

TRANSITECTURE

architecture as symbiosis
between the energy transition
and social challenges

architecture A. Snijders // M. Parravicini

research J. de Krieger

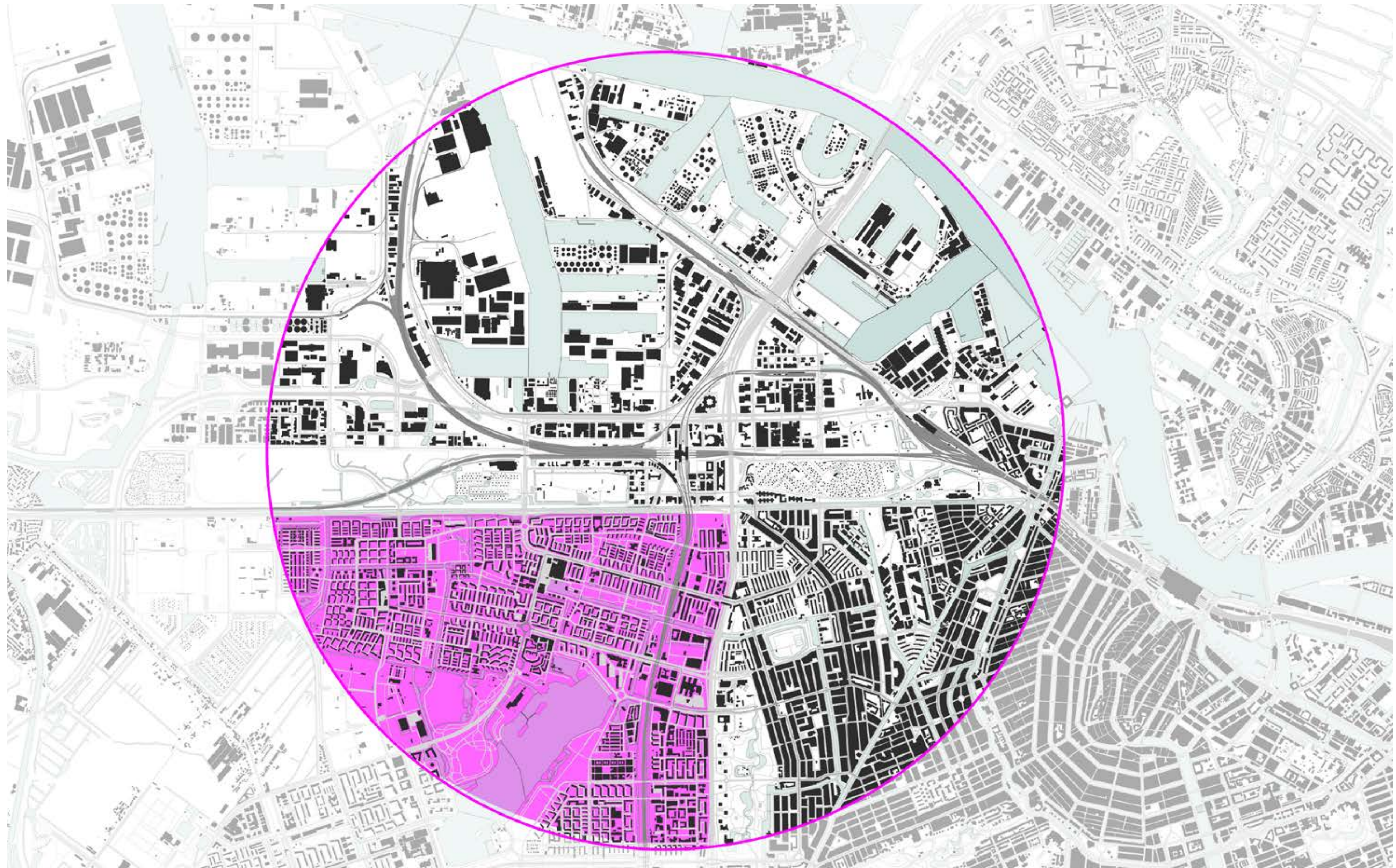
building technology P. Tomesen

delegate examiner A. Sioli // S. Pietsch



PART 01

INTRODUCTION // PROBLEM STATEMENT

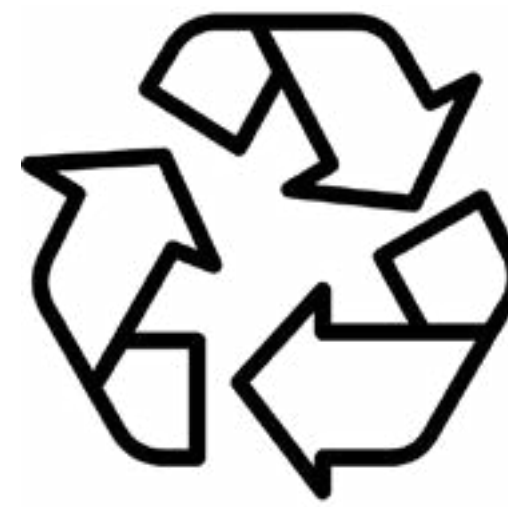




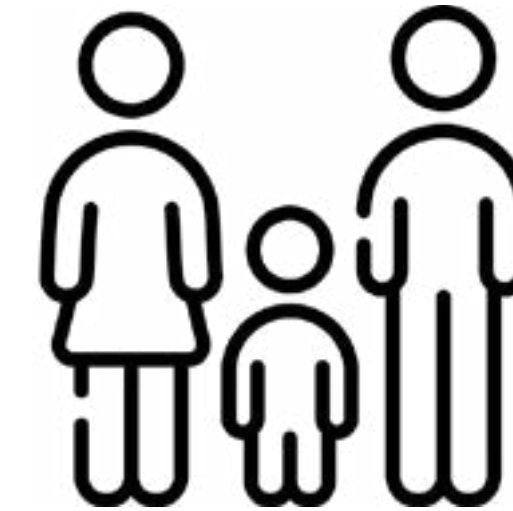
global



national



local



individual



global



national



local



individual

GLOBAL SUSTAINABILITY DEFINITION





global



national



local



individual

GOALS DUTCH GOVERNMENT

CO₂ reduction of 55% by 2030 (cf. 1990)

CO₂ reduction of 95% by 2050 (cf. 1990)

70% of all electricity from sustainable sources



global



national

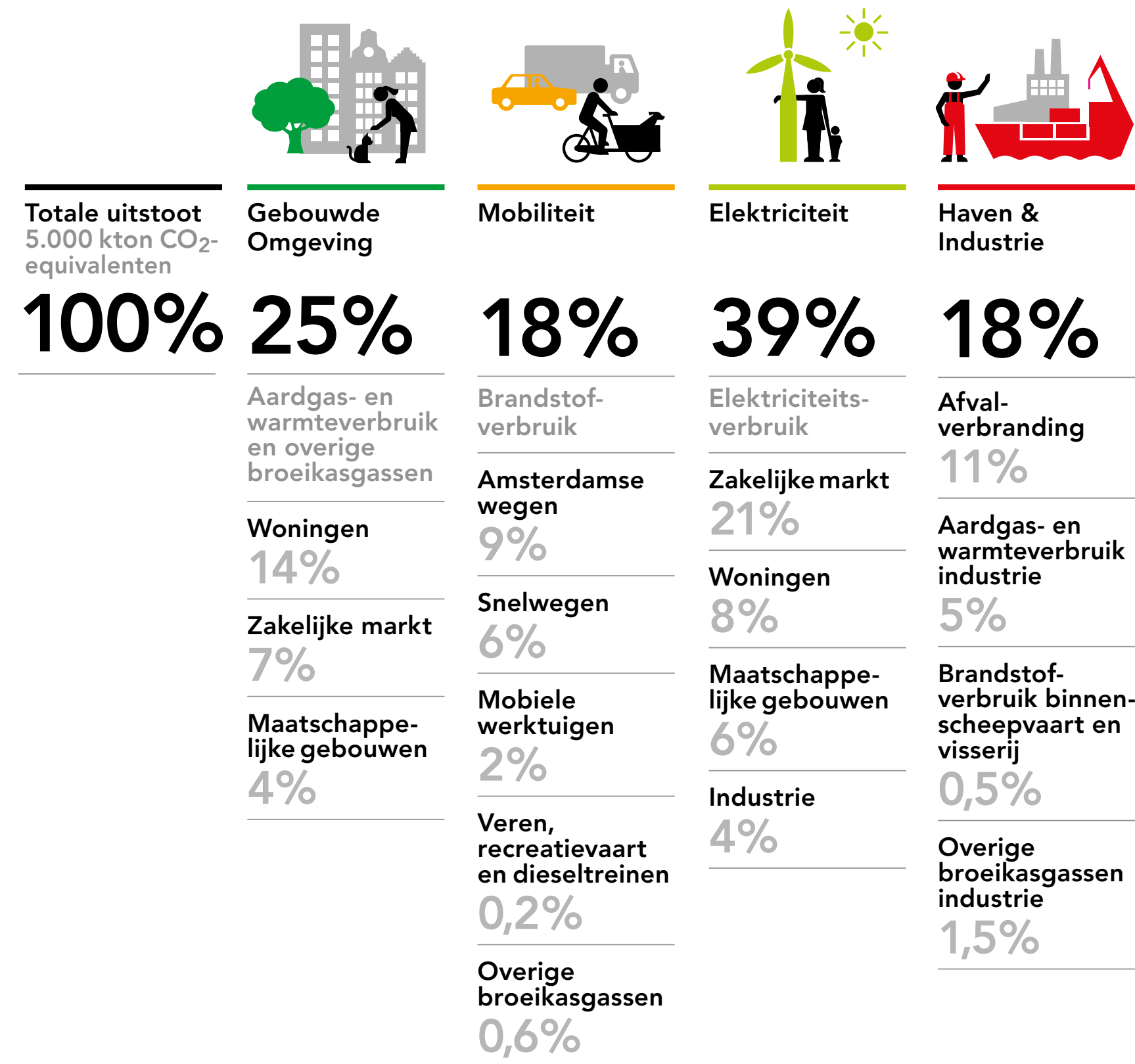


local



individual

AMBITION AMSTERDAM = ROUTEKAART 2050





global



national

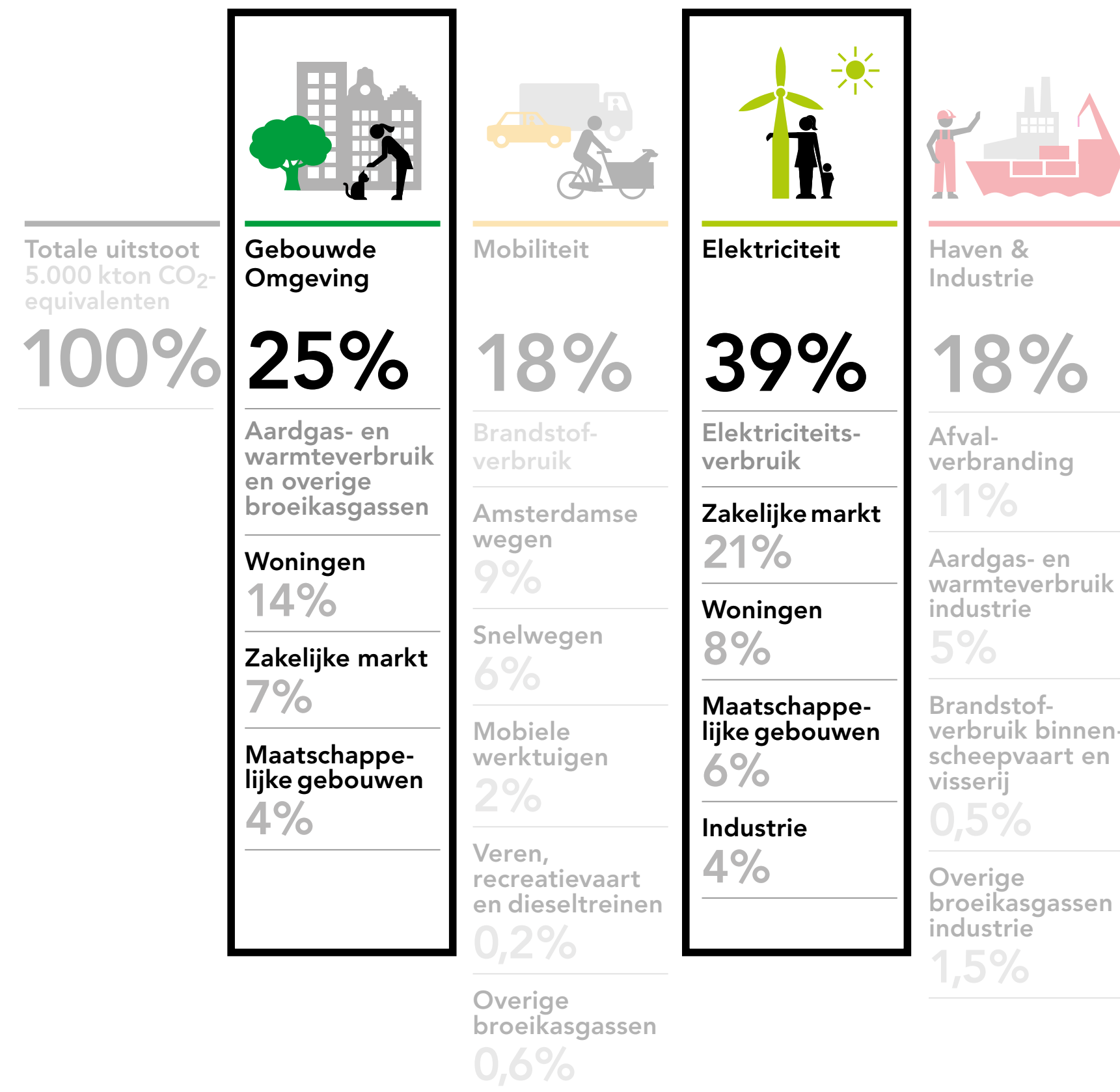


local



individual

AMBITION AMSTERDAM = ROUTEKAART 2050





global



national



local



individual



Hemwegcentrale, oktober 1953, Stadsarchief Amsterdam



global



national



local



individual

CURRENT INDIVIDUAL SOLUTIONS





global



national



local



individual

CURRENT NEIGHBOURHOOD SOLUTIONS





global



national



local



individual

CURRENT NEIGHBOURHOOD SOLUTIONS



Stadshaard Krachtcentrale Enschede // De Architekten Cie



DEC-Noord Hengelo // Damast Architects



WKK Utrecht // Dok Architecten



global



national



local



individual

CURRENT NEIGHBOURHOOD SOLUTIONS



▲ © Reinier van Willigen

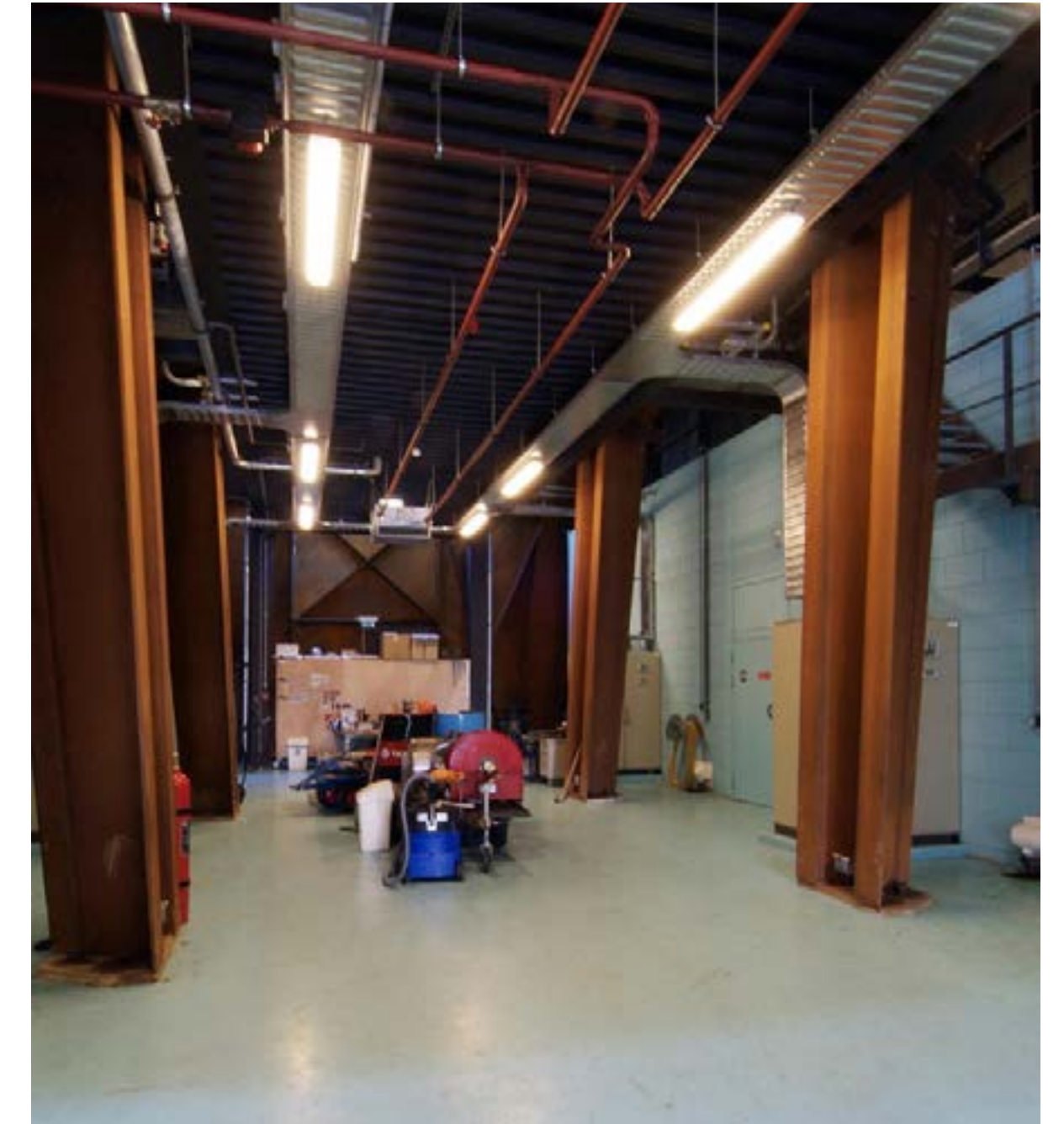
Veel belangstelling voor open dag Stadshaard Enschede

ENSCHEDÉ - De eerste open dag bij de Stadshaard in Roombeek heeft zaterdag ongeveer 150 belangstellenden getrokken. Dat waren er meer dan initiatiefnemer Ennatuurlijk had verwacht.

Stadshaard Krachtcentrale Enschede // De Architecten Cie



DEC-Noord Hengelo // Damast Architects



WKK Utrecht // Dok Architecten



global



national

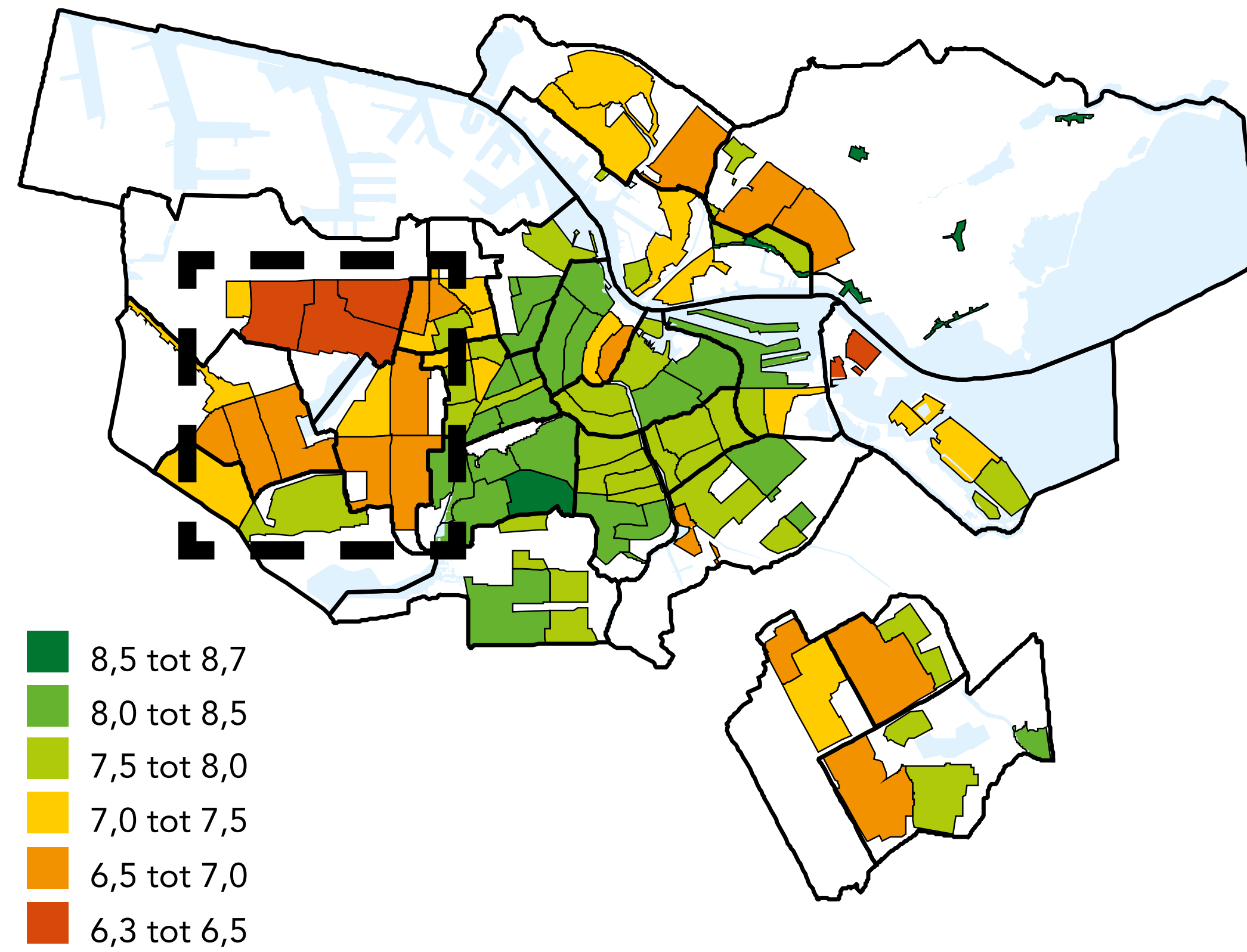


local



individual

NEIGHBOURHOOD SATISFACTION



Neighbourhood satisfaction // Amsterdamse Federatie van Woningcorporaties, 2017



global



national



local



individual

SOCIAL CHALLENGES

✗ Gemeente
✗ Amsterdam
✗



- Lowest score on social economic indicators compared to all the other development neighbourhoods
- Poverty, debt
- Social exclusion is twice as common as the average
- Low literacy is extremely high (40% compared to 16% for Amsterdam as a whole)
- Unemployment and a lack of control over one's own life
- Too little personal space due to small houses

Spatial and programmatic guidelines for the renewal of Geuzenveld-Sltoermeer // Municipality of Amsterdam, 2019



global



national



local



individual

OBJECTIVE

NECESSARY IMPROVEMENTS

ENERGY TRANSITION



SPACE



DESIGN

NECESSARY SOCIAL

IMPROVEMENTS



SPACE



DESIGN





global



national



local



individual

OBJECTIVE

NECESSARY IMPROVEMENTS
ENERGY TRANSITION



SPACE

NECESSARY SOCIAL
IMPROVEMENTS



SPACE



INTEGRATION



DESIGN

OVERALL DESIGN QUESTION

How can the **consequences** that are necessary to comply with the ambitions of the 'Routekaart 2050' form a **symbiosis** with **community strengthening beneficial functions** in the Louis Couperusbuurt in Amsterdam Slotermeer?

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THEMATIC RESEARCH QUESTION

Which **technical solutions** are necessary for a centralized, neighbourhood scale, **heat and electricity system** in a Dutch post war neighbourhood?

What are the **spatial consequences** of this system?

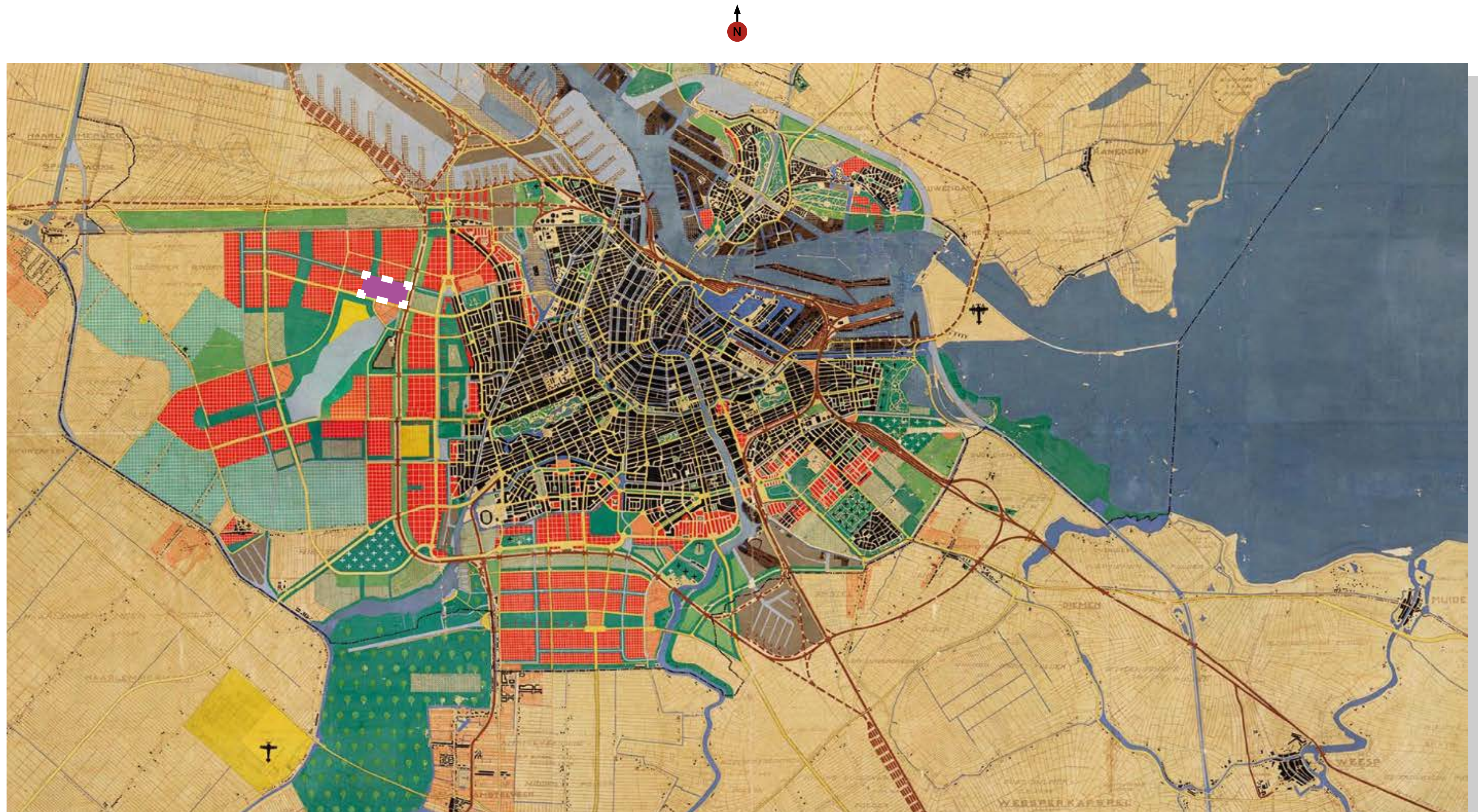


PART 02

**WESTERN GARDEN CITIES AND
THE LOUIS COUPERUSBUURT**

AMSTERDAM GENERAL EXPANTION PLAN

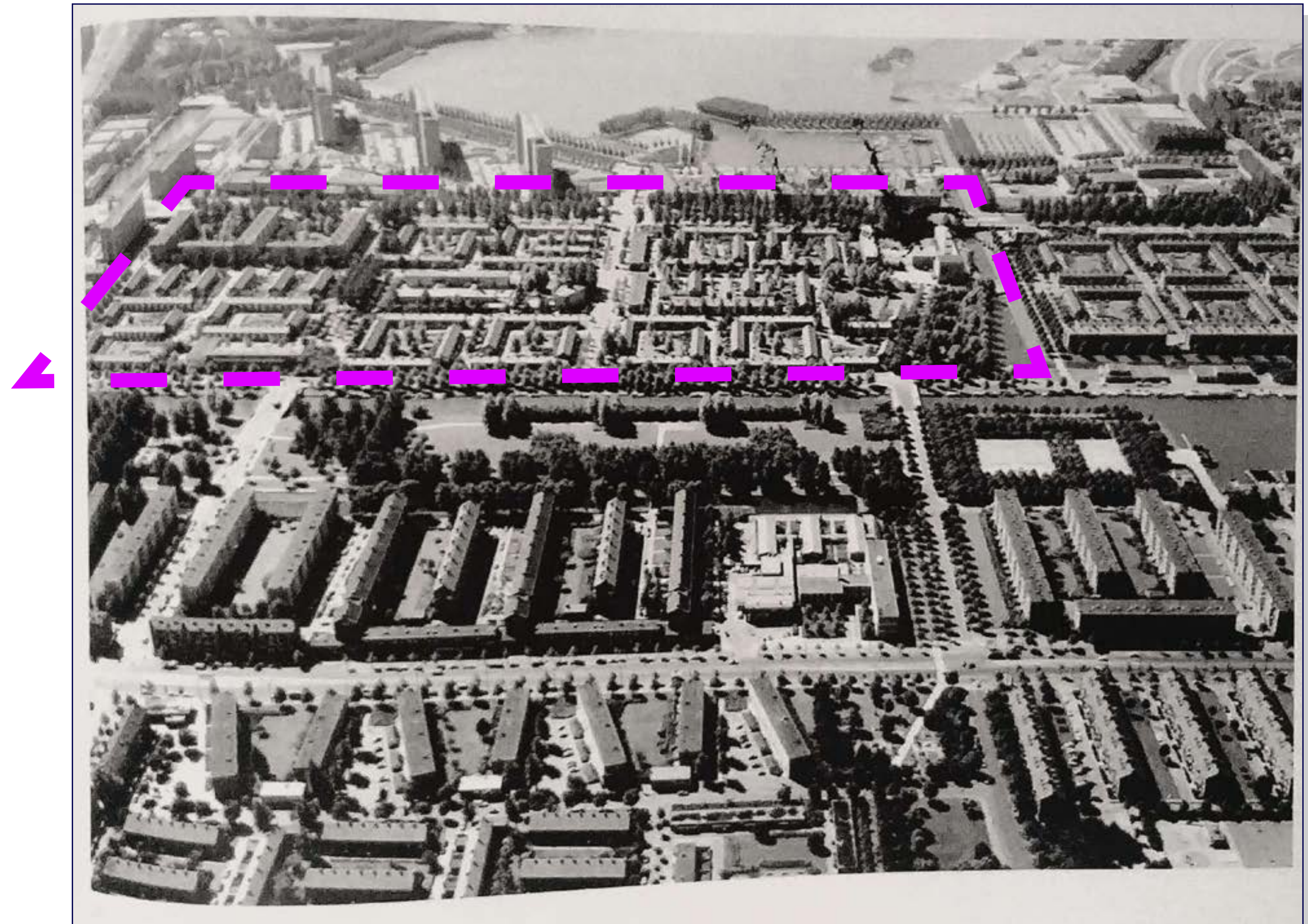
PART 2 : WESTERN GARDEN CITIES AND SITE



Broad design of the Amsterdam Expansion Plan (Gemeente Amsterdam, 1934)

SLOTERMEER

PART 2 : WESTERN GARDEN CITIES AND SITE

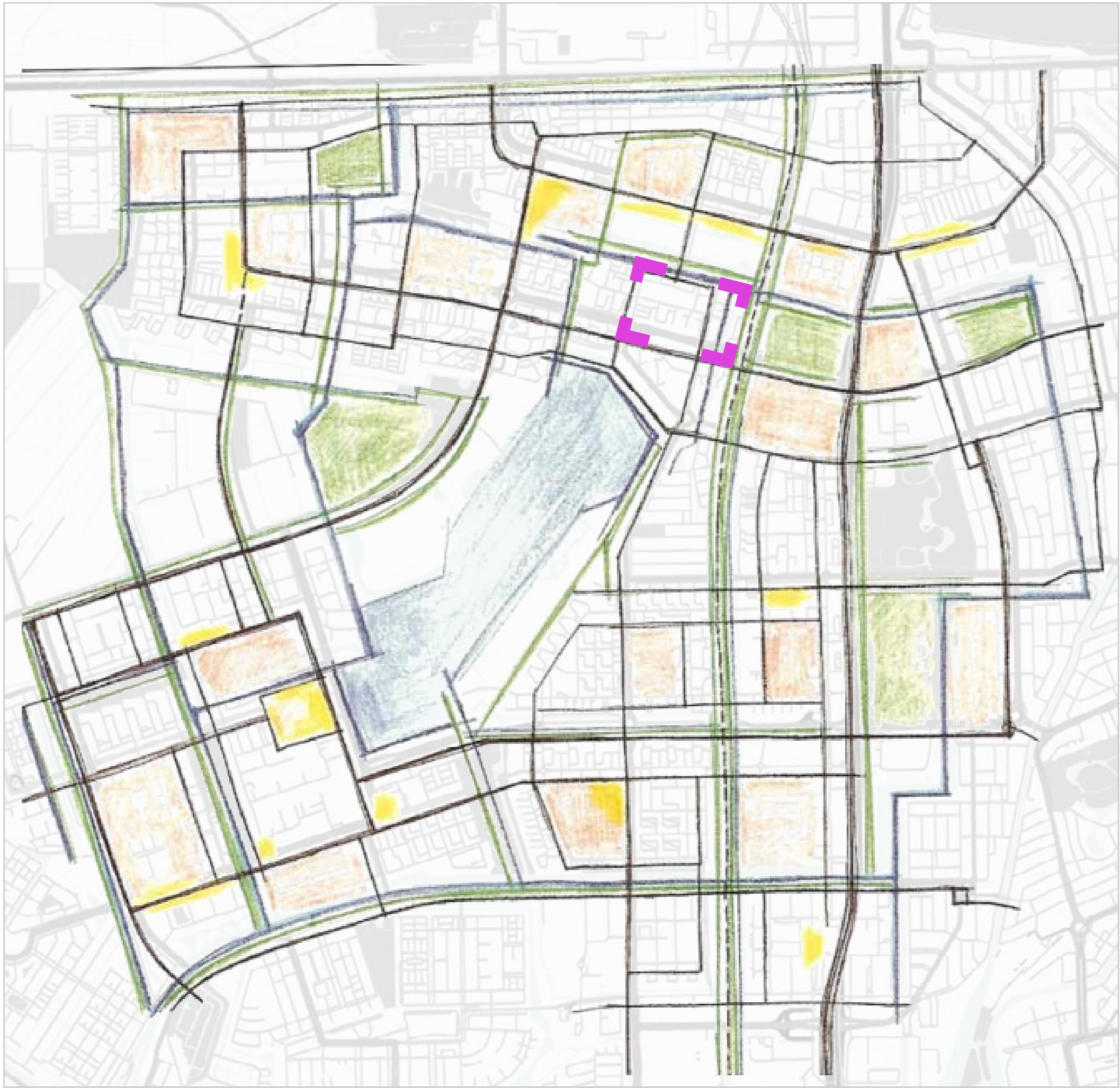


Slotermeer, Stadsarchief Amsterdam, 1963



THE 'SCHOTSE RUIT' // TRUE QUALITY OF THE PLAN

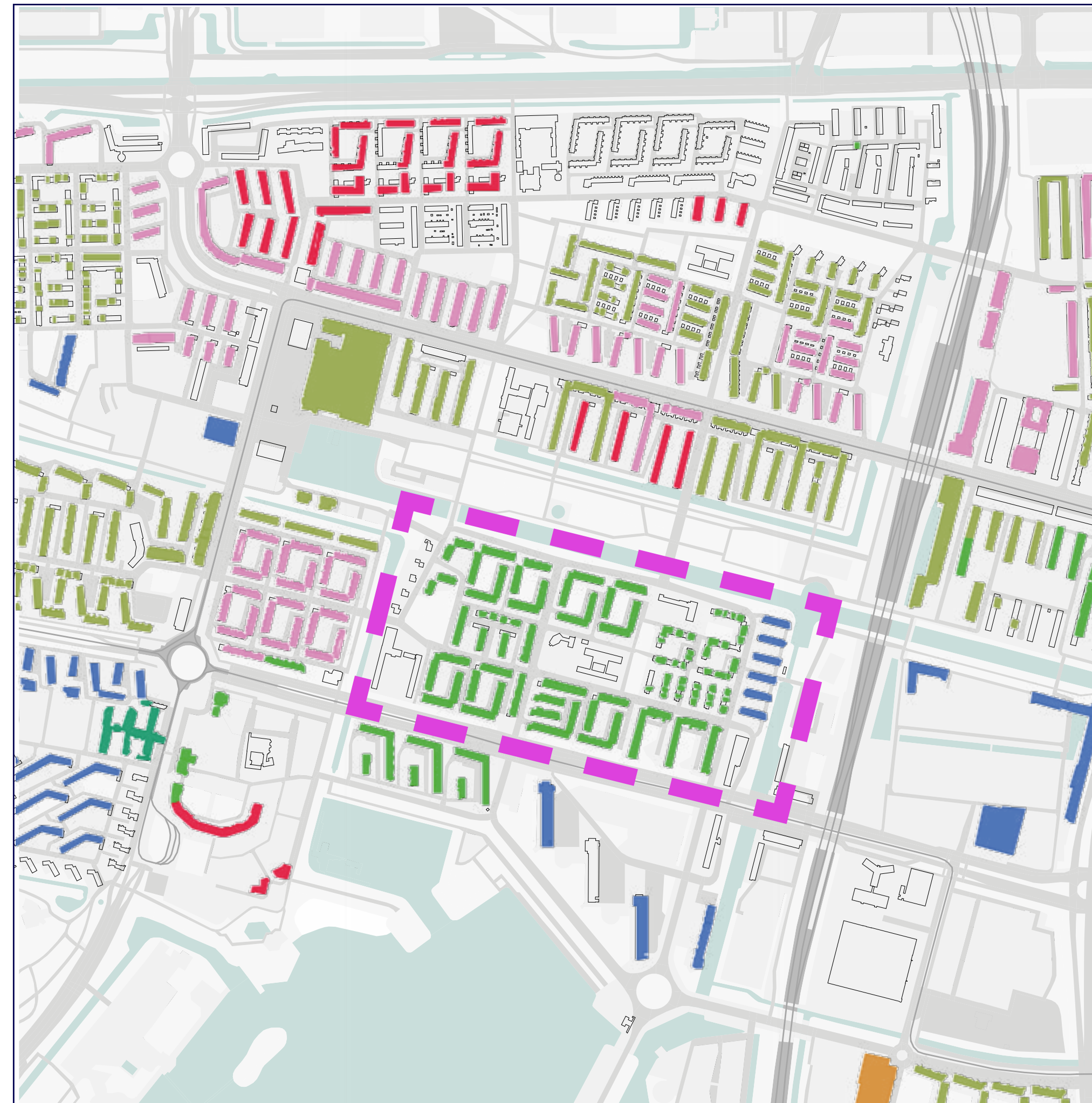
PART 2 : WESTERN GARDEN CITIES AND SIT



Schotse Ruit, Anna Vos, 1995

QUALITIES	CHARACTERISTICS
THE STRUCTURE AS A WHOLE	CONTINUOUS AND UNIDENTIFIED GREEN
THE RELATIVE AUTONOMY OF THE SYSTEMS	OPEN BUILDING BLOCKS
THE SPACES WHERE THE SYSTEMS INTERFERE	LACK OF DIVERSITY
THE 'SOUL'	ZEITGEIST
PERMANENT	CAN BE REDEVELOPED

- LEGEND
- THE LINES
- INFRASTRUCTURE
 - GREENERY
 - WATER
- THE FIELDS
- BUILDINGS
 - NATURE
 - HOT-SPOTS



https://maps.amsterdam.nl/afwc_2019/

IMPRESSION LOUIS COUPERUSBUURT

PART 2 : WESTERN GARDEN CITIES AND SITE



GALLERY FLAT



DUPLEX HOUSING



PUBLIC BUILDING



INDEPENDENT DWELLING



TERRACED HOUSING



TENEMENT HOUSING

IMPRESSION LOUIS COUPERUSBUURT

PART 2 : WESTERN GARDEN CITIES AND SITE



SATELLITE IMAGE LOUIS COUPERUSBUURT

PART 2 : WESTERN GARDEN CITIES AND SITE



Google Earth





Own Illustration, 2020

residential clusters

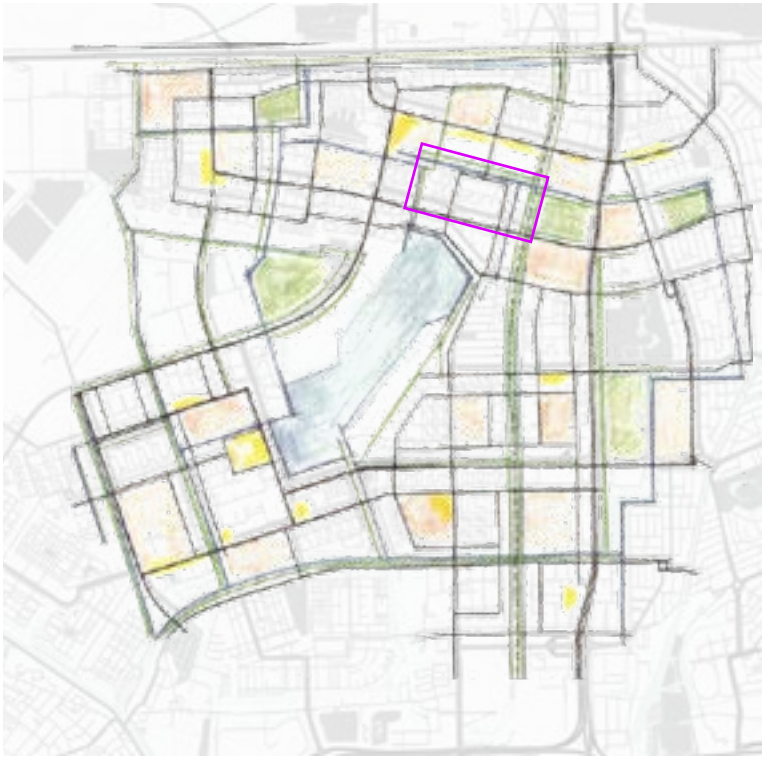




Own Illustration, 2020

schotse ruit

100 meters



Schotse Ruit, Anna Vos, 1995



Own Illustration, 2020

potential lines that can be activated to
expand the main schotse ruit layout

100 meters



Own Illustration, 2020

best places for new public developments



NECESSARY IMPROVEMENTS
ENERGY TRANSITION
|
SPACE

NECESSARY SOCIAL
IMPROVEMENTS
|
SPACE

INTEGRATION

DESIGN

PART 03
NEIGHBOURHOOD ENERGY SYSTEM

OVERALL DESIGN QUESTION

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THEMATIC RESEARCH QUESTION

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THEORETIC FRAMEWORK

The new step strategy

step 1 : REDUCE ENERGY DEMAND

step 2 : REUSE RESIDUAL FLOWS

step 3a : SOLVE THE REMAINING ENERGY DEMAND IN A SUSTAINABLE WAY

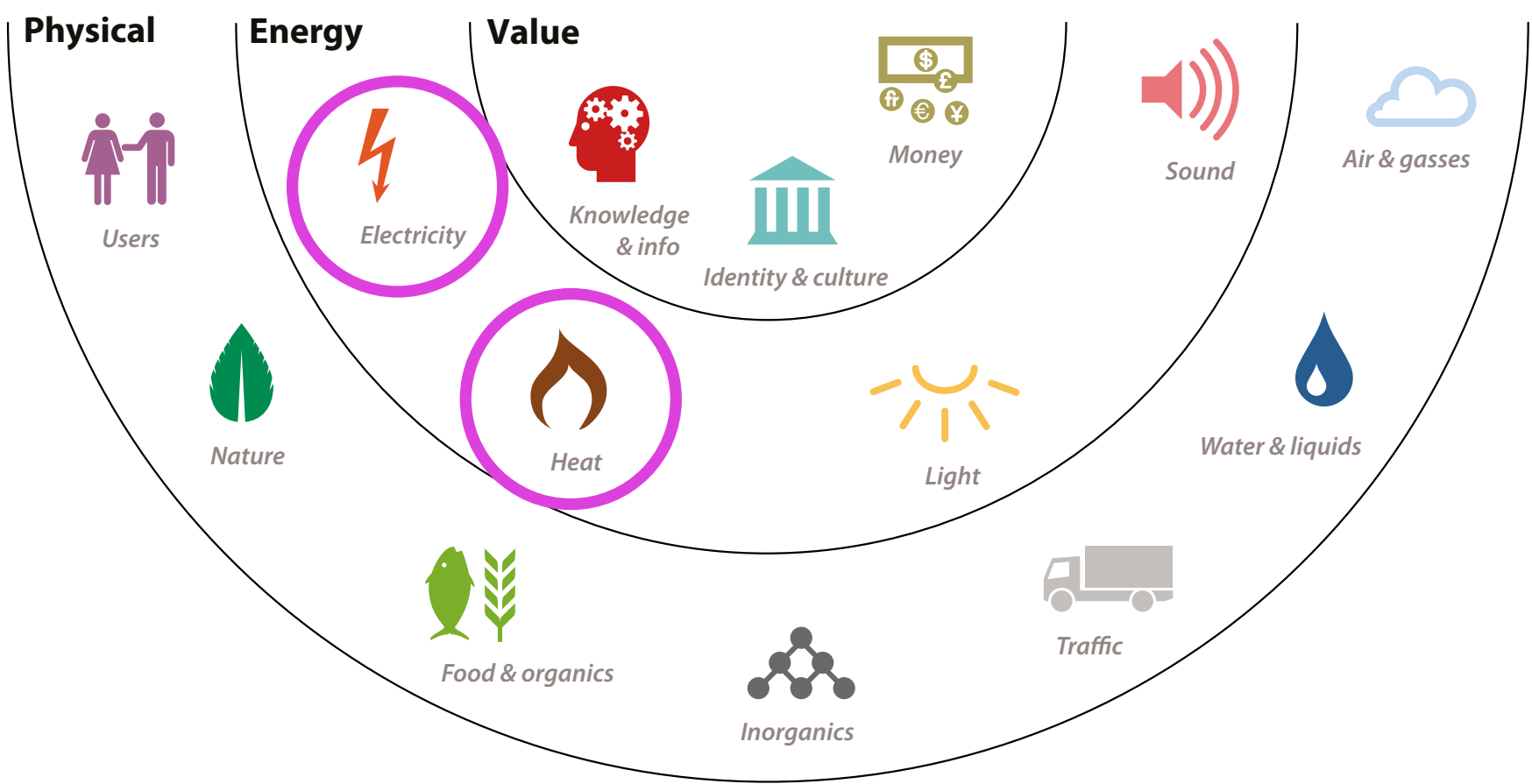
step 3b : WASTE = RESOURCE

Yanovshchinsky, V., Huijbers, K., Blokland, E., & van den Dobbelaars, A. (2012). Architectuur als klimaatmachine

Tille, N., van den Dobbelaars, A., Doepel, D., de Jager, W., Joubert, M., & Mayenburg, D. (2009). REAP Rotterdamse EnergieAanpak en Planning

METHOD

INSIDE Flows



INSIDE Flows method creates a systematic understanding of the working of flows in the environment and is using the knowledge of these systems to give a positive contribution to design.

Jongert, J., Dirx, L., Venhuizen, H., van der Burgh, M., (2013). Inside Flows

SUPERUSE Studio. (2020, March 6). Intro Circulaire Afstudeerders [Slides]

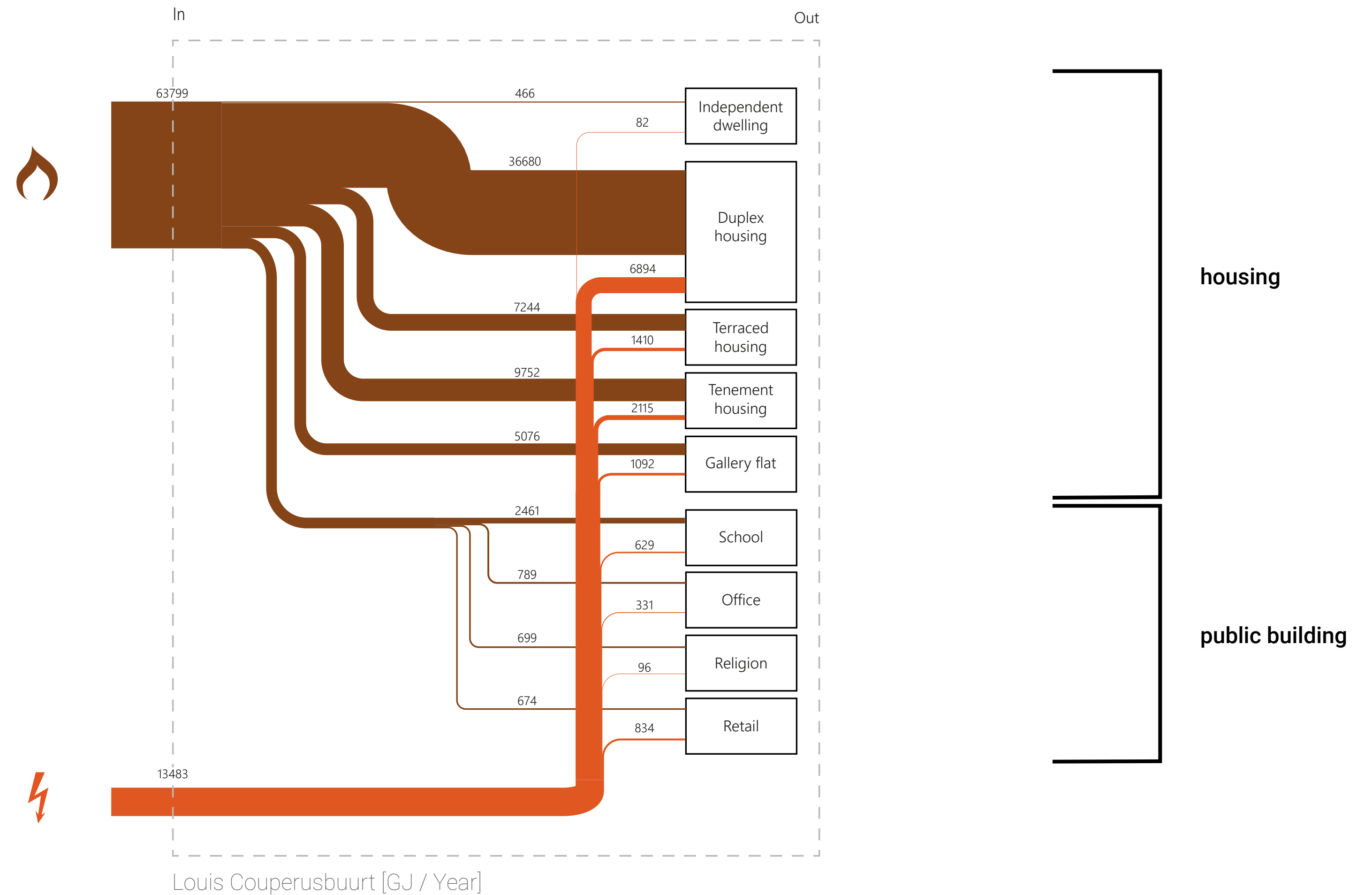


RESULTS HEAT FLOWS LOUIS COUPERUSBUURT

PART 03 : THEMATIC RESEARCH

Situation 1, Current State

- Bad insulated
- Natural gas
- Resources used in a linear way
- No circularity
- No benefit for the surroundings



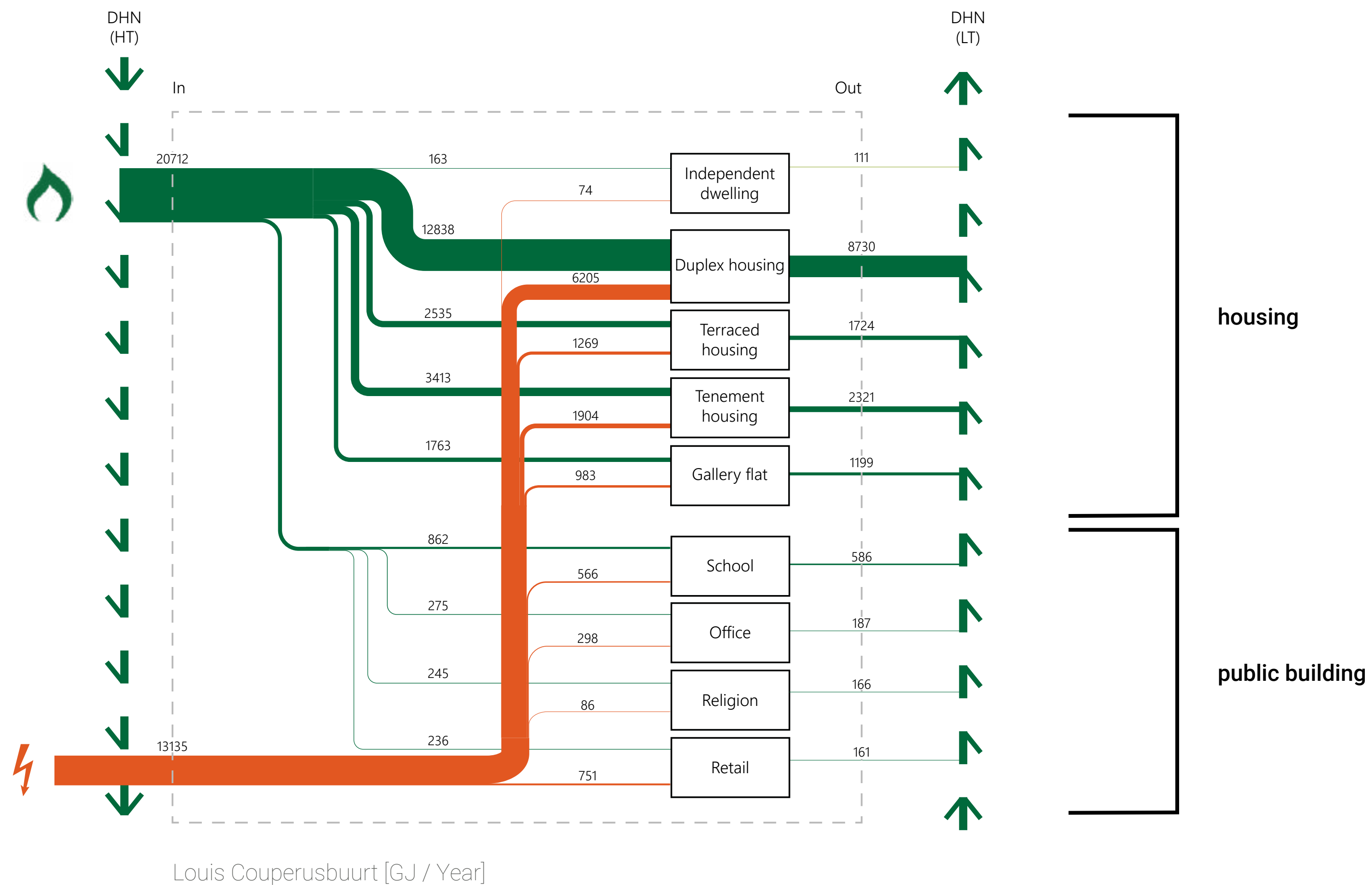


RESULTS HEAT FLOWS LOUIS COUPERUSBUURT

PART 03 : THEMATIC RESEARCH

Situation 2, Reducing the Energy Demand

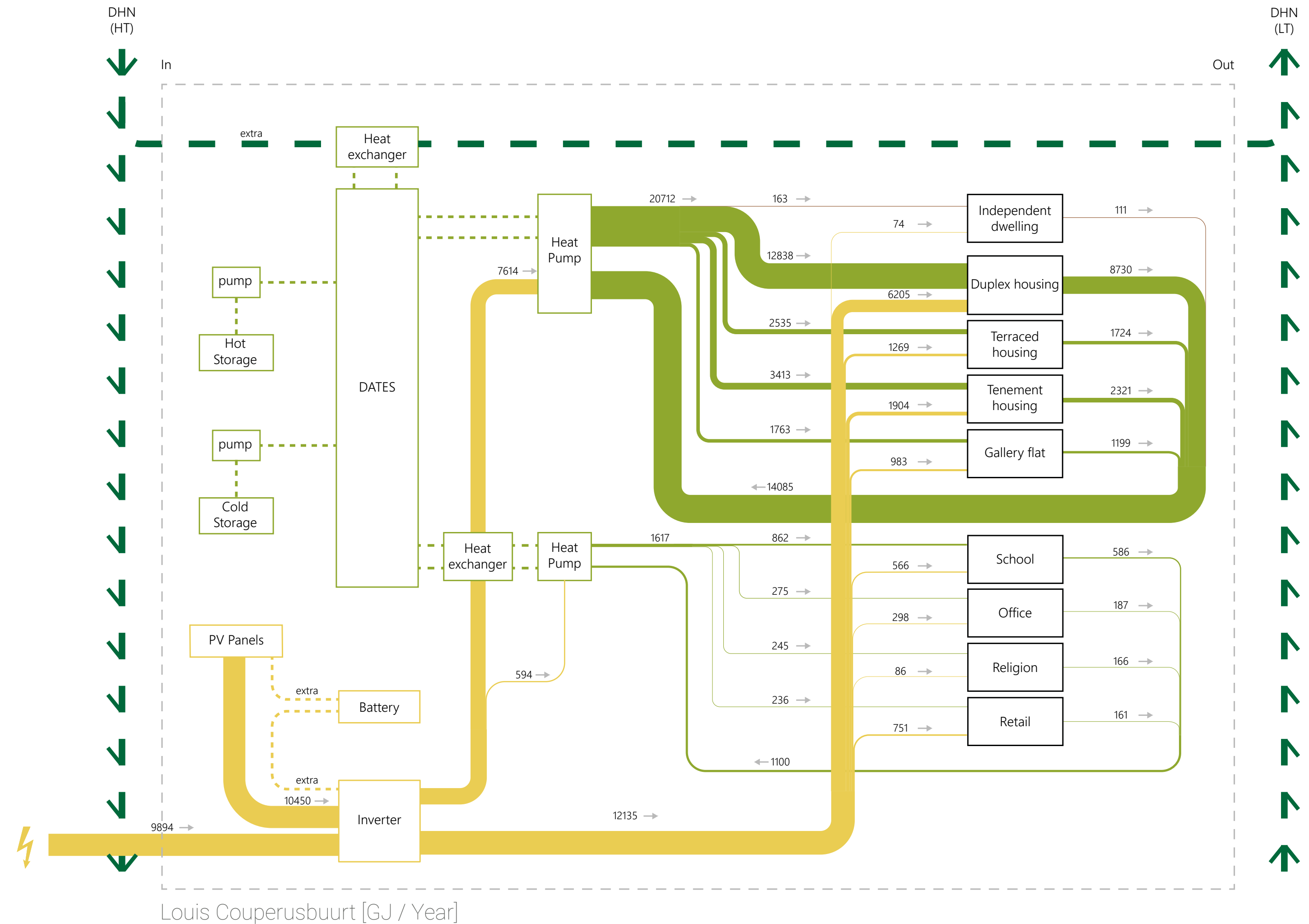
- Insulation
- Connection to District Heating Network
- No more gas
- First steps to reusing flows





Situation 3, Sustainable Louis Couperusbuurt

- Optimal use of residual flows
- Centralized mini grid
- Community oriented
- Sustainable measures for heating
 - . District Aquifer Thermal Energy Storage (DATES)
 - . Central Heat Pumps
 - . Heat Exchangers
- Sustainable measures for Electricity
 - . PV Panels
 - . Solar Inverter
 - . Neighbourhood Battery





RESULTS HEAT FLOWS LOUIS COUPERUSBUURT

PART 03 : THEMATIC RESEARCH



pump



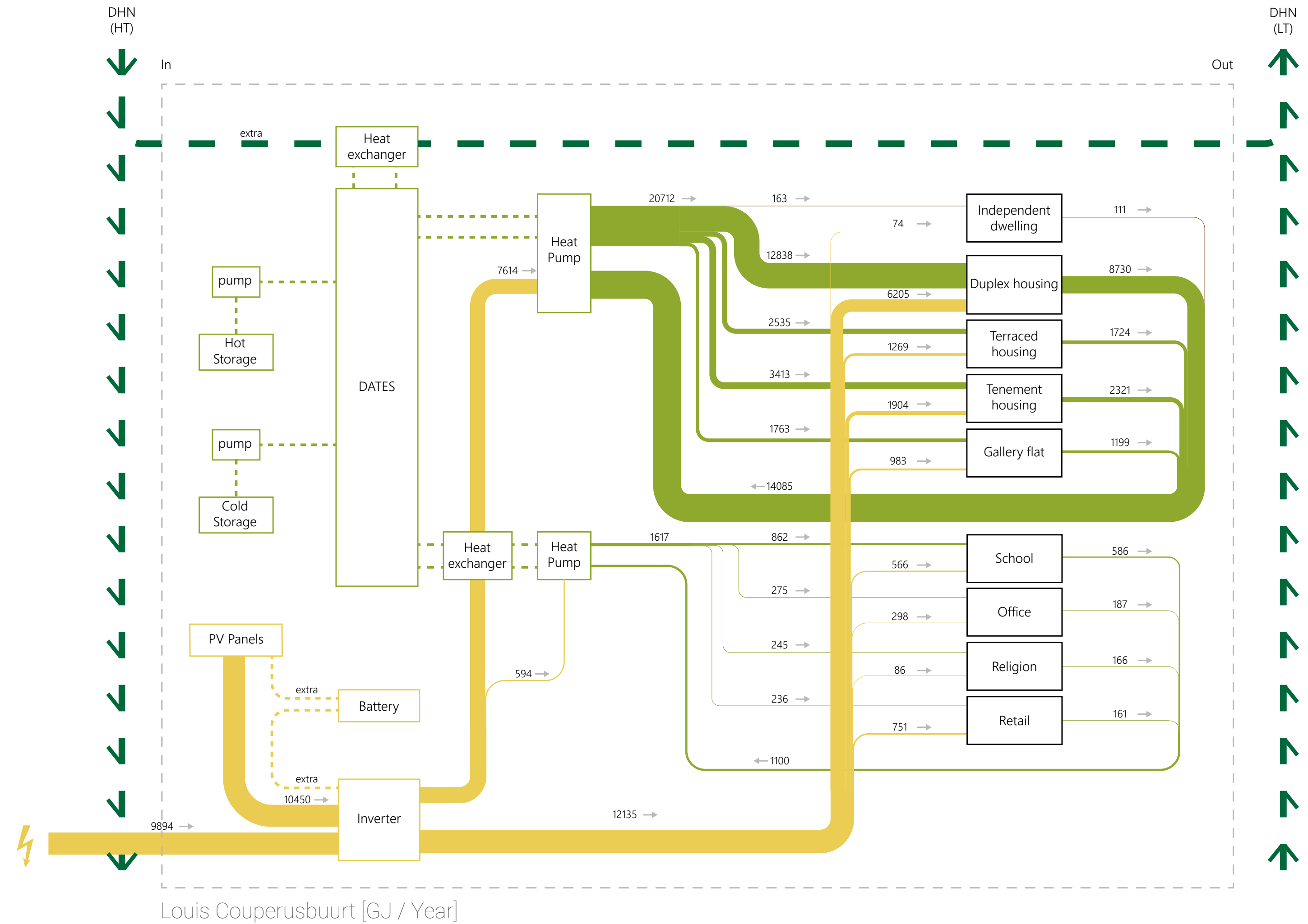
DATES skid



heat exchanger



heatpump





SCHEMATIC WORKING HEATGRID LOUIS COUPERUSBUURT

PART 03 : THEMATIC RESEARCH



pump



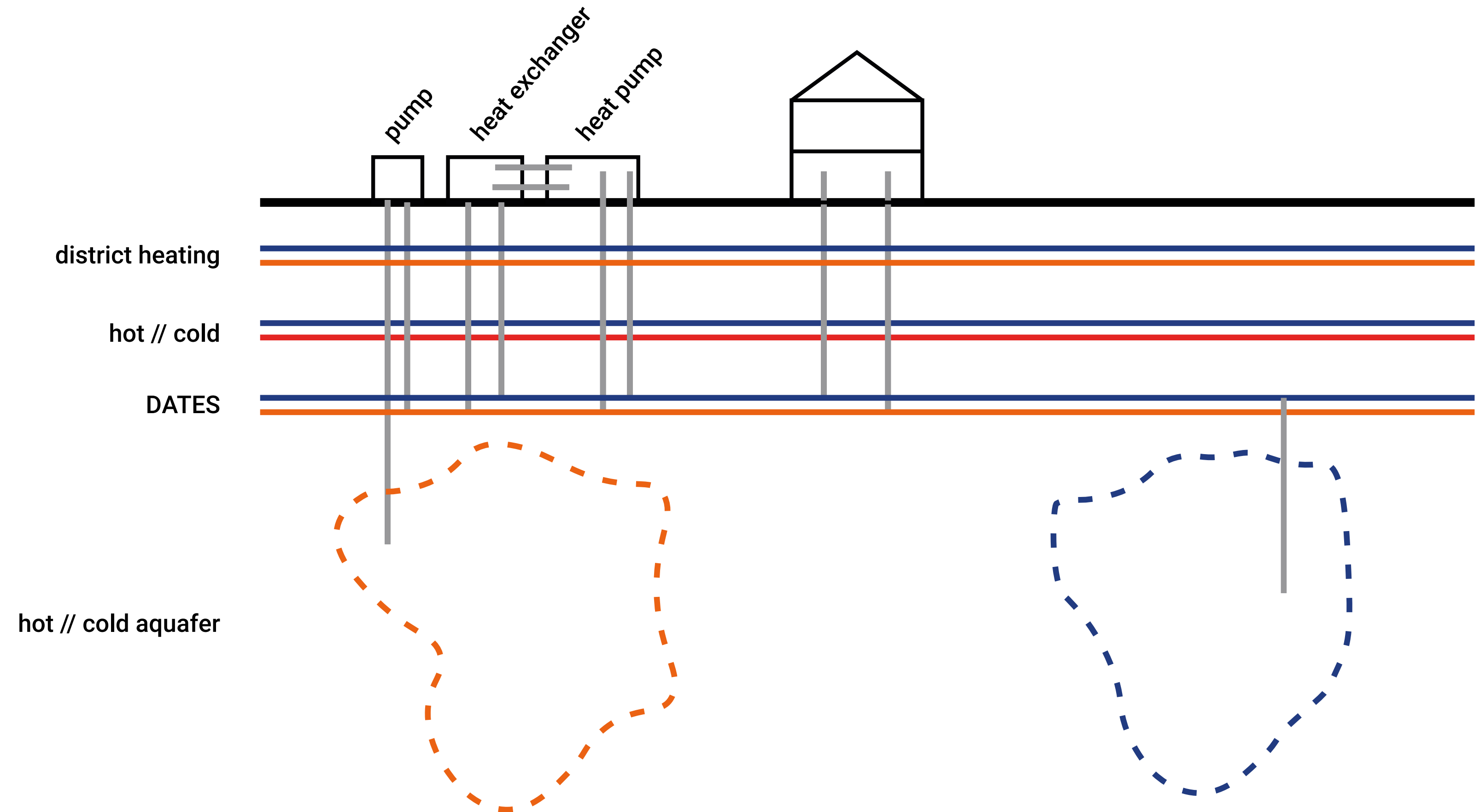
DATES skid



heat exchanger



heatpump





SCHEMATIC WORKING HEATGRID LOUIS COUPERUSBUURT

PART 03 : THEMATIC RESEARCH



pump



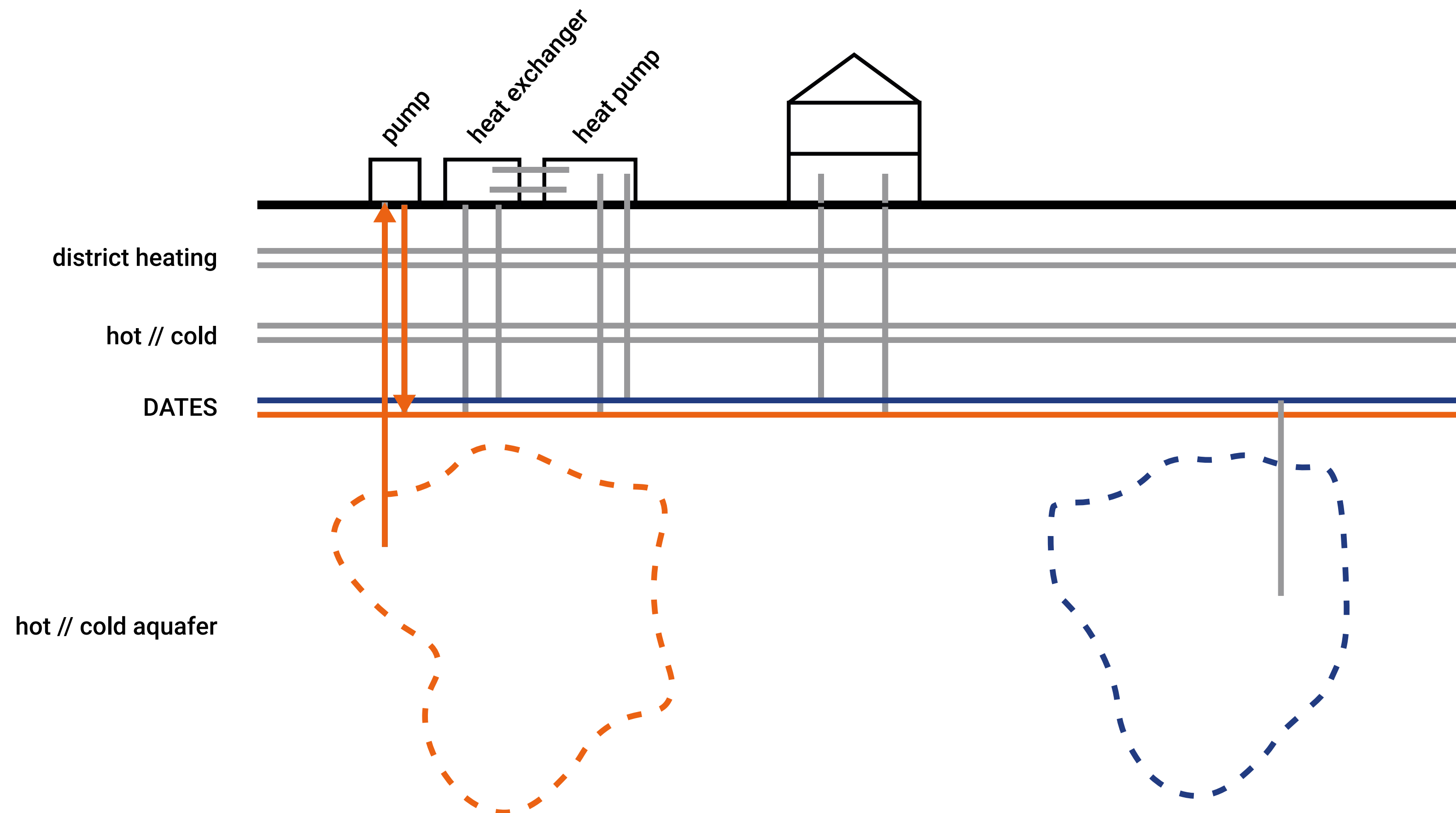
DATES skid



heat exchanger



heatpump





SCHEMATIC WORKING HEATGRID LOUIS COUPERUSBUURT

PART 03 : THEMATIC RESEARCH



pump



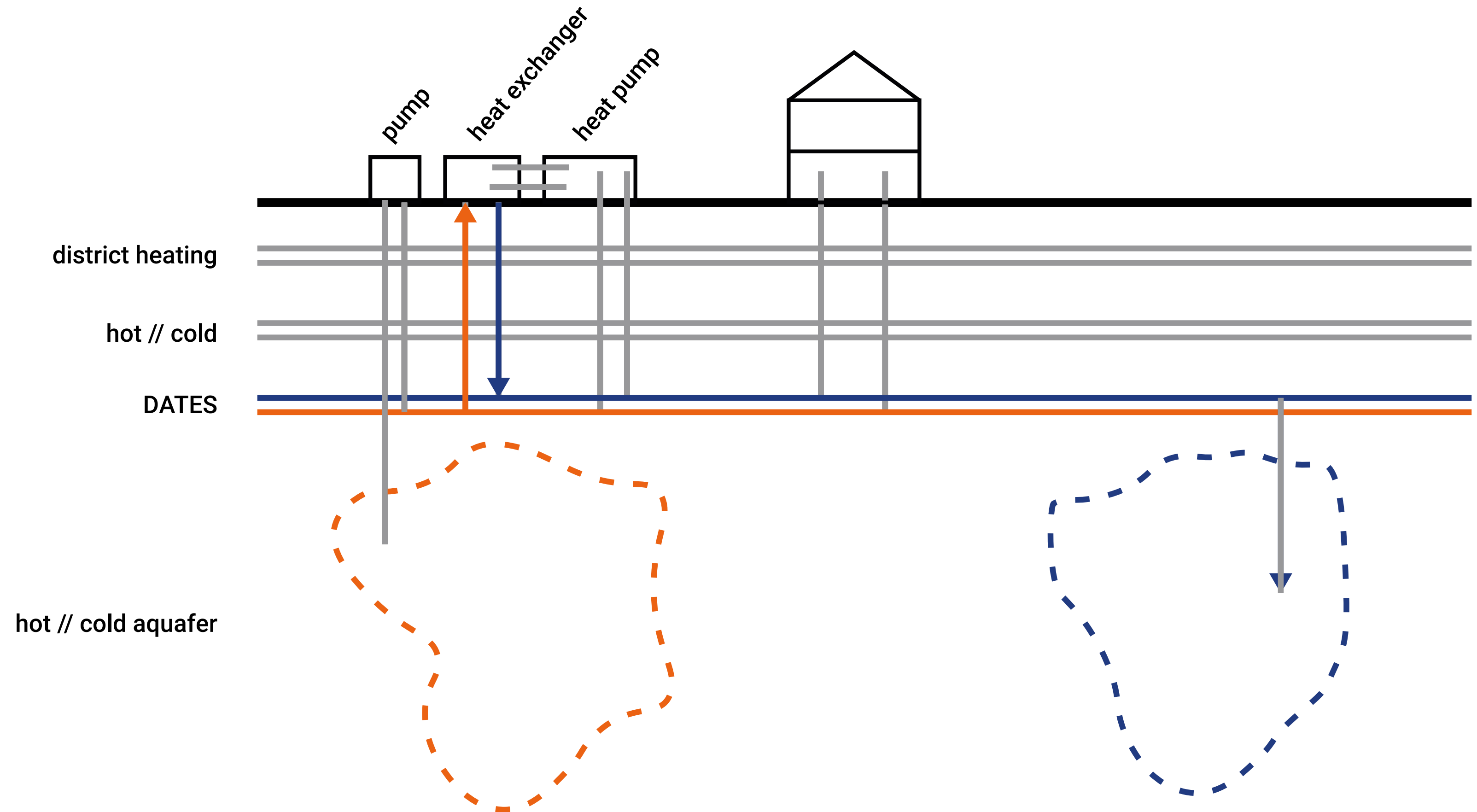
DATES skid



heat exchanger



heatpump





SCHEMATIC WORKING HEATGRID LOUIS COUPERUSBUURT

PART 03 : THEMATIC RESEARCH



pump



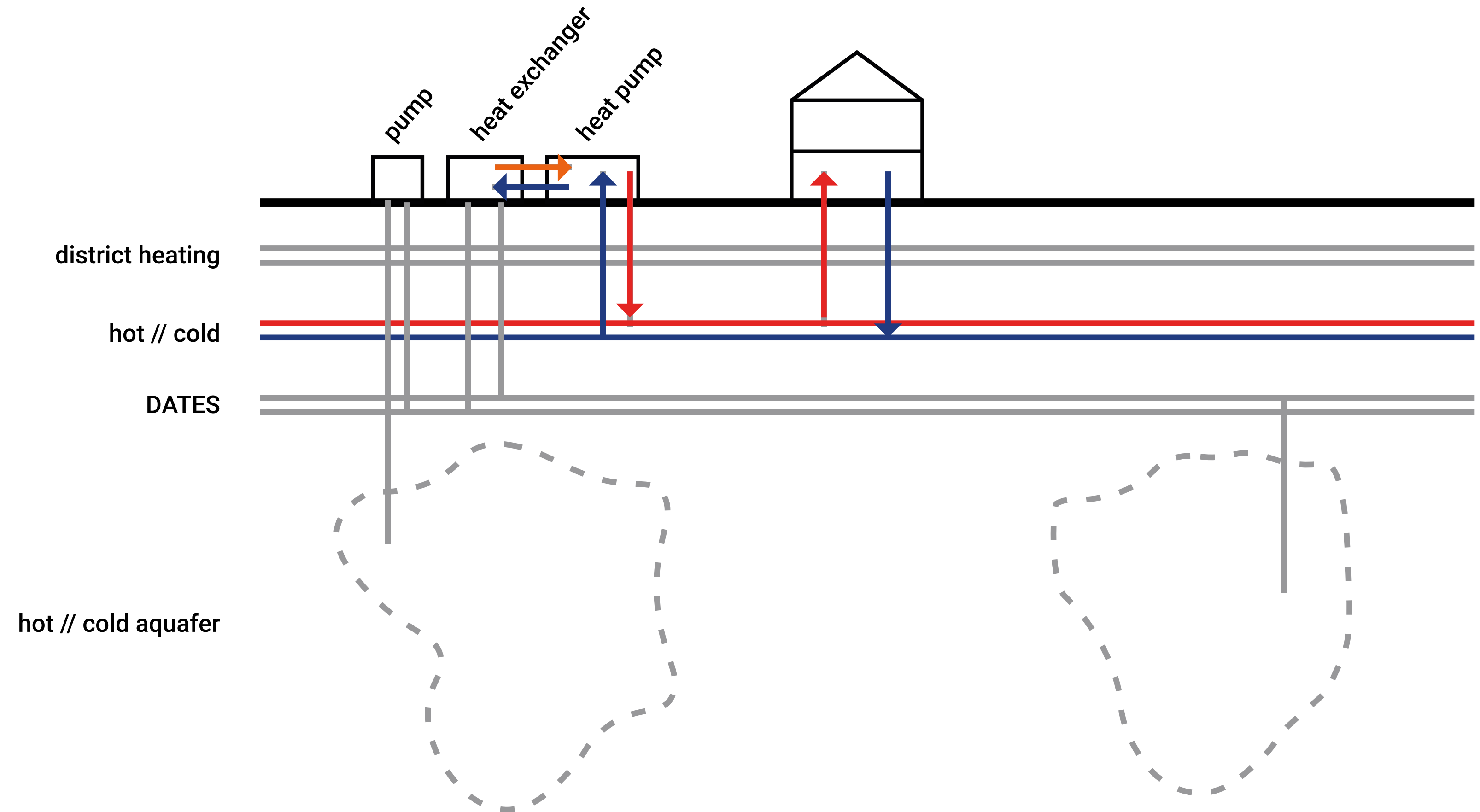
DATES skid



heat exchanger



heatpump





SCHEMATIC WORKING HEATGRID LOUIS COUPERUSBUURT

PART 03 : THEMATIC RESEARCH



pump



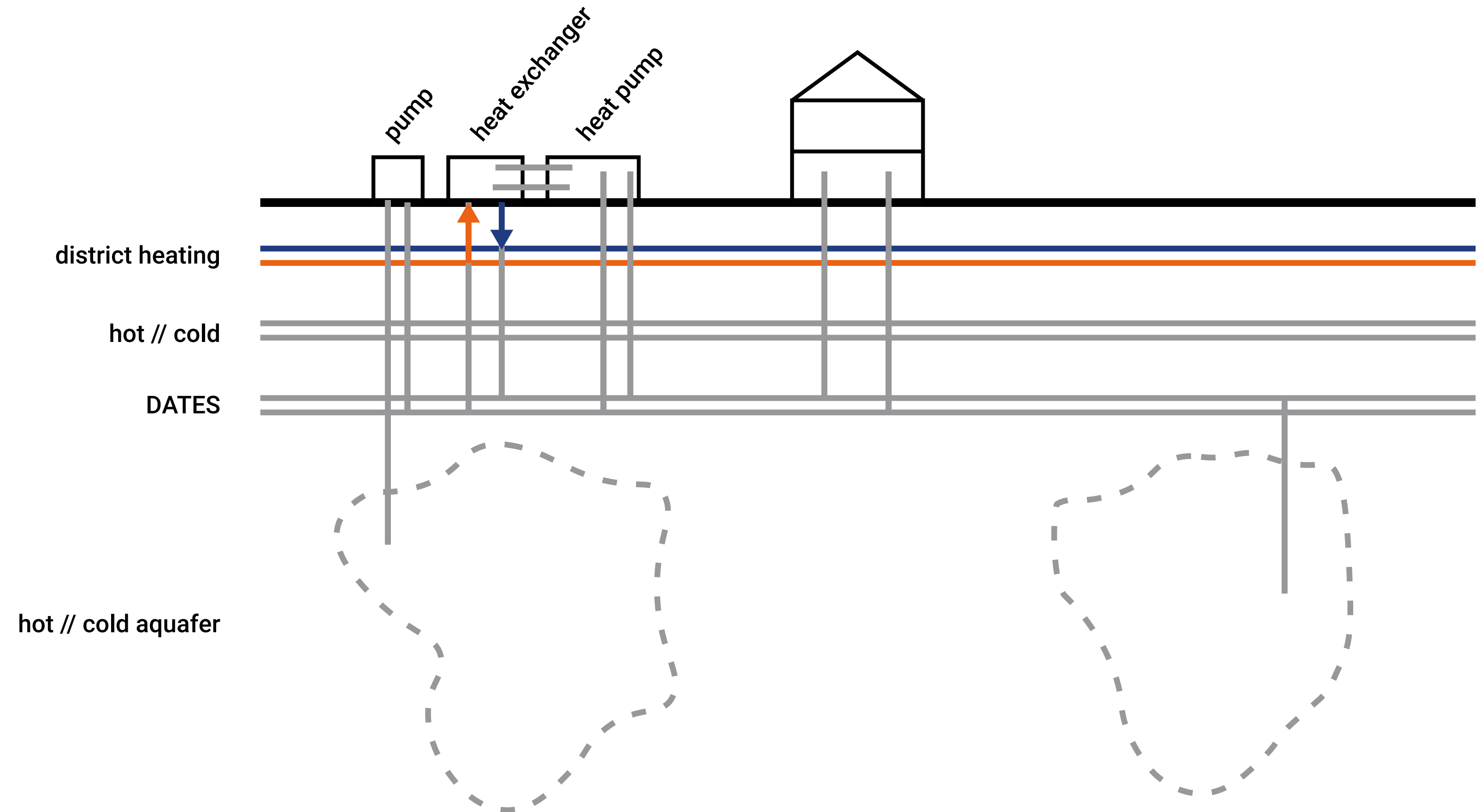
DATES skid



heat exchanger



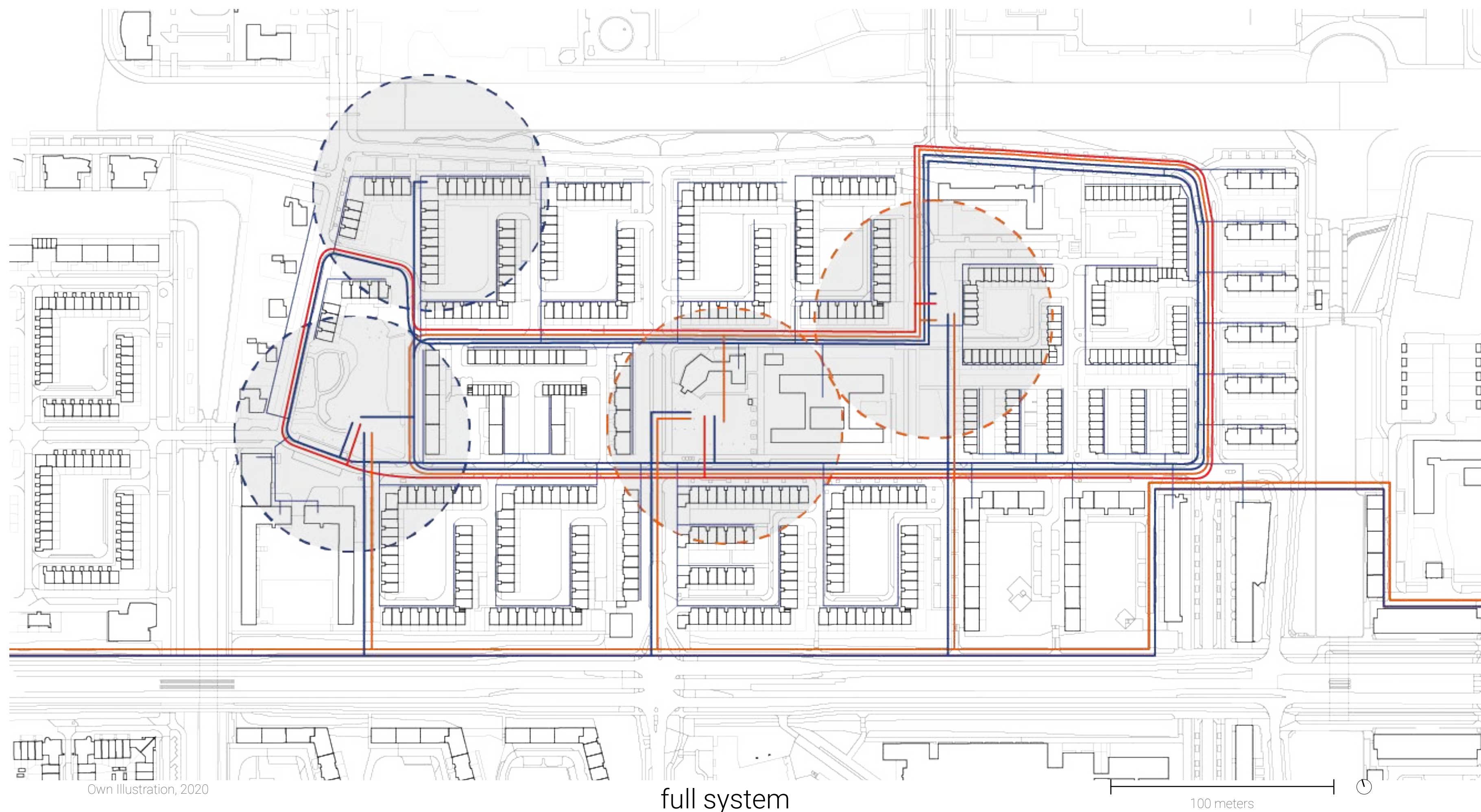
heatpump





HEAT GRID SYSTEM INTEGRATED IN LOUIS COUPERUSBUURT

PART 03 : THEMATIC RESEARCH





ELECTRICITY GRID SYSTEM

PART 03 : THEMATIC RESEARCH





ELECTRICITY GRID HARDWARE NECESSITIES

PART 03 : THEMATIC RESEARCH



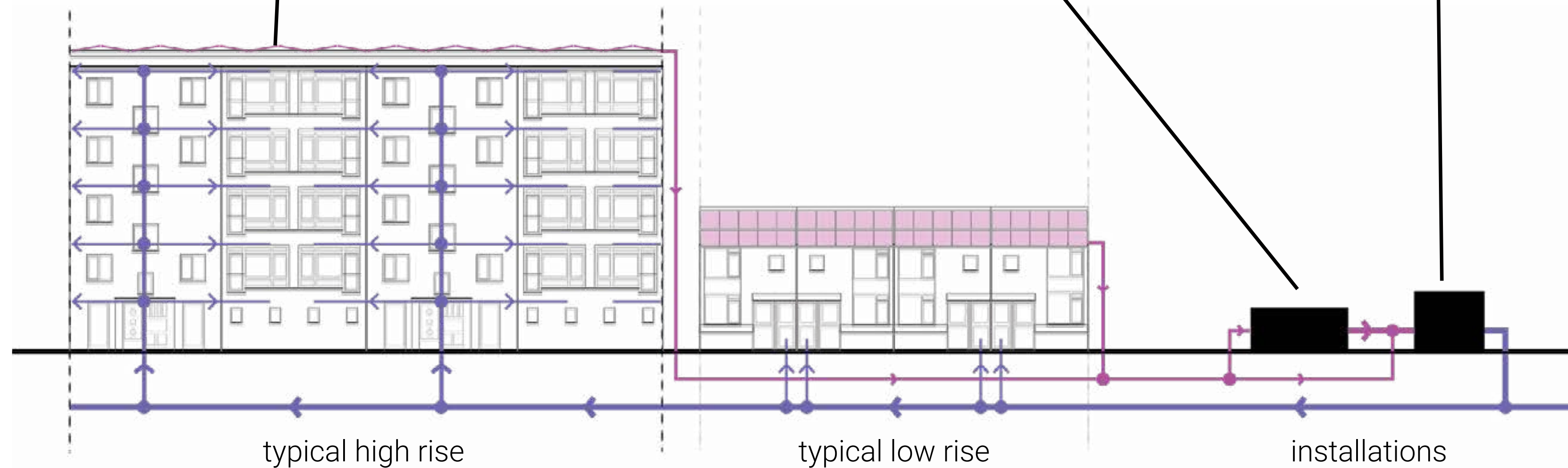
pv panels



neighbourhood battery



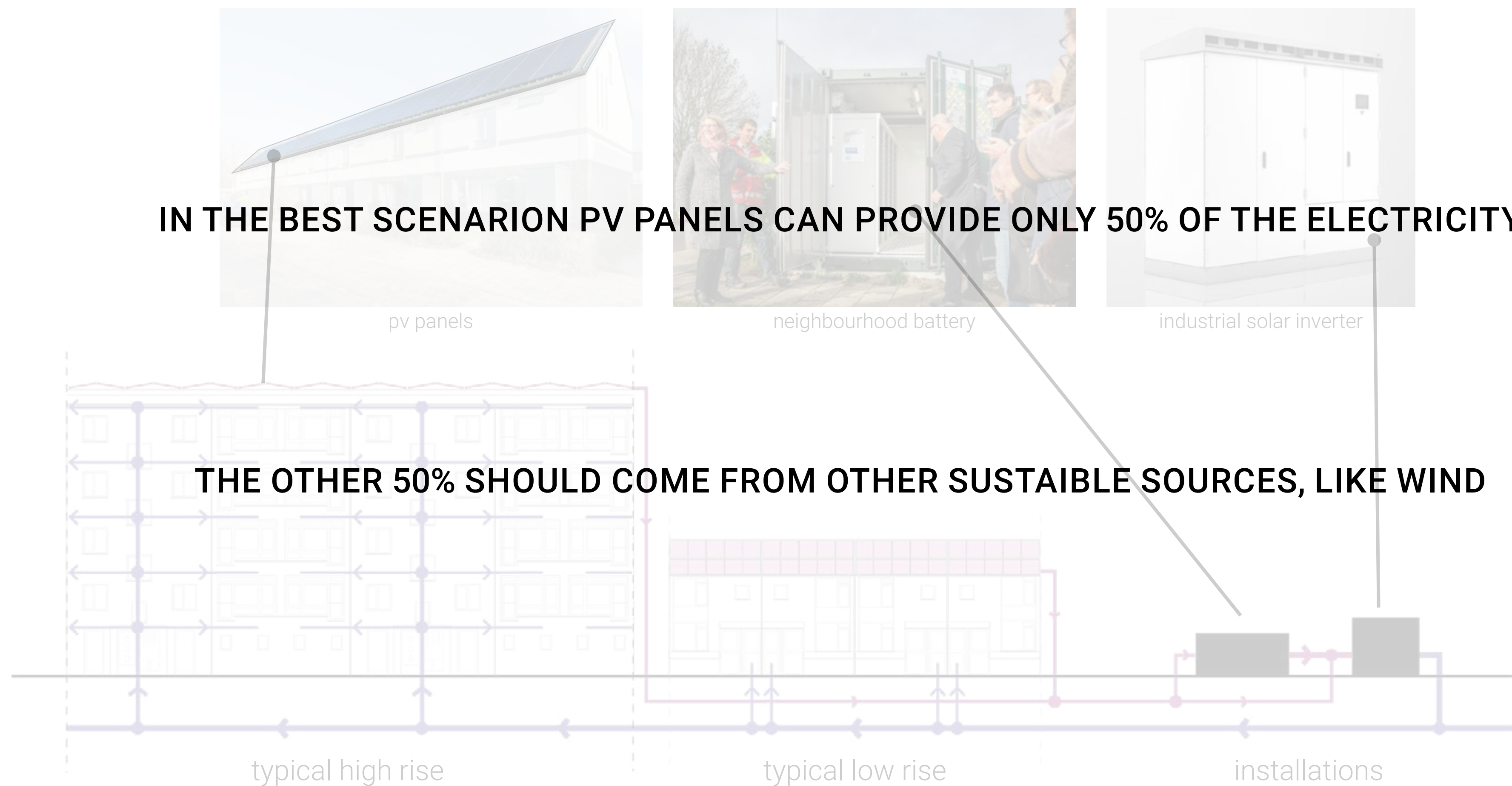
industrial solar inverter

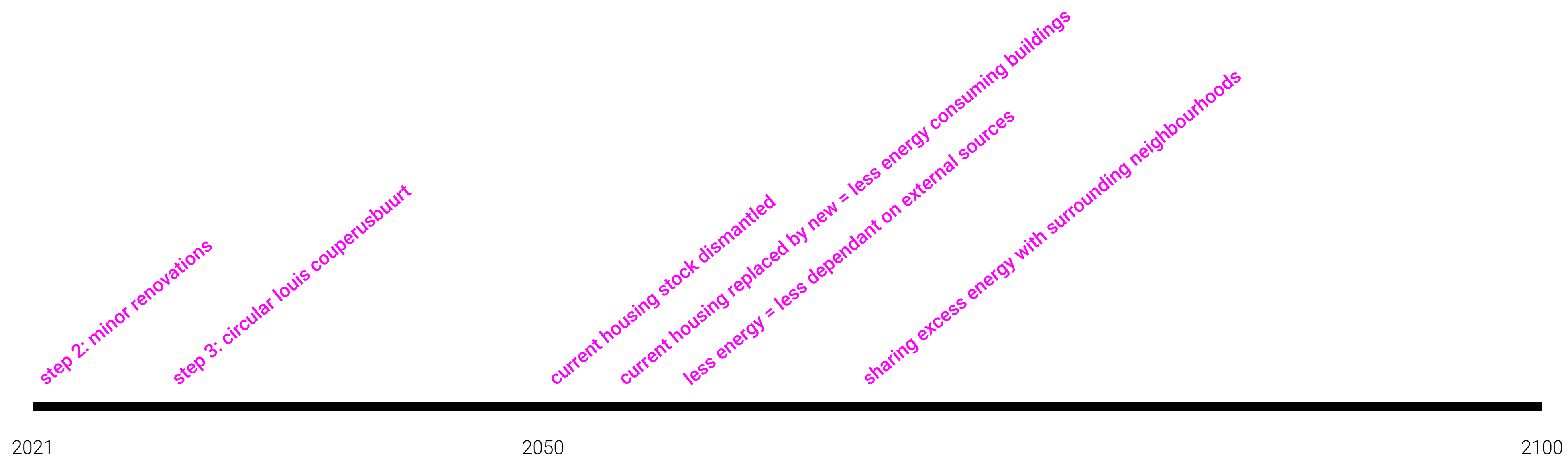


typical high rise

typical low rise

installations







INSTALLATION DESIGN CORE

PART 03 : THEMATIC RESEARCH



Neighbourhood battery



Heatpump



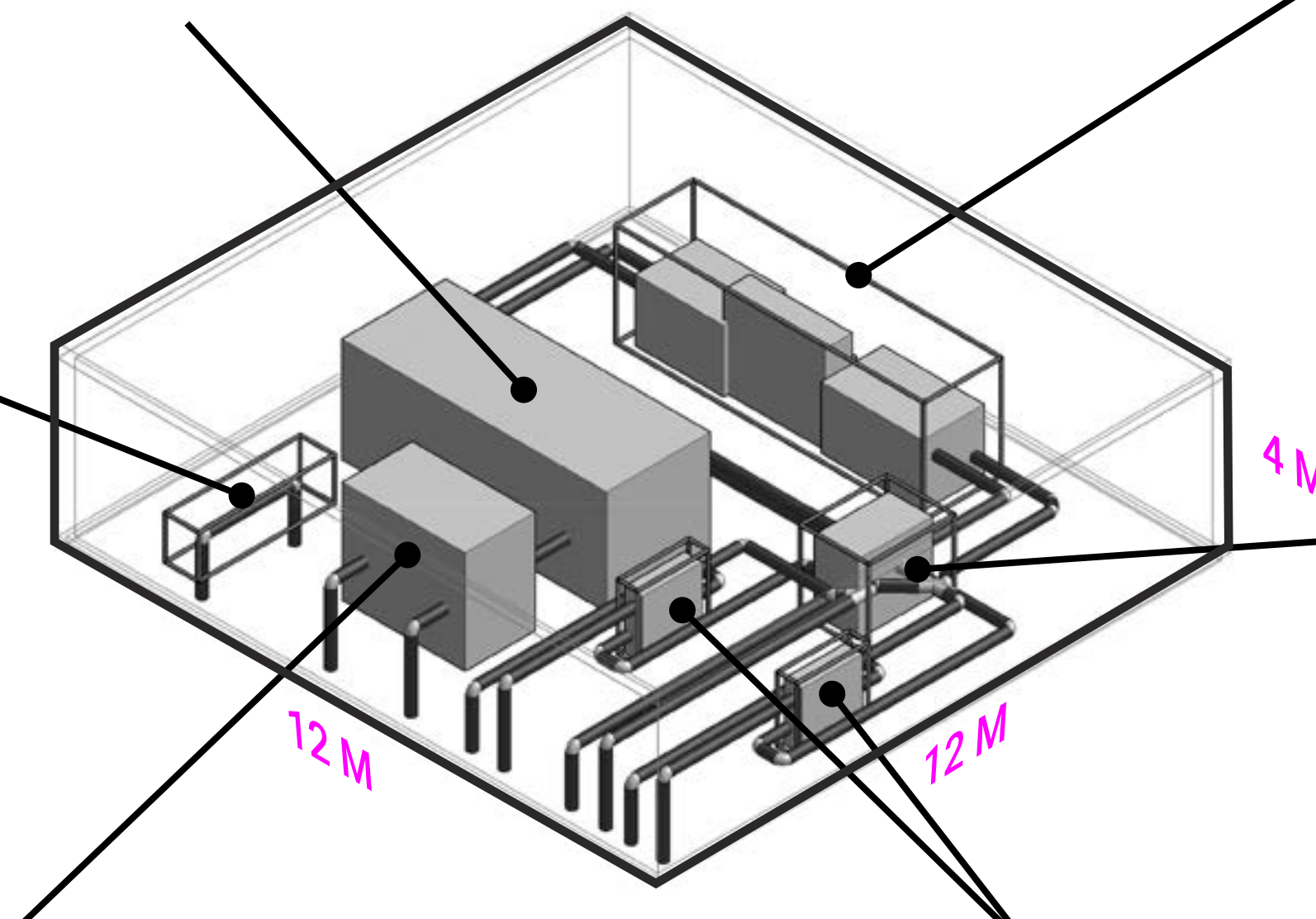
Pump



Converter



DATES Skid

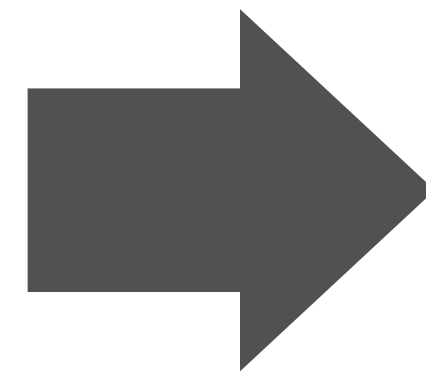
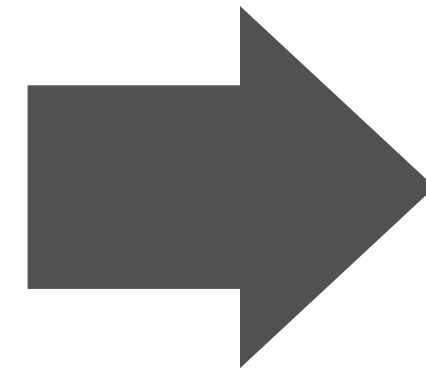
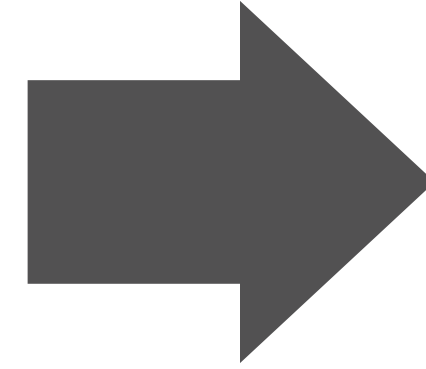
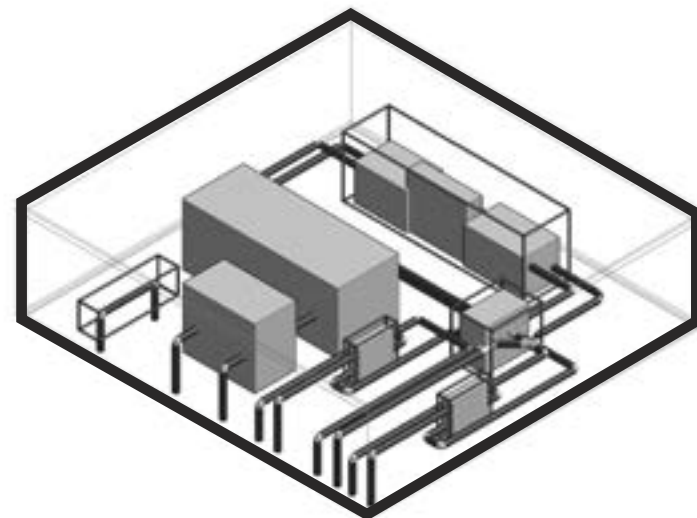
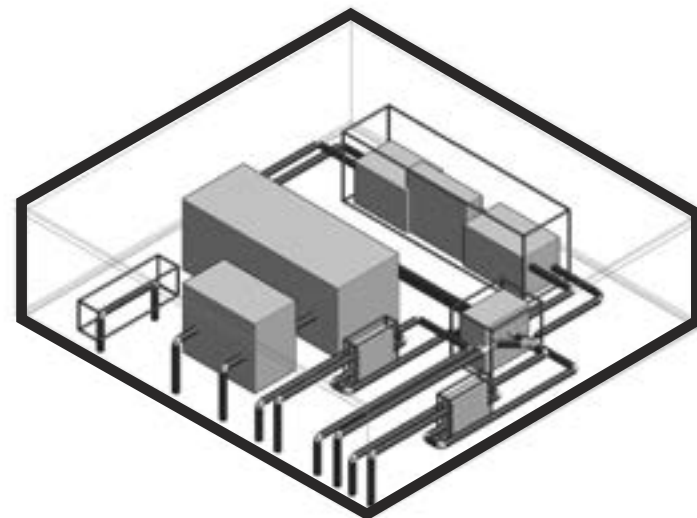
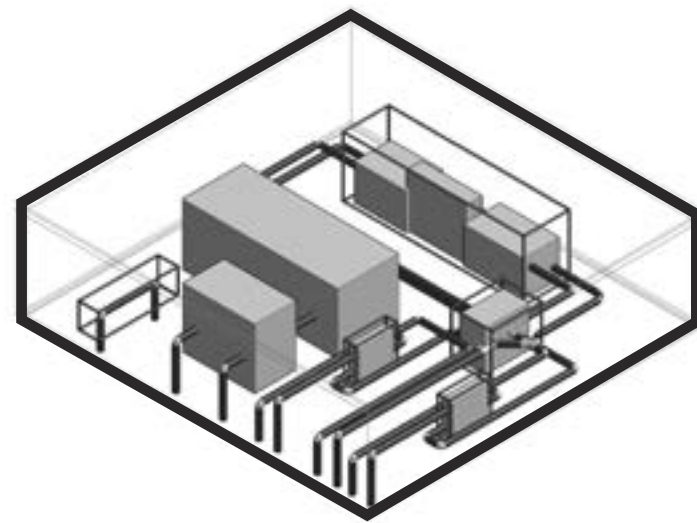


Heat Exchanger



INSTALLATION DESIGN CORE

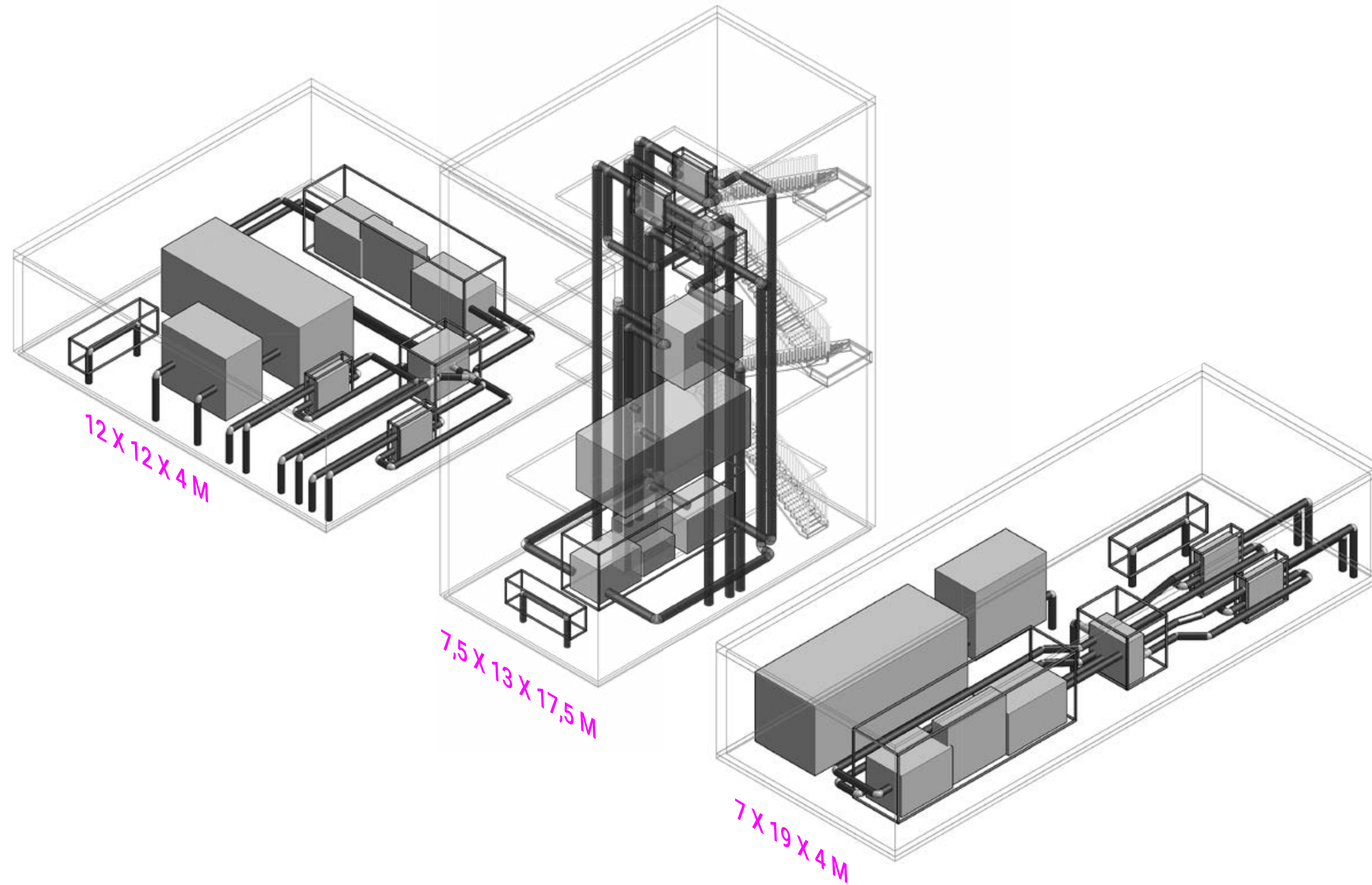
PART 03 : THEMATIC RESEARCH





INSTALLATION DESIGN CORE VARIATIONS

PART 03 : THEMATIC RESEARCH





Own Illustration, 2020

best places for new public developments

100 meters

NECESSARY IMPROVEMENTS
ENERGY TRANSITION
|
SPACE

NECESSARY SOCIAL
IMPROVEMENTS
|
SPACE

INTEGRATION

DESIGN

PART 04

SOCIAL CHALLENGES AND SOLUTIONS

“WHEN A WHOLE NEIGHBOURHOOD IS BEING LINKED TO A BENEFICIAL SYSTEM, THE SOCIAL IMPACT CANNOT BE NEGLECTED.”

(Bus, 2001, p. 269)

BENEFITS OF INTEGRATING LOCAL COMMUNITY WITH SUSTAINABLE MEASURES:

- 1. IT CAN GENERATE INCOME**
- 2. IT CAN PROVIDE ENERGY MORE CHEAPLY**
- 3. MORE LOCAL ACCEPTANCE FOR SUSTAINABLE MEASURES**
- 4. INCREASE AWARENESS ON ENERGY CONSUMPTION**

(Walker, Simcock, 2012)

THEN



Slotermeerlaan bij Plein '40-'45, Nico Swaager, 1954

NOW



Elsevier Weekblad, Zo ziet het leven eruit in Amsterdam Nieuw-West

✗ Gemeente
✗ Amsterdam
✗



Principenota Geuzenveld-Slotermeer

Ruimtelijke en programmatische richtlijnen voor vernieuwing

Januari 2019

THE CHALLENGES

- Lowest score on social economic indicators compared to all the other development neighbourhoods
- Poverty, debt
- Social exclusion is twice as common as the average
- Low literacy is extremely high (40% compared to 16% for Amsterdam as a whole)
- Unemployment and a lack of control over one's own life
- Too little personal space due to small houses

Spatial and programmatic guidelines for the renewal of Geuzenveld-Sltoermeer // Municipality of Amsterdam, 2019

✗ Gemeente
✗ Amsterdam
✗



Principenota Geuzenveld-Slotermeer

Ruimtelijke en programmatische richtlijnen voor vernieuwing

Januari 2019

THE SOLUTIONS

- Meeting rooms, neighbourhood rooms that create more meeting, moving and connecting

Spatial and programmatic guidelines for the renewal of Geuzenveld-Sltoermeer // Municipality of Amsterdam, 2019



music and dance school



"support around the corner"



tea room and playground in the park



more diversity in facilities



PROGRAM DISTRIBUTION LOUIS COUPERUSBUURT

PART 4 : SOCIAL CHALLENGES

NeST

- NEIGHBOURHOOD CAFE
- WORKSHOP AREA
- SMALL SCALE SITTING AREAS (INDOOR)
- STUDY SPACES
- NEIGHBOURHOOD KITCHEN
- COMMUNITY MEETING AREA (INDOOR)
- PERSONAL MEETING SPACE (INDOOR)
- SAFE SPACE



- SpeelPlaats**
- PLAYGROUND
 - OUTDOOR COME TOGETHER SPACES

PleinKijkToren

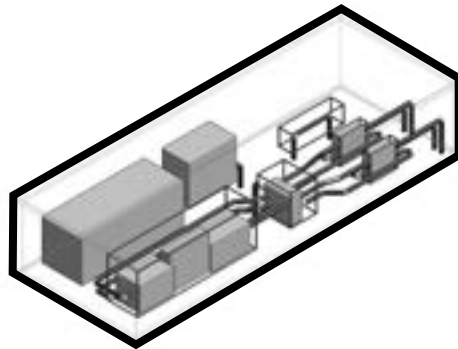
- CONTACT POINT FOR PROBLEMS // QUESTIONS
- LARGE SCALE SITTING AREAS (OUTDOOR)
- COMMUNITY MEETING AREA (OUTDOOR)
- PERSONAL MEETING SPACE (OUTDOOR)

PROGRAM DISTRIBUTION LOUIS COUPERUSBUURT

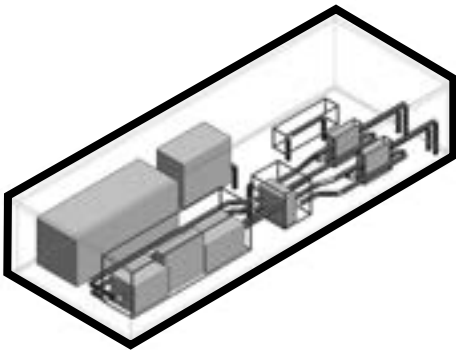
PART 4 : SOCIAL CHALLENGES

NeST

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- STUDY SPACES
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- PERSONAL MEETING SPACE (INDOOR)
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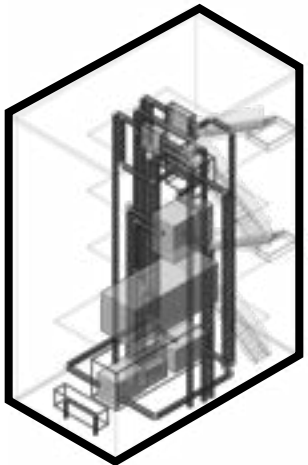


- SpeelPlaats**
- PLAYGROUND
 - OUTDOOR COME TOGETHER SPACES



PleinKijkToren

- CONTACT POINT FOR PROBLEMS // QUESTIONS
- LARGE SCALE SITTING AREAS (OUTDOOR)
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NECESSARY IMPROVEMENTS
ENERGY TRANSITION

|
SPACE

NECESSARY SOCIAL
IMPROVEMENTS

|
SPACE

INTEGRATION

DESIGN

=

PART 05
NeST

PART 05 : NEST

NeST SITE



PART 05 : NEST

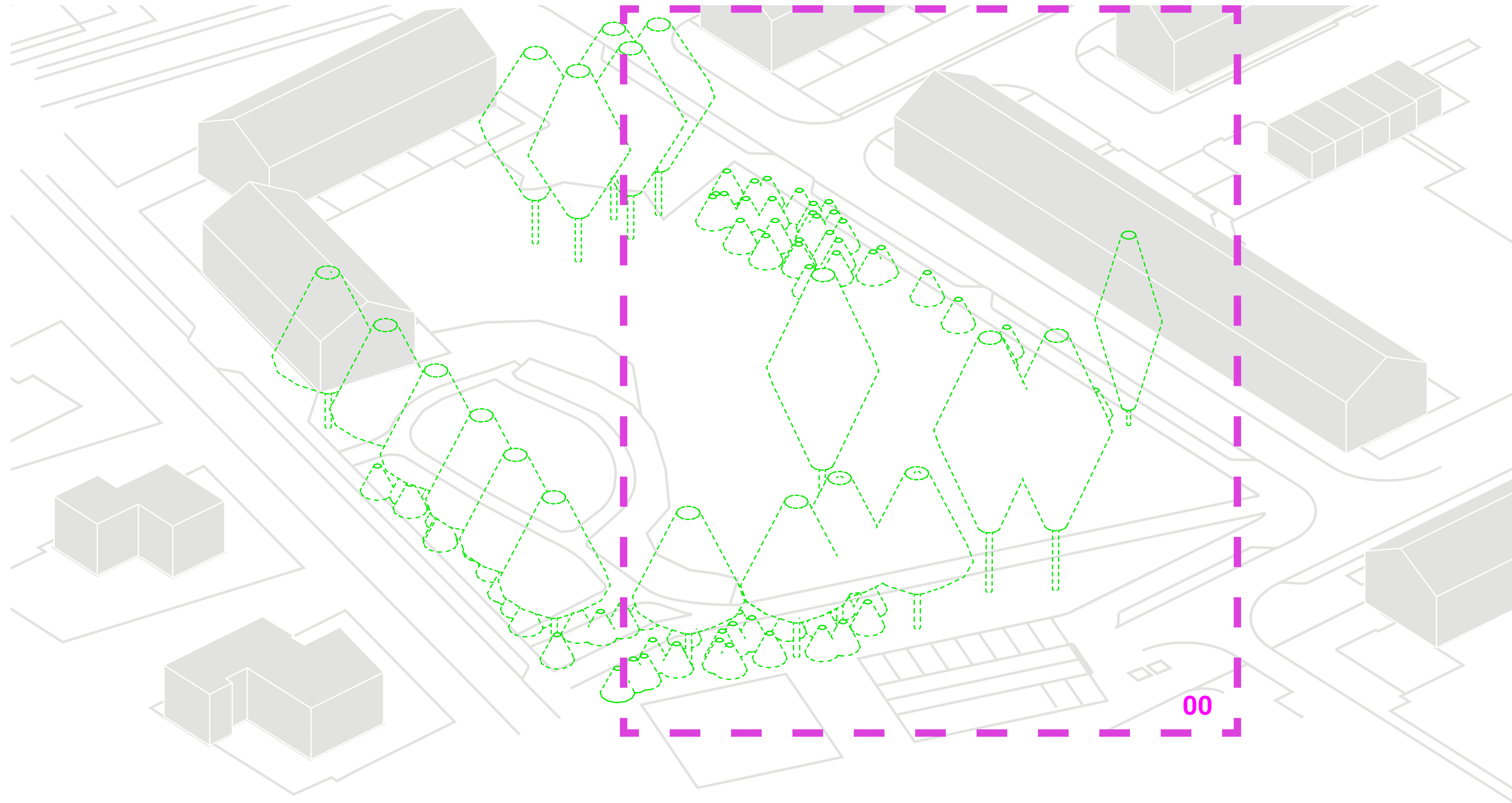
SITE



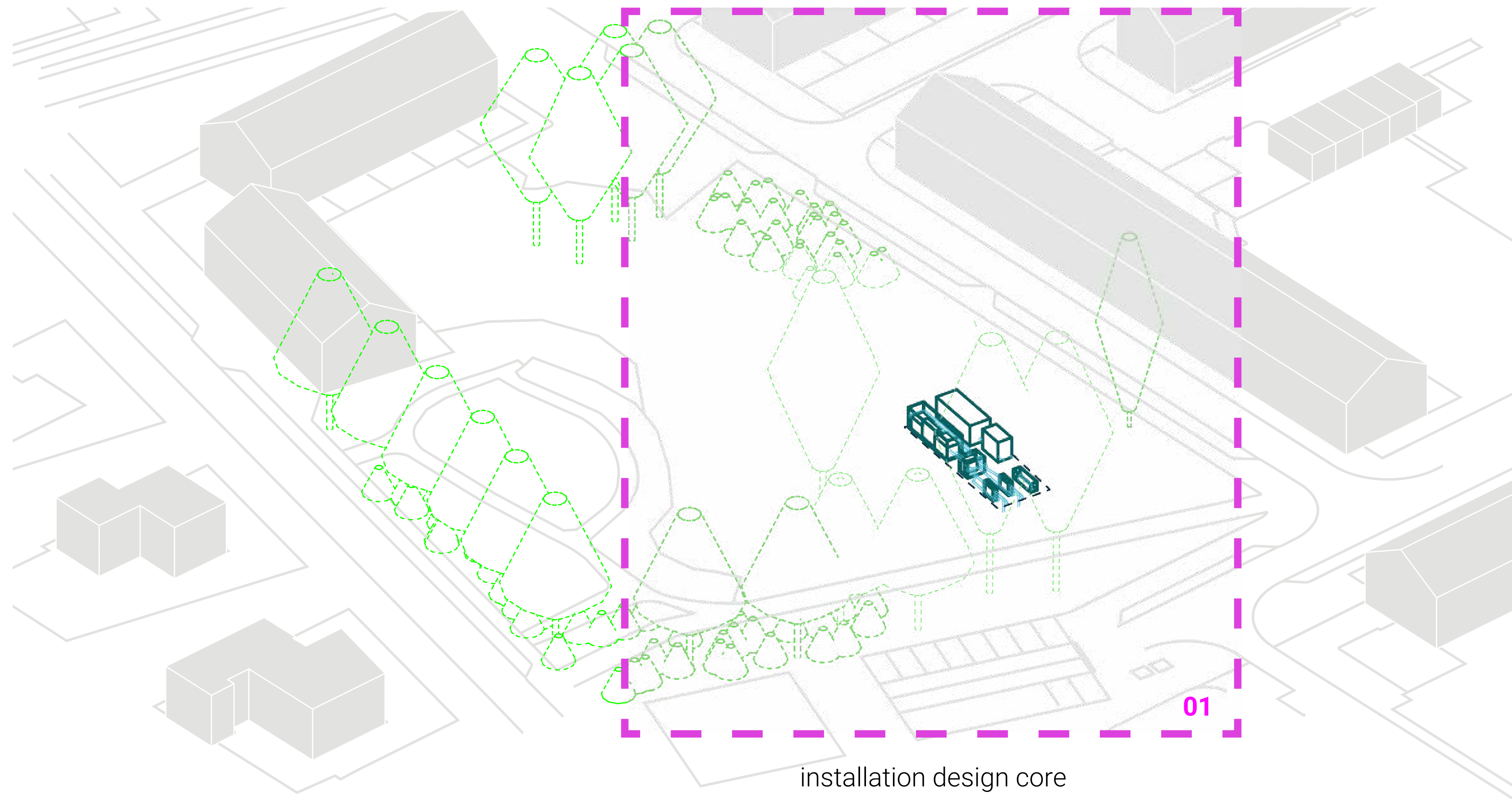
google maps

PART 05 : NEST

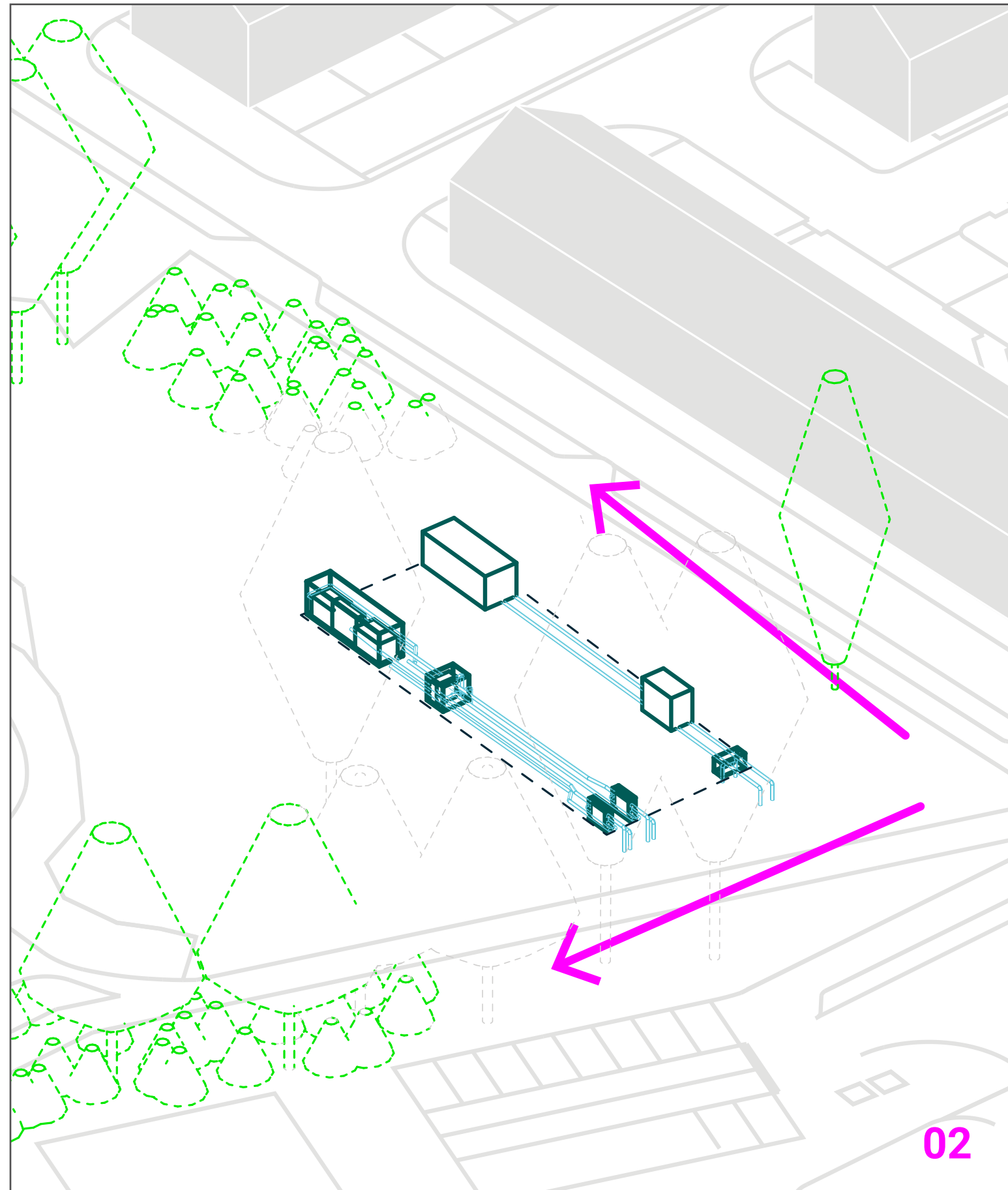
BUILD UP



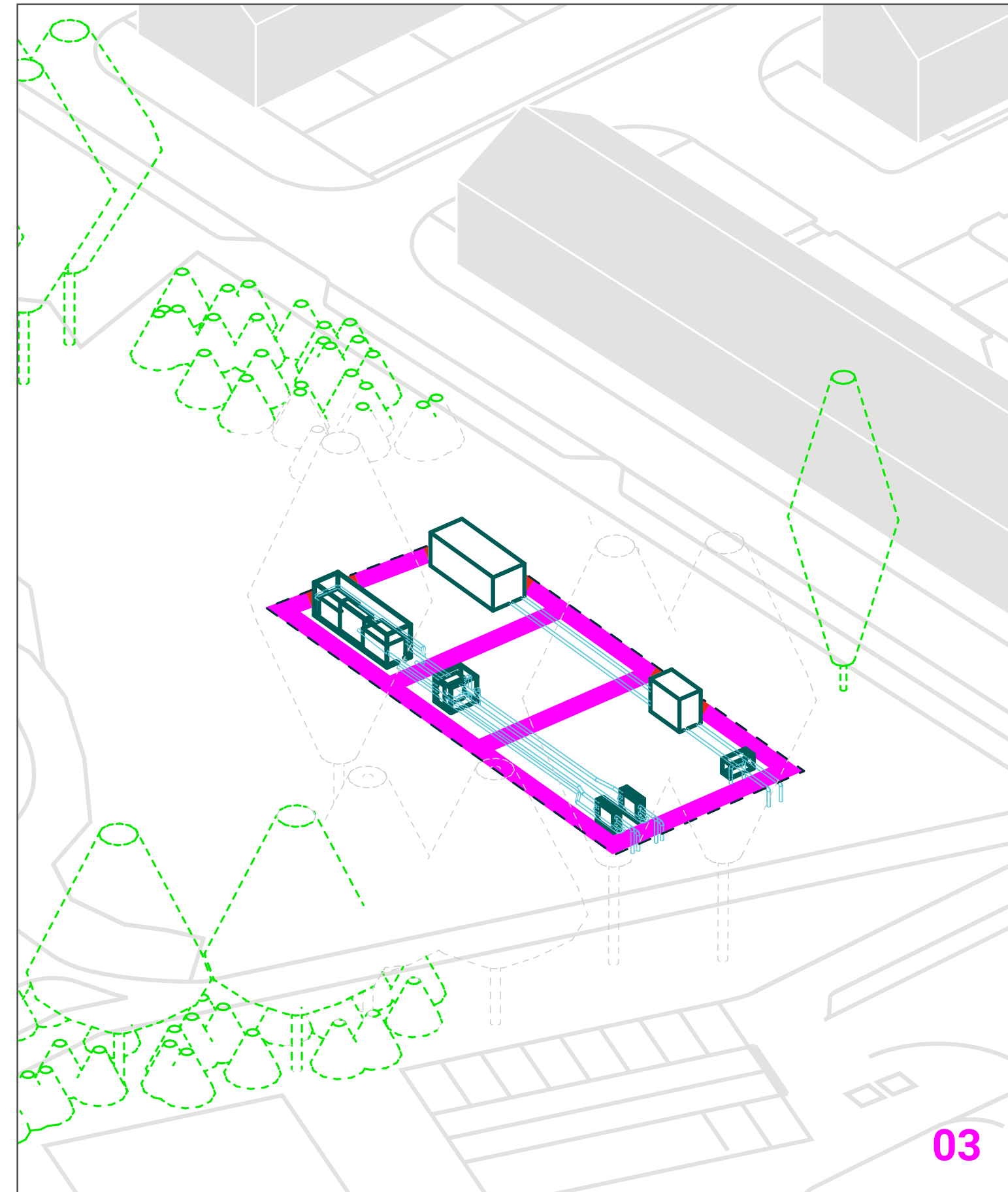
BUILD UP



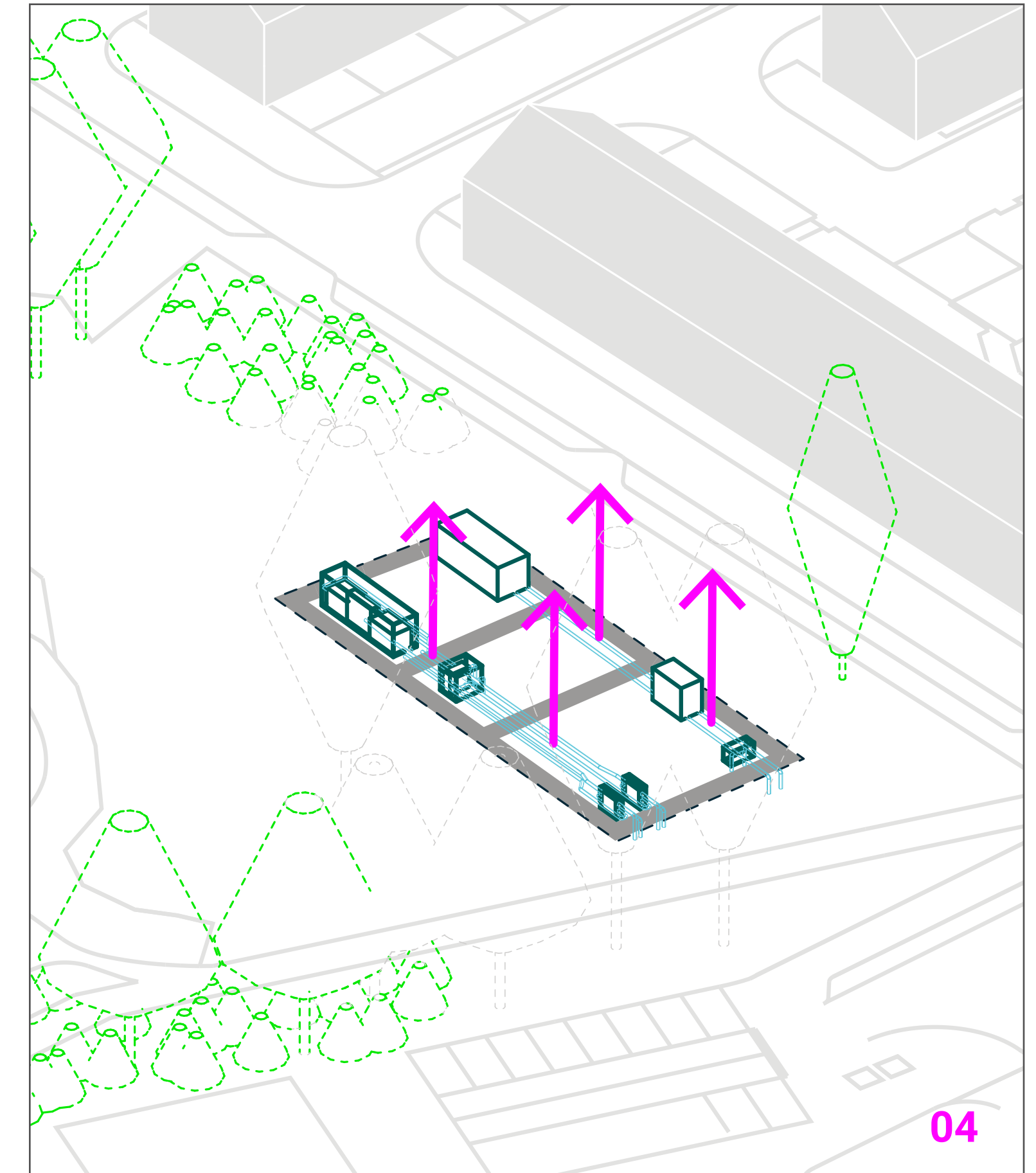
BUILD UP



stretching the installations to create space

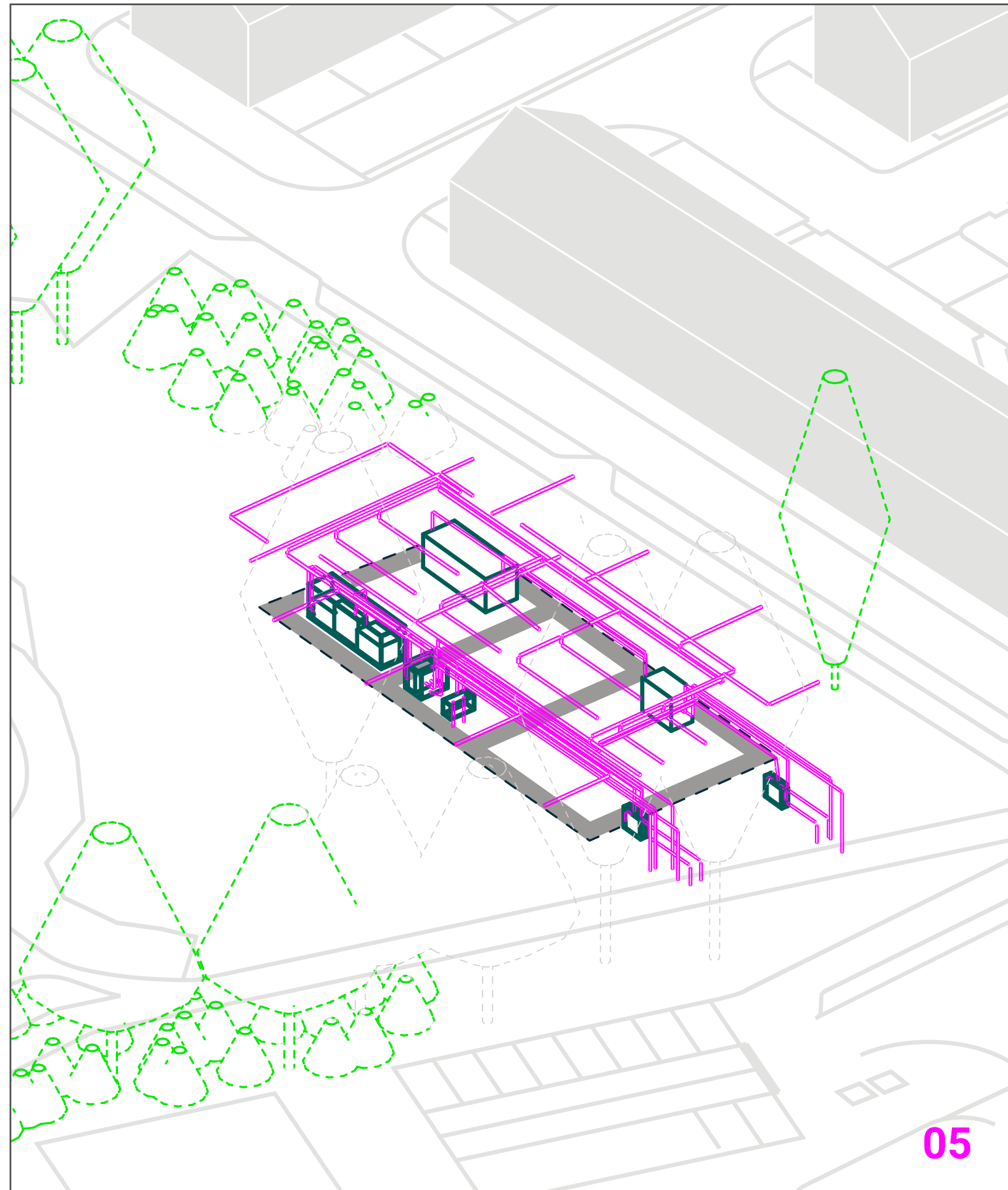


service space as main routing

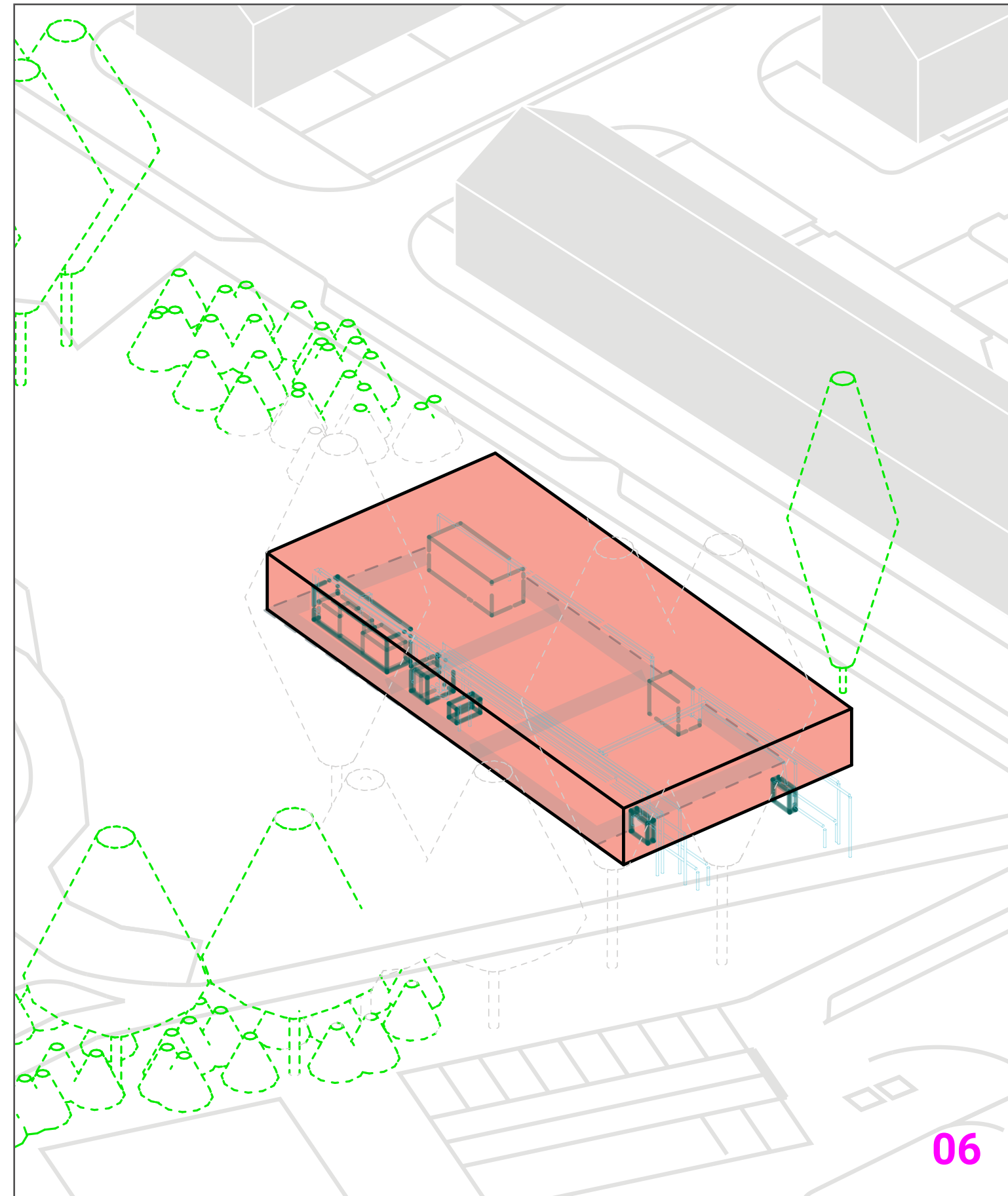


lifting the pipes for usage

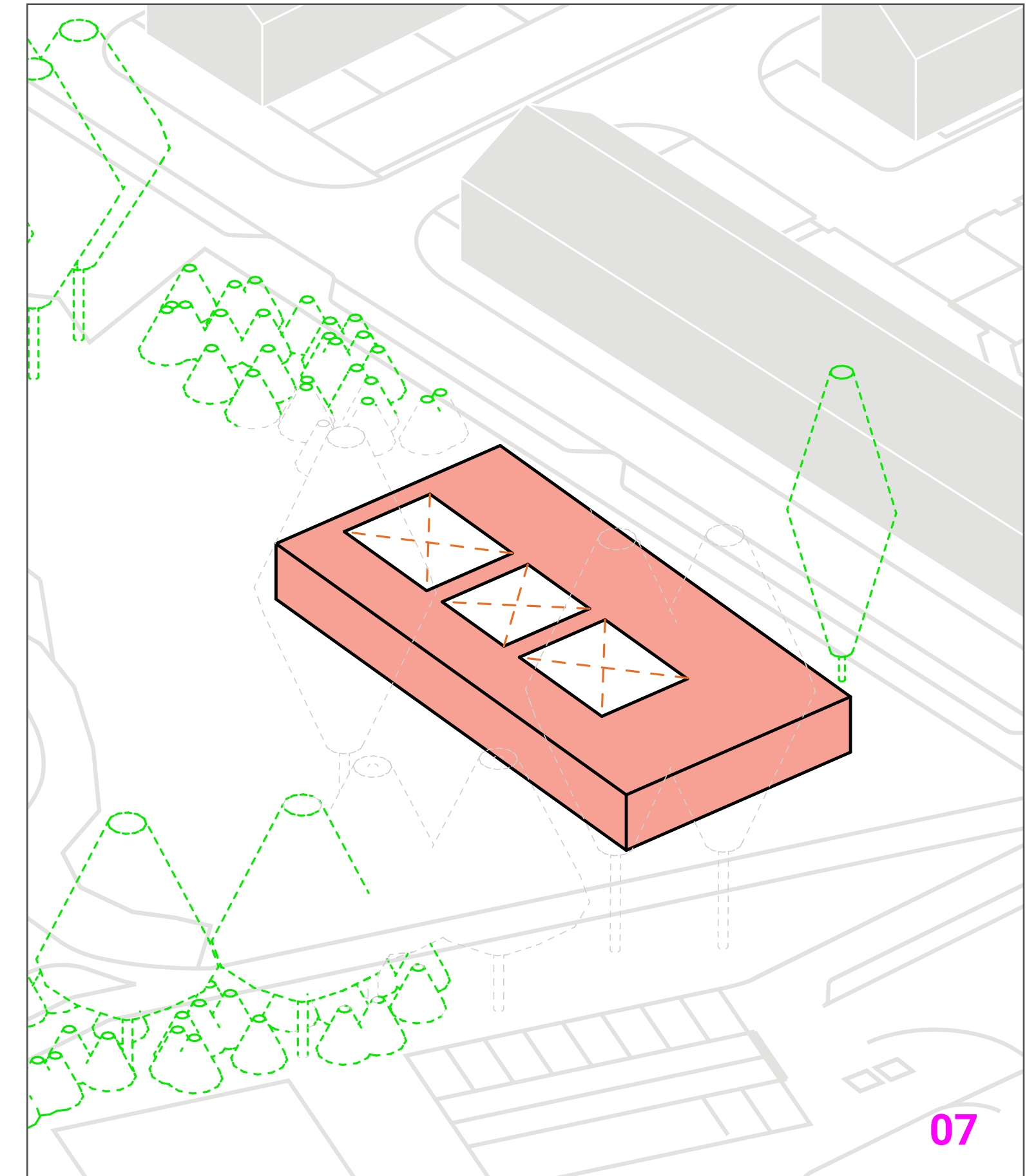
BUILD UP



optimal positioning and connectig of installations

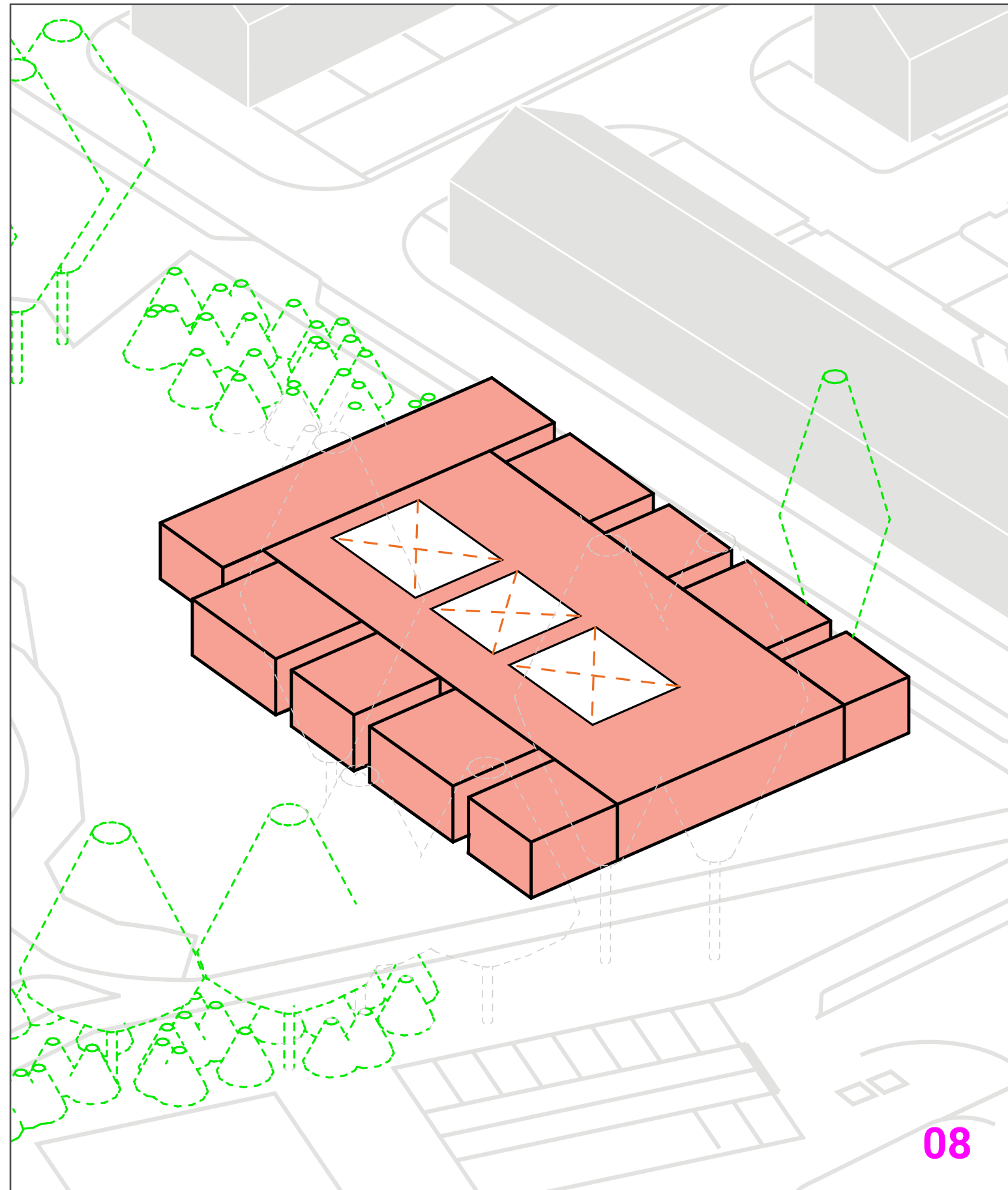


cover

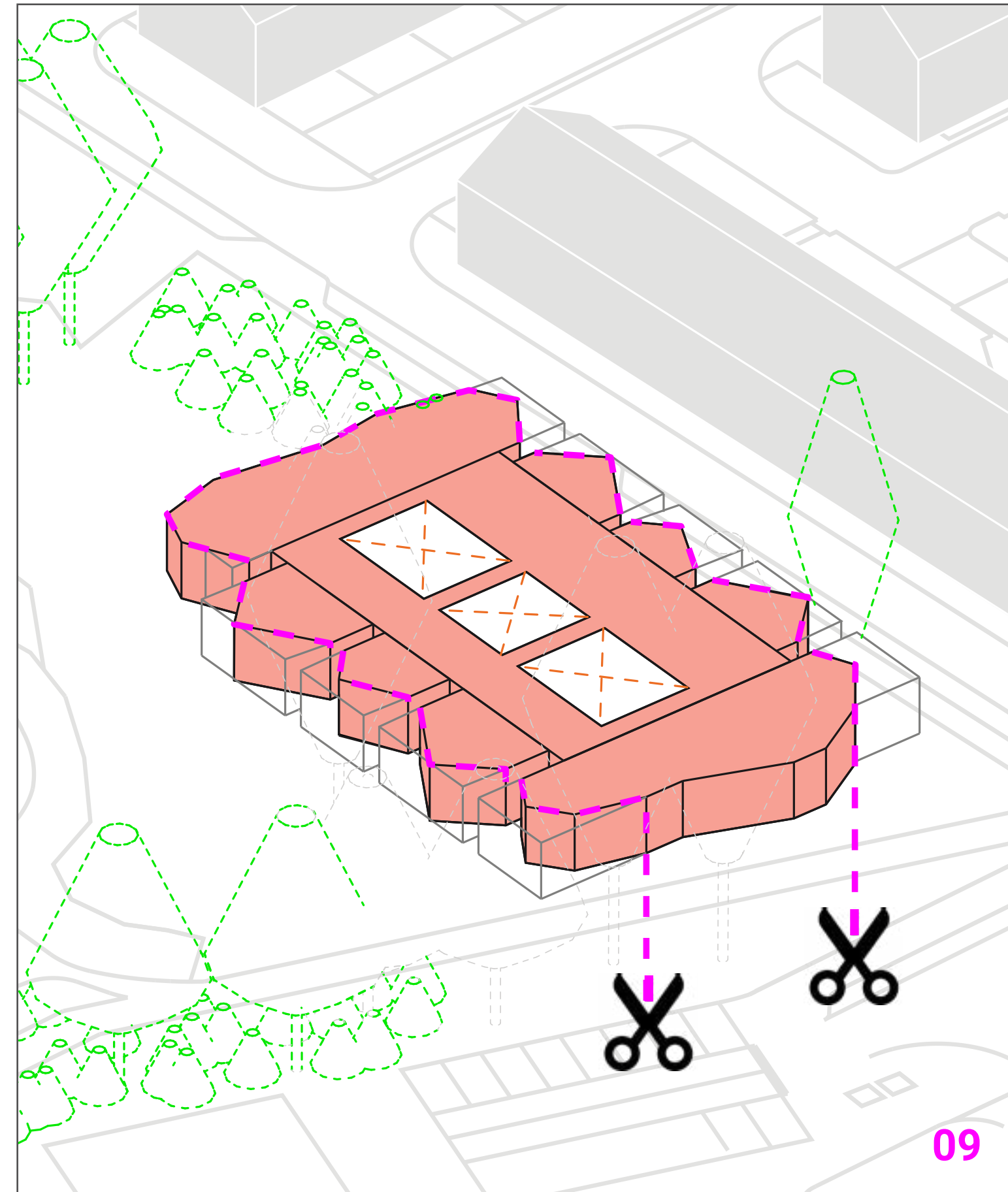


roof lights

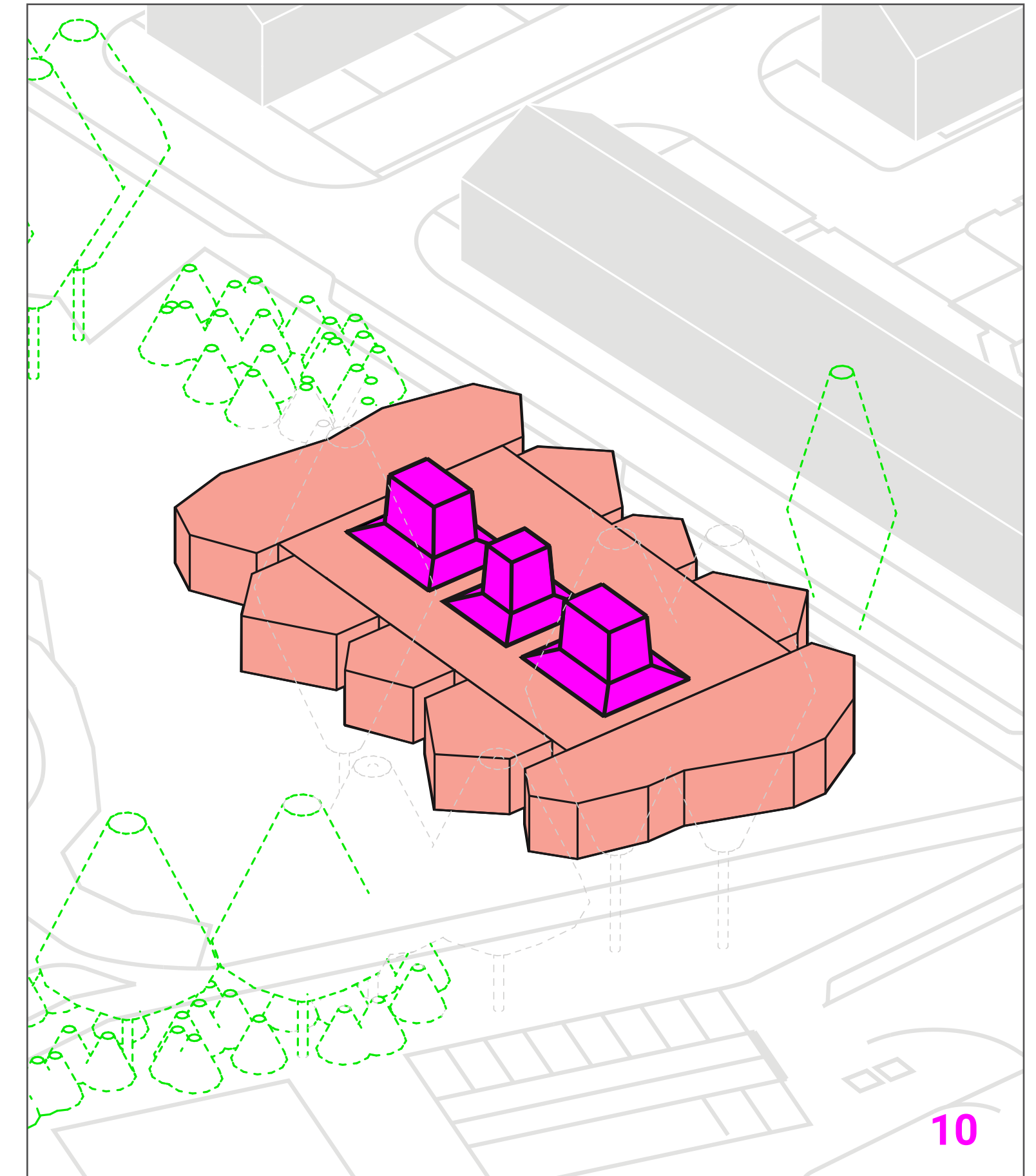
BUILD UP



addition of POD's

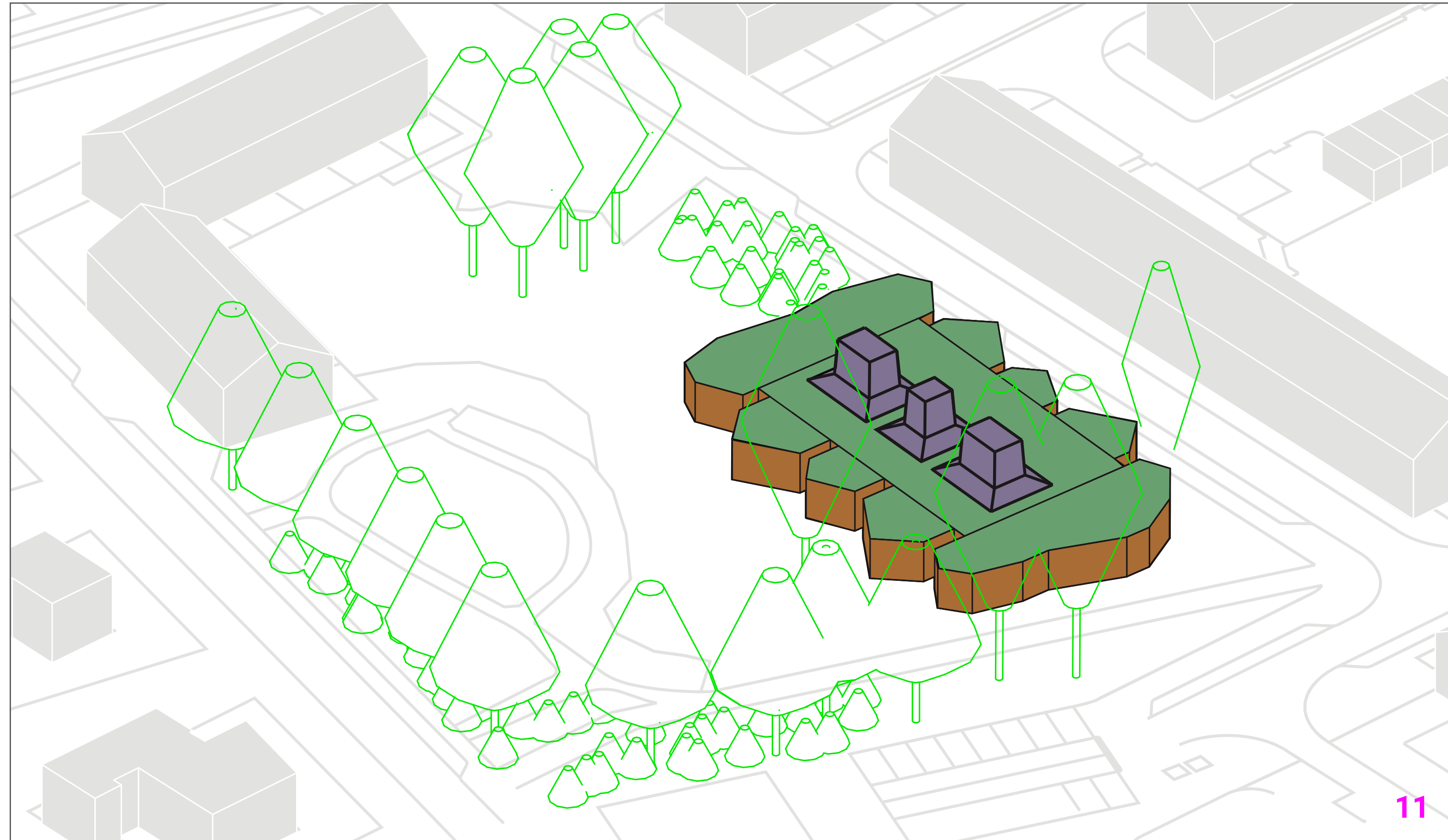


shaping the pods



adding solar chimneys

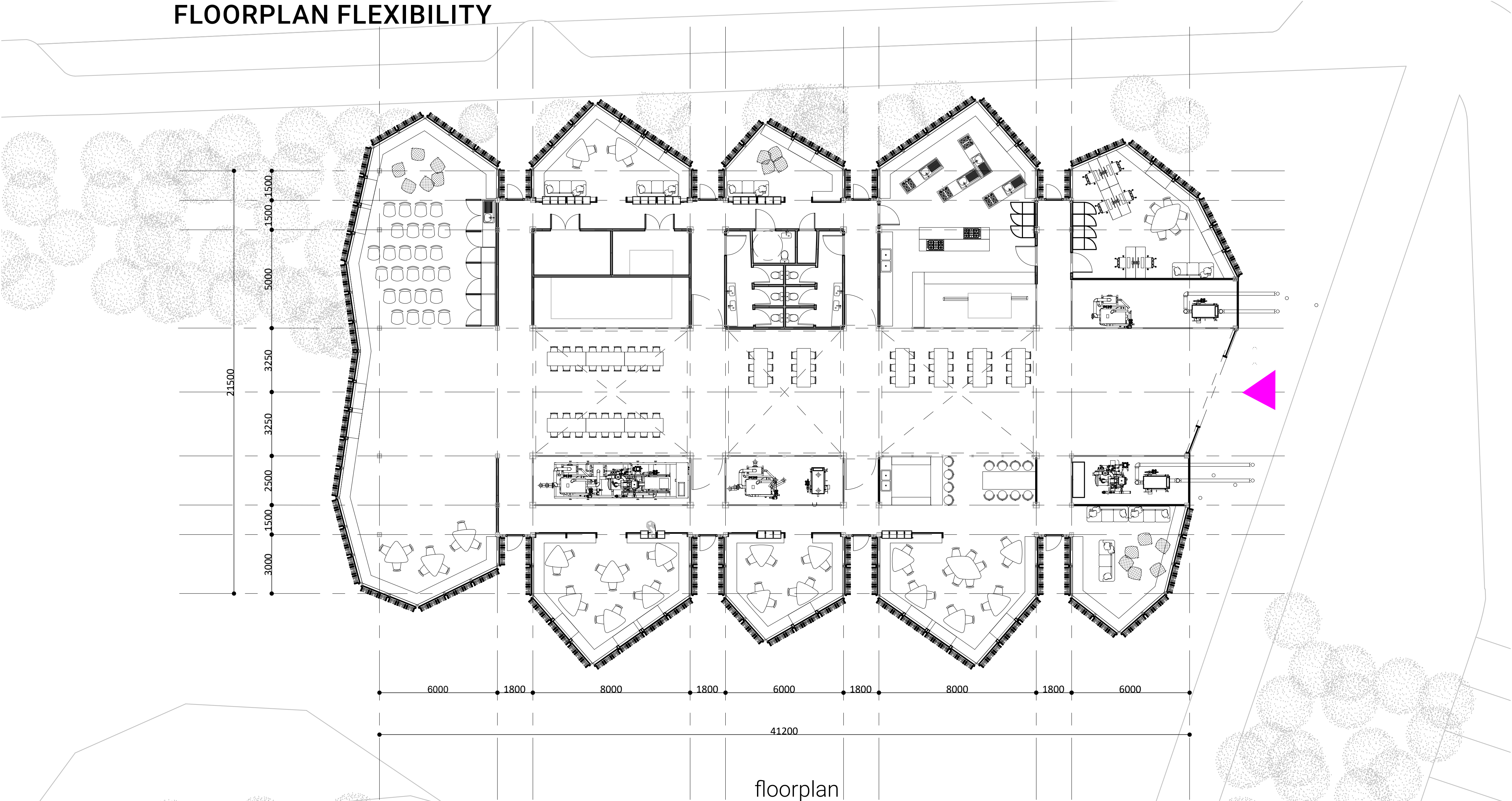
BUILD UP



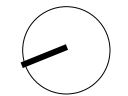
11

adding materialisation

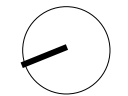
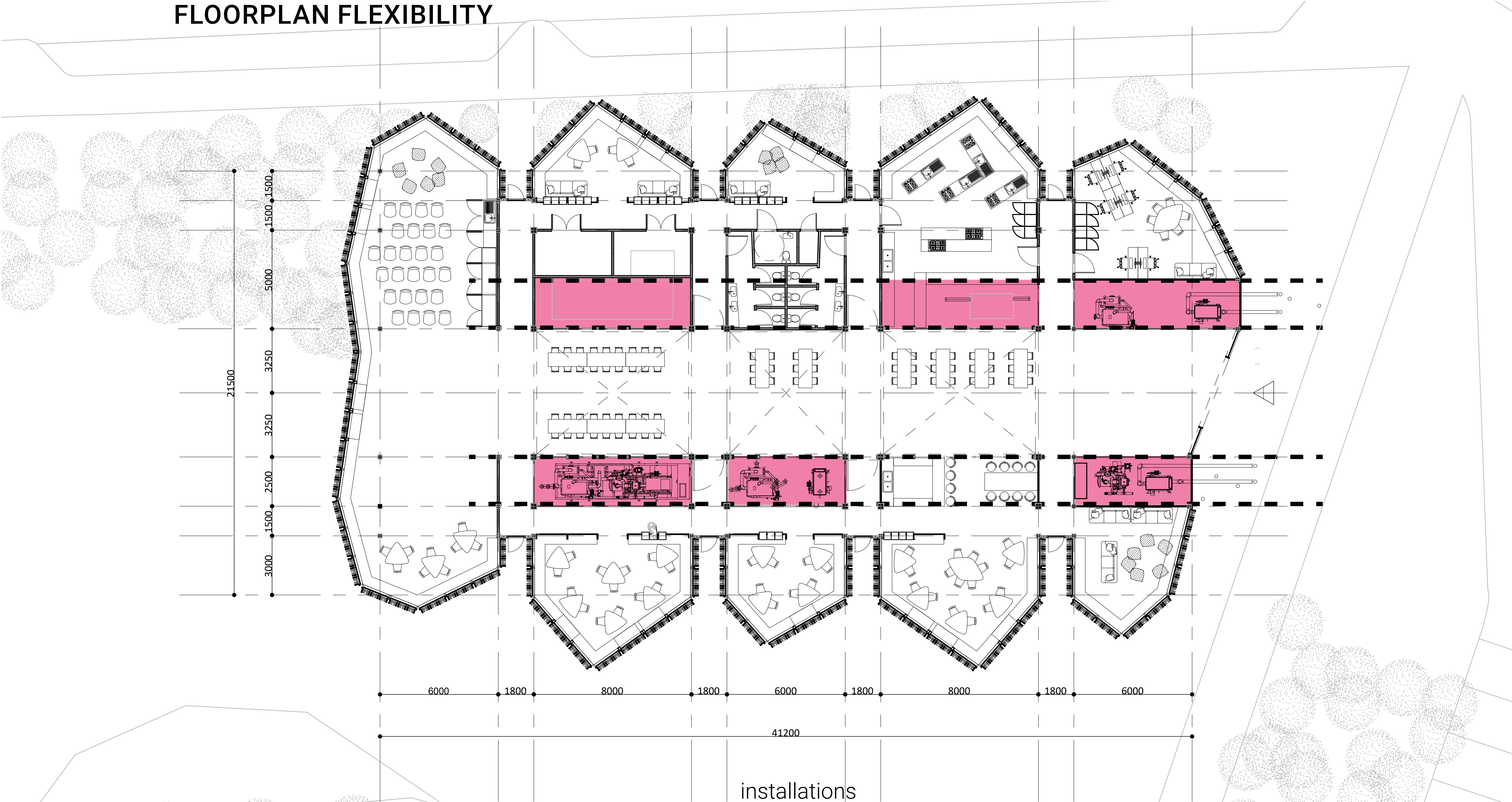
FLOORPLAN FLEXIBILITY



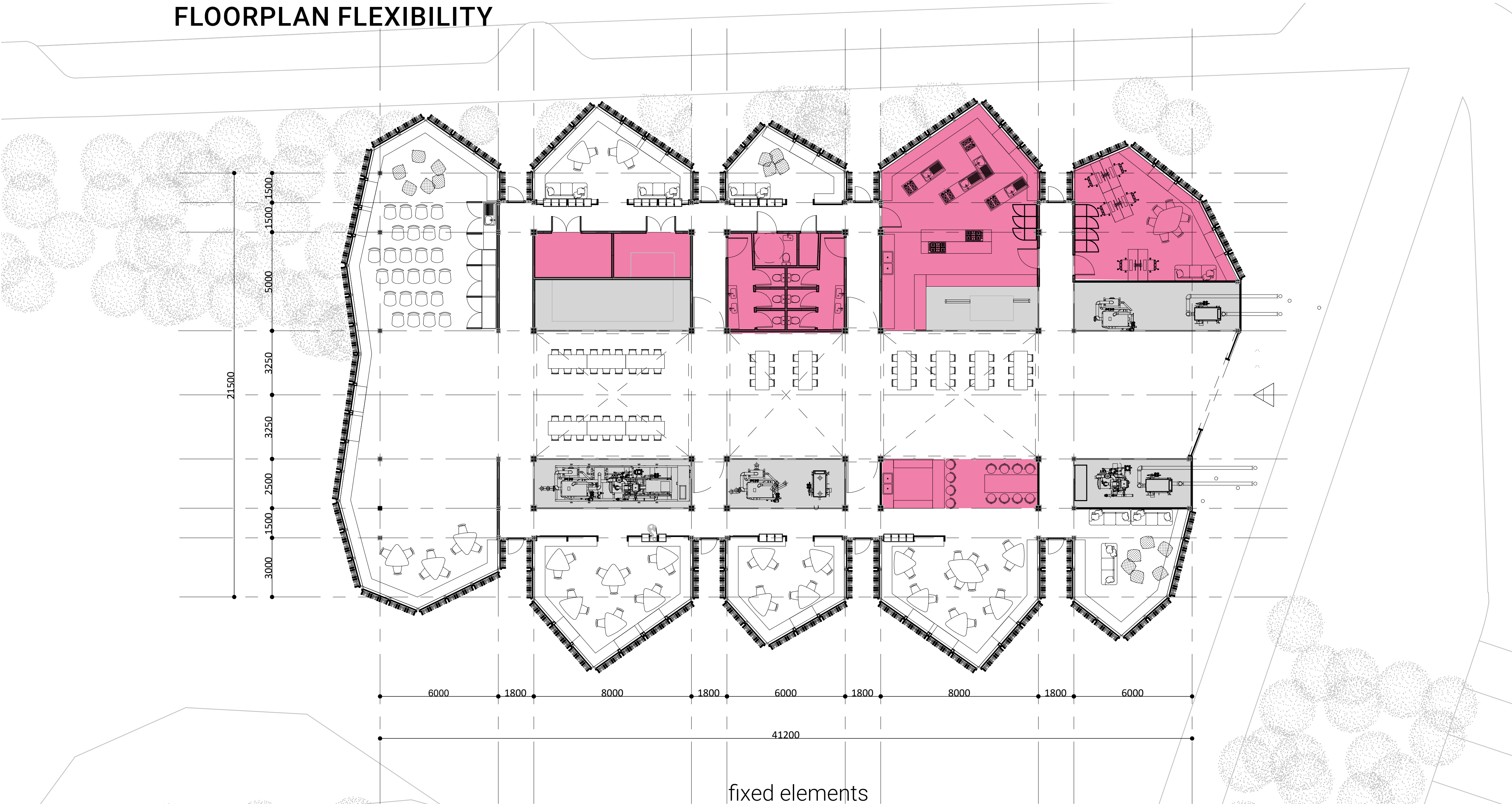
floorplan



FLOORPLAN FLEXIBILITY



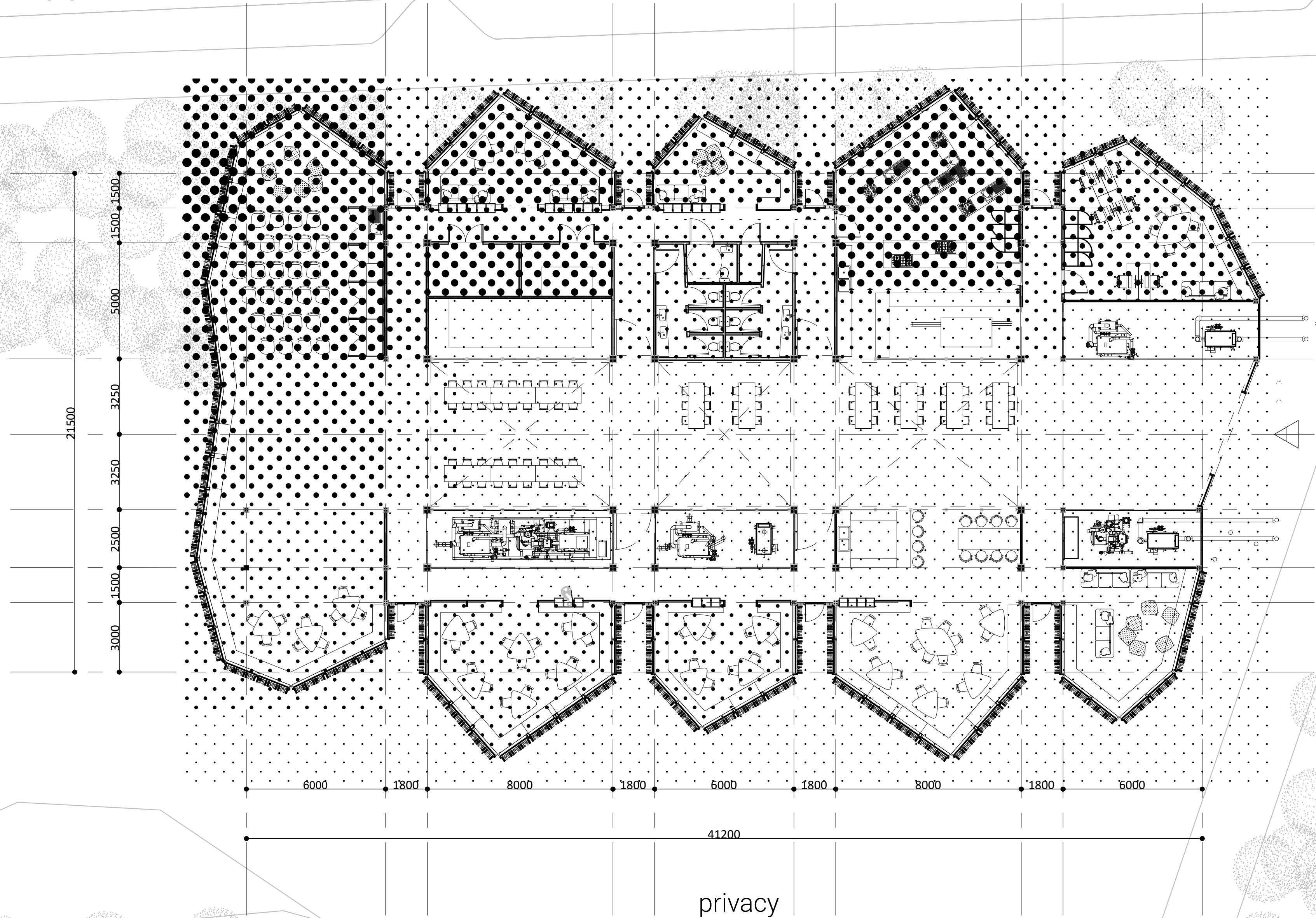
FLOORPLAN FLEXIBILITY



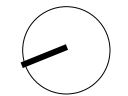
fixed elements



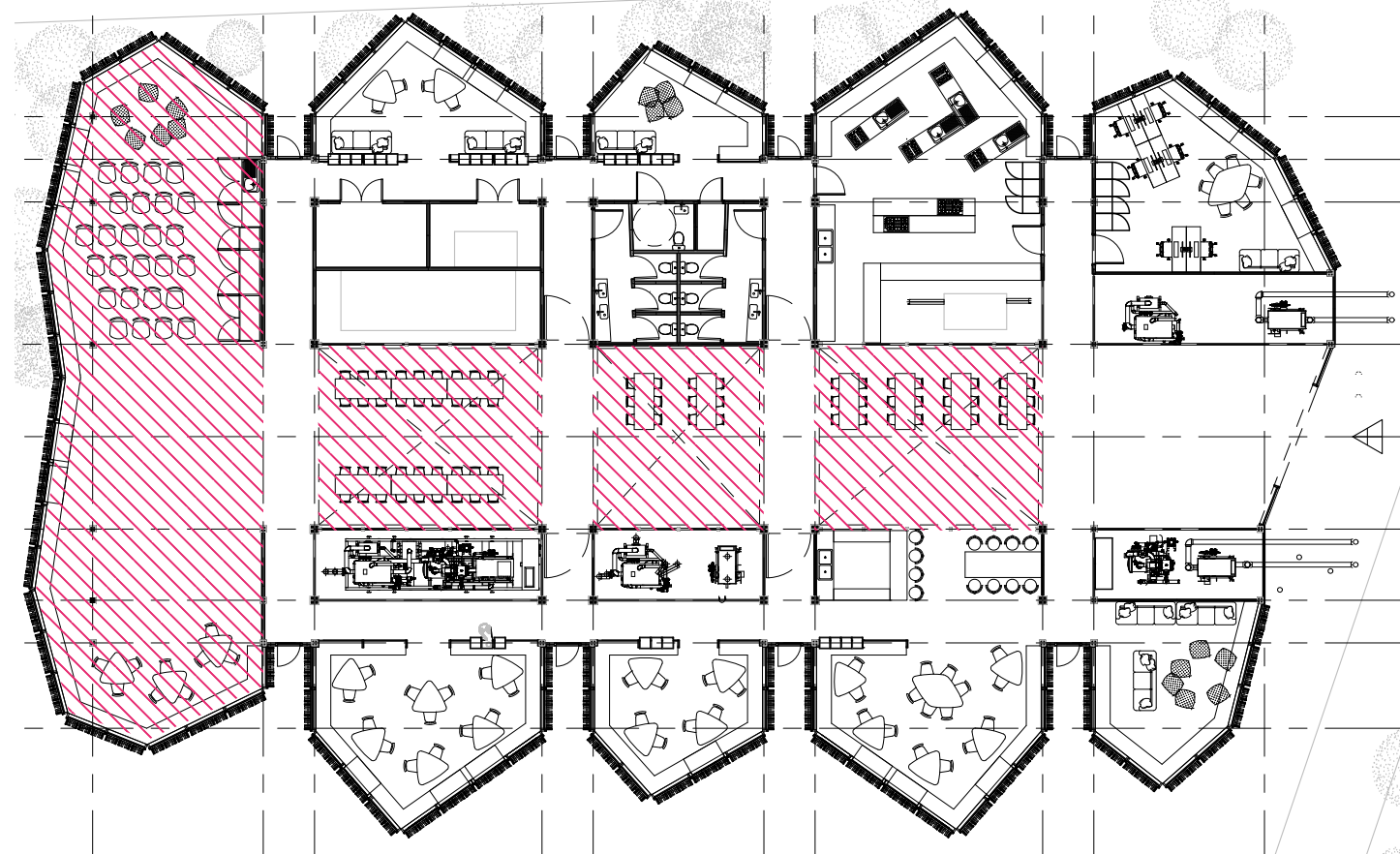
FLOORPLAN FLEXIBILITY



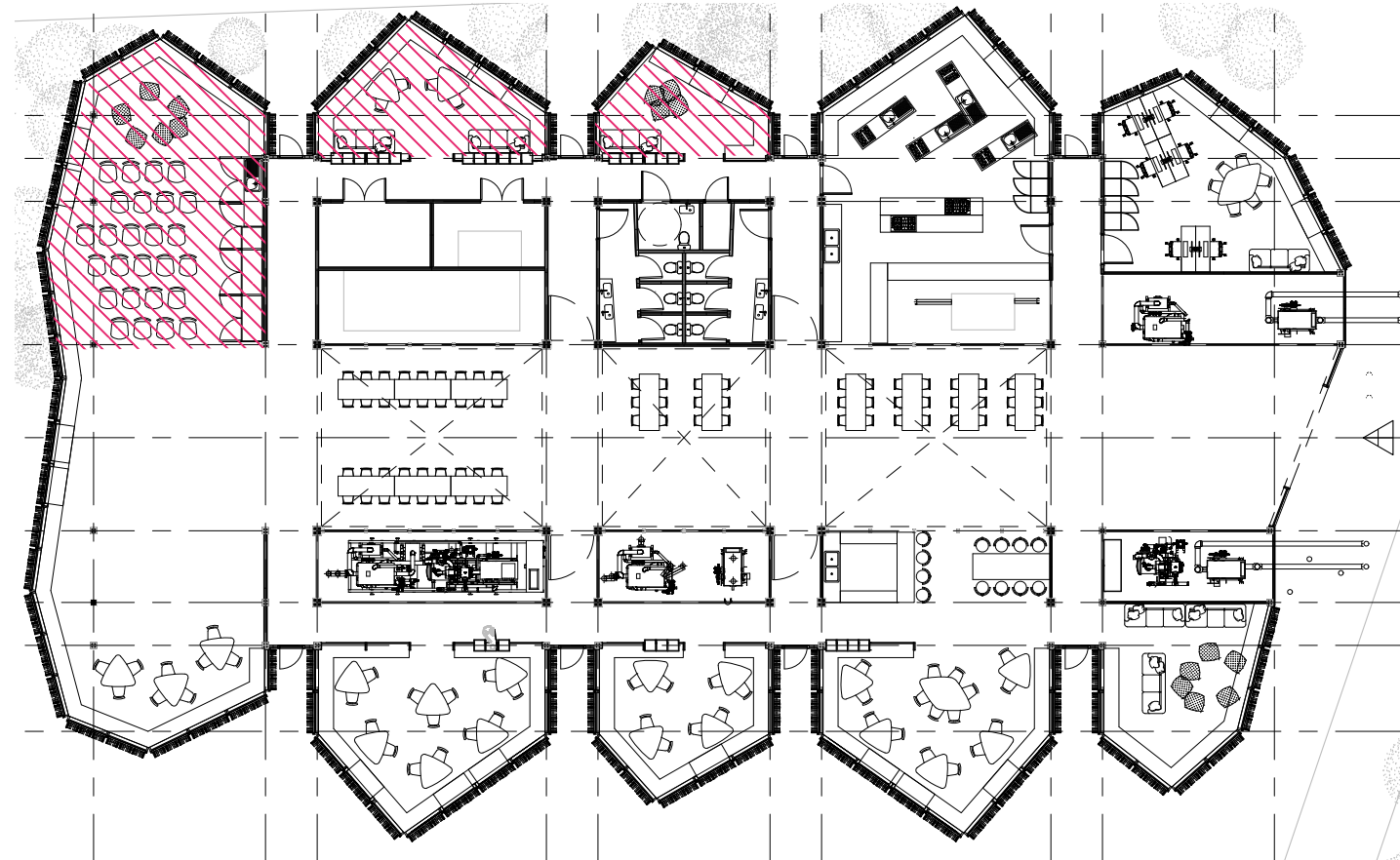
privacy



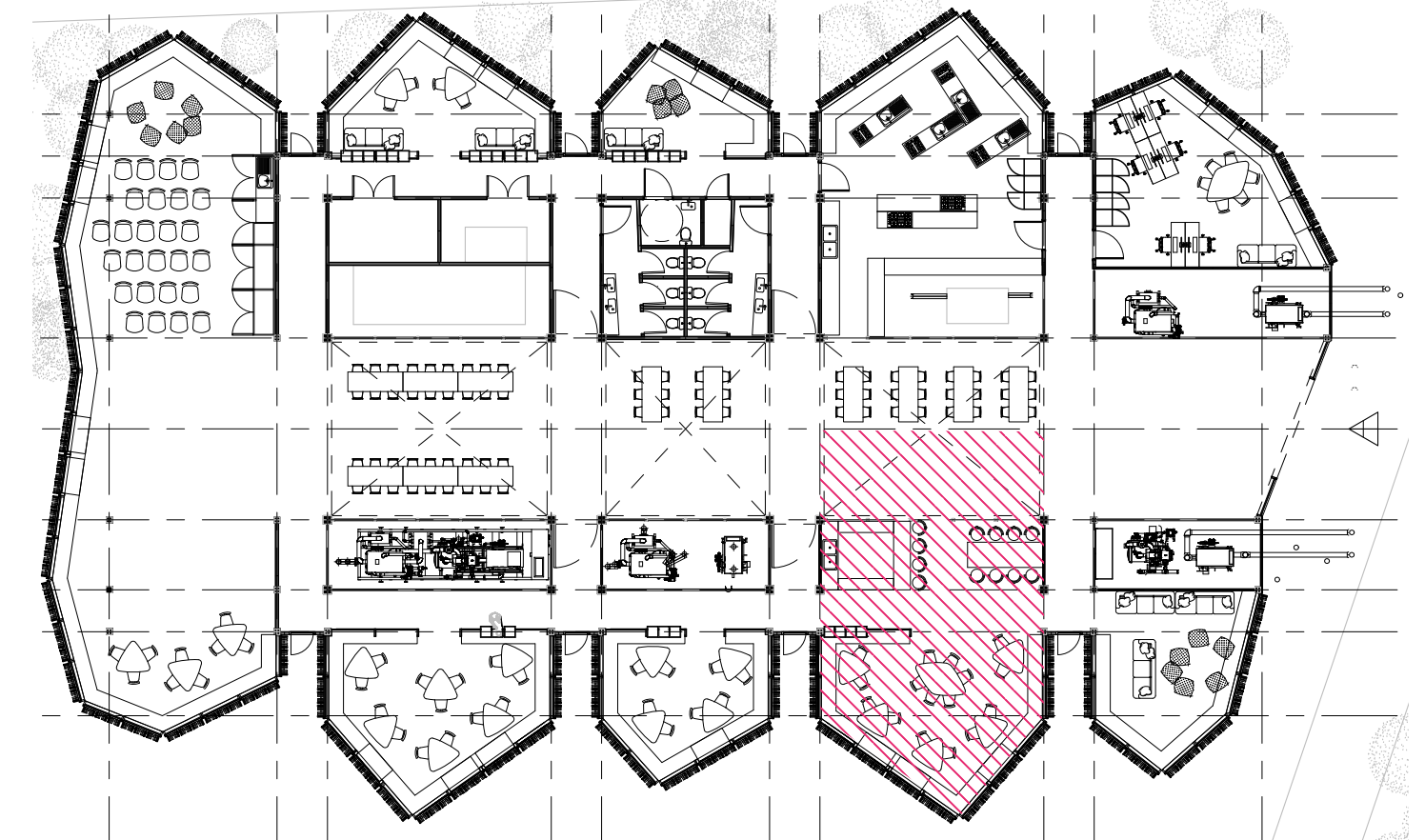
FLOORPLAN FLEXIBILITY



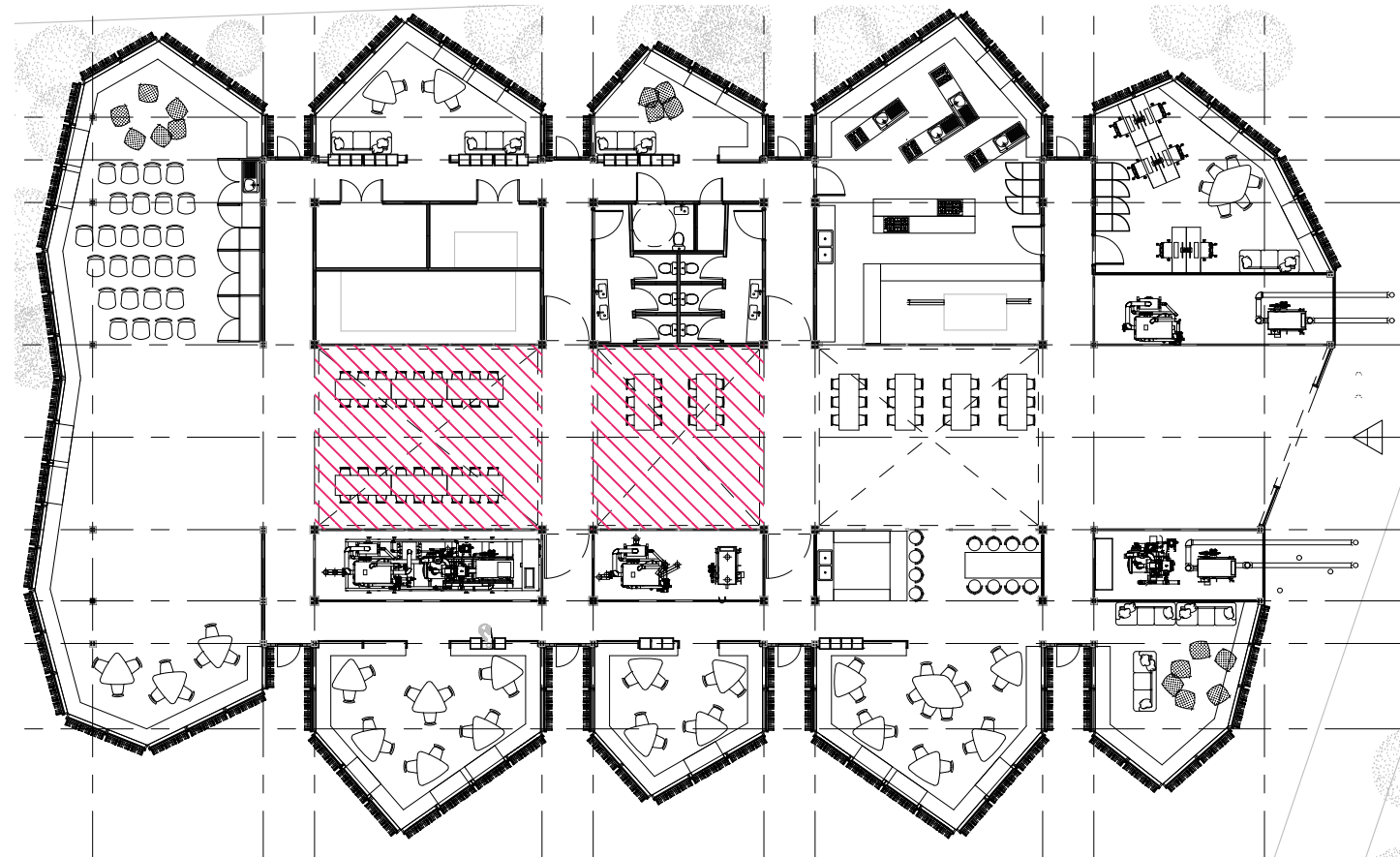
workshop day // neighbourhood meeting **1**



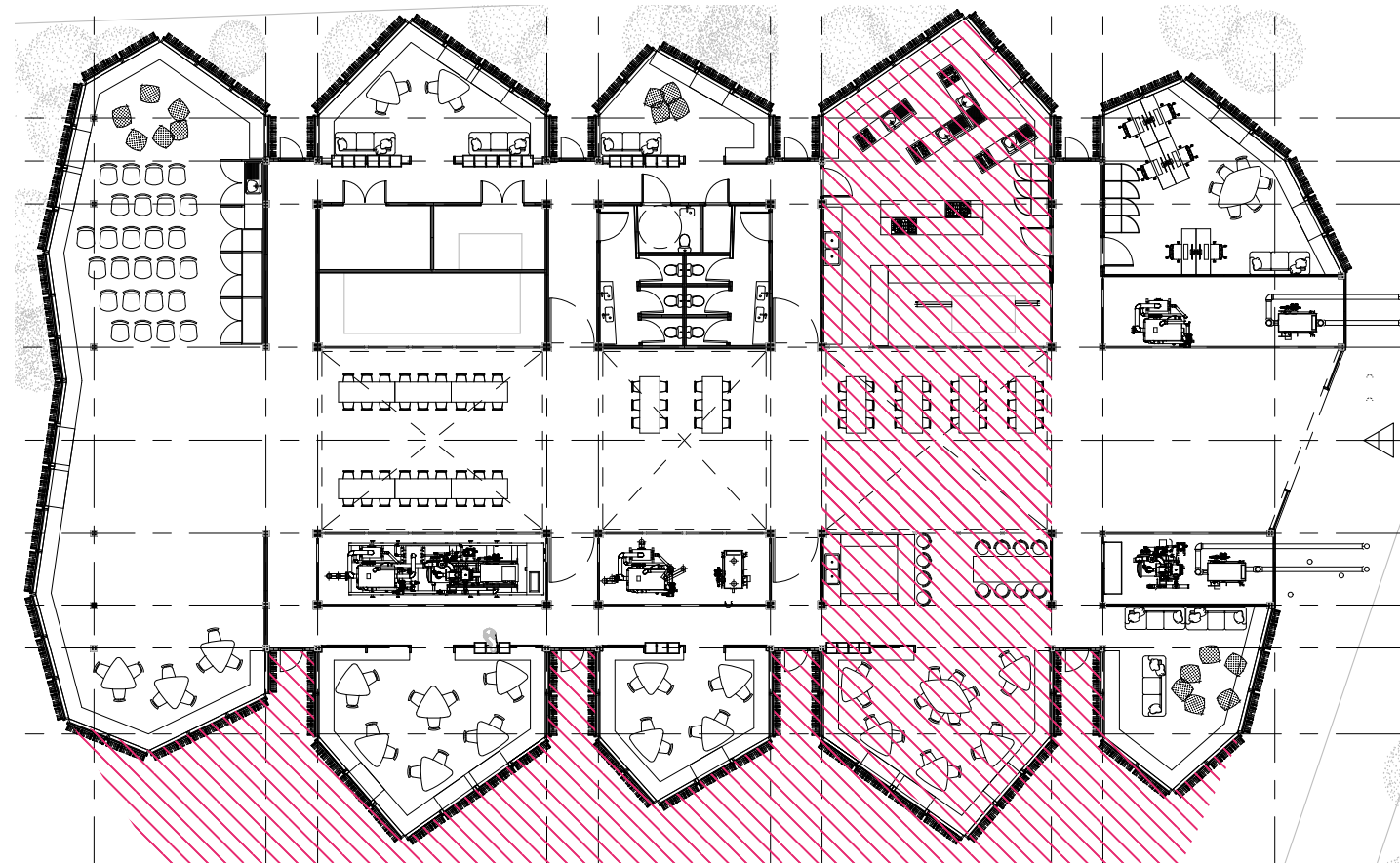
counselling **2**



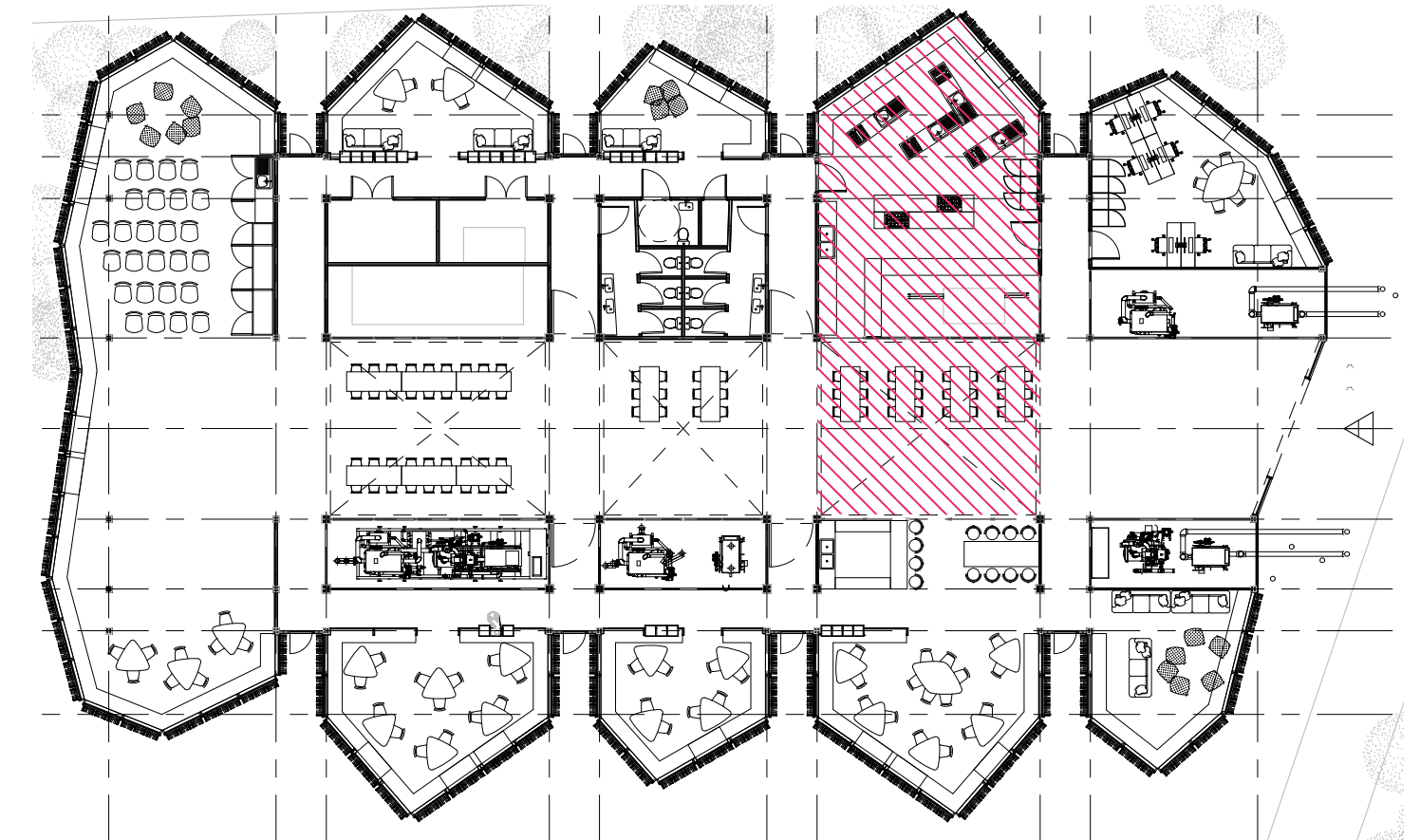
celebration // party **3**



workshops **4**



summer terrace and cafe **5**



cooking class // neighbourhood lunch/dinner **6**

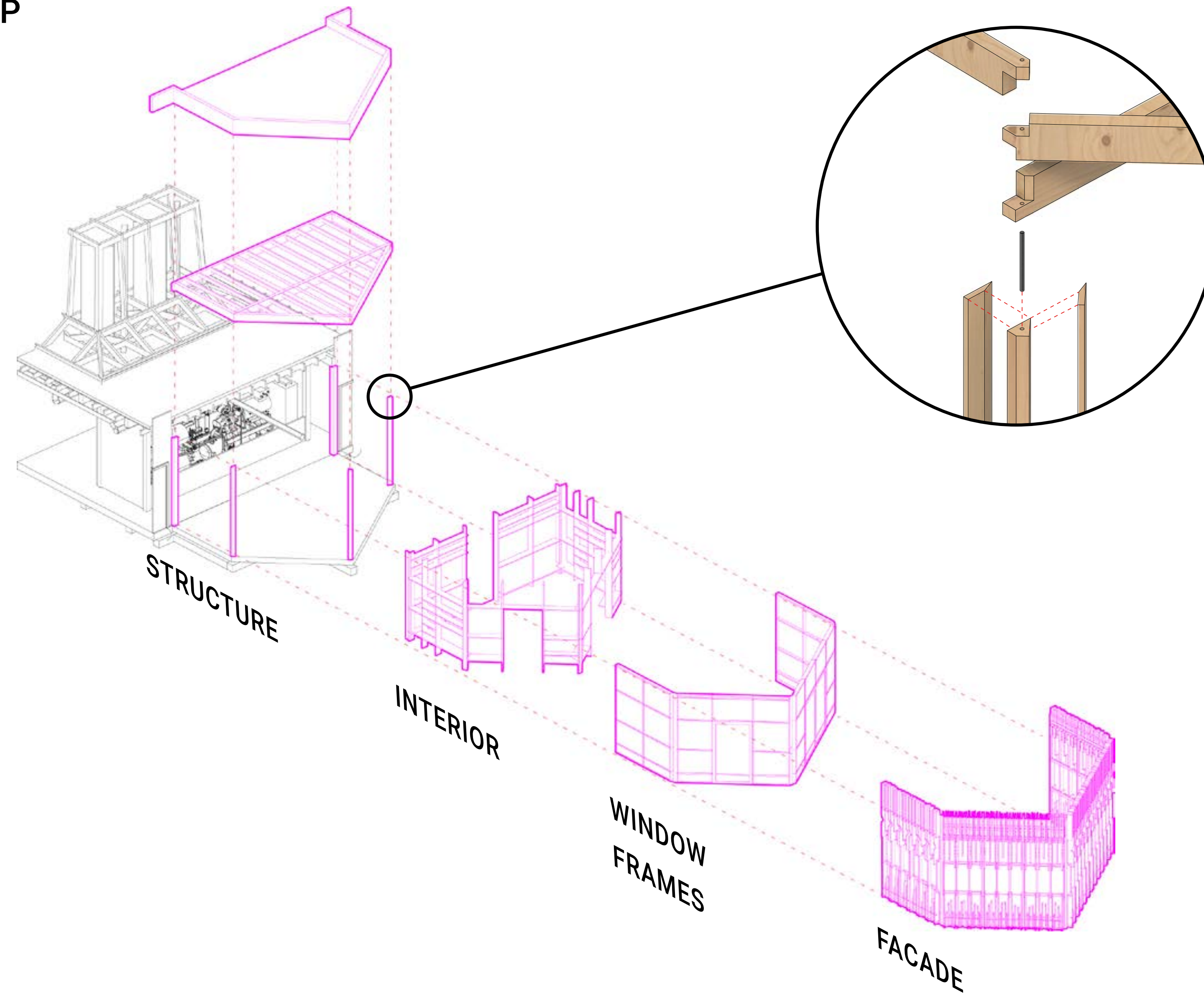






PART 05 : NEST

POD BUILD UP



FACADE BUILD UP

HARVEST

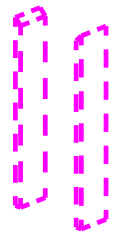
new wood

deadstock

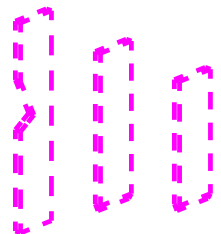
waste
=
resource



MAKE IT FIT



x8 // x8



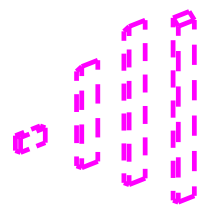
x6 // x2 // x1



x4



x6

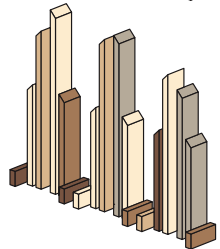
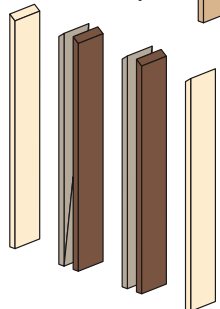
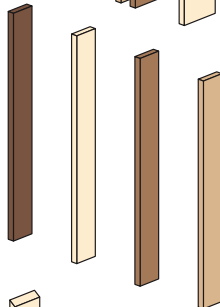
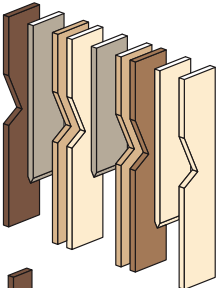
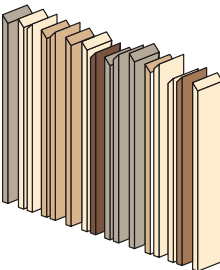


x6 // x6 // x6

TREAT

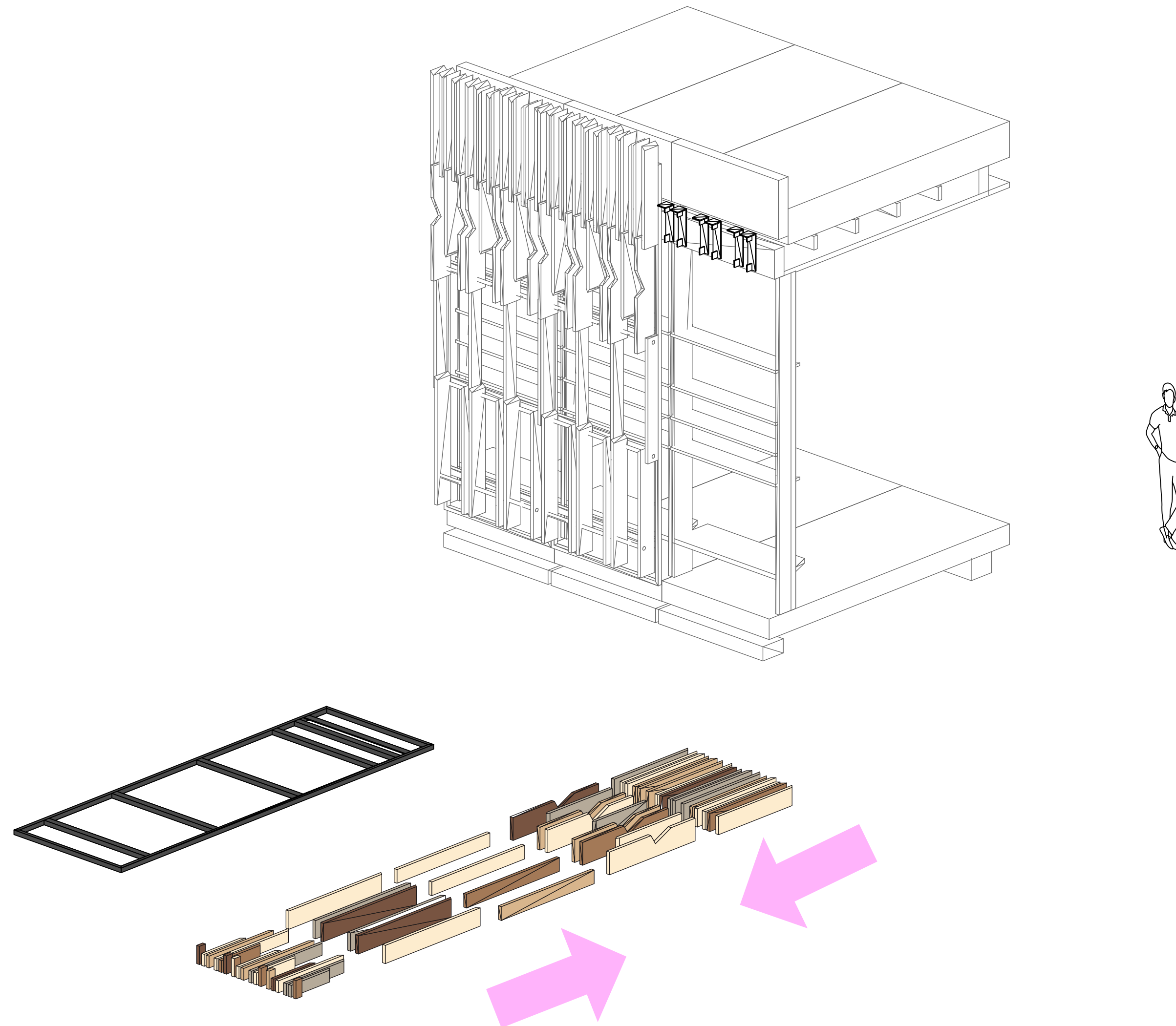


COMPOSE



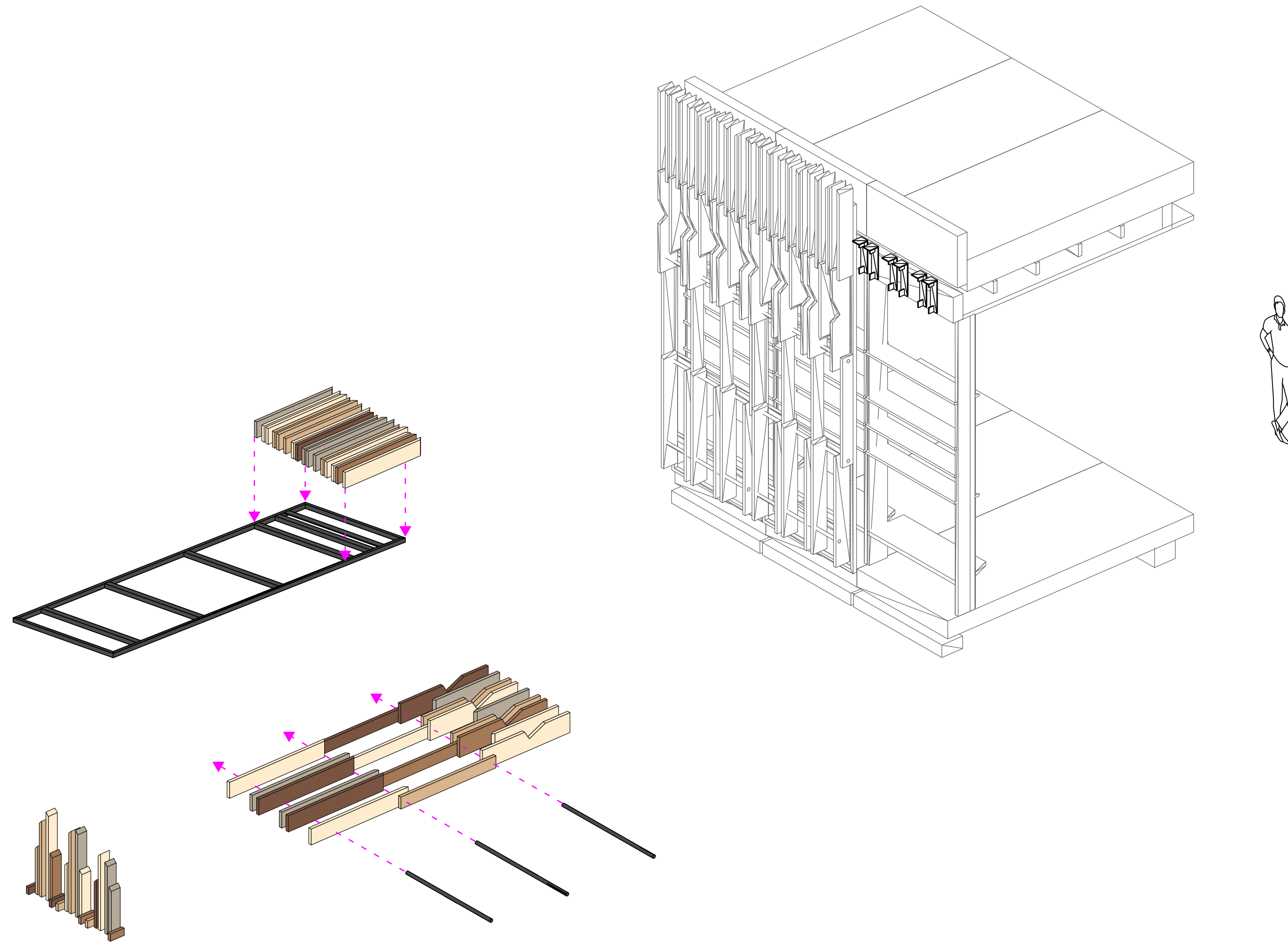
PART 05 : NEST

FACADE BUILD UP



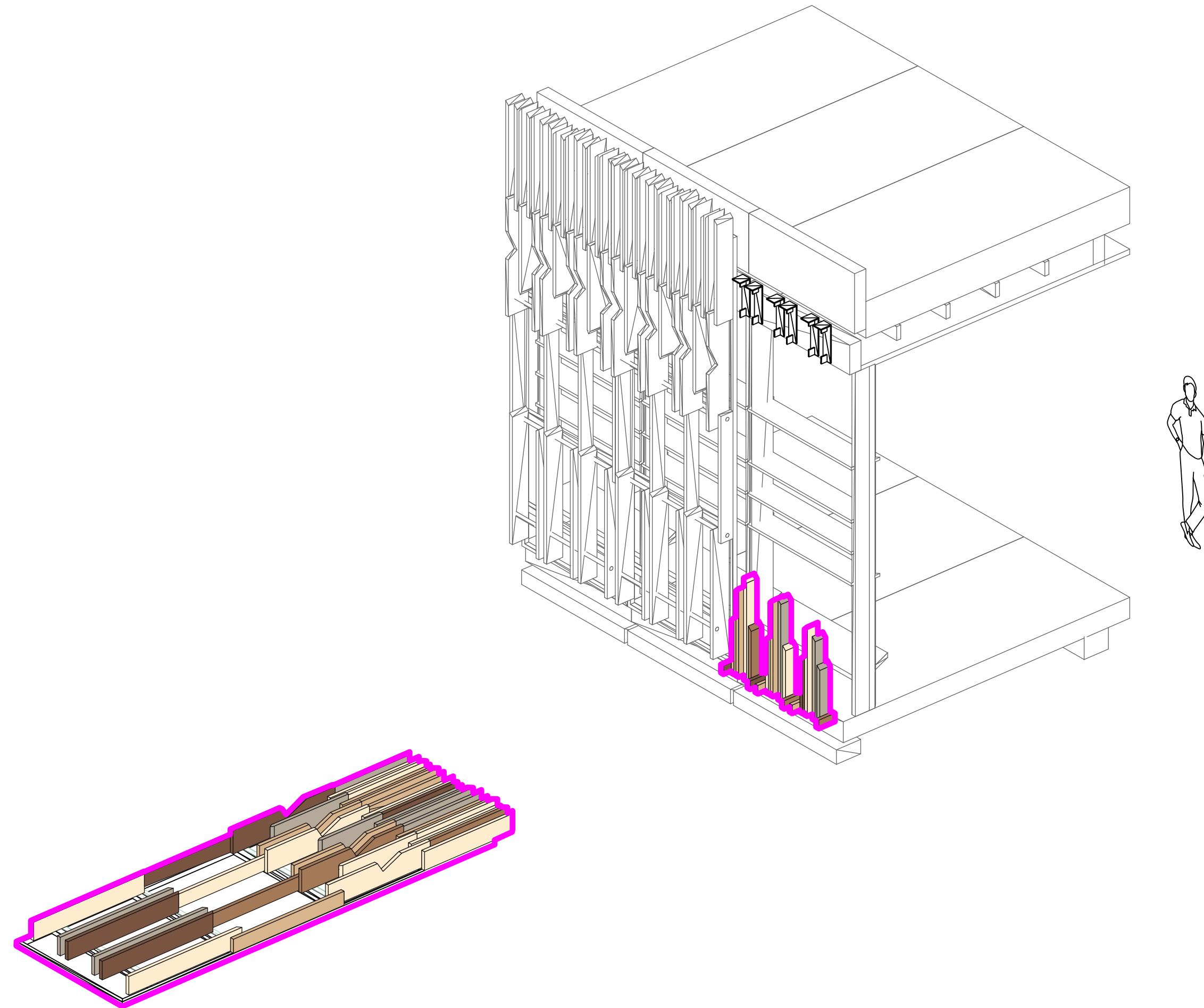
PART 05 : NEST

FACADE BUILD UP



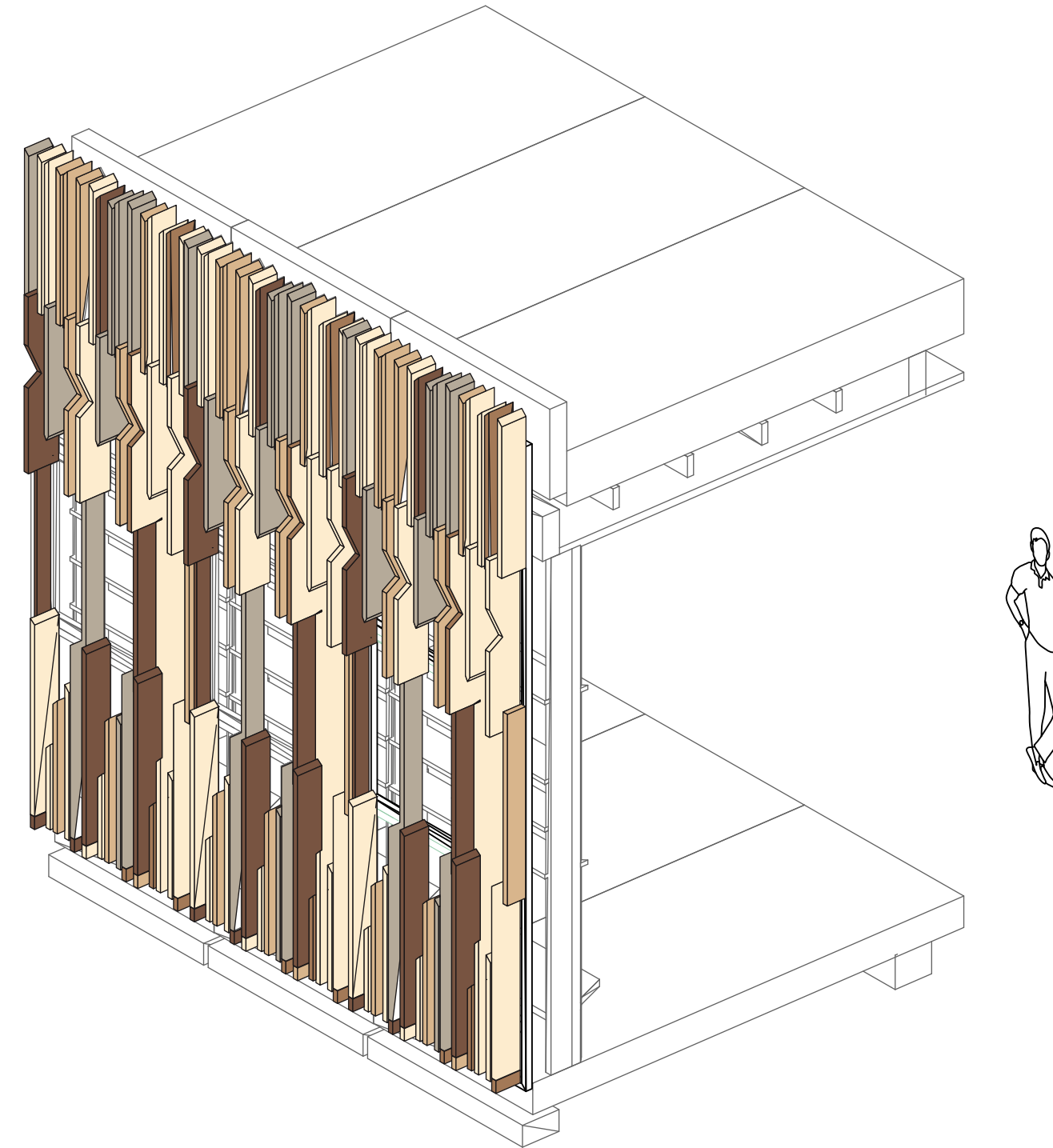
PART 05 : NEST

FACADE BUILD UP



PART 05 : NEST

FACADE BUILD UP



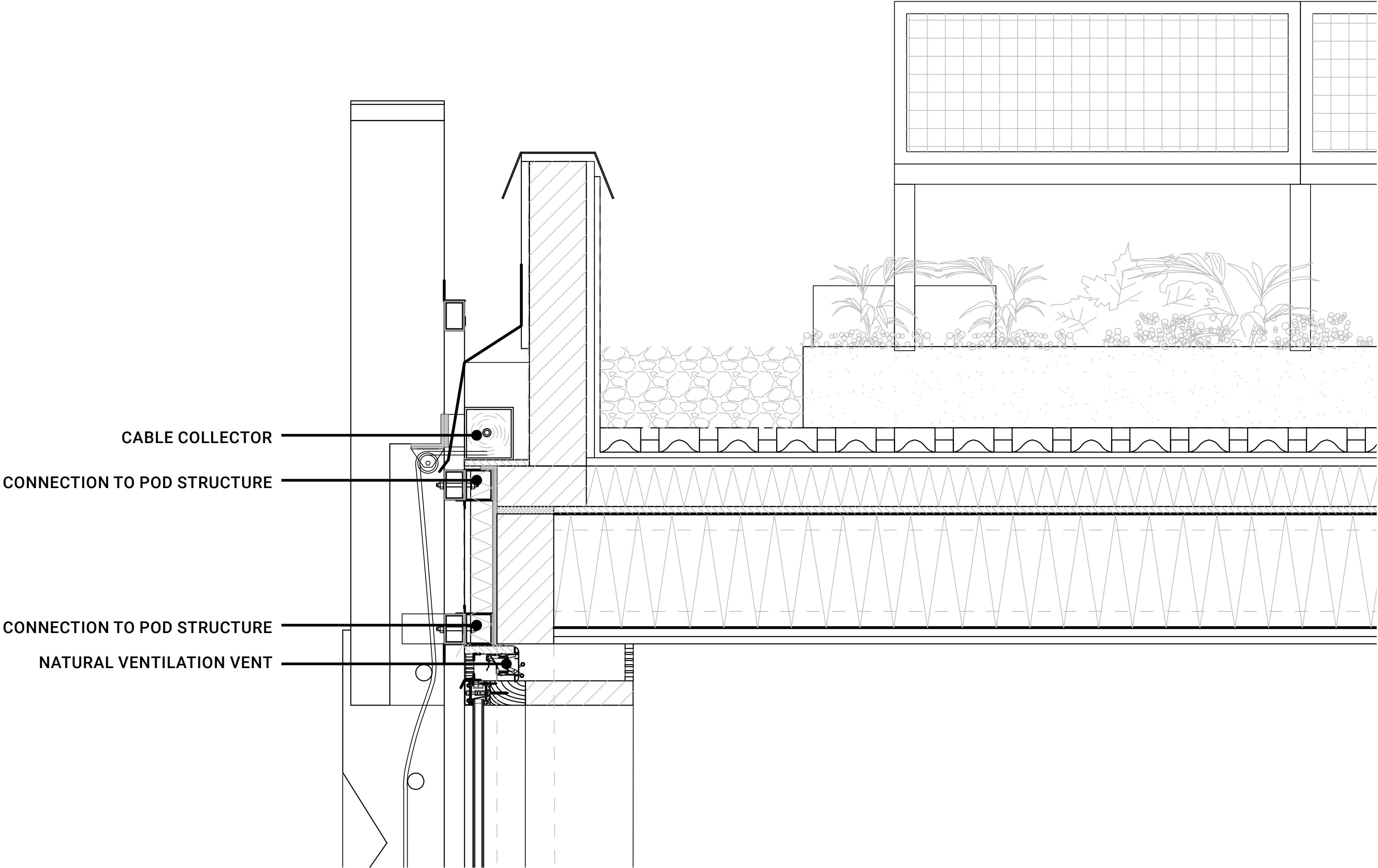




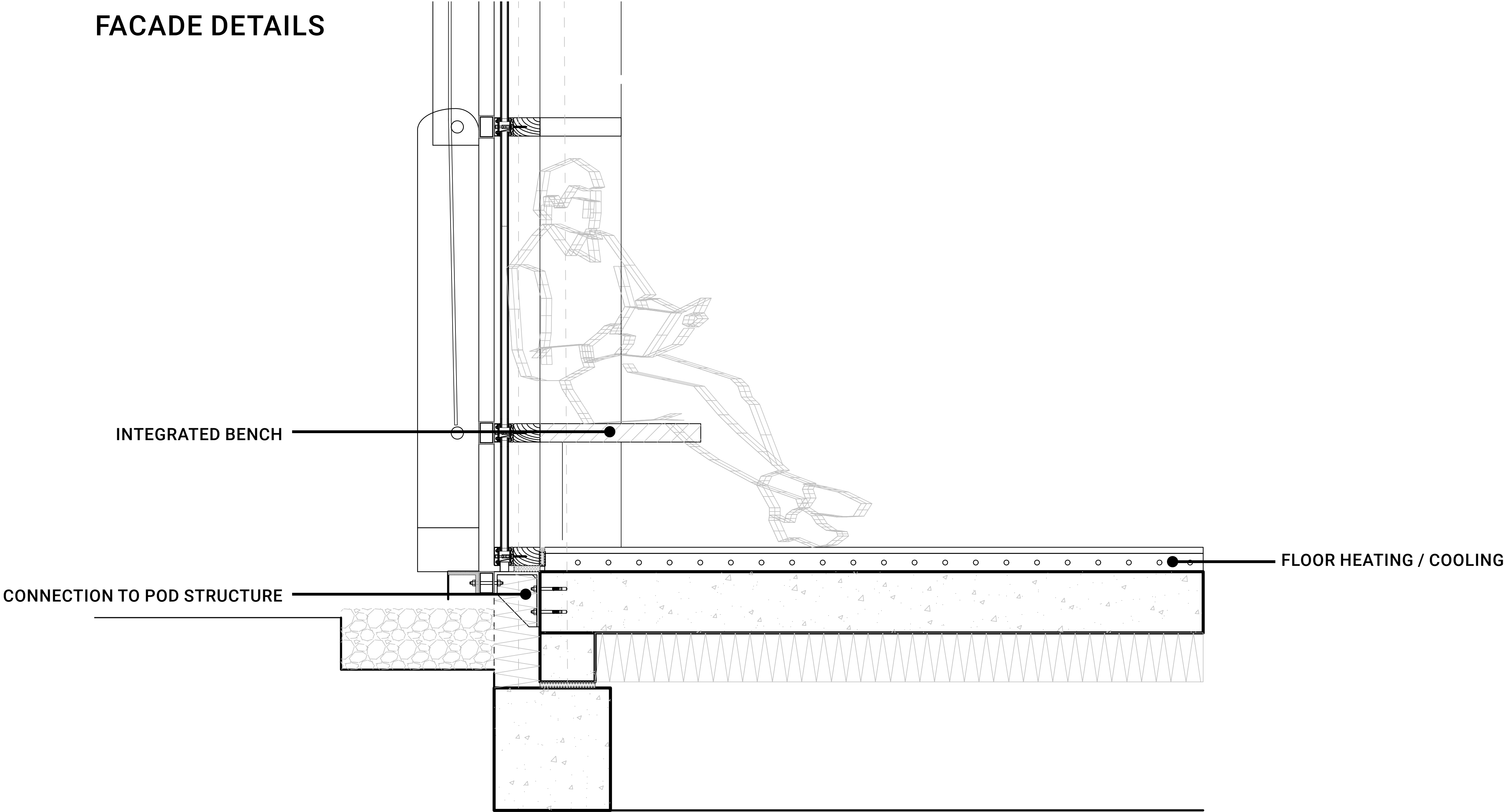




FACADE DETAIL



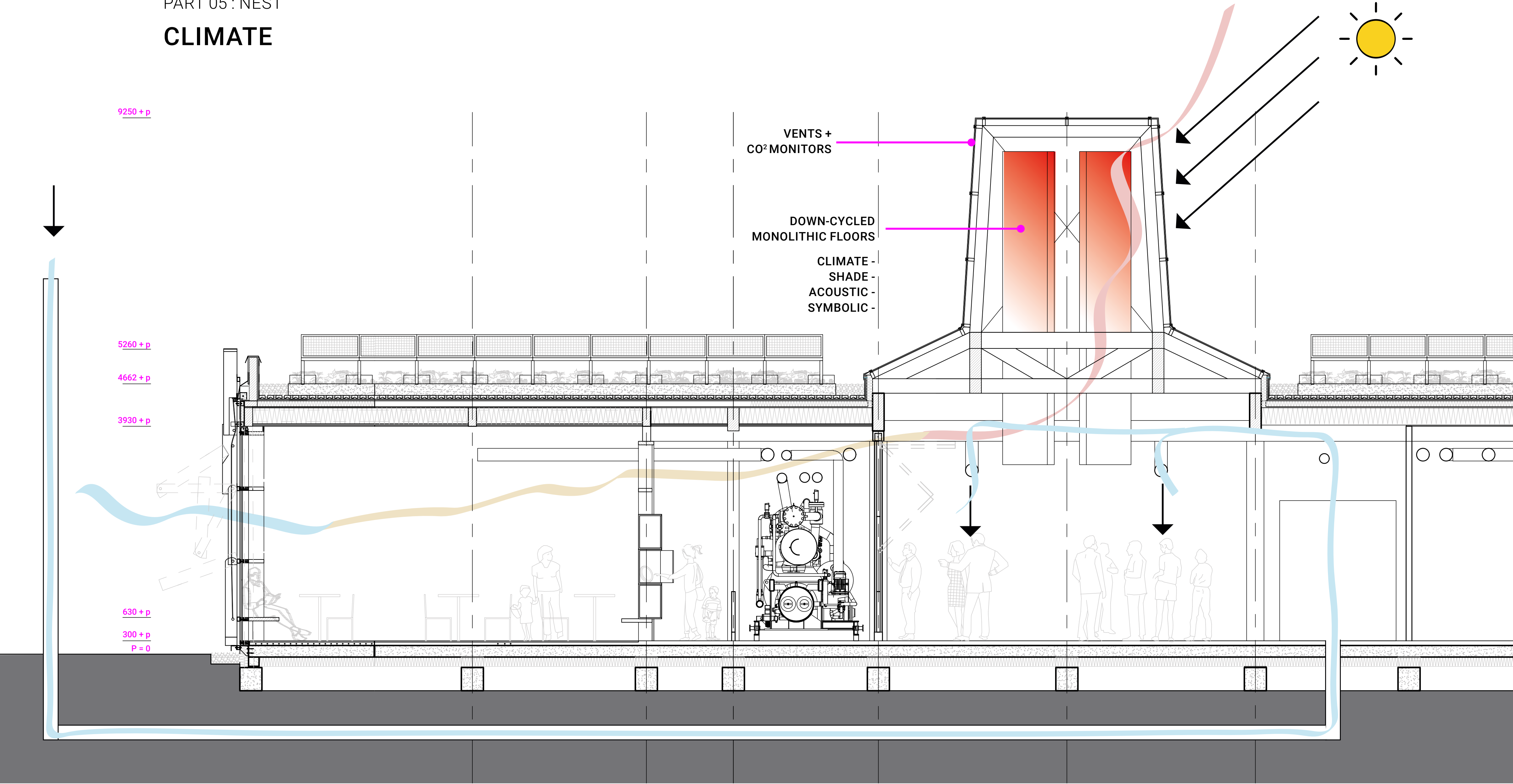
FACADE DETAILS





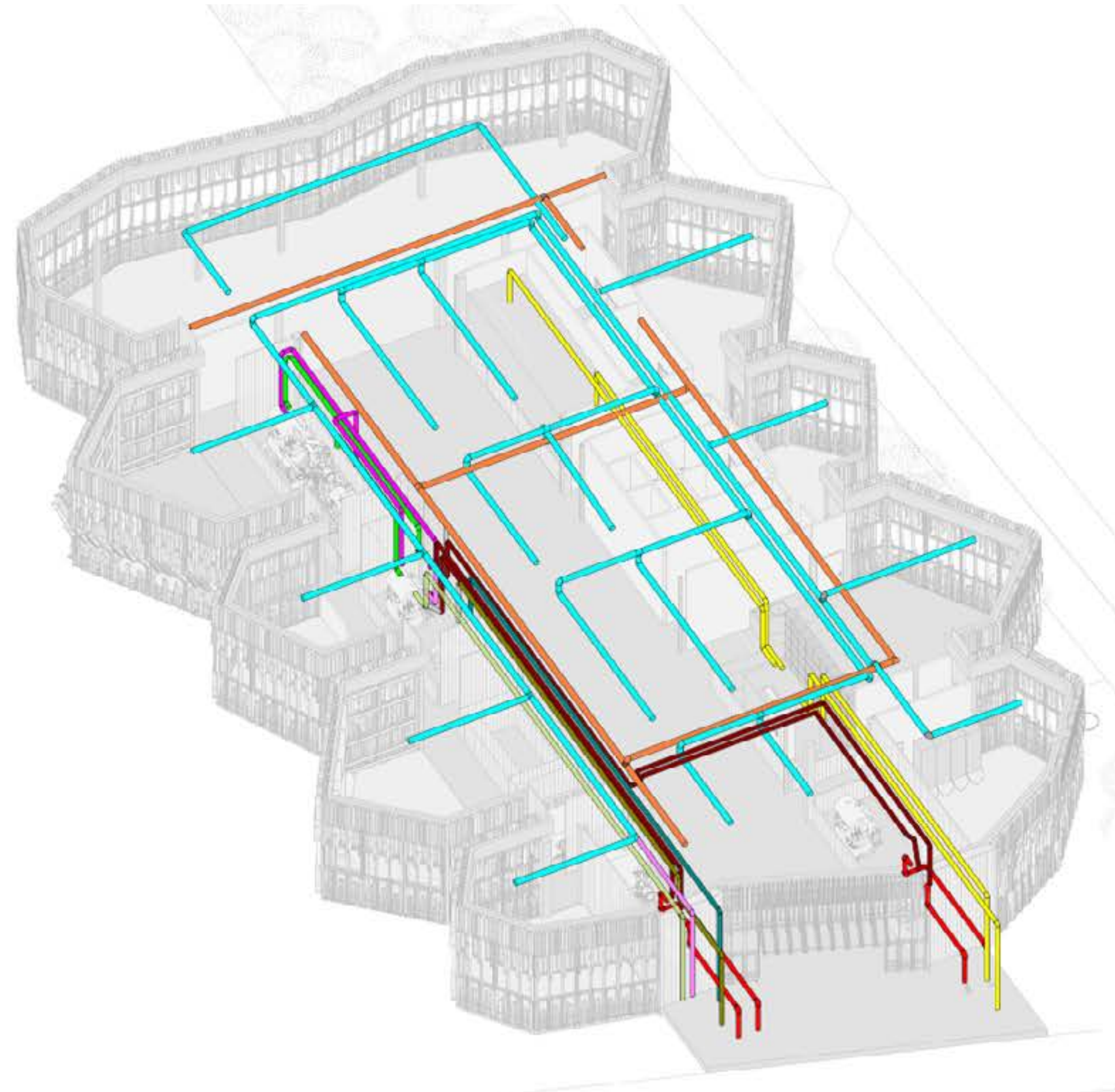
PART 05 : NEST

CLIMATE

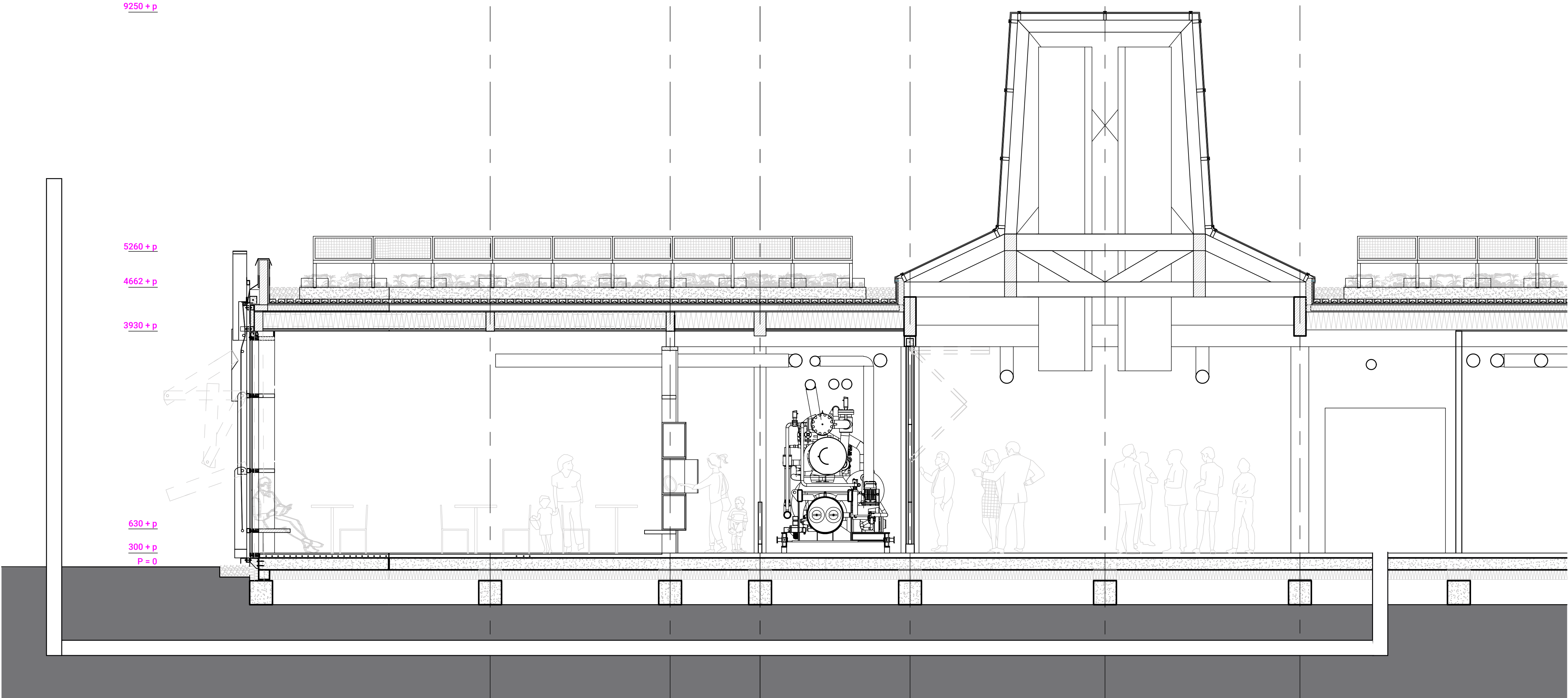


PART 05 : NEST

RELATIONSHIP POD // INSTALLATIONS // HALL



RELATIONSHIP POD // INSTALLATIONS // HALL



NECESSARY IMPROVEMENTS
ENERGY TRANSITION

SPACE

NECESSARY SOCIAL
IMPROVEMENTS

SPACE

INTEGRATION

DESIGN

AND BEYOND

PART 06
CONCLUSION AND FUTURE

AMBITION AND RESEARCH QUESTIONS

FASCINATION

fascination for unravelling the hidden potentials of different fields within the neighbourhood scale

How they can strengthen each other to create a mutual benefit?

OVERALL DESIGN QUESTION

How can the consequences that are necessary to comply with the ambitions of the 'Routekaart 2050' (municipality of Amsterdam) form a symbiosis with community strengthening beneficial functions in the Louis Couperusbuurt in Amsterdam Sloterveer?

THEMATIC RESEARCH QUESTION

Which technical solutions are necessary for a centralized, neighbourhood scale, heat and electricity system in a Dutch post war neighbourhood?

What are the spatial consequences of this system?

CONCLUSION

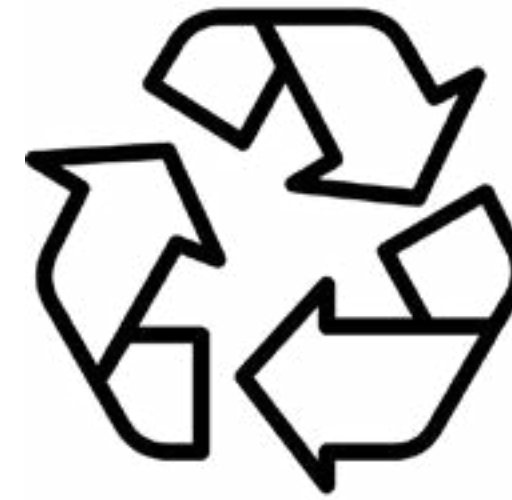
ANSWERS AND ACCOMPLISHMENTS



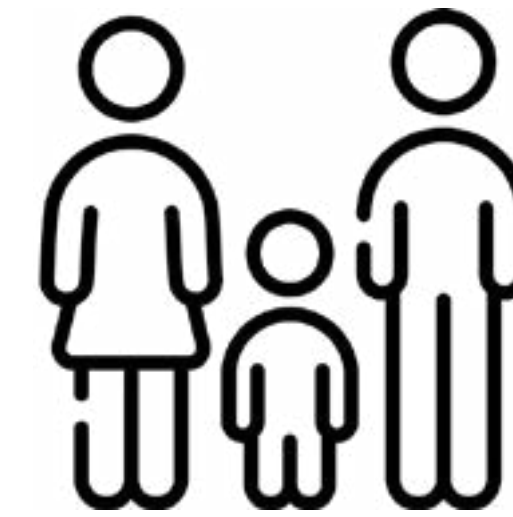
global



national



local



individual

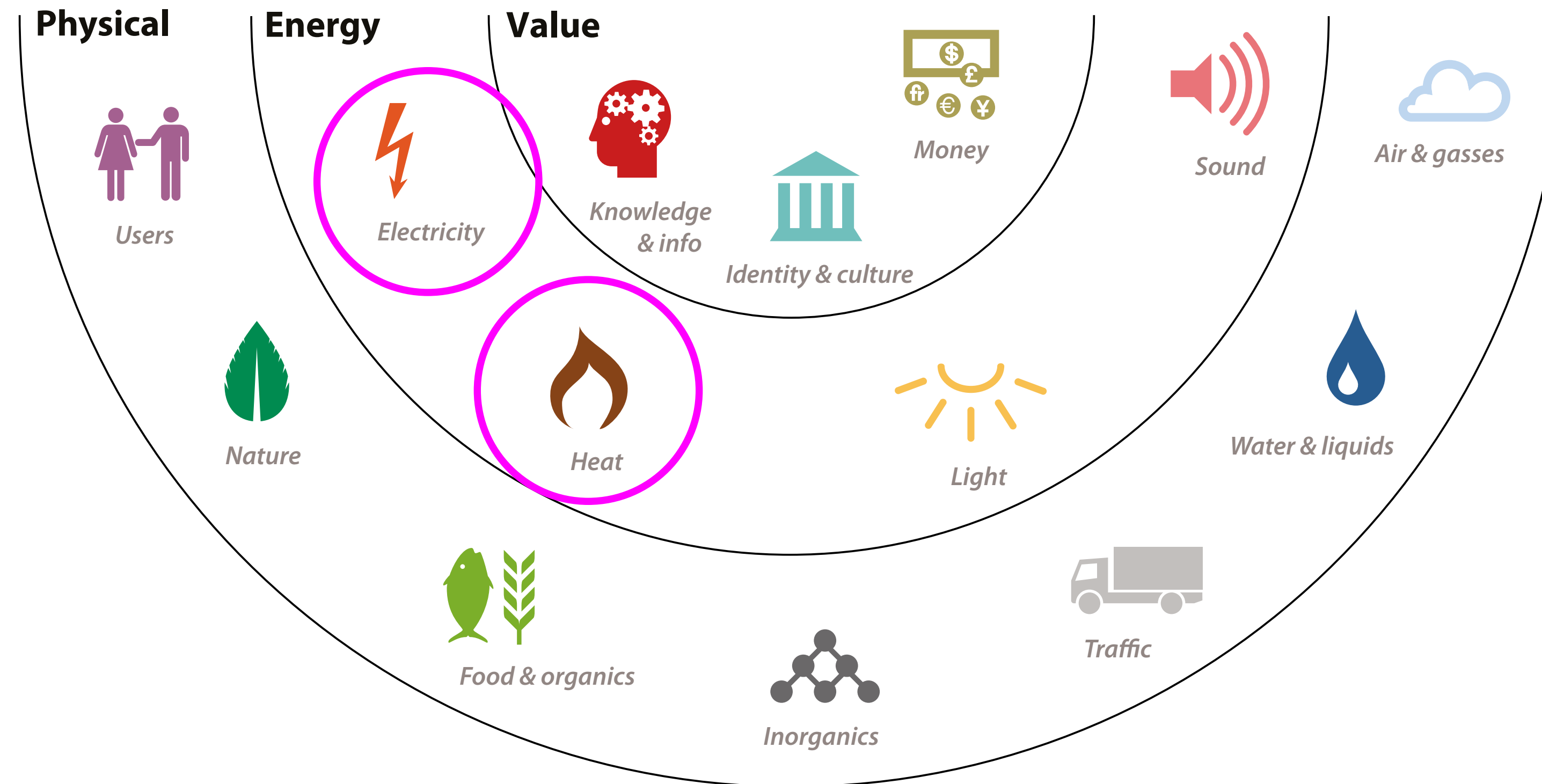
NEST CONNECTS THE PEOPLE / PLANET / PROFIT AMBITIONS IN A SUSTAINABLE DESIGN

NEST CONNECTS THE DIFFERENT SCALES

NEST GIVES SPACE FOR INDIVIDUALITY AND PERSONAL DEVELOPMENT

CONCLUSION

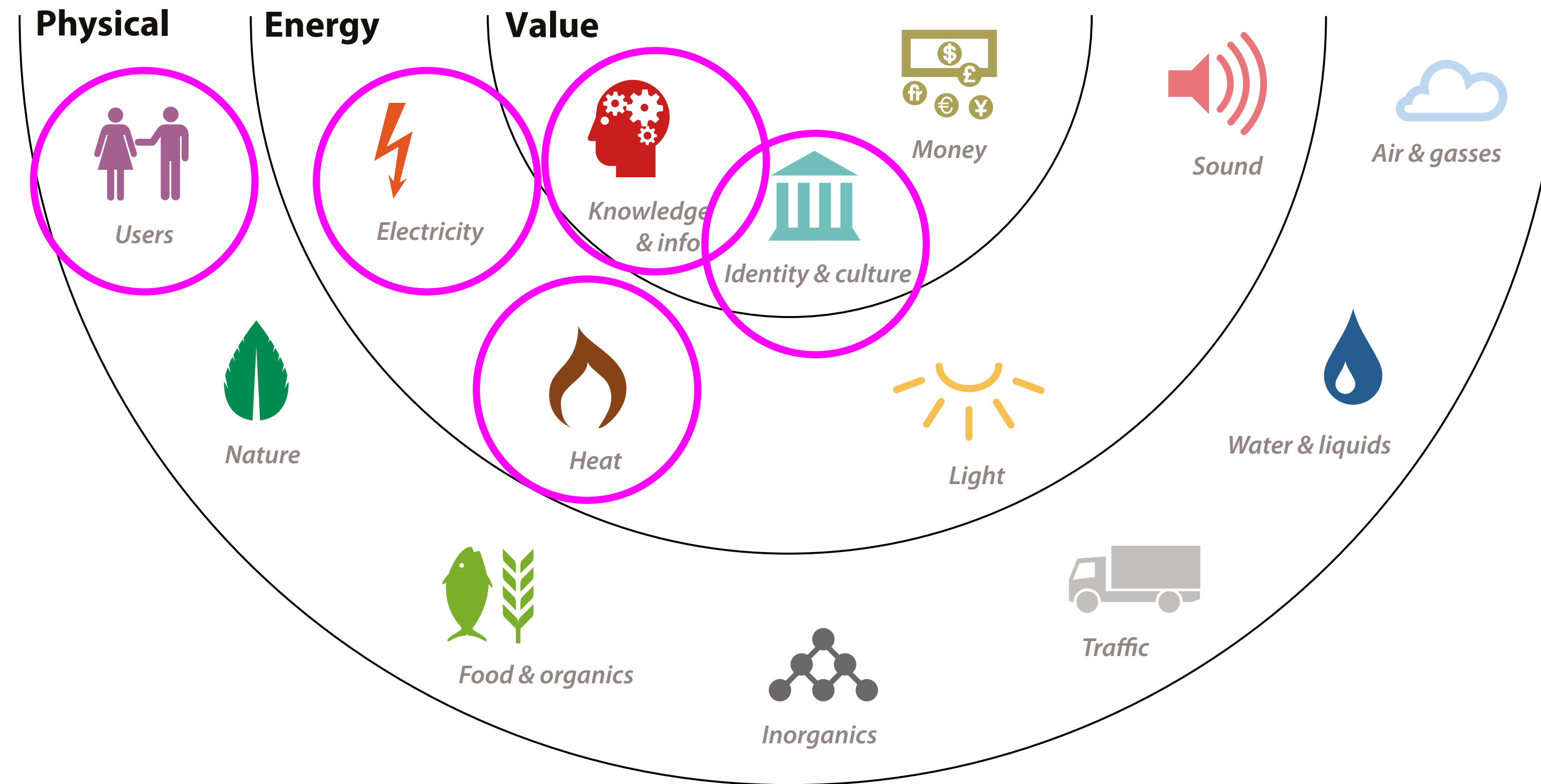
ANSWERS AND ACCOMPLISHMENTS



NEST PROUDLY HOSTS THE SYSTEM TO POWER THE NEIGHBOURHOOD

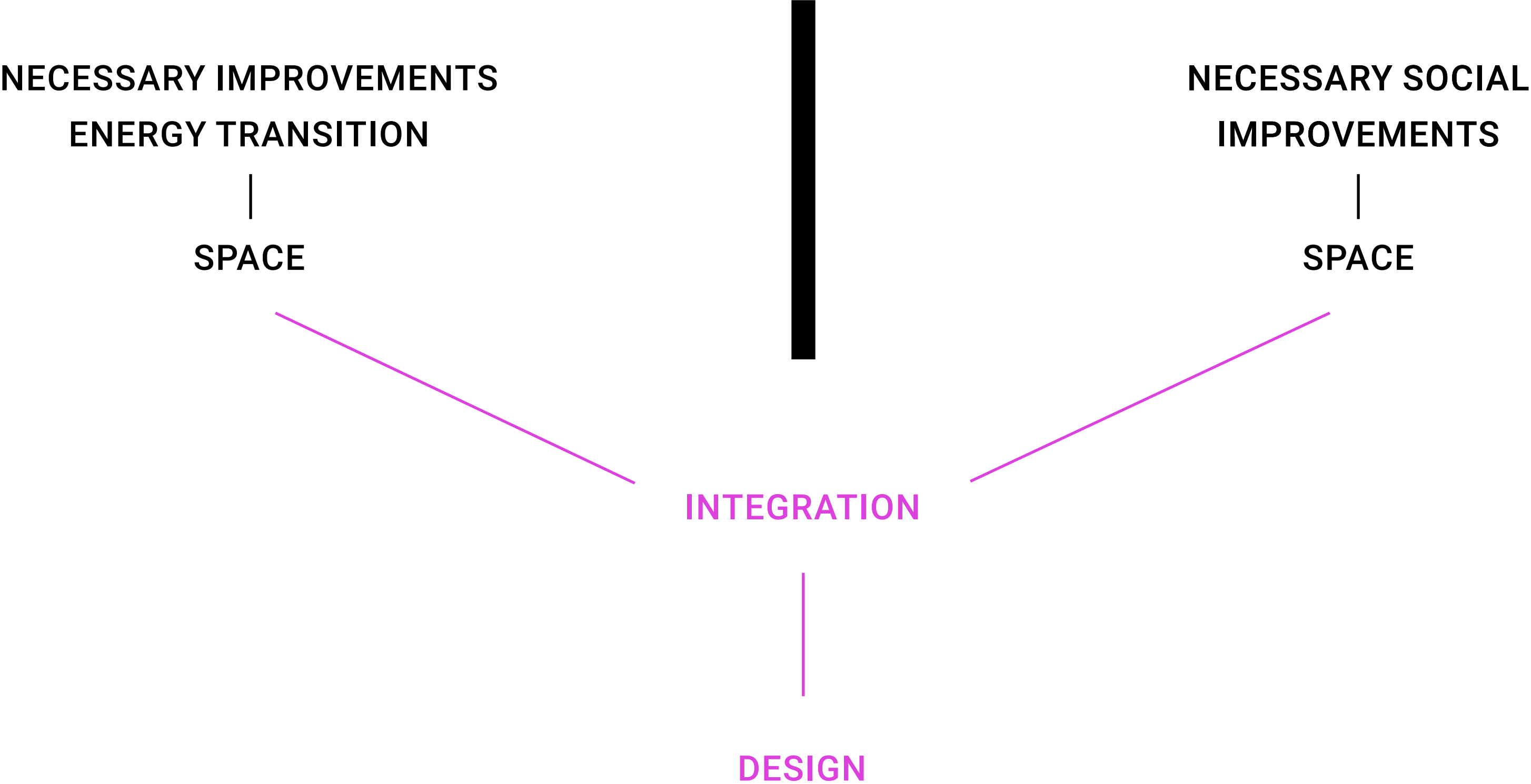
CONCLUSION

ANSWERS AND ACCOMPLISHMENTS



BUT ALSO INCLUDES MORE FLOWS IN A BENEFICIAL WAY

SAME CONCEPT // DIFFERENT OUTCOME



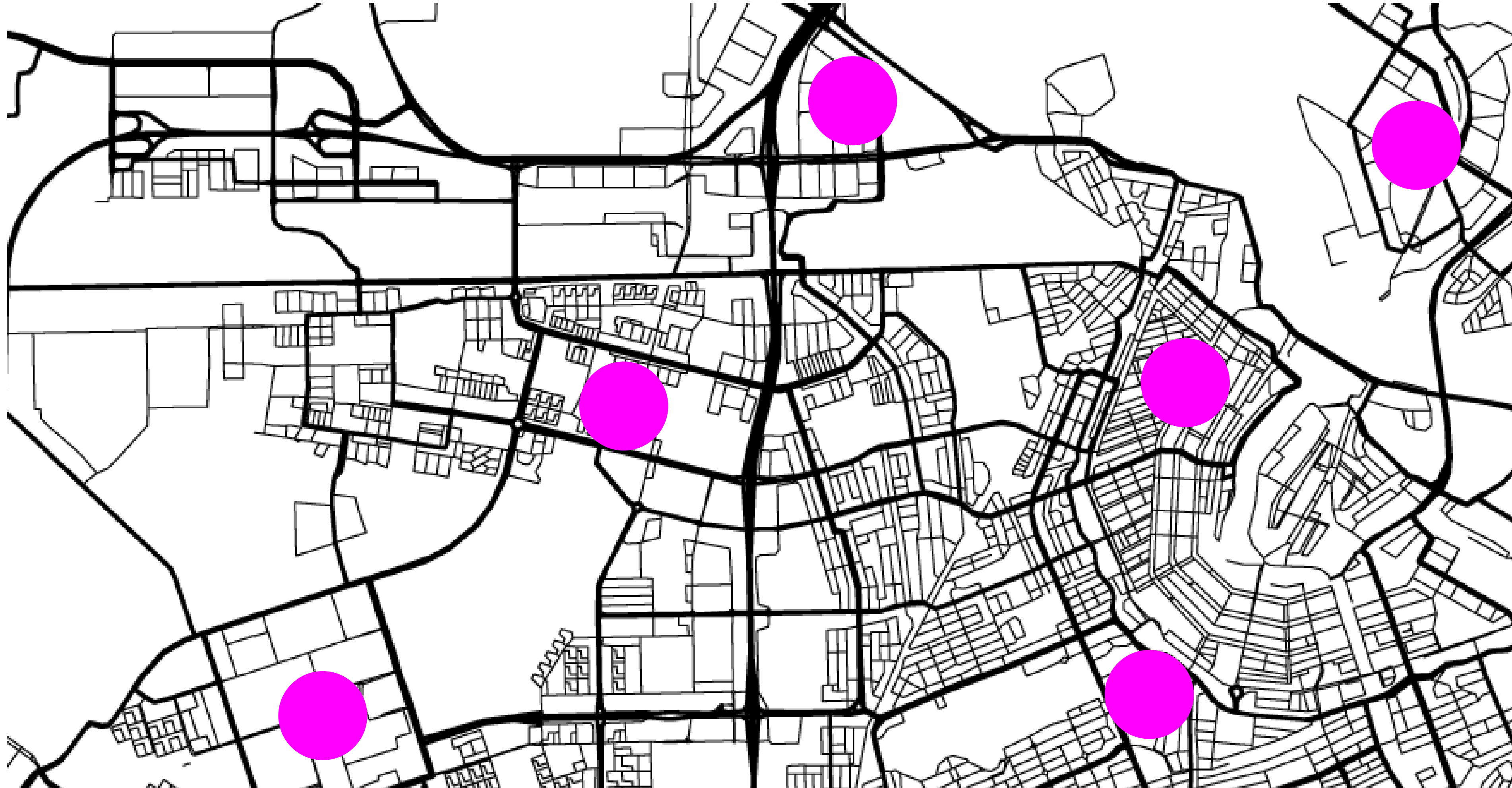
CONCLUSION
AND BEYOND



CONCLUSION
AND BEYOND



CONCLUSION
AND BEYOND





PROFIT MODELS

MODEL 1
ENERGY COMPANY FULL
OWNERSHIP

Energy company invests and is
owner of the installations

Energy company provides service
to the installation

Inhabitants pay the energy
company on monthly bases

Municipality subsidizes part
of energy company initial
investment

MODEL 2
HOUSING CORPORATION
FULL OWNERSHIP

Housing corporation invests and
is owner of the installations

Energy company provides service
to the installation

Inhabitants pay rent and energy
costs to housing corporation on
monthly bases

Municipality subsidizes part
of housing corporations initial
investment

MODEL 3
HOUSING CORPORATION
ENERGY COMPANY
SHARED OWNERSHIP

Housing corporation invests and
is owner of the installations

Energy company provides service
to the installation

Inhabitants pay rent and energy
costs to housing corporation on
monthly bases

Municipality subsidizes part
of housing corporations initial
investment