CIRCULARITY HUB

A study about how urban mining and building material waste could be used in future-proof architecture with data-driven design as a tool.

P2

13 JUNE 2024

BRITT LIGTHART

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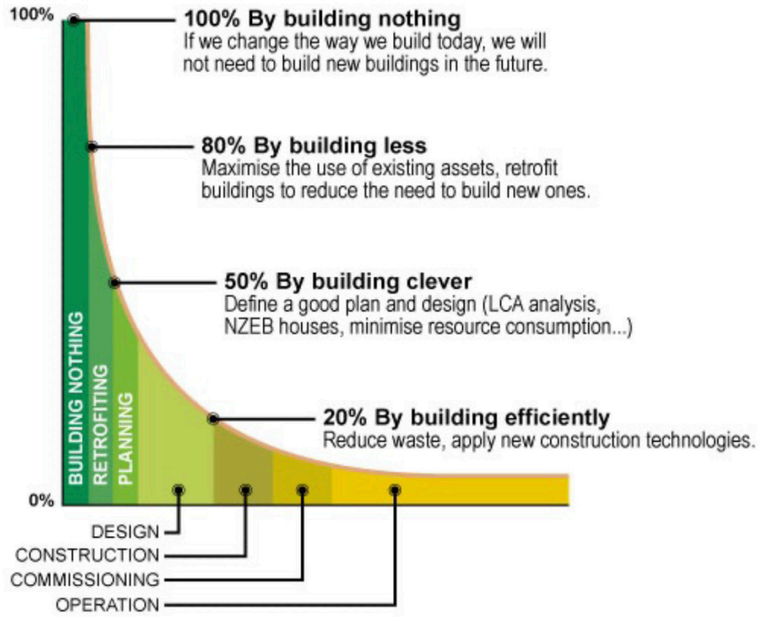
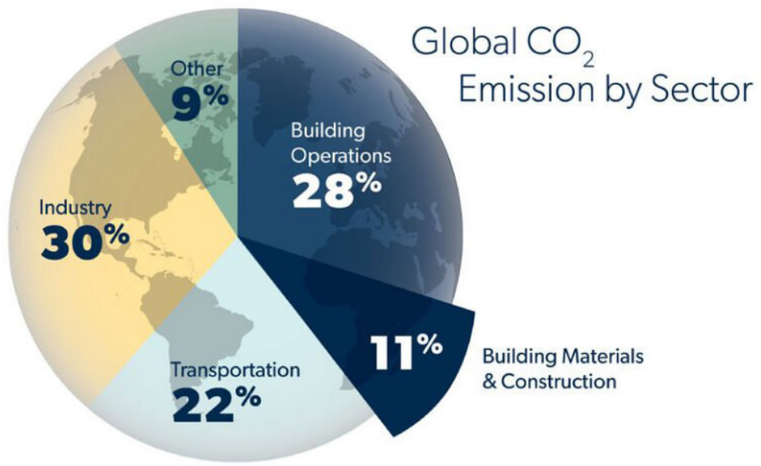
Context

1. Problem statement
2. Research objective
3. Research question
4. Design question
5. Research introduction Megastores
6. Methodology
7. Research findings
8. Design objectives
9. Preliminary design
10. Towards P3

Problem statement

How to reduce the carbon emitted at each stage



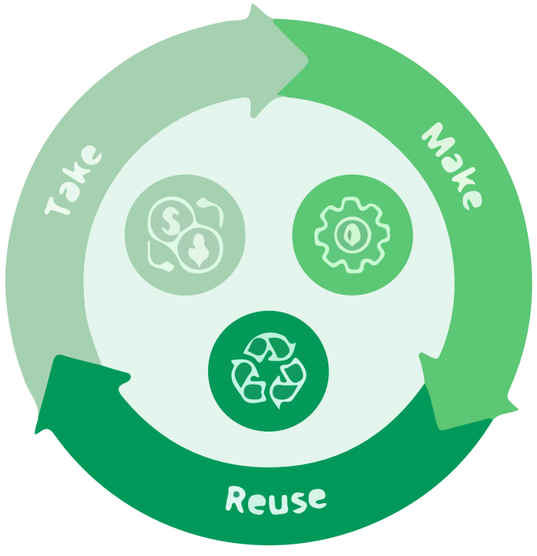


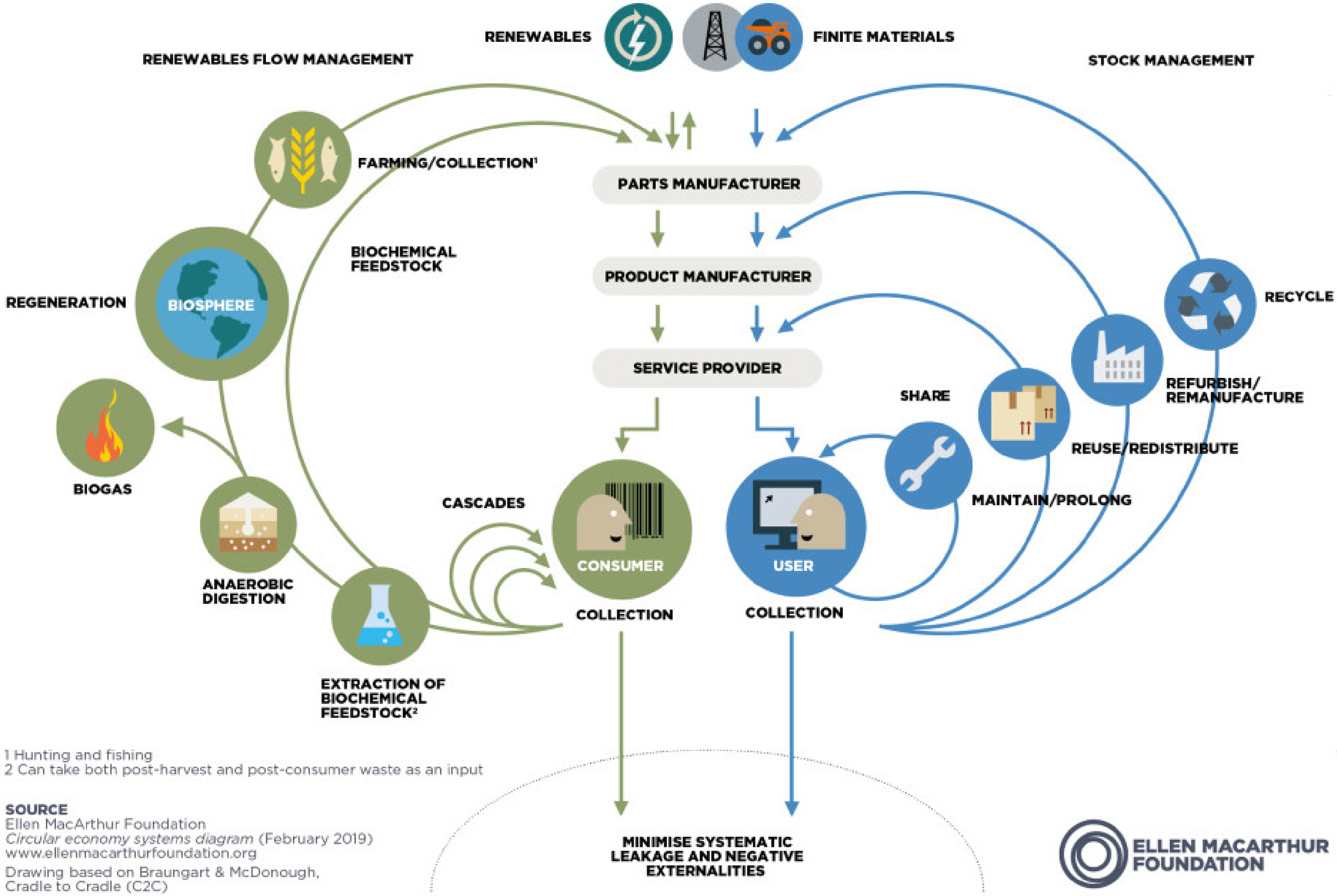
https://www.openaccessgovernment.org/environmental-impact-construction/144144/
https://sabmagazine.com/design-practice-buildings-as-a-climate-change-solution/


PARIS
PROOF
DGBC

Linear Economy

Circular Economy





1 Hunting and fishing
2 Can take both post-harvest and post-consumer waste as an input

SOURCE
Ellen MacArthur Foundation
Circular economy systems diagram (February 2019)
www.ellenmacarthurfoundation.org
Drawing based on Braungart & McDonough, Cradle to Cradle (C2C)

ELLEN MACARTHUR FOUNDATION

Role of the architect

“Change is needed rapidly and because of that our processes, material, economic system and building norms need to be adjusted. **Everything around construction and urban development is up for debate.**”

- Anders Lendager, Architect

Rising population in cities
Rotterdam 86.000 home seekers

Solution: Build, build, build!

https://openrotterdam.nl/woningtekort-niet-opgelost-door-nieuwe-plannen-kabinet-minder-kans-op-huur-2/#:~:text=Er%20is%20een%20groot%20woningtekort,flink%20ingegrepen%20in%20de%20woningmarkt.

‘Meten is weten’

ECI

Environmental
Cost
Indicators

LCA

Life
Cycle
Analyses

$C0_2$

Embodied
Carbon

Paris Proof grenswaarden	materiaalgebonden kg CO_2-eq. per m^2			
	2021	2030	2040	2050
Woning (eengezinswoning)	200	126	75	45
Woning (meergezinswoning)	220	139	83	50
Kantoor	250	158	94	56
Retail vastgoed	260	164	98	59
Industrie[5]	240	151	91	54

NOS Nieuws • Zaterdag 15 juli 2023, 08:30 •
Aangepast zaterdag 15 juli 2023, 09:29

Gebouwen vaker duurzaam gesloopt, meer tweedehands bouwmaterialen op de markt

Circular Building

“A circular building is a building that is developed,
used and reused without unnecessary depletion of resources environmental pollution and degradation of ecosystems. It is built in an economically sound manner and contributes to the well-being of people and the biosphere. Here and there, now and later.
Technical elements are demountable and reusable and biological elements can be returned to their biological cycle.”

- Framework Voor Circulaire Gebouwen - Nieuwbouw - Dutch Green Building Council

Thematic Research Focus

Research objective

The objective of this research is to develop **a method for designing with reused building materials by employing a data-driven approach.**

This involves identifying the necessary information to enable the reuse of materials, evaluating the factors that affect the reuse potential, and **creating a data-driven design tool** using Microsoft Excel to assist in making deposition decisions for sustainable reuse.

The research aims to apply this tool in a case study involving the transformation of building materials from the Megastores in The Hague for a new circular residential building in Rotterdam's Merwehaven.

Additionally, the research seeks to derive **design principles** from case studies of architectural projects that successfully used reclaimed materials, providing a comprehensive overview of considerations and guidelines for reuse in architectural design.

Data-Driven

- Making actions measurable
- Controling raw data with a model of script (set of mathematical instructions)
- Setting parameters and constraints to a objective

Data-Driven Design Tool

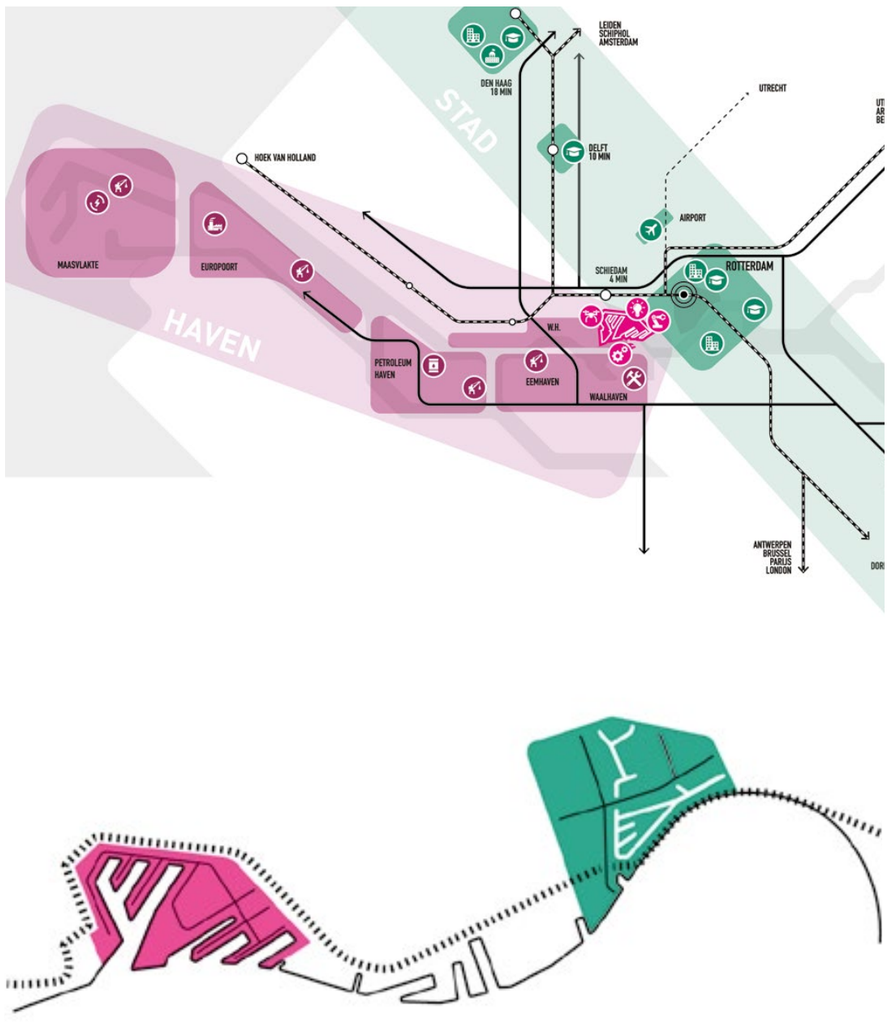
- Input: data + instructions + parameters + constrains
- Output: controlled data
- When your design is guided by the results of the model, it is data-driven. This allows you to make informed design decisions based on data.

Research question

What data-driven design method is needed for a design tool with reclaimed materials to make disposition decisions for a new circular building?

Merwehaven

Masterplan Merwehaven.



Design question

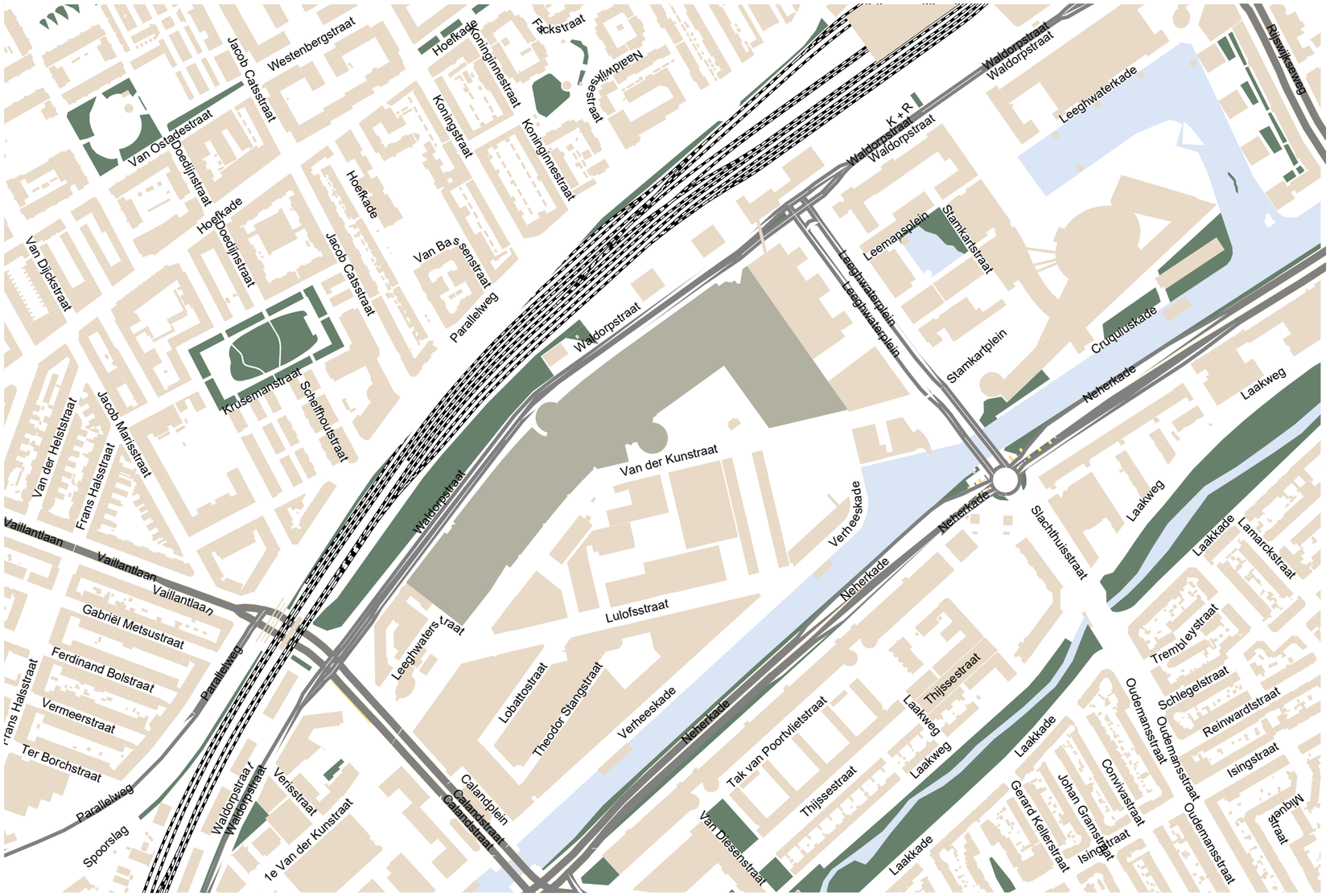
How can an circular multilevel building in the Merwehaven, Rotterdam, take shape for a mixed target group with a design approach where reclaimed materials and reuse practices play a leading role?

Thematic Research Focus

Research introduction

Megastores

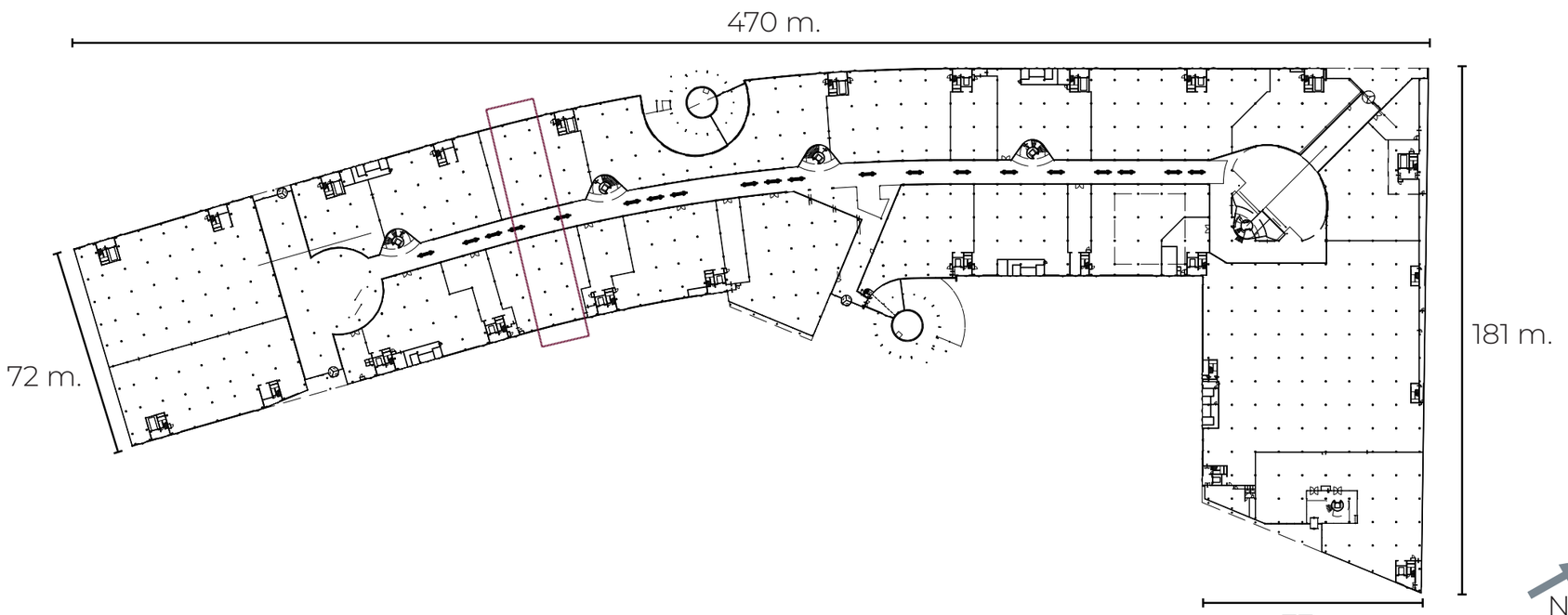
Megastores



scale 1:5000

N

Megastores



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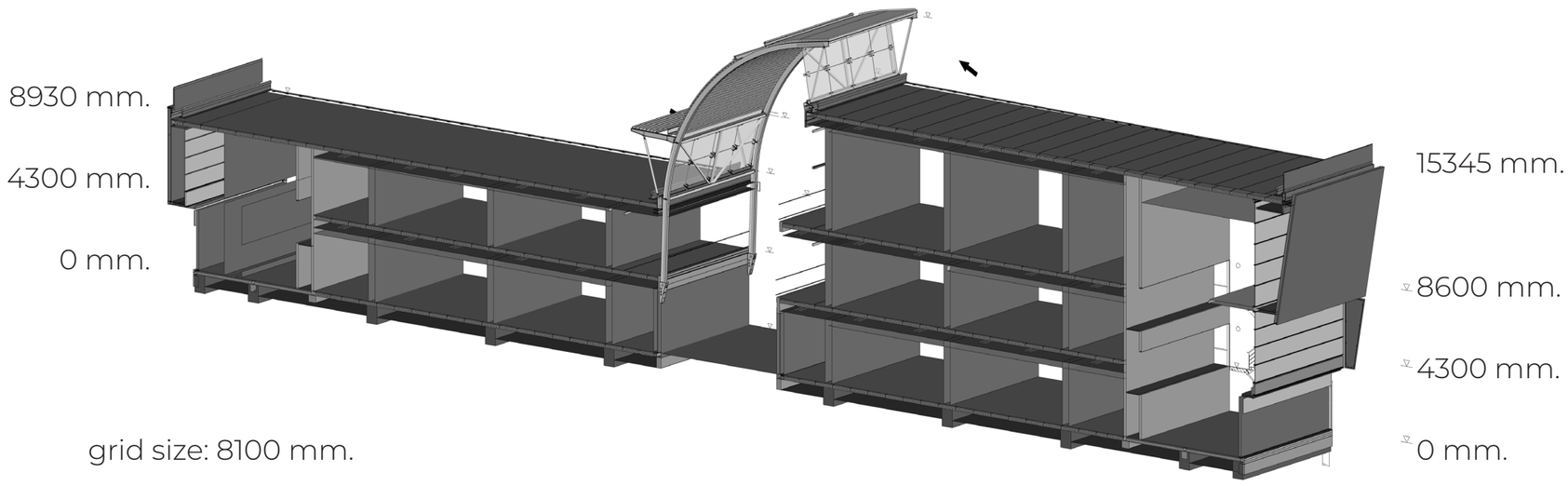
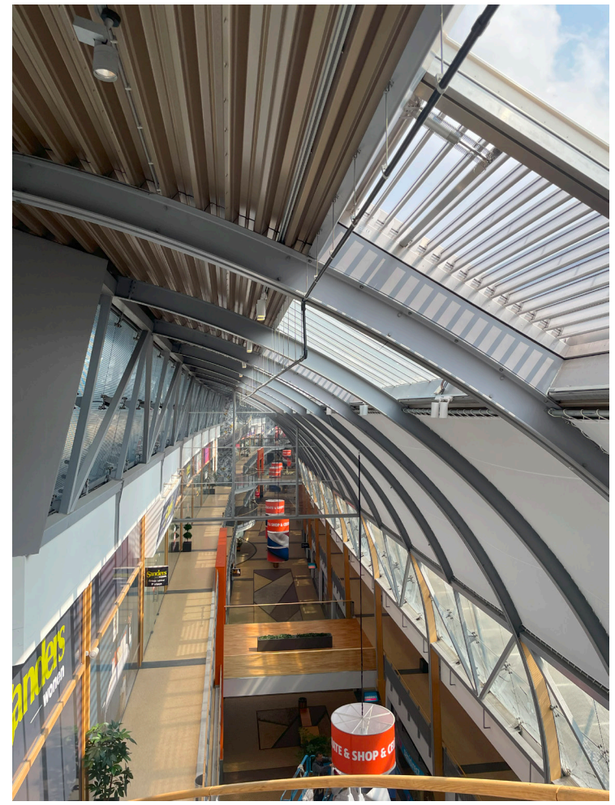


grid size: 8100 mm.

Megastores



Construction	Facade	Floorplans
Precast hollow core slabs	Curtain wall (Rc=2,5)	Railings
Steel columns with concrete	Steel for advertisement	Stairs
Concrete beams	Doors	Shop windows
Concrete columns	Spider curtain wall (Rc=2,5)	Paving
Steel beams ‘arches’	Insulation	Prefab concrete elements (bridges, stairs)
Steel beams	Corrugated sheets	
	Prefab concrete facade panels	
	Tourniquet door	

Methodology

Methodology

A

Cross-project research

Circulairity
Reusability
Building Technology

Data-Driven Design Tool
Data Management

1. What information and methods are needed to facilitate the reuse of building materials to extend the life cycle?

2. How to make the reuse potential measurable to develop a design tool?

B

Project specific research

Case Study:

Megastores Material Reuse

Circulair Building on the Merwehaven

Methodology

1

Material

Reusability Factors
Dimensions
Availability
Performance
(Technical) Lifespan
Disassembly
Toxicity
Maintenance

2

Logistics

Transport

3

Architectural Implementation

Bau-büro in situ
K.118

Popma Ter Steege Architects
Biopartners 5

Lendager Group
Resource Rows/Upcycle Studios

3. What constraints does a new circular residential building impose on implementing reclaimed materials into design?

4. What can we learn from architectural projects with reclaimed materials implemented in their design?

5. When availability defines the form of your design, how does it influence your design process?

Methodology

A

“Project overstijgend onderzoek”

Circulairity
Reusability
Building Technology

Data-Driven Design Tool
Data Management

1

Material

Reusability Factors
Dimensions
Availability
Performance
(Technical) Lifespan
Disassembly
Toxicity
Maintenance

2

Logistics

Transport

3

Architectural Implementation

Bau-büro in situ
K.118

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Lendager Group
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B

“Project Specifiek onderzoek”

Case Study:

Megastores Material Reuse

Circulair Building on the Merwehaven

1

Material

Reusability Factors
Dimensions
Availability
Performance
(Technical) Lifespan
Disassembly
Toxicity
Maintenance

2

Logistics

Transport

3

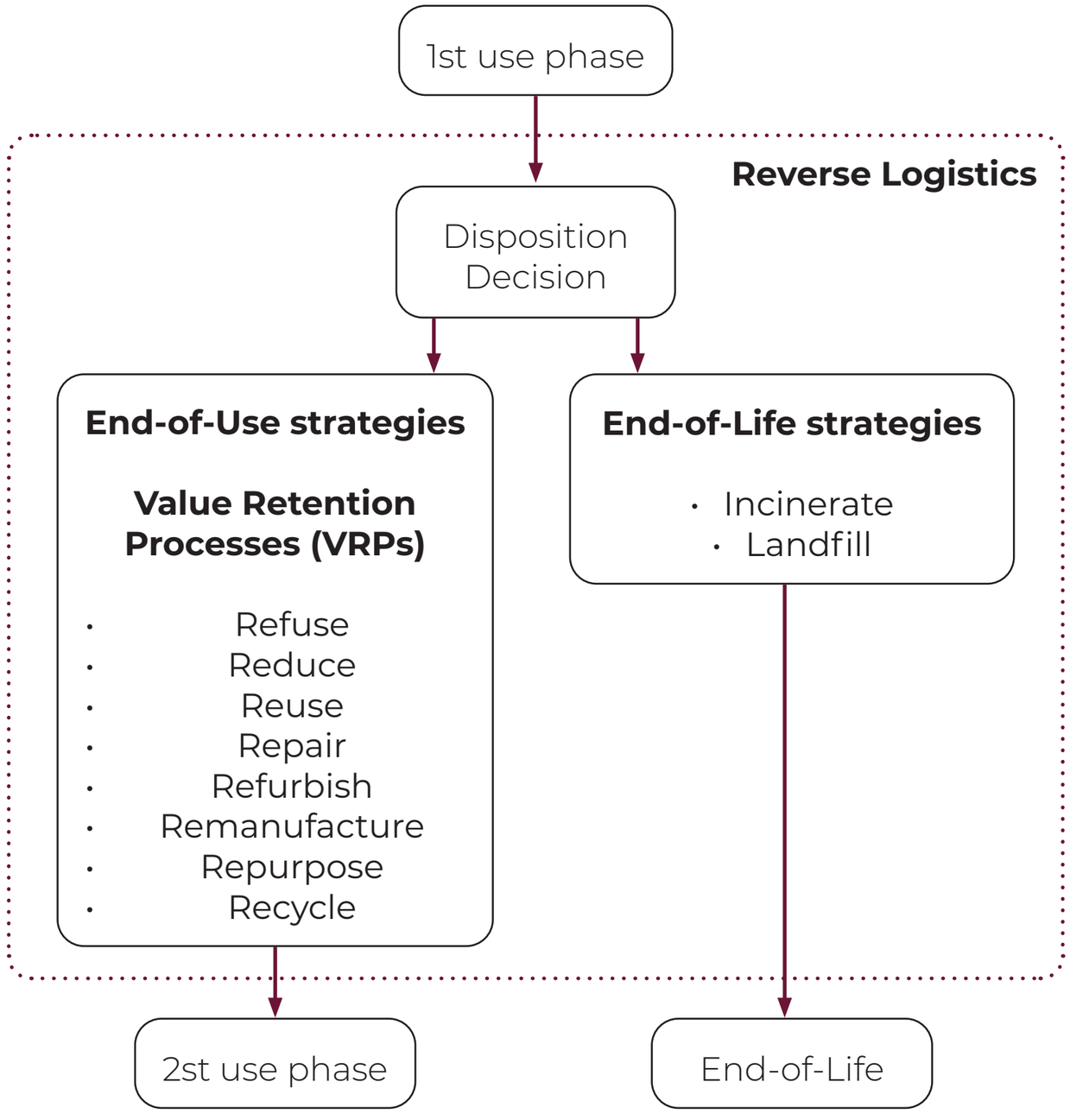
Architectural Implementation

P5?

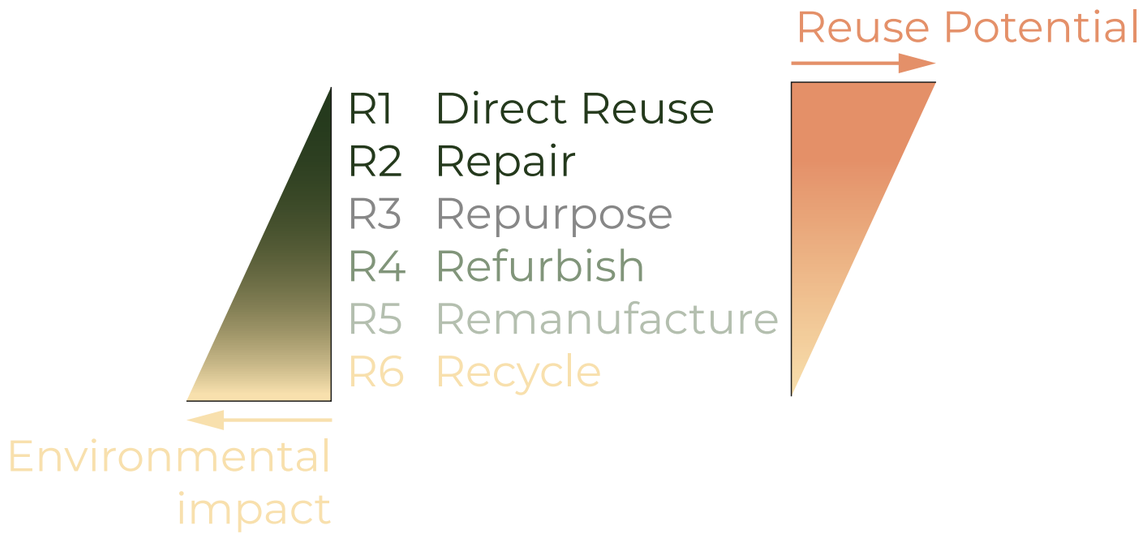
Research findings

Reuse of building materials

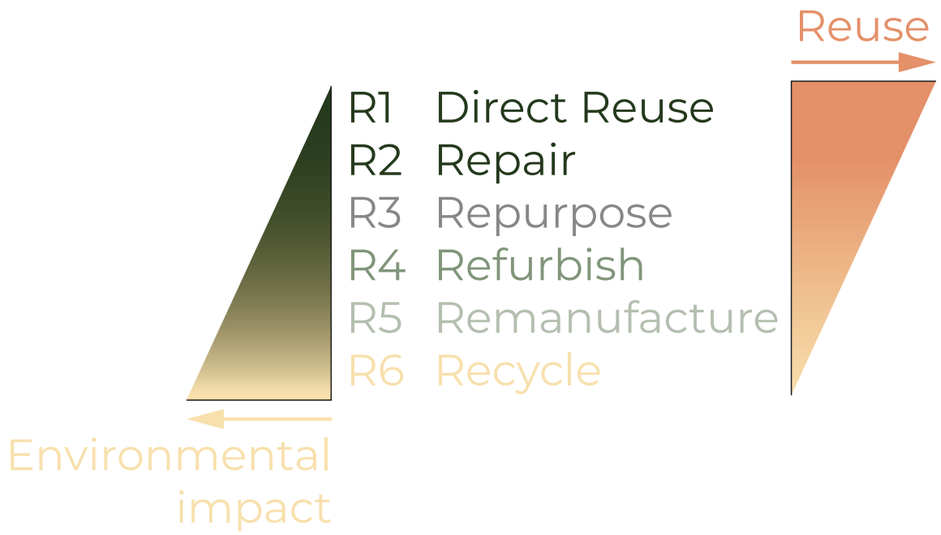
https://www.archdaily.com/943293/giving-demolished-building-materials-a-new-life-through-recycling


1st use phase
Reverse Logistics
Disposition Decision
End-of-Use strategies
Value Retention Processes (VRPs)
Refuse
Reduce
Reuse
Repair
Refurbish
Remanufacture
Repurpose
Recycle
End-of-Life strategies
Incinerate
Landfill
2st use phase
End-of-Life

R-strategies

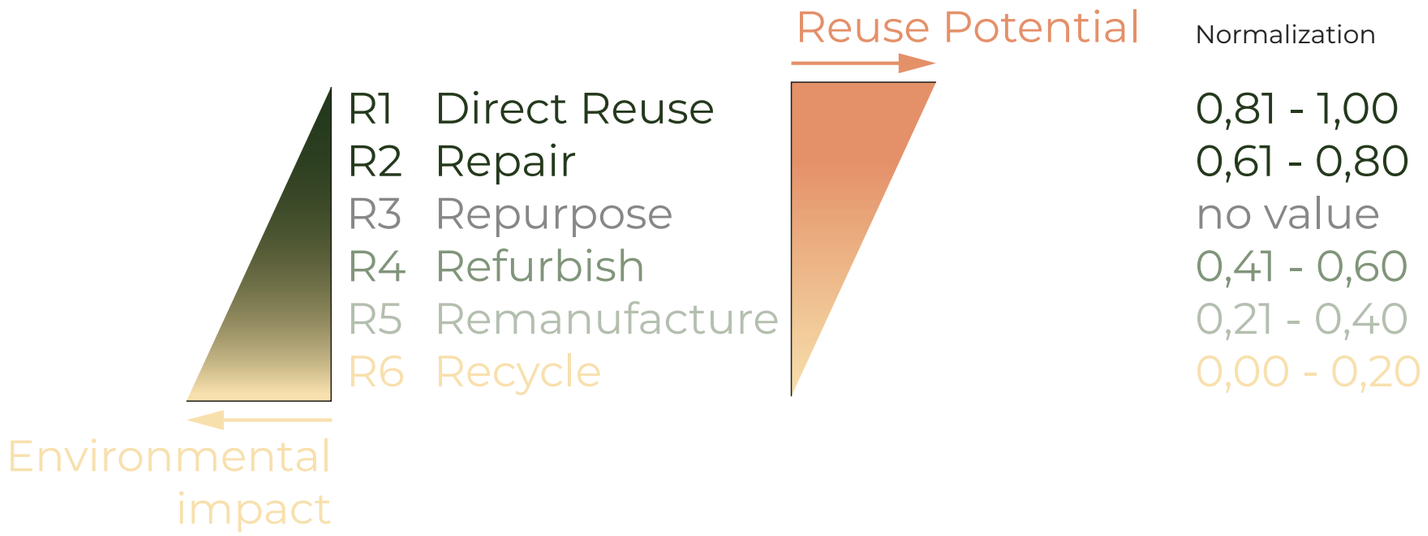


R-strategies



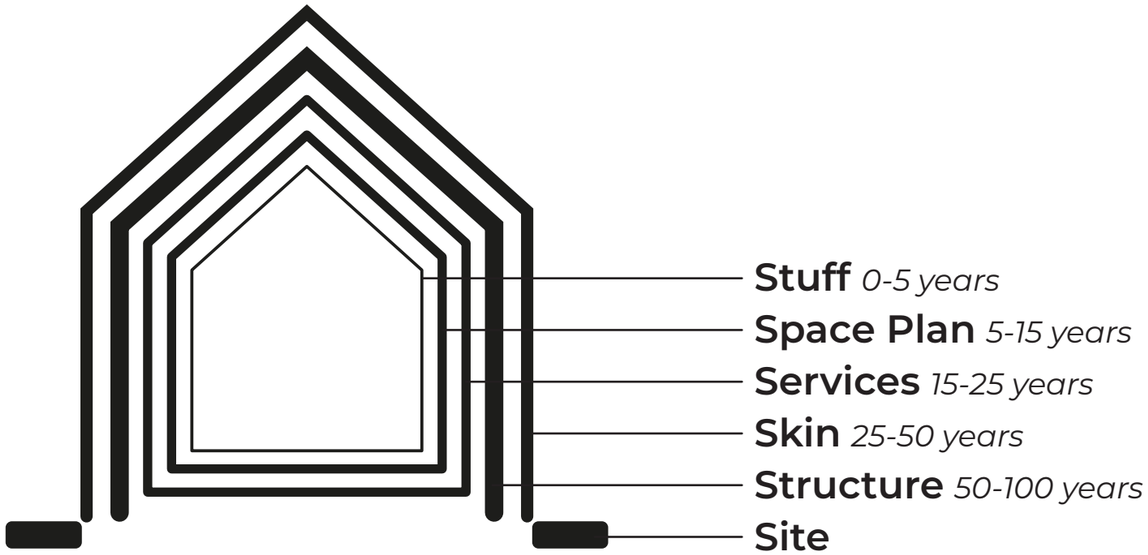
	Value Retention Process
R1 Direct Reuse	Only cleaning
R2 Repair	E.g. painting
R3 Repurpose	Other function, breaking down into smaller parts
R4 Refurbish	Replace or repair parts
R5 Remanufacture	Take apart completely, replace/repair parts, reassemble
R6 Recycle	Return to original raw materials and make new product

R-strategies

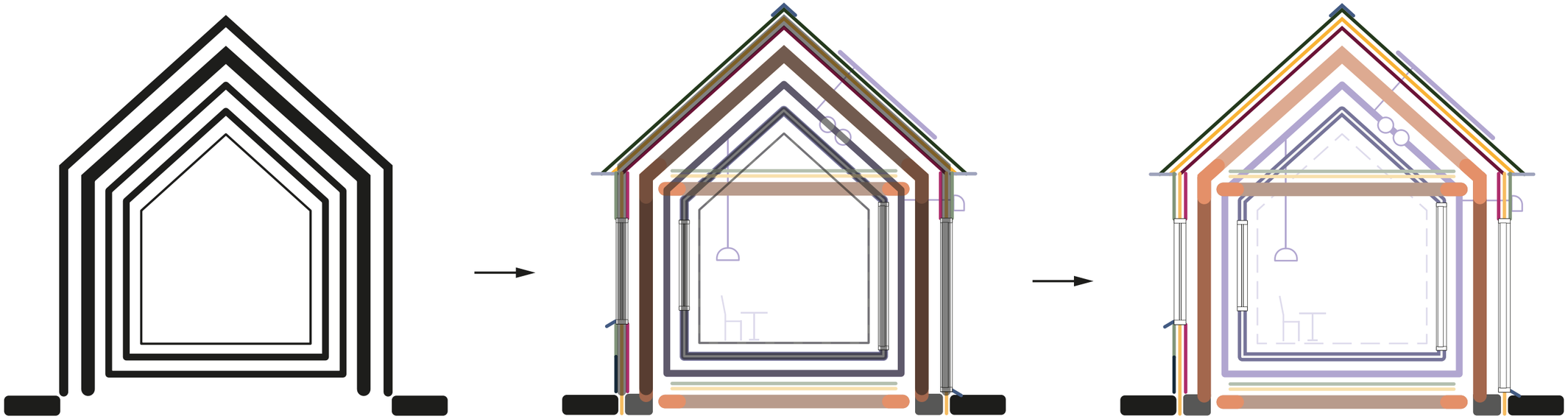


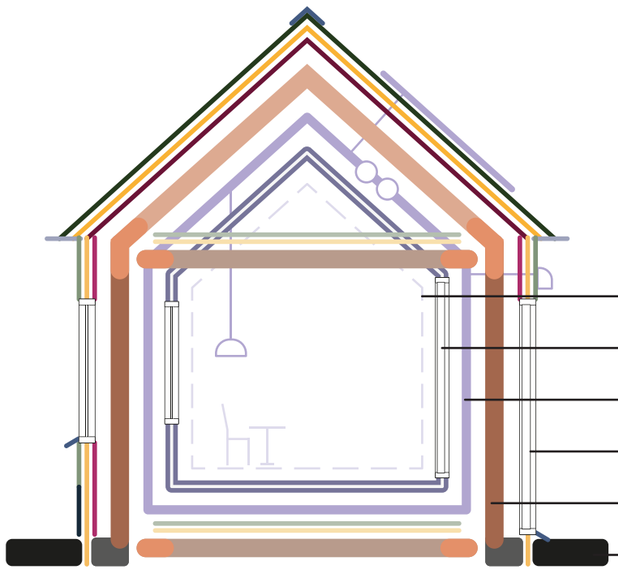
		Normalization
R1	Direct Reuse	0,81 - 1,00
R2	Repair	0,61 - 0,80
R3	Repurpose	no value
R4	Refurbish	0,41 - 0,60
R5	Remanufacture	0,21 - 0,40
R6	Recycle	0,00 - 0,20

Building layers



Building layers





Stuff *0-5 years*

Space Plan *5-15 years*
- interior wall systems
- doors
- window frames

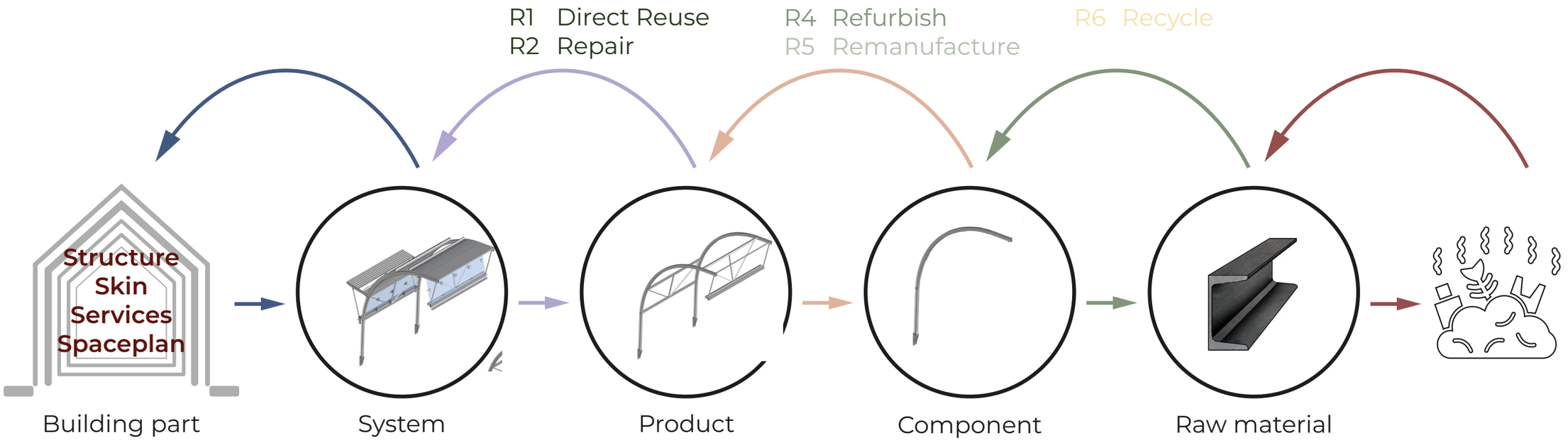
Services *15-25 years*
- climate systems
- electricity
- pipes
- lighting

Skin *25-50 years*
- facade systems
- facade cladding
- insulation
- bearing inner wall
- bearing inner roof
- roof cladding
- sealing profiles

Structure *50-100 years*
- beams
- columns
- connections
- floors
- bearing walls

Site

Scales


R1 Direct Reuse
R2 Repair
R4 Refurbish
R5 Remanufacture
R6 Recycle
Structure
Skin
Services
Spaceplan
Building part
System
Product
Component
Raw material

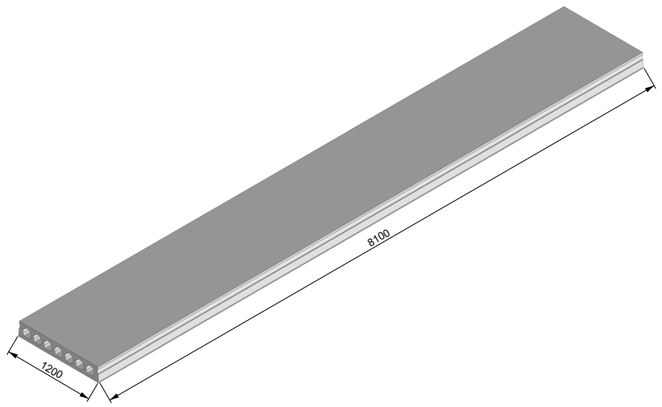
Tool 1/5

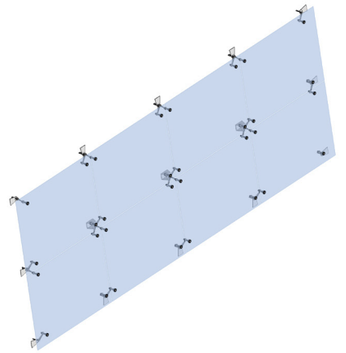
Bill of Material

	Code	Item name	Photo	Shearing layer
Building part	1			
System	2			
Product	3a			
	3b			
	3c			
Component	4a			
	4b			
	4c			
Raw Material	5a			
	5b			
	5c			

Shearing Layer
Stuff (0-5 years)
Space Plan (5-15 years)
Services (15-25 years)
Structures (50-100 years)
Skin (25-50 years)
Site

Case study Megastores & Merwehaven 1/5





Bill of Material

	Code	Item name	Photo	Shearing layer
Building part	1.1	Floors		Structures (50-100 years)
System	1.2	Floor packet		Structures (50-100 years)
Product	1.3a	Precast hollow core slabs		Structures (50-100 years)
	1.3b	50 mm Anhydrietvloer		Structures (50-100 years)
	1.3c	Finishing		Space Plan (5-15 years)
Raw Material	1.5a	Concrete		
	1.5b	Concrete and gypsum mix		
	1.5c	Reinforcement steel		

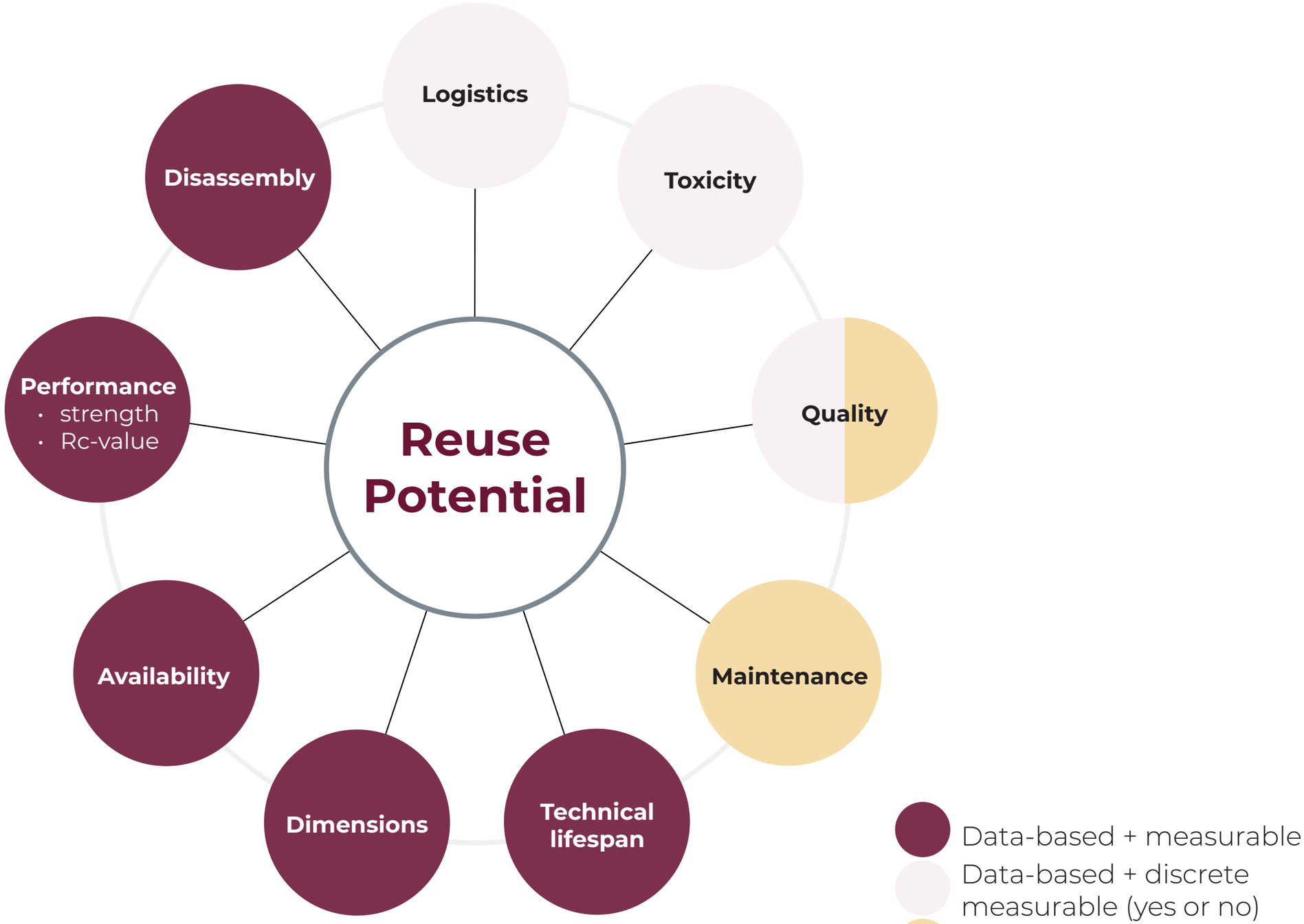
Bill of Material

	Code	Item name	Photo	Shearing layer
Building part	2.1	Roof		Skin (25-50 years)
System	2.2	Loadbearing construction		Structures (50-100 years)
Product	2.3a	Steel beam square		Structures (50-100 years)
	2.3b	Steel beam I		Structures (50-100 years)
	2.3c	Steel pipe		Structures (50-100 years)
Component	2.4a	Pin + bolts		
	2.4b	Hanger curtain wall		
	2.4c	Profile connections		
Raw Material	2.5a	Steel		

Bill of Material

	Code	Item name	Photo	Shearing layer
Building part	2.1	Facade		Skin (25-50 years)
System	2.2	Curtain wall spider		Skin (25-50 years)
Product	2.3a	Glass panel		Skin (25-50 years)
	2.3b	Spider connections		Skin (25-50 years)
Component	2.4a	Pin + bolts		
	2.4b	Spider 2 knots		
	2.4c	Spider 4 knots		
	2.4d	Plate		
Raw Material	2.5a	Aluminium		
	2.5b	Glass		
	2.5c	Foil		

Criteria


Logistics
Disassembly
Toxicity
Performance
• strength
• Rc-value
Reuse Potential
Quality
Availability
Maintenance
Dimensions
Technical lifespan
Data-based + measurable
Data-based + discrete measurable (yes or no)
Other

Tool 2/5

Bill of Material

	Code	Item name	Photo	Shearing layer
Building part	1			
System	2			
Product	3a			
	3b			
	3c			
Component	4a			
	4b			
	4c			
Raw Material	5a			
	5b			
	5c			

Measurements

Height (mm)	Width (mm)	Thickness (mm)	Weight (gram)	Volume (m^3)
				0
				0
				0
				0
				0
				0
				0
				0
				0
				0

Availability

Amount

Performance

Strength	Strength aim	RP value	Rc-value	Rc-value aim	RP value
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1

Logistics

Building close to waterway ?	Transport options

Supplier

Brand	Age (End-of-use) (months)	Technical lifespan End-of-life (months)	Estimated remaining lifespan	RP value
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0

Disassembly index

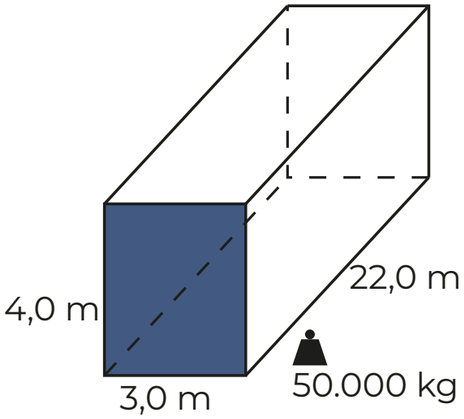
(Tv) Type joint		Accessibility link (ToV)		Intersections (DK)		Edging (RO)		Disassembly index	LIcn = losmaakbaarheidsindex van de connectie van product of element n:	LIcn = losmaakbaarheidsindex van de samenstelling van element n:
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0

Toxicity

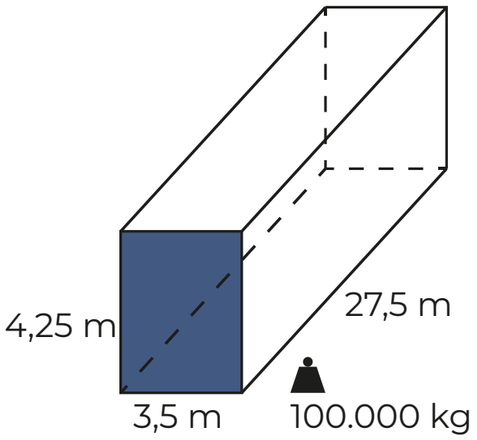
Toxicity range	index toxicity

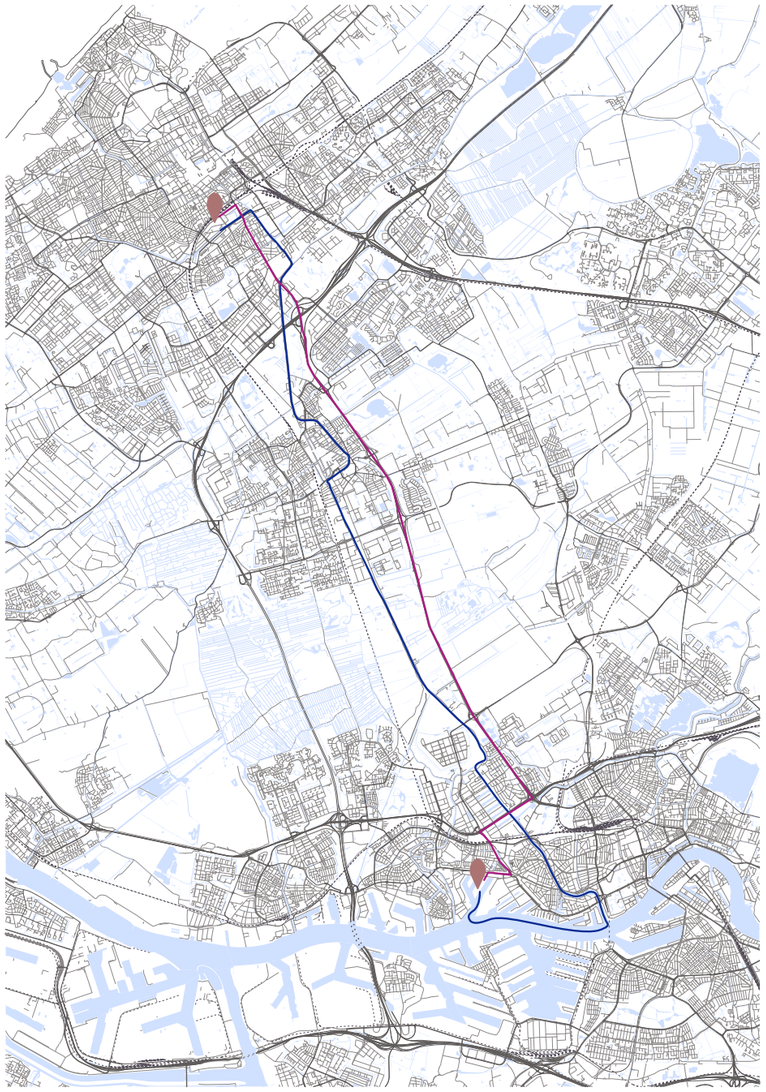
Logistics

Normal transportation



Specific transportation





CEMT-Class II
length: 50-55 m.
width: 6,6 m.
401-650 tonnes
carrying capacity

Tool 3/5

Bill of Material

	Code	Item name	Photo	Shearing layer
Building part	1			
System	2			
Product	3a			
	3b			
	3c			
Component	4a			
	4b			
	4c			
Raw Material	5a			
	5b			
	5c			

Measurements / Availability

Height (mm)	Width (mm)	Thickness (mm)	Weight (gram)	Volume (m^3)	Amount
				0	
				0	
				0	
				0	
				0	
				0	
				0	
				0	
				0	
				0	
				0	

Performance

Strength	Rc-value

Logistics

Building close to waterway ?	Transport options

Supplier

Brand	Age (End-of-use) (months)	Technical lifespan End-of-life (months)		
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0

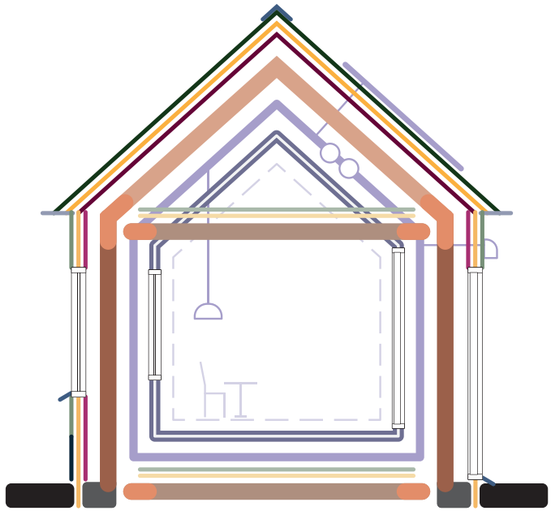
Disassembly index

(Tv) Type joint	Accessibility link (ToV)	Intersections (DK)	Edging (RO)	Disassembly index	LIcn = losmaakbaarheidsindex van de connectie van product of element n:	LIcn = losmaakbaarheidsindex van de samenstelling van element n:
				0	0	0
				0	0	0
				0	0	0
				0	0	0
				0	0	0
				0	0	0
				0	0	0
				0	0	0
				0	0	0
				0	0	0
				0	0	0

Toxicity

Toxicity range	index toxicity

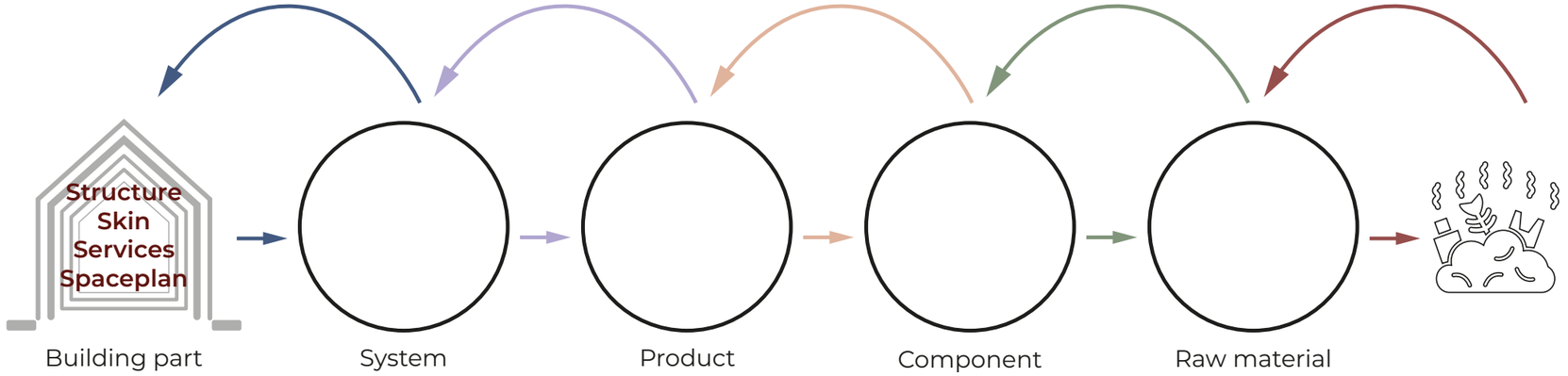
Used vs. ‘new’



User traces
Old building codes
Degradation of material
One-of-a-kind products
Designed for specific function

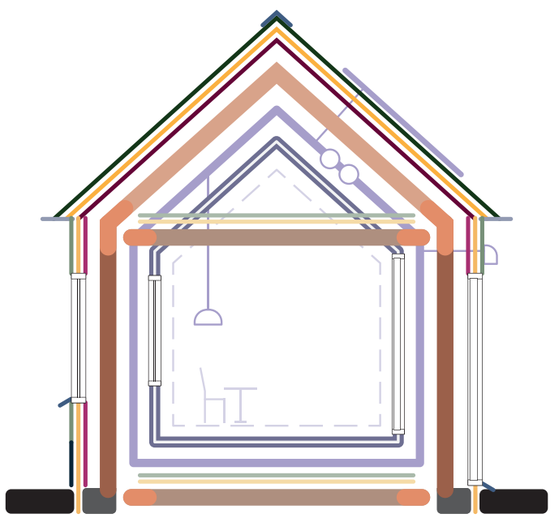
1st use phase

R1 Direct Reuse
R2 Repair
R4 Refurbish
R5 Remanufacture
R6 Recycle



2st use phase

Aesthetics
New building codes
Design for disassembly
Different function



Tool 4/5

Bill of Material

	Code	Item name	Photo	Shearing layer
Building part	1			
System	2			
Product	3a			
	3b			
	3c			
Component	4a			
	4b			
	4c			
Raw Material	5a			
	5b			
	5c			

Measurements

Height (mm)	Width (mm)	Thickness (mm)	Weight (gram)	Volume (m^3)
				0
				0
				0
				0
				0
				0
				0
				0
				0
				0
				0
				0

Availability

Amount

Performance

Strength	Strength aim	RP value	Rc-value	Rc-value aim	RP value
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1
		1			1

Logistics

Building close to waterway ?	Transport options

Supplier

Brand	Age (End-of-use) (months)	Technical lifespan End-of-life (months)	Estimated remaining lifespan	RP value
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0

Disassembly index

(Tv) Type joint		Accessibility link (ToV)		Intersections (DK)		Edging (RO)		Disassembly index	LIcn = losmaakbaarheidsindex van de connectie van product of element n:	LIcn = losmaakbaarheidsindex van de samenstelling van element n:
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0
								0	0	0

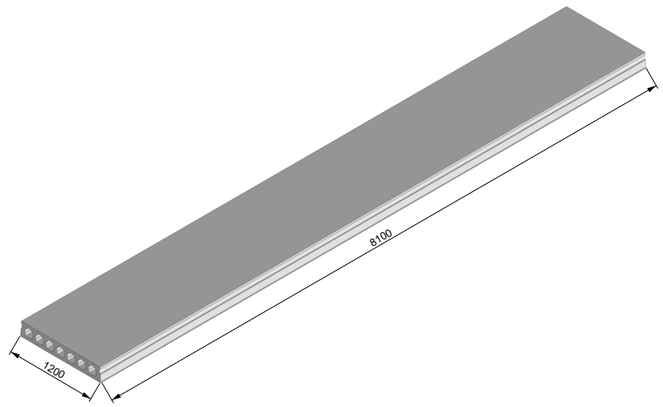
Toxicity

Toxicity range	index toxicity

Tool 5/5

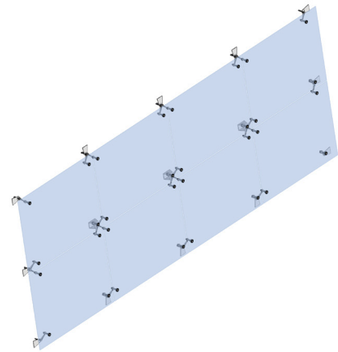
Reuse Potential				Bill of Material				
RP-	RP		RP+		Code	Item name	Photo	Shearing layer
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle	Building part	1			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle	System	2			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle	Product	3a			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle		3b			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle		3c			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle	Component	4a			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle		4b			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle		4c			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle	Raw Material	5a			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle		5b			
R4 Refurbi	0,33	R5 Remanufacture	R6 Recycle		5c			

Case study Megastores & Merwehaven 5/5



Reuse Potential				Bill of Material		
RP-	RP		RP+		Code	Item name
R2 Repair	0,54	R4 Refurbish	R5 Remanufacture	Building part	1.1	Floors
R2 Repair	0,54	R4 Refurbish	R5 Remanufacture	System	1.2	Floor packet
R1 Direct u	0,75	R2 Repair	R4 Refurbish	Product	1.3a	Precast hollow core slabs
R4 Refurbi	0,39	R5 Remanufacture	R6 Recycle		1.3b	50 mm Anhydrietvloer
R1 Direct u	0,75	R2 Repair	R4 Refurbish		1.3c	Finishing
R2 Repair	0,57	R4 Refurbish	R5 Remanufacture	Raw Material	1.5a	Concrete
R2 Repair	0,50	R4 Refurbish	R5 Remanufacture		1.5b	Concrete and gypsum mix
R2 Repair	0,57	R4 Refurbish	R5 Remanufacture		1.5c	Reinforcement steel

Case study Megastores & Merwehaven 5/5



Reuse Potential				Bill of Material		
RP-	RP		RP+		Code	Item name
R2 Repair	0,54	R4 Refurbish	R5 Remanufacture	Building part	2.1	Roof
R2 Repair	0,54	R4 Refurbish	R5 Remanufacture	System	2.2	Loadbearing construction
#N/B	0,94	R1 Direct use	R2 Repair	Product	2.3a	Steel beam square
#N/B	0,95	R1 Direct use	R2 Repair		2.3b	Steel beam I
#N/B	0,95	R1 Direct use	R2 Repair		2.3c	Steel pipe
#N/B	0,95	R1 Direct use	R2 Repair	Component	2.4a	Pin + bolts
R1 Direct u	0,66	R2 Repair	R4 Refurbish		2.4b	Hanger curtain wall
R1 Direct u	0,69	R2 Repair	R4 Refurbish		2.4c	Profile connections
R2 Repair	0,57	R4 Refurbish	R5 Remanufacture	Raw Material	2.5a	Steel

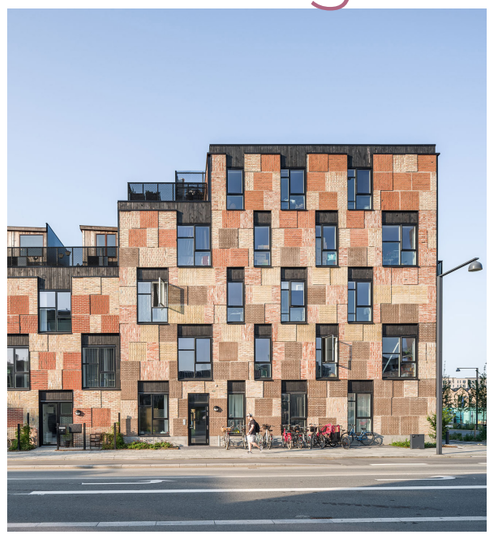
Reuse Potential				Bill of Material		
RP-	RP		RP+		Code	Item name
R2 Repair	0,43	R4 Refurbish	R5 Remanufacture	Building part	2.1	Facade
R2 Repair	0,43	R4 Refurbish	R5 Remanufacture	System	2.2	Curtain wall spider
#N/B	0,81	R1 Direct use	R2 Repair	Product	2.3a	Glass panel
#N/B	0,98	R1 Direct use	R2 Repair		2.3b	Spider connections
R2 Repair	0,57	R4 Refurbish	R5 Remanufacture	Component	2.4a	Pin + bolts
R2 Repair	0,57	R4 Refurbish	R5 Remanufacture		2.4b	Spider 2 knots
R2 Repair	0,57	R4 Refurbish	R5 Remanufacture		2.4c	Spider 4 knots
R2 Repair	0,50	R4 Refurbish	R5 Remanufacture		2.4d	Plate
R2 Repair	0,57	R4 Refurbish	R5 Remanufacture	Raw Material	2.5a	Aluminium
R2 Repair	0,57	R4 Refurbish	R5 Remanufacture		2.5b	Glass
R2 Repair	0,57	R4 Refurbish	R5 Remanufacture		2.5c	Foil

Implementation

K.118

Biopartner5

Lendager



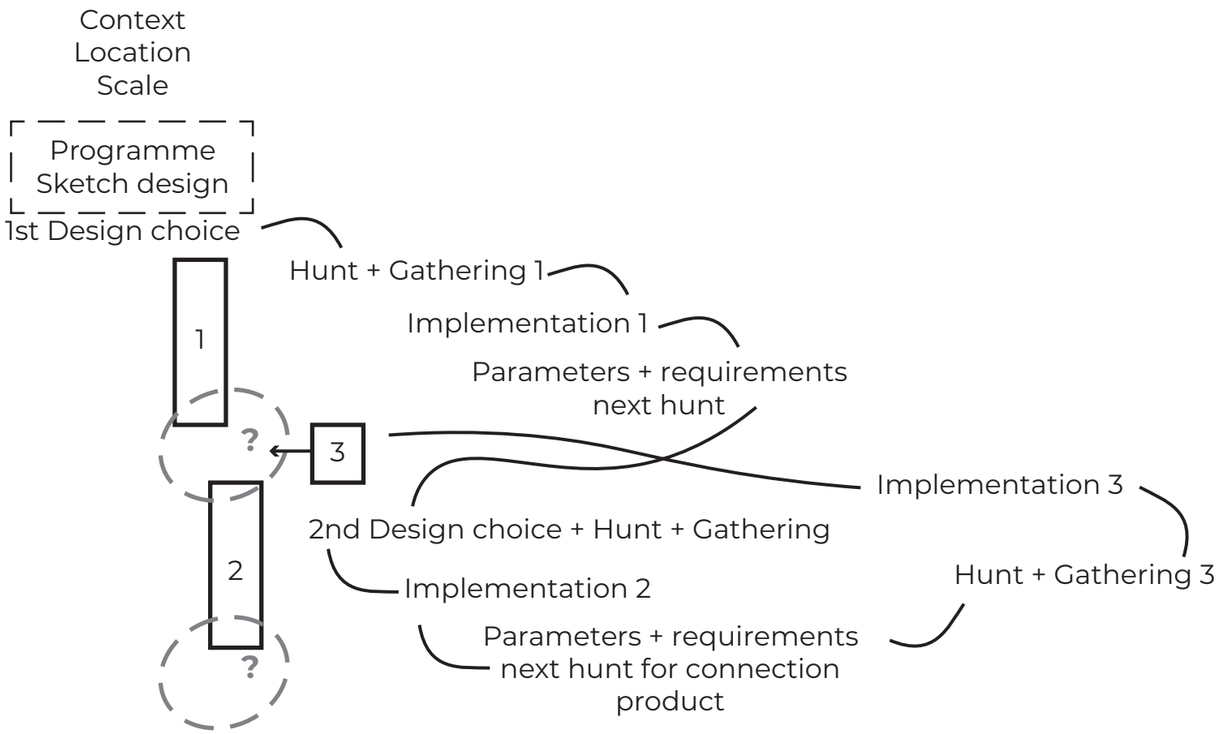
design processes

Integration of reuse within their designs

objectives related to reuse

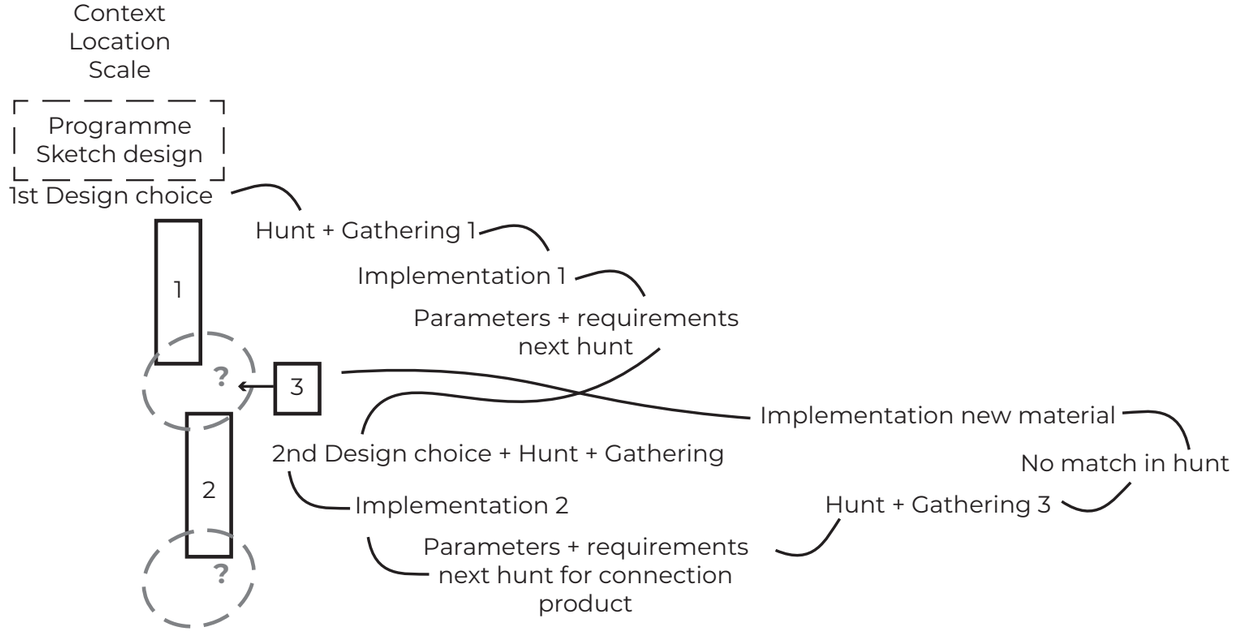
K.118

- Full reuse without additional costs.
- Material mining within a radius of 90 km
- Iterations of ‘hunting, gathering, implementing, setting parameters of the next hunt’
- Flexible design approach
- Dealing with the tolerances of reclaimed materials
- Designing with the uncertainty of not knowing what material you find next.



Biopartner5

- CO2 budget
- To develop with a low carbon footprint, sustainable use of materials has three major pillars:
  1. Prevent
  2. Urban mining first – 20%
  3. Renewable if possible – 40%
  4. Choose the most sustainable producer – 40%
- Biggest impact on reuse of structure
- Collages of materials



Lendager Group

- Business approach:
  circularity strategies create value in aesthetics
- Innovations with reclaimed materials
- Rethinking

Ein Mosaik aus wiederverwendeten Holzrahmen prägt die Gastfront an der Südseite.

Die Fenster sparen bis zu 95 Prozent des CO_2 ein, das sonst bei ihrer Herstellung freigesetzt würde

stab zu schaffen. Mit dieser neuen Konstruktionsmethode geht auch eine neue Ästhetik einher, die einen letztlich unvermeidlichen ökologischen Wandel der Branche verbildlicht.

Jenseits der Baumaterialien setzt die Lendager Group bei den Upcycle Studios auch auf ein flexibleres Miet- und Wohnmodell nach dem Prinzip der „Sharing Economy". Neben den privaten Wohnbereichen bieten die 20 Reihenhäuser auch Räume, die angemietet und geteilt werden können – als Büro, Werkstatt oder gemeinschaftliche Wohnraumerweiterung.

Die Lendager Group führt eine Tochtergesellschaft, die Lendager UP, die sich vor allem mit Ressourcenoptimierung und der Upcycling-Produktentwicklung beschäftigt. Zu ihren Projekten gehört das Kopenhagener Wohngebäude Resource Rows, für das ein Quadratmeter große Module aus den Ziegelwänden verlassener Gebäude geschnitten und im Neubau zu einer Fassade zusammengesetzt wurden. Für ein anderes Projekt, ein Ferienhaus, verwendeten die Lendager Group ebenfalls Holzüberschüsse der Firma Dinesen sowie ein Tragwerk aus „upgecycletem" und feuerbehandeltem Holz. Damit diese Gebäude keine Unikate der Nachhaltigkeitsarchitektur bleiben, legt die Firma ein Augenmerk auf die Kosten und Umsetzbarkeit der entwickelten Produkte. Denn wohl erst mit wirtschaftlichen Argumenten wird es gelingen, die Wiederverwertung von Materialien von einem Ausnahmeverfahren zu einer Norm der Branche werden zu lassen.

Aus dem Englischen von Sigrid Ehrmann

Architekten
Lendager ARC, Kopenhagen

Mitarbeiter
Anders Lendager, Anette Orth Laybourn, Mathias Rud Rasmussen, Nicholas Ransome, Niklas Holsøe, Iben Nørkjær, Torben Vestergaard, Sunniva Gårshol, Signe Balthazar Munk

Bauleitung
AG Gruppen, Odense

Landschaftsplanung
Bogl, Kopenhagen

Tragwerksplanung
MOE, Søborg

Hersteller
Fassade Lendager
Dach koppel
Türen Lendager, Krone Vindauer
Fenster Lendager, Krone Vindauer
Boden Dinesen, Lendager

Büro, Wohnzimmer, Werkstatt: Der zweigeschossige Eingangsbereich soll verschiedene Nutzungen ermöglichen. Unten: Im zweiten Obergeschoss und auf der Dachterrasse.

Design objective

Objective technical design

1. Reuse of building materials from vacant buildings being demolished or offered in second-hand markets takes precedence over the use of new building materials if the material is suitable for implementation in the design. (minimal 20% reuse, 40% renewable, 40% most sustainable supplier)

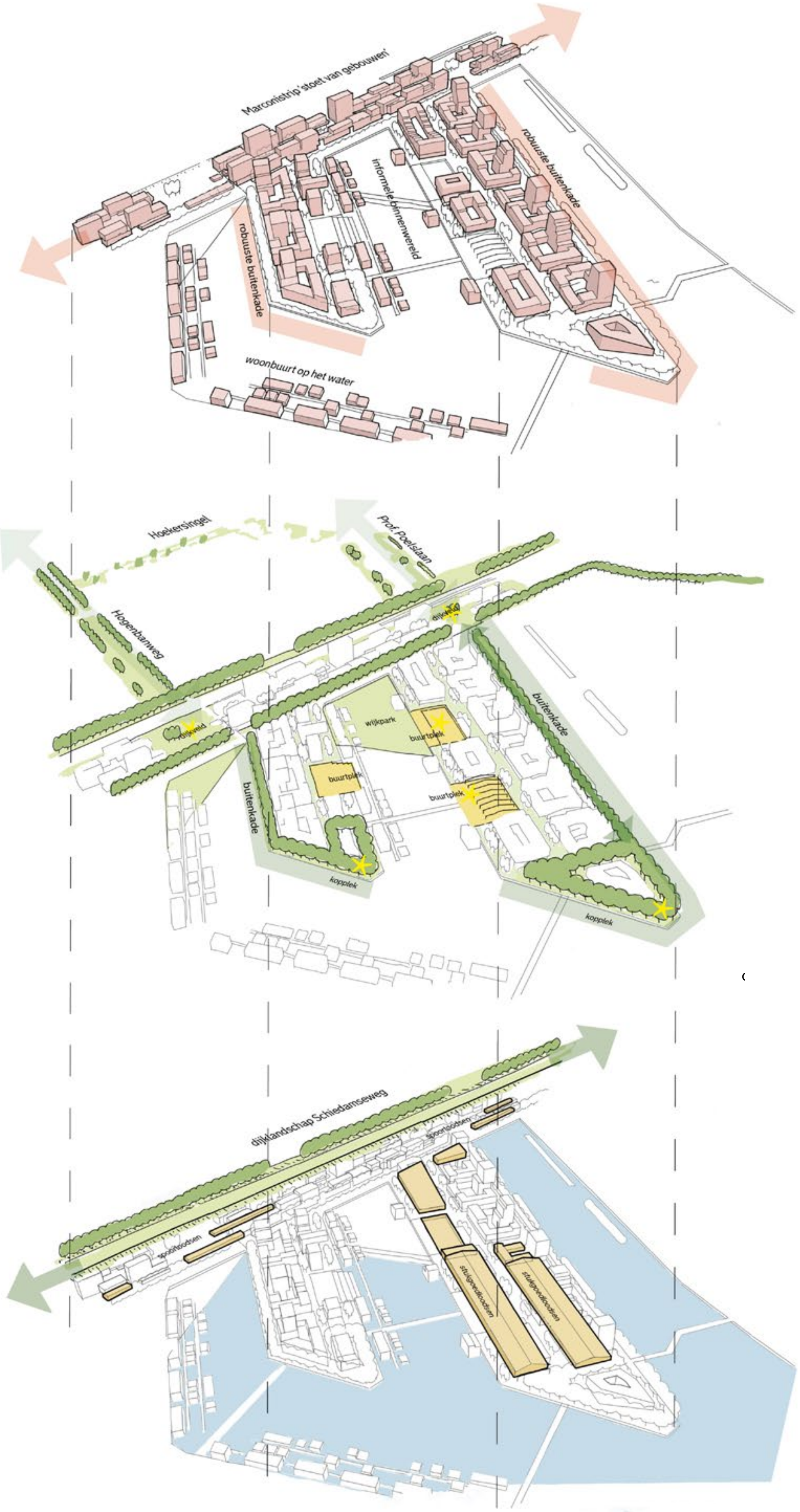
2. The goal is to find the optimal match for reclaimed building materials architecturally and functionally. However, the ‘scars’ of reclaimed materials may be seen or recognized in the design.

3. Disassembly and replaceability of building materials should be possible to make the next lifecycle possible.

4. The building’s performance in terms of energy efficiency should be taken into consideration when selecting building materials.

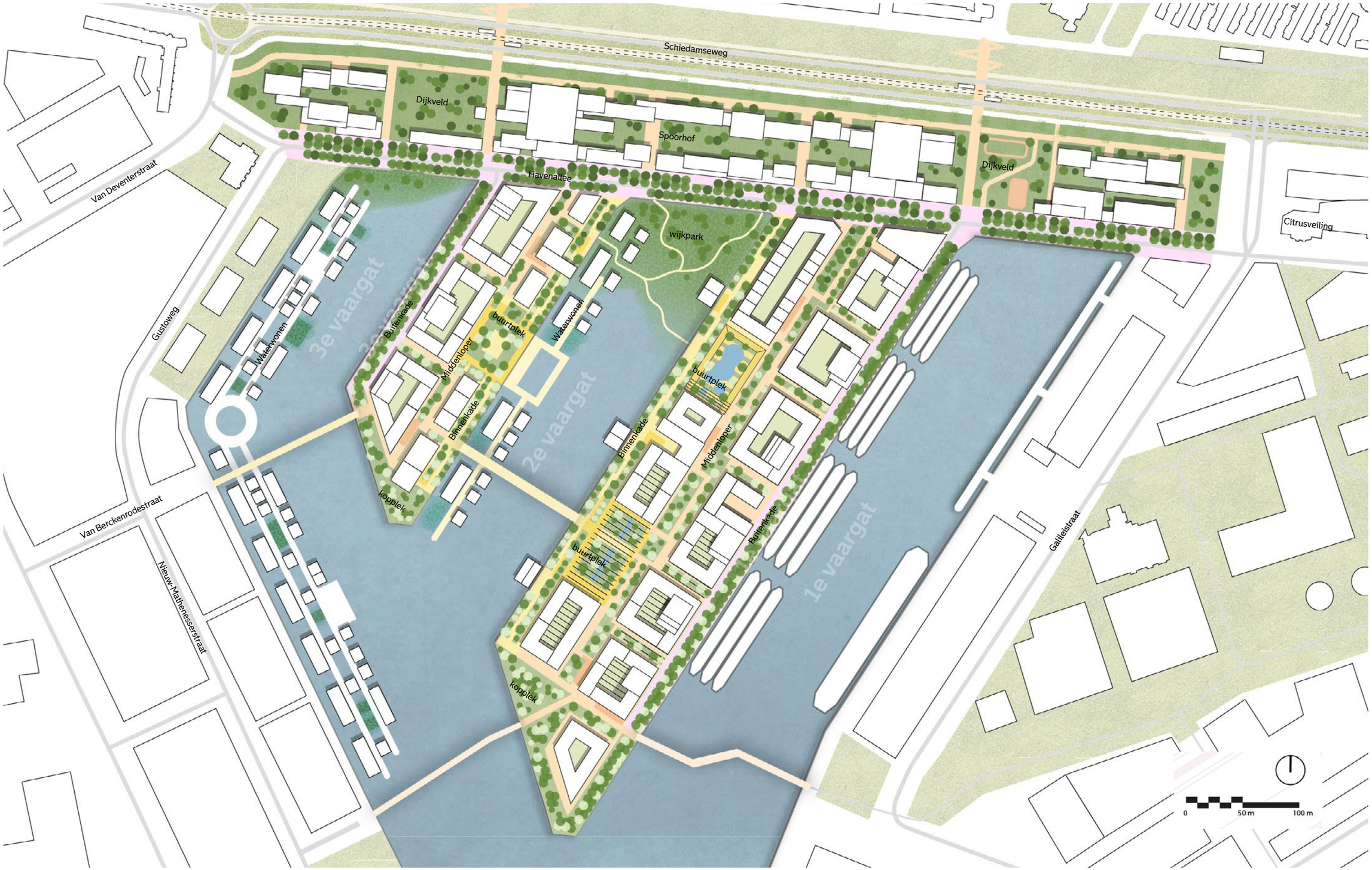
Merwehaven

Masterplan

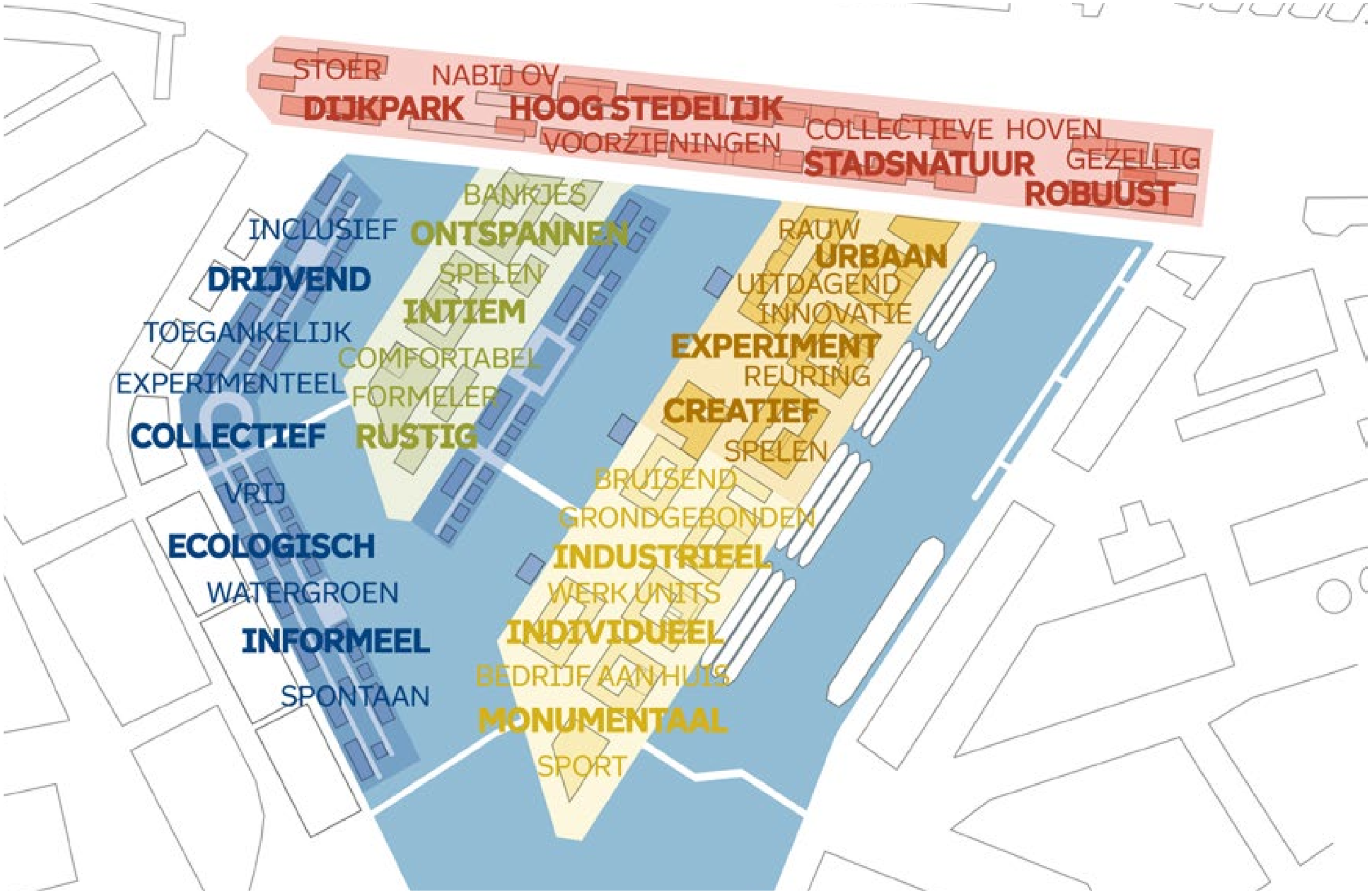


Marconistrip 'stoet van gebouwen'
robuuste buitenkade
informele binnenwereld
robuuste buitenkade
woonbuurt op het water
Hoekersingel
Prof. Poelslaan
Hogenbanweg
dijkveld
dijkveld
wijkpark
buurtplek
buurtplek
buurtplek
buitenkade
buitenkade
kopplek
kopplek
dijklandschap Schiedamseweg
spoorloodsen
spoorloodsen
stukgoedloodsen
stukgoedloodsen

Masterplan


Schiedamseweg
Dijkveld
Spoorhof
Dijkveld
Havenallee
wijkpark
Citrusveiling
Van Deventerstraat
Gustoweg
3e vaargat
2e vaargat
1e vaargat
Buitenkade
Middenloper
buurtplek
Waterwonen
Binnenkade
kopplek
Van Berckenrodestraat
Nieuw Mathenesserstraat
Galileïstraat
0
50 m
100 m

Masterplan


STOER
NABIJ OV
DIJKPARK
HOOGSTEDELIJK
VOORZIENINGEN
COLLECTIEVE HOVEN
STADSNATUUR
GEZELLIG
ROBUUST
BANKJES
INCLUSIEF
ONTSPANNEN
RAUW
URBAAN
DRIJVEND
SPELEN
UITDAGEND
INNOVATIE
INTIEM
TOEGANKELIJK
EXPERIMENT
COMFORTABEL
REURING
EXPERIMENTEEL
FORMELER
CREATIEF
COLLECTIEF
RUSTIG
SPELEN
BRUISEND
VRIJ
GRONDGEBONDEN
ECOLOGISCH
INDUSTRIEEL
WATERGROEN
WERK UNITS
INDIVIDUEEL
INFORMEEL
BEDRIJF AAN HUIS
SPONTAAN
MONUMENTAAL
SPORT


BARRIO·ABARROTES·COMIDA


77

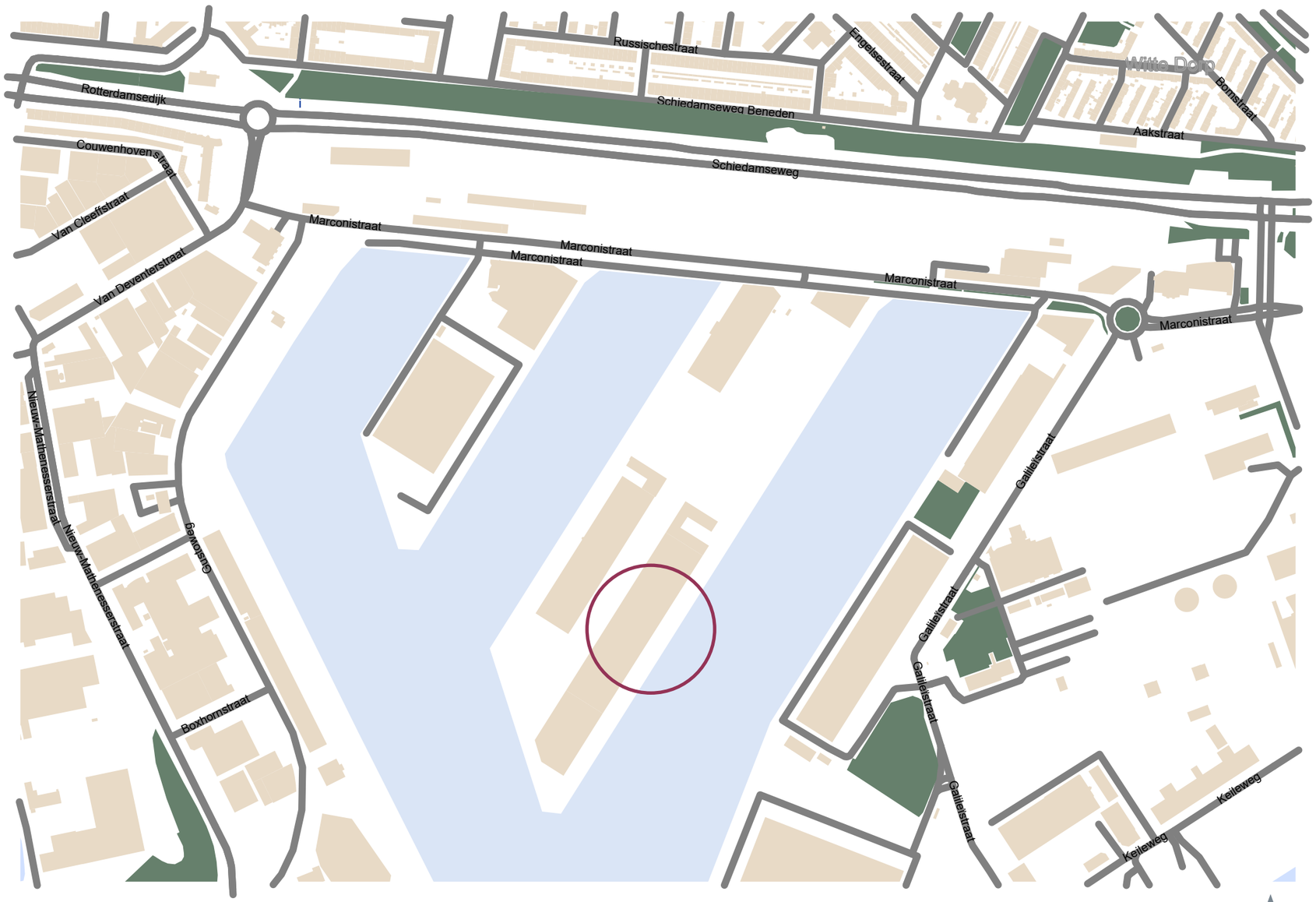

roest

Objective context

1. The masterplan for Merwehaven in Rotterdam focuses on a unique living in an innovative Makers-district.

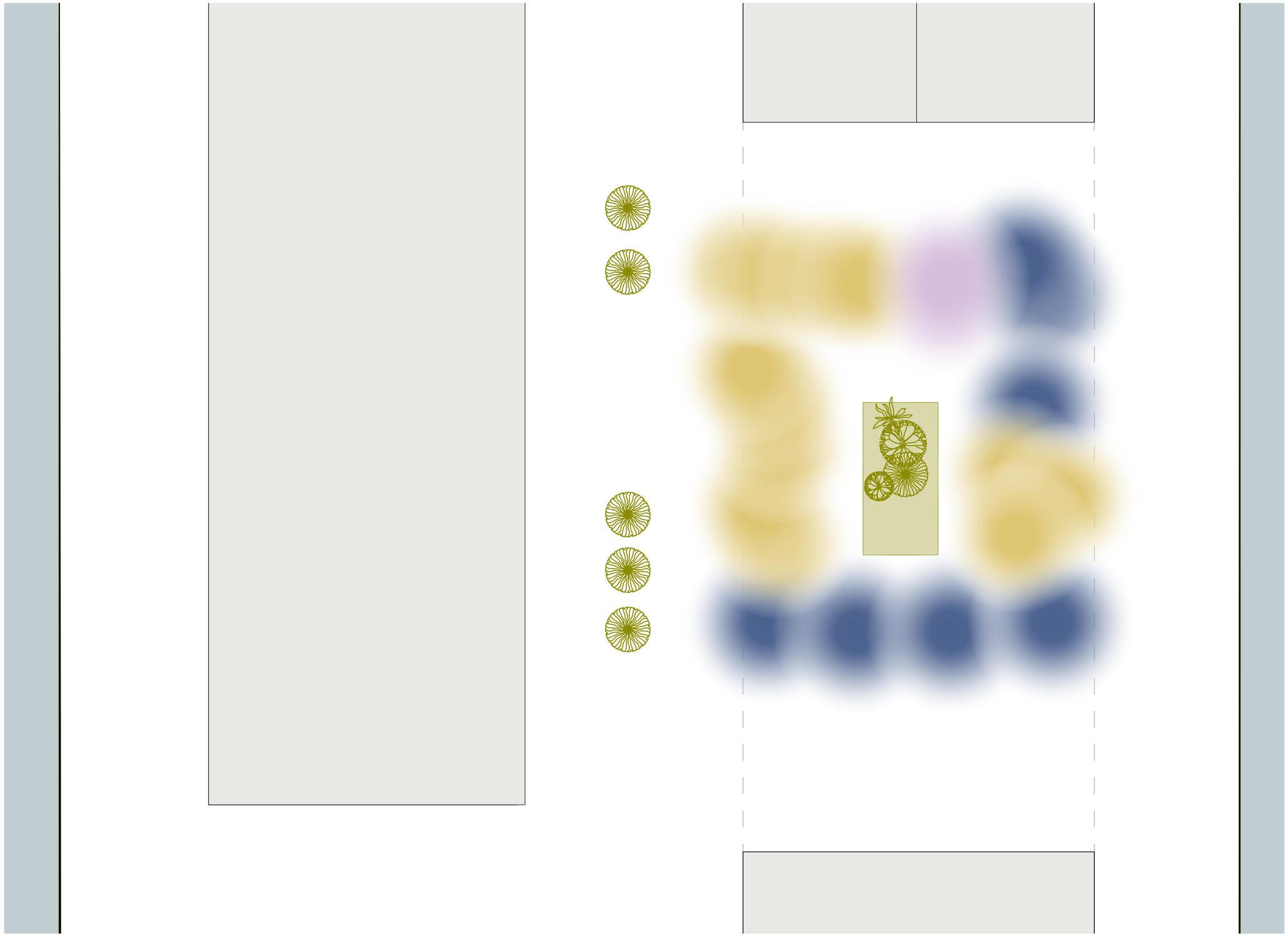
2. The building design is in line with the ambitions of the masterplan ‘Merwehaven’. However the design is not necessarily a 1-to-1 fit to the urban design and the function map in the masterplan.

Preliminary design

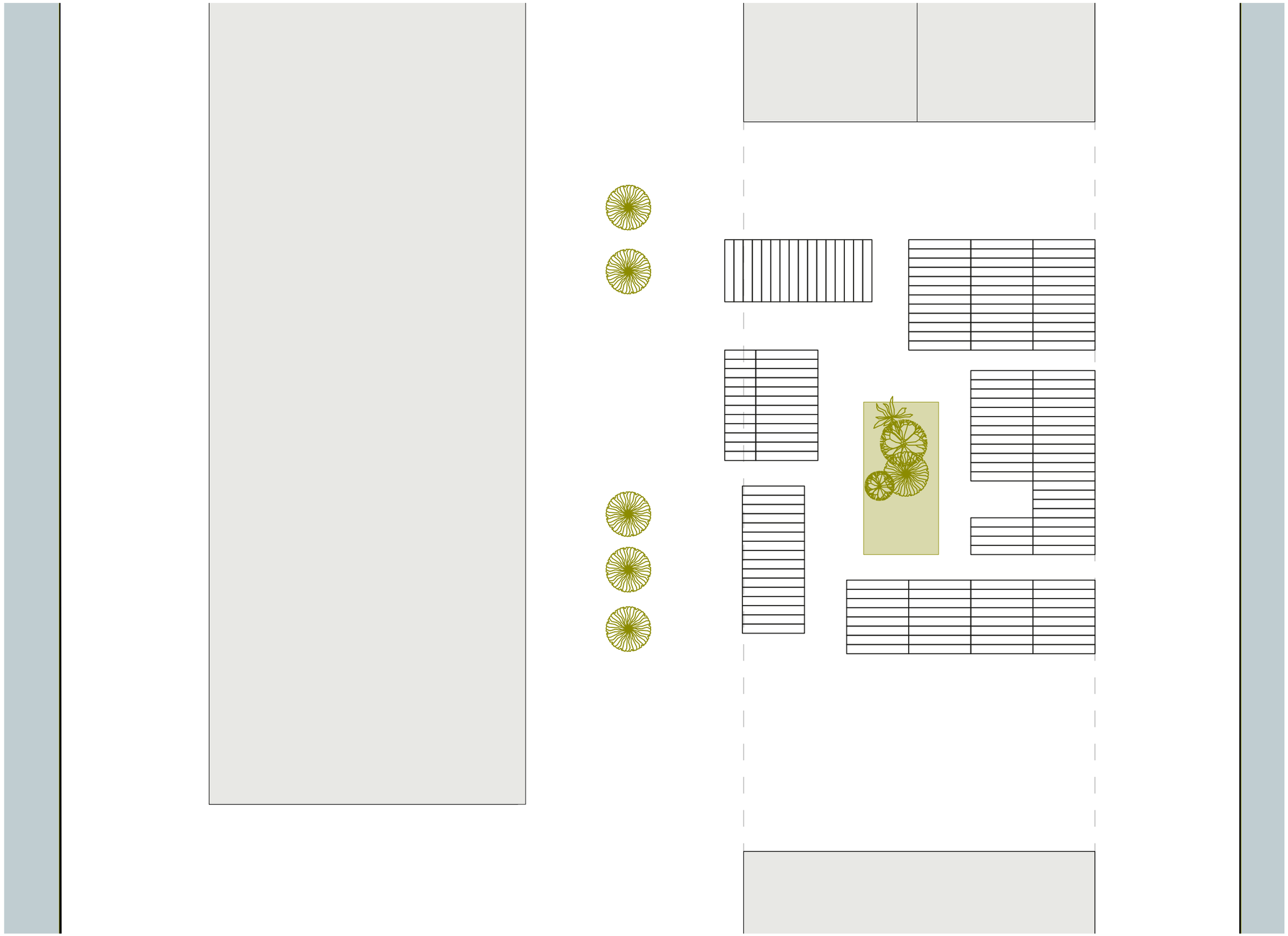

Russischestraat
Engelsestraat
Willie Dorn
Bomstraat
Rotterdamsedijk
Schiedamseweg Beneden
Aakstraat
Schiedamseweg
Couwenhovenstraat
Van Cleeffstraat
Van Deventerstraat
Marconistraat
Marconistraat
Marconistraat
Marconistraat
Marconistraat
Nieuw-Mathenesserstraat
Nieuw-Mathenesserstraat
Oudedijk
Boxhornstraat
Galileïstraat
Galileïstraat
Galileïstraat
Galileïstraat
Keileweg
Keileweg
Keileweg
N

scale 1:5000

Housing
Public Spaces
Makers Places



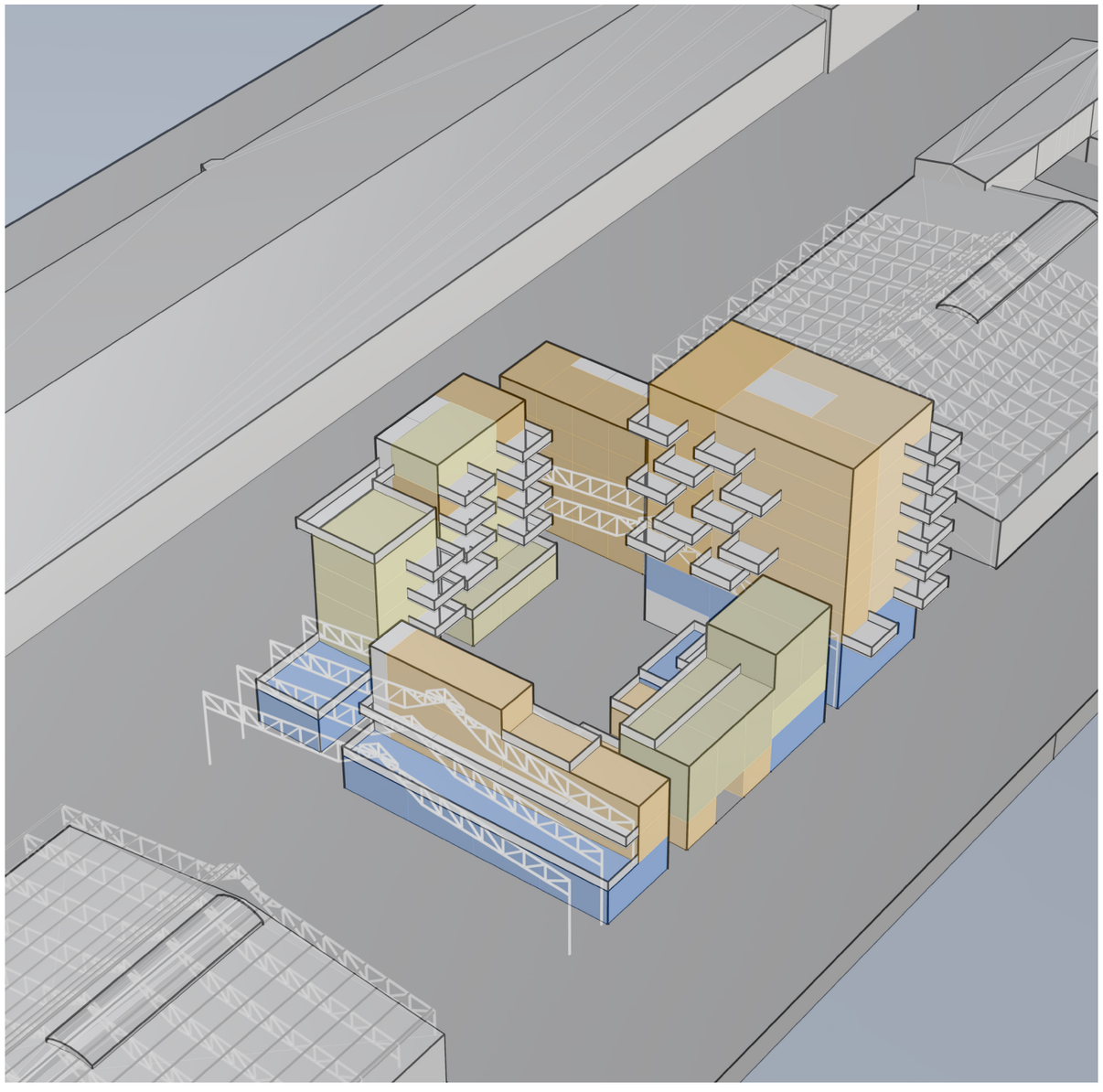
Scale 1:500



Scale 1:500

Scale 1:500

Programm

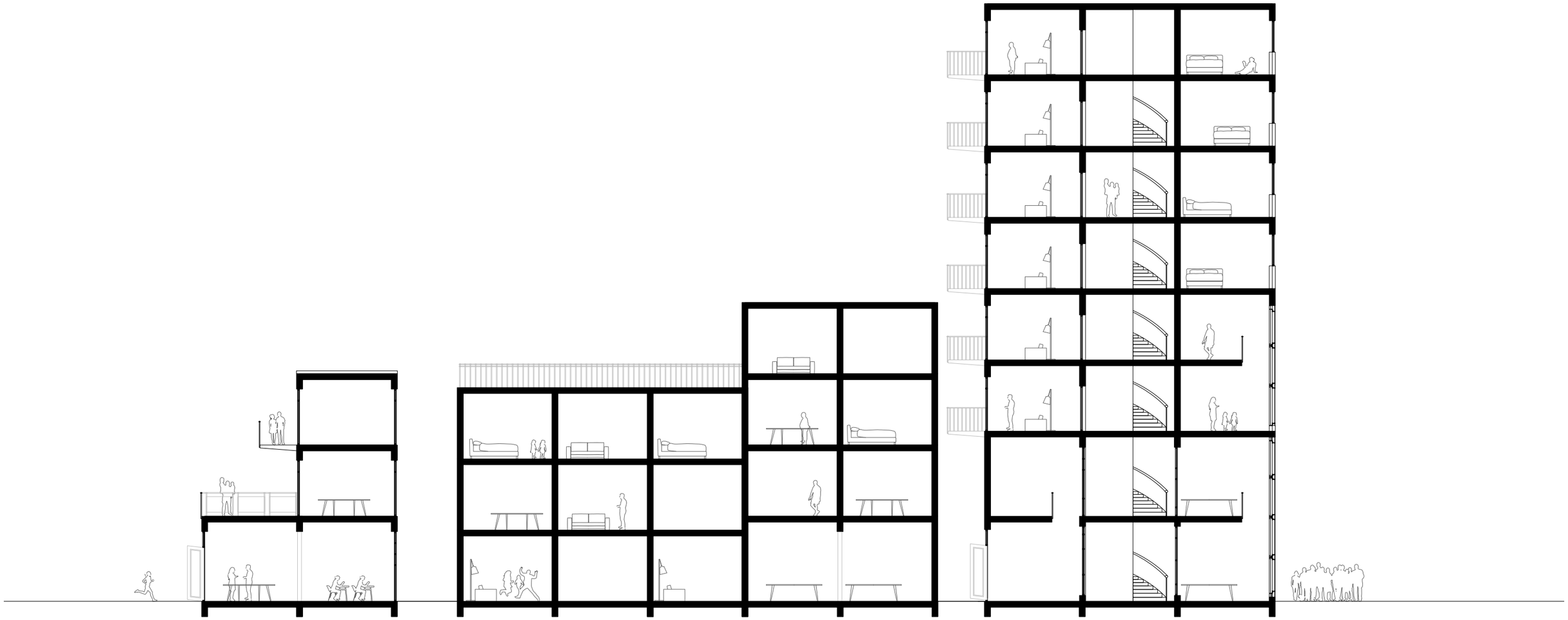


Makers Places
1087 m²

Public Spaces
233 m²

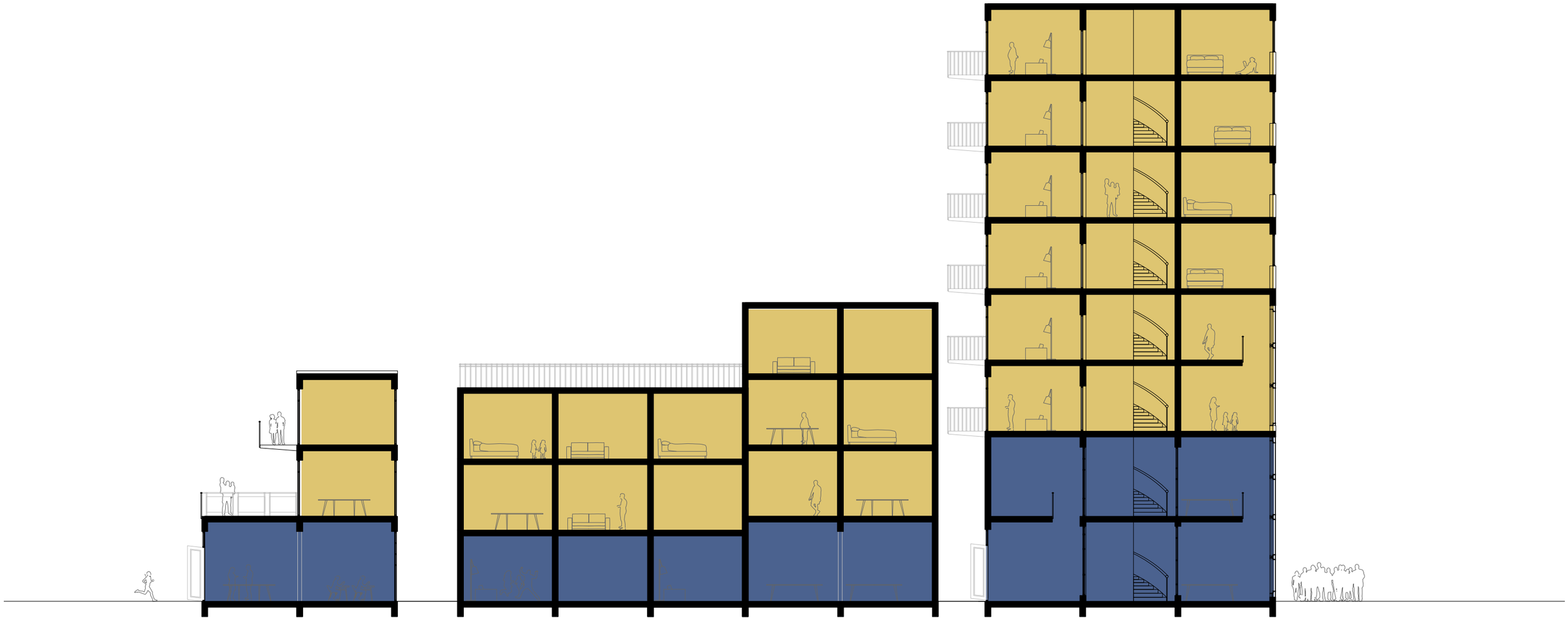
Housing

- studios
  38,9 m²
- family homes
  116,6 m²
- appartments
  77,7 m²



Housing
Public Spaces
Makers Places

Scale 1:200



Housing
Public Spaces
Makers Places

Towards P3

Design
Harbour character
Work/Live combination
Reclaimed materials on different levels

Reuse
Proceed the hunt
Asses materials

Data
Measure impact of circularity strategies
Improve the tool