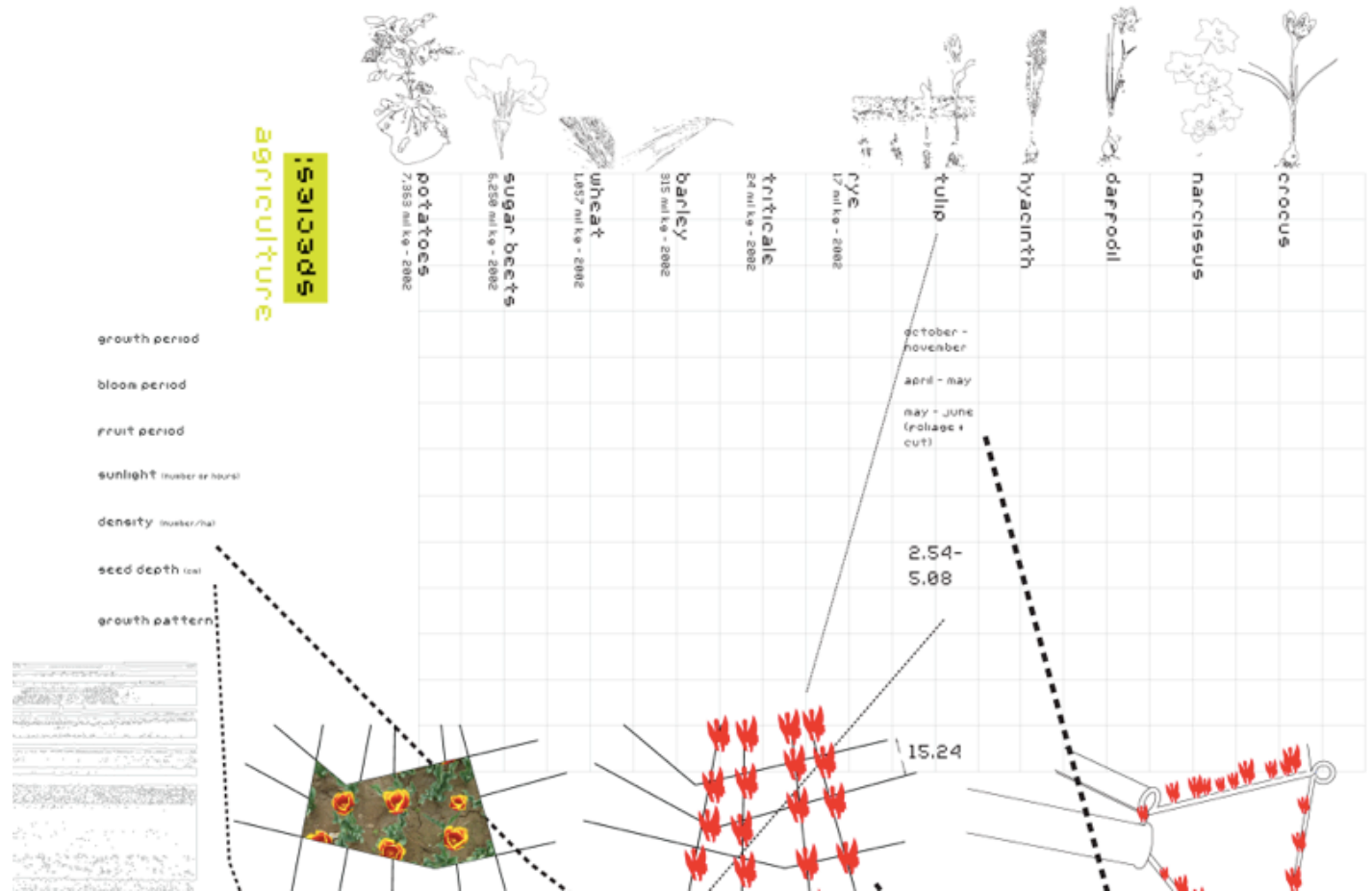
Transformation of Haarlemmermeer

How to parameterize?

## 3 Design Generation

The Problem

Argumentation

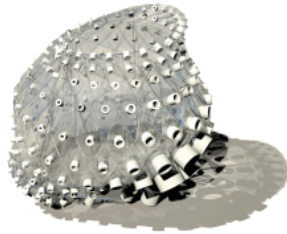




# 1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol



# 2 The Scenario

Why to parameterize?

Transformation of Haarlemmermeer

How to parametrize?

# 3 Design Generation

The Problem

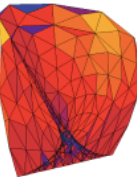
Argumentation

length of the members  
( $c+d=a+b$ )

openings  
least fulfil the sunlight needs of the plants and the lighting quality of the inner space!

OBJECT ATTRIBUTES  
Total Sunlight Hours  
Percentage of 100%

total sunlight hours calculated for each mesh



april - may

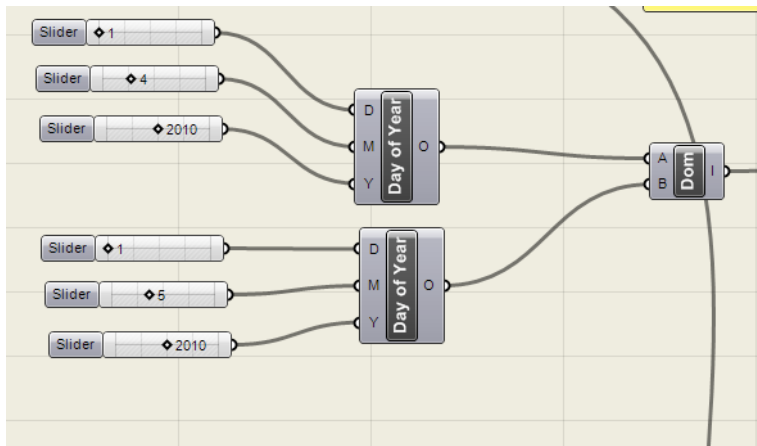
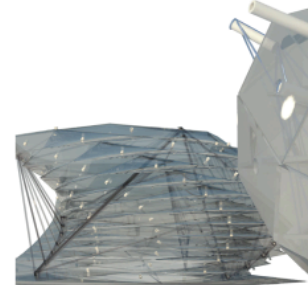
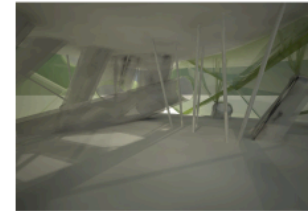
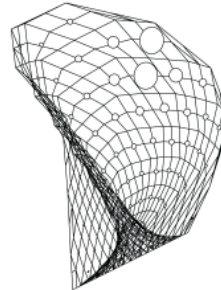
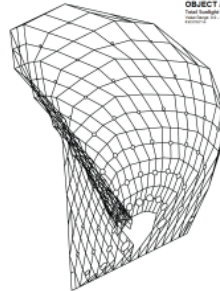


may - June  
(foliage period for tulips)

OBJECT ATTRIBUTES  
Percentage of Total  
Percentage of 100%

total diffuse radiation calculated for each mesh

June 2010 - June 2011



0	Referenced Surface	{0;0}	0	19.722221	{0;0;0}
0	Referenced Surface	{0;1}	0	48.333332	{0;1;0}
0	Referenced Surface	{0;2}	0	48.333332	{0;2;0}
0	Referenced Surface	{0;3}	0	59.722221	{0;3;0}
0	Referenced Surface	{0;4}	0	59.722221	{0;4;0}
0	Referenced Surface	{0;5}	0	48.333332	{0;5;0}
0	Referenced Surface	{0;6}	0	19.722221	{0;6;0}
0	Referenced Surface	{0;7}	0	22.5	{0;7;0}
0	Referenced Surface	{0;8}	0	39.722221	{0;8;0}
0	Referenced Surface	{0;9}	0	50.833332	{0;9;0}
0	Referenced Surface	{0;10}	0	50.833332	{0;10;0}
0	Referenced Surface	{0;11}	0	50.833332	{0;11;0}
0	Referenced Surface	{0;12}	0	69.166664	{0;12;0}
0	Referenced Surface	{0;13}	0	68.888893	{0;13;0}
0	Referenced Surface	{0;14}	0		{0;14;0}

1 Mobility in the Randstad

The case of North Holland

The case of Haarlemmer(meer) - Schiphol

2 The Scenario

Why to parameterize?

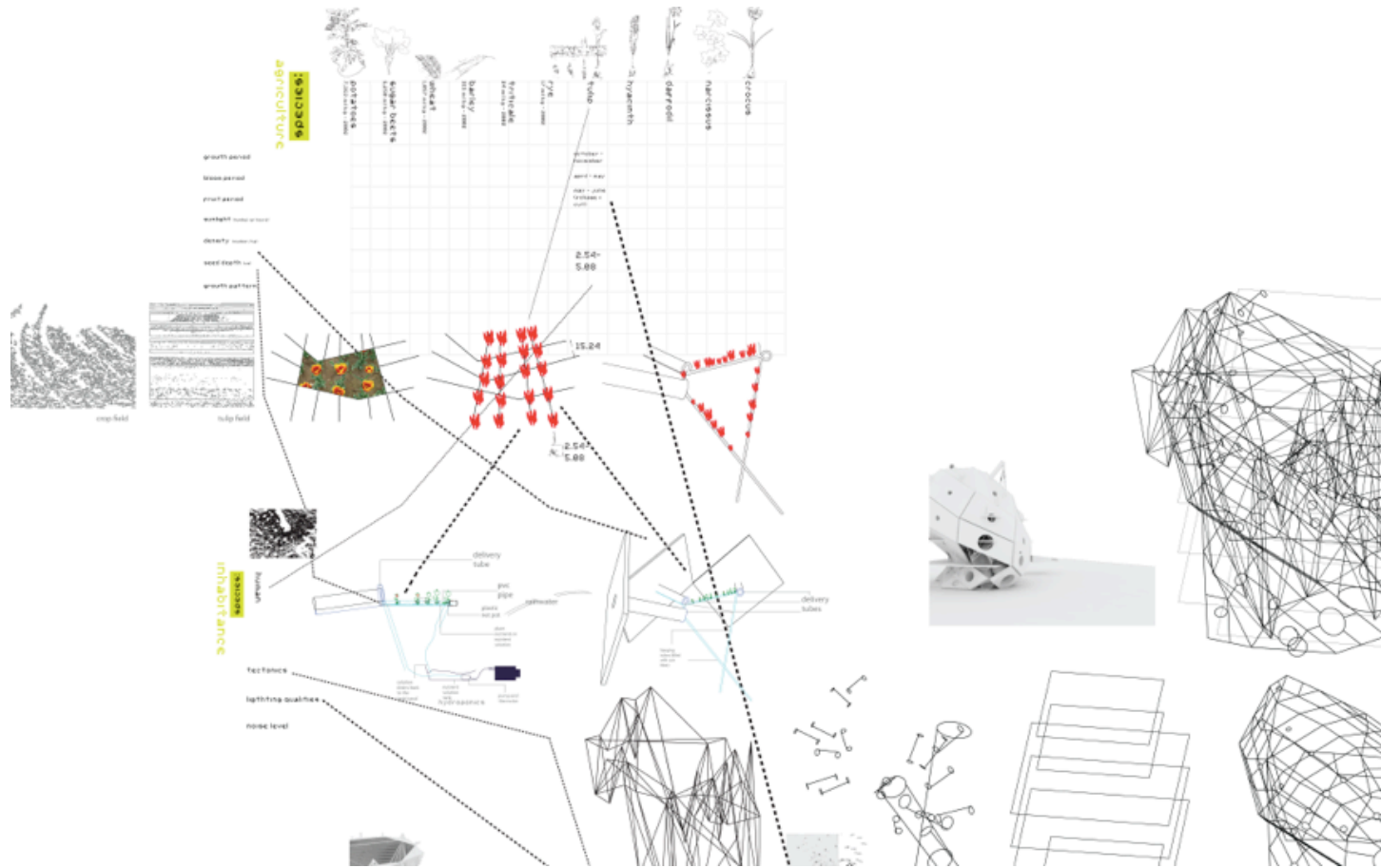
Transformation of Haarlemmermeer

How to parameterize?

3 Design Generation

The Problem

Argumentation



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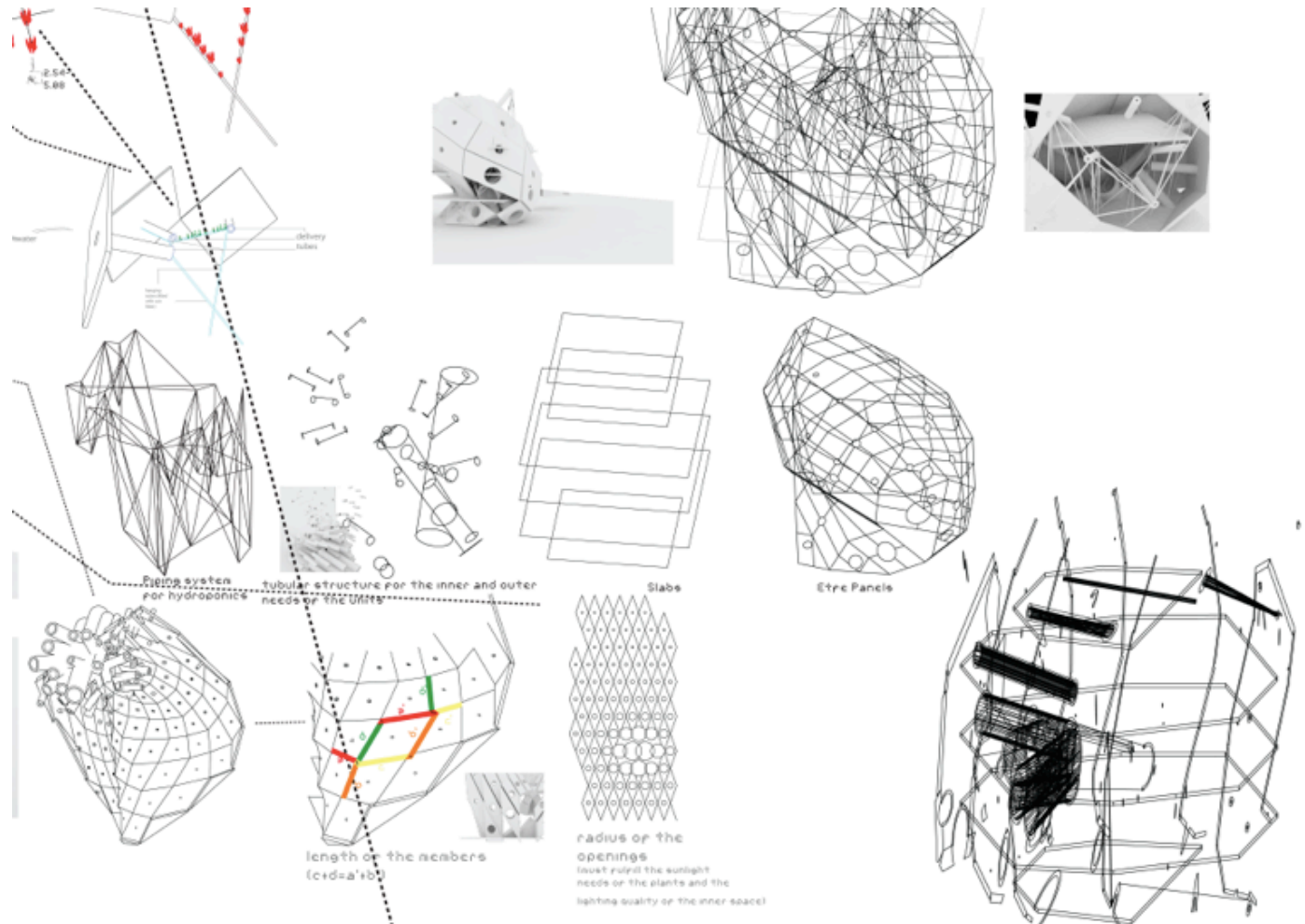
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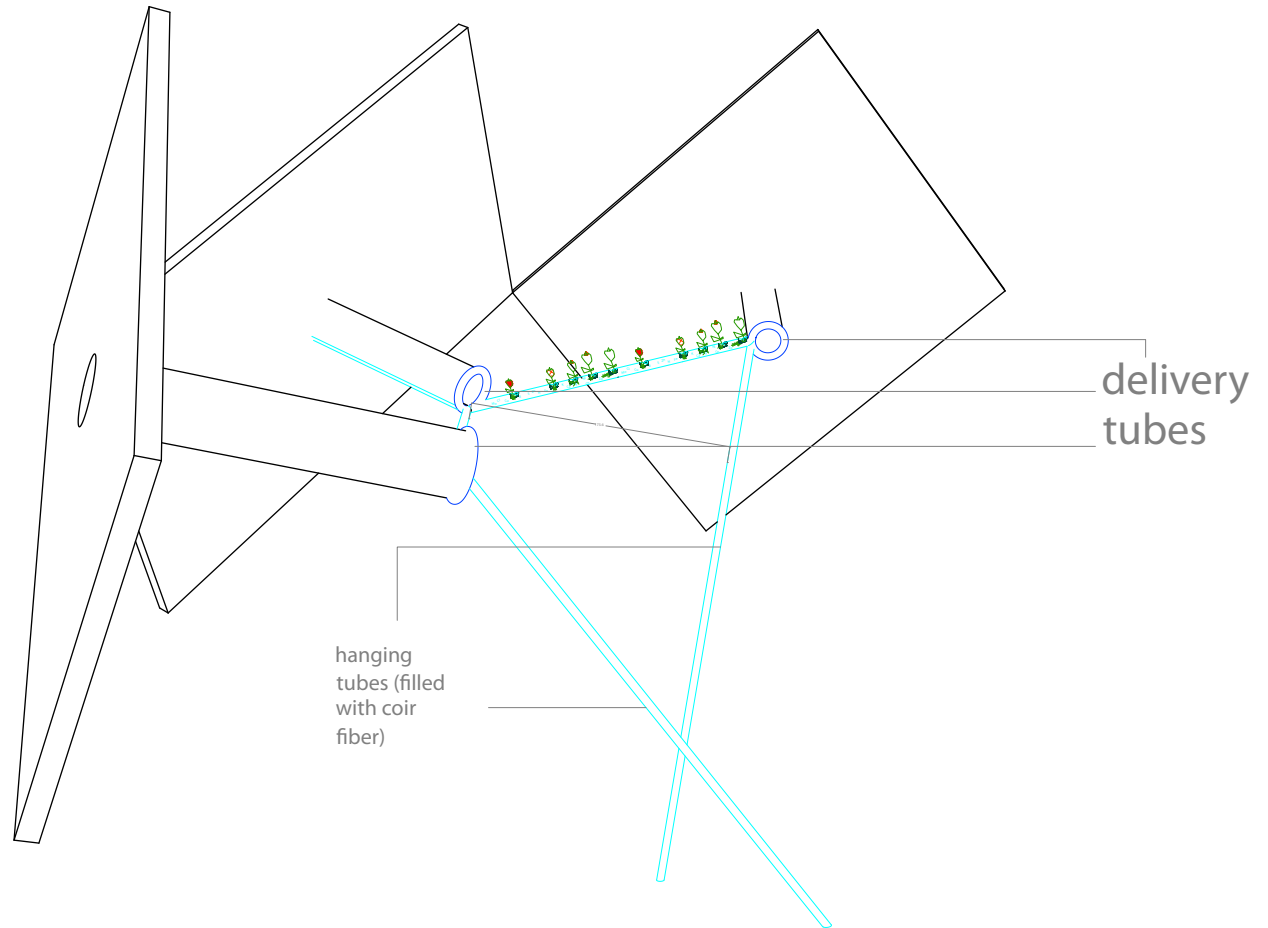
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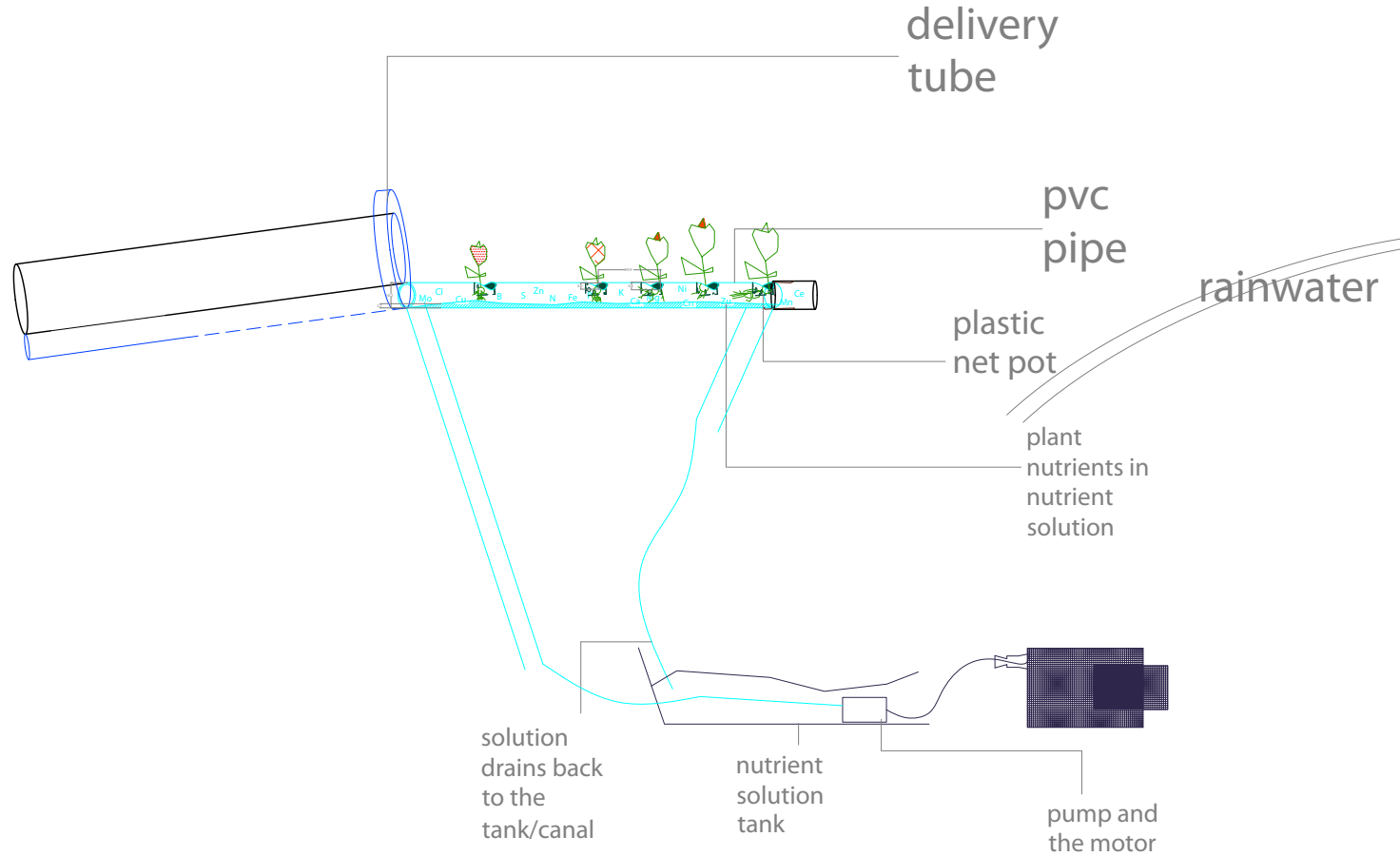
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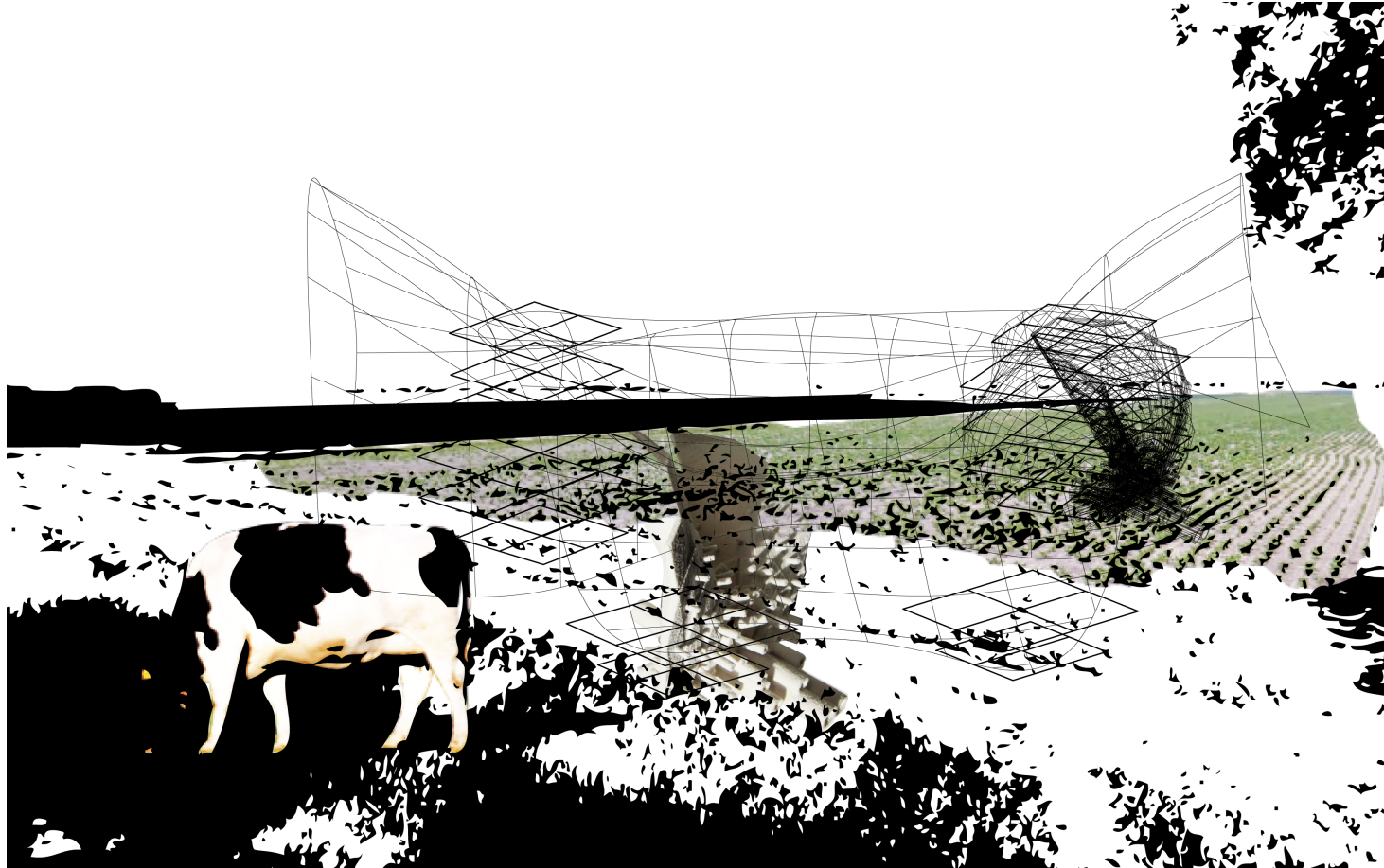
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Objects of Design



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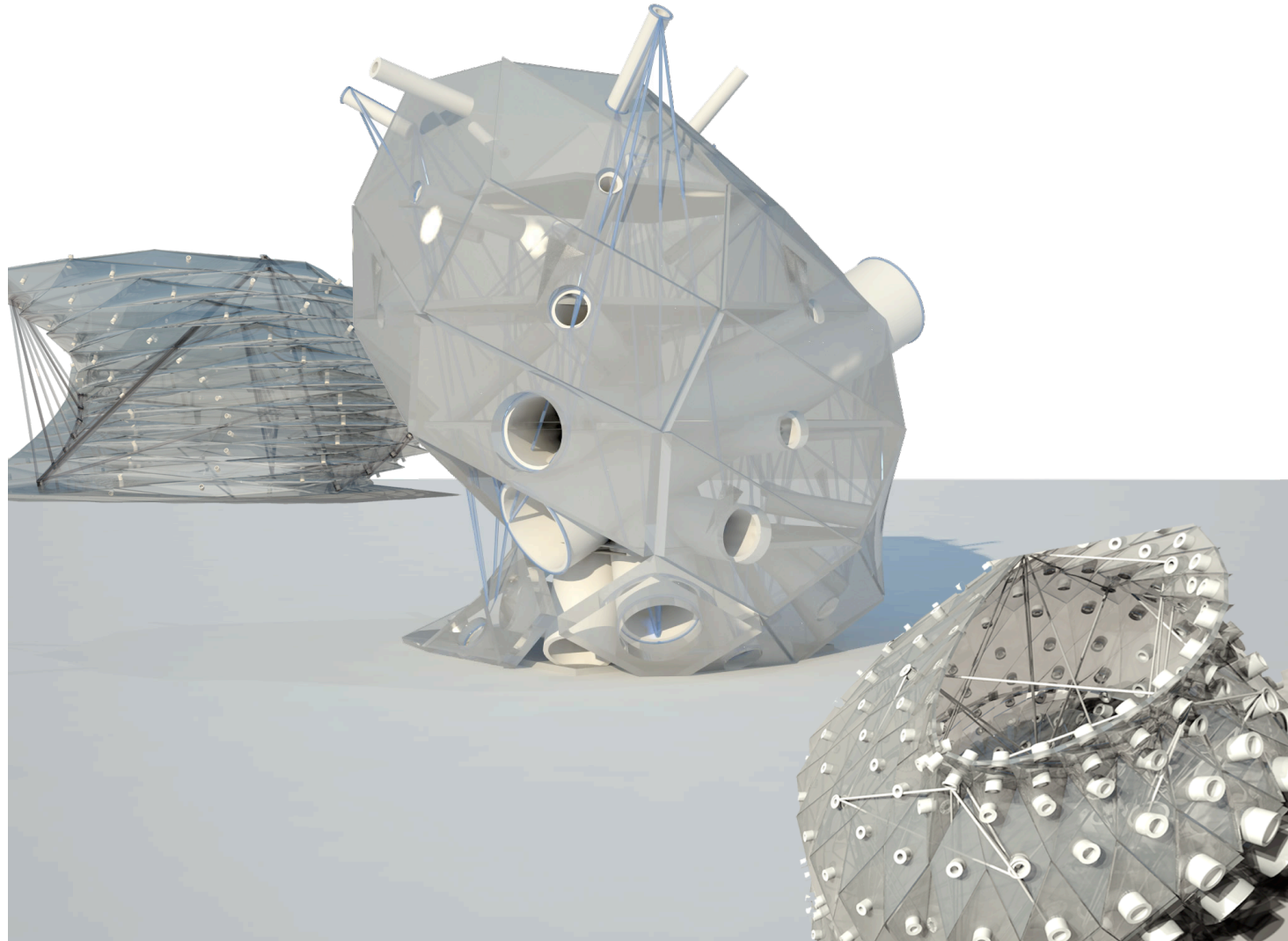
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