



# RETHINKING ROOFS

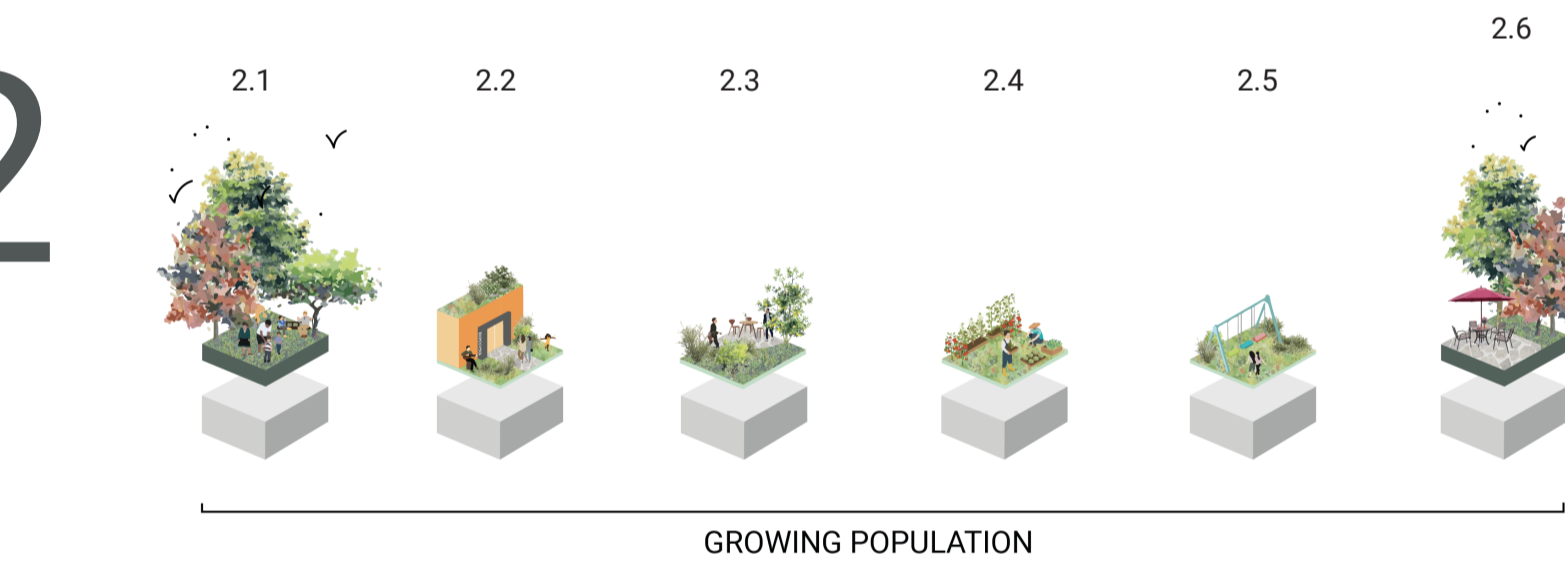
# TOOLKIT DESIGN



## 1

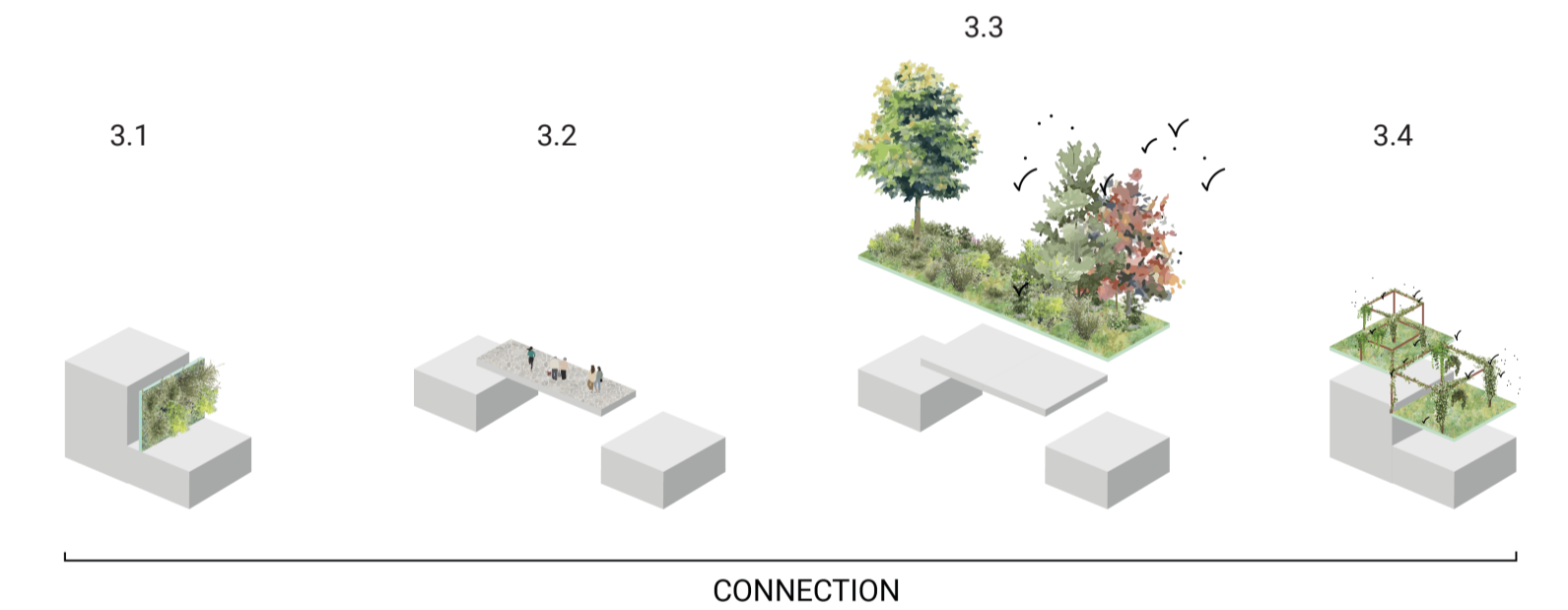
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12	1.13	1.14	1.15	1.16
<b>PROPERTIES</b>	<b>LACK OF BIODIVERSITY</b>									<b>UHI-EFFECT (medium) X FLOODING X ENERGY TRANSITION</b>						
water storage	0mm	70-300mm	18mm	25mm	19mm	30-80mm	30-80mm	150-370mm	110-160mm	95-150mm	95-150mm	70-80mm	70-80mm	70-126mm	180-230mm	95-150mm
substrate layer	0mm	0mm	30mm	60mm	60mm	60-150mm	150-210mm	230-400mm	230-400mm	0mm	80mm	60-80mm	80-210mm	80-400mm	250-400mm	80mm
weight	>6kg/m2	70-300kg/m2	55kg/m2	90kg/m2	90kg/m2	<95kg/m2	95kg/m2	310kg/m2	320kg/m2	<120kg/m2	120kg/m2	<95kg/m2	95kg/m2	150kg/m2	600kg/m2	120kg/m2
vegetation	no	no	sedum	sedum (herbs, grasses)	sedum, herbs grasses	herbs, bushes	herbs, bushes	perennials, trees, grass, pavement	perennials, trees, grass, pavement	no	sedum	herbs, bushes	herbs, bushes	vegetables, fruits	perennials, trees, grass, pavement	sedum
reference	Solarge DUO	Waterdak (Amsterdam Rainroof)	Dakbegroeiing lichtgewicht (Optigrün)	Dakbegroeiing economisch dak (Optigrün)	Meander FKM 30 (Optigrün)	Natuurdak (Optigrün)	Natuurdak (Optigrün)	Drossel Intensief (Optigrün)	Daktuin (Optigrün)	Solargroendak WRB (Optigrün)	Solargroendak WRB (Optigrün)	Natuurdak (Optigrün)	Natuurdak (Optigrün)	Dakbegroeiing (dakmoestuin) (Optigrün)	Dakpark (verblijfsdak) (Optigrün)	Solargroendak WRB (Optigrün)
cost	€257/m2 (Vattenfall)	€100-150/m2 (Duurzaam D10)	€45-100/m2 (Sedumdak-bedeckking)	€45-100/m2 (Sedumdak-bedeckking)	€45-100/m2 (Sedumdak-bedeckking)	€100-120/m2 (Interpolis)	€120-150/m2 (Interpolis)	€120-150/m2 (Interpolis)	€120-150/m2 (Interpolis)							

## 2



	2.1	2.2	2.3	2.4	2.5	2.6
<b>PROPERTIES</b>	<b>GROWING POPULATION</b>					
function	public park, event area	green community centre, cafe, yoga school	green, outdoor workspace	vegetable garden	shared rooftop garden, playground	rooftop garden, terrace
accessibility	public	public	communal	communal	private	private
maintenance	municipality	municipality	municipality, private ownership	housing corporation	housing corporation, private ownership	private ownership
building height	<15m	<15m	0-40m	0-40m	0-40m	0-40m
reinforce supporting structure	yes	yes	yes	yes	yes	no
ownership	housing corporation, municipality	municipality	property manager	community (residents)	community (residents)	owner

## 3



	3.1	3.2	3.3	3.4
<b>PROPERTIES</b>	<b>CONNECTION</b>			
function	green facade	elevated walkway	green bridge	green pergolas: enrich, strengthen connections for flora and fauna
accessibility	public, community, private	public, community	nobody	nobody
maintenance	municipality, community, house owner	municipality	municipality	municipality, community, house owner
reinforce supporting structure	no	yes	yes	no
ownership	housing corporation, municipality, private ownership	housing corporation, municipality	housing corporation, municipality	housing corporation, municipality, private ownership

Rotterdam's almost untapped roofscape offers an exceptional chance to solve large urban, and environmental problems cities are facing nowadays. Take for instance, climate change, energy transition, loss of biodiversity, and the shortage of public places. Therefore we should rethink flat roofs, and expose their potential. In many different ways, they could contribute to the development of a sustainable and resilient city in the future. Especially, multifunctional, green roofs are able to reduce heat stress, store (temporarily) water, purify the air, enrich biodiversity, and accommodate social functions, especially when there is a possibility to connect all those 'hidden', unused spaces in the city.

There are already a lot of initiatives in Rotterdam, that come up with all different ideas to fill in the 18 km<sup>2</sup> of flat roofs we have at our disposal. However, there are a handful of flat roofs that are already transformed into green roofs (40.000 in 2019) (Rotterdam, 2022) for instance. This is just 0,2% of the available surface, in other words, almost nothing has transformed yet. If we want to prevent our cities from flooding, heat stress, and overcrowded public squares and parks, we need to do something with our roofs.

In the next 10 years, the municipality of Rotterdam aims for all potential flat roofs in the city center to transform into either green surfaces or surfaces that provide our city with renewable energy, by implementing solar panels. To achieve this ambition we need your help!

The decision tree on the other page tells you what the potential of your roof is. The potential function of your roof is based on the type of space (whether you have a pitched roof, semi-flat roof, or a flat roof), the amount of surface available on your roof, the location of your roof (in a zone that suffers highly from heat stress or flooding), ownership of the roof (public, private, communal),

and access to the roof (indoor or outdoor). To release the (re)development of your roof, subsidies are available from the municipality. This is about 75-100 €/m<sup>2</sup> depending on the multifunctionality of your future roof. When you are not able to transform your roof yourself, it is possible to outsource it to the municipality or another party.

When we are not going to do this together in the next few years, our urban, living environment will become more and more unpleasant to live and work in. So, rethink your roof!