MODAL WARFARE IS DYING...
BUT WHAT IS LIVING?

KEVIN J. KRIZEK

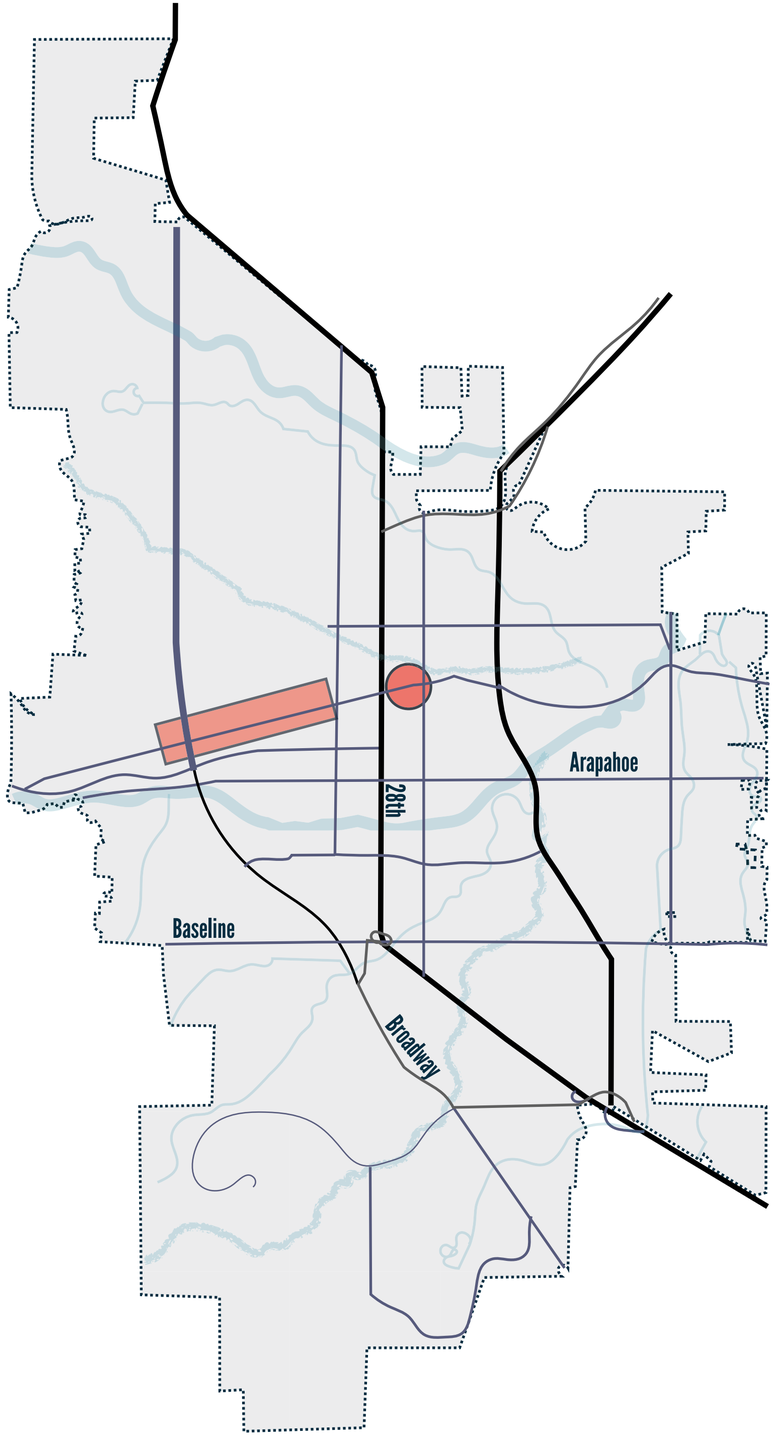
BOULDER TMP 2018

21 MARCH 2018

Environmental Design
UNIVERSITY OF COLORADO BOULDER

www.vehicleforasmallplanet.com

Radboud University


Arapahoe
28th
Baseline
Broadway

1

LET ACCESS BE your WATCHWORD

2

ADAPT CITY STREETS

3

LEVERAGE STRENGTHS

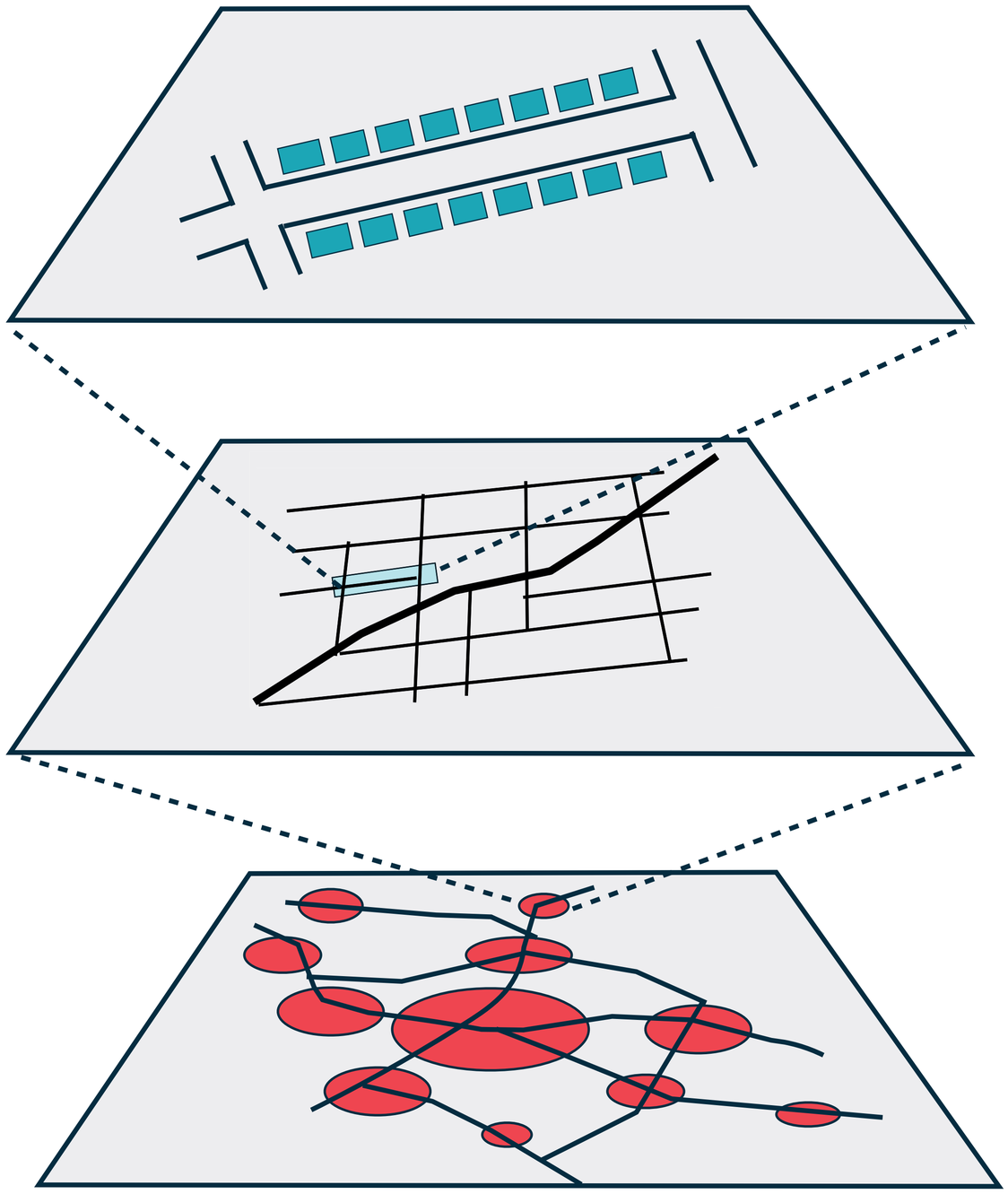
1 - LET ‘ACCESS’ BE YOUR WATCHWORD

$$F = G \frac{m_1 m_2}{d^2}$$

ATTRACTION

RESISTANCE

ACCESS & TRANSPORT: SCALE & SCOPE?

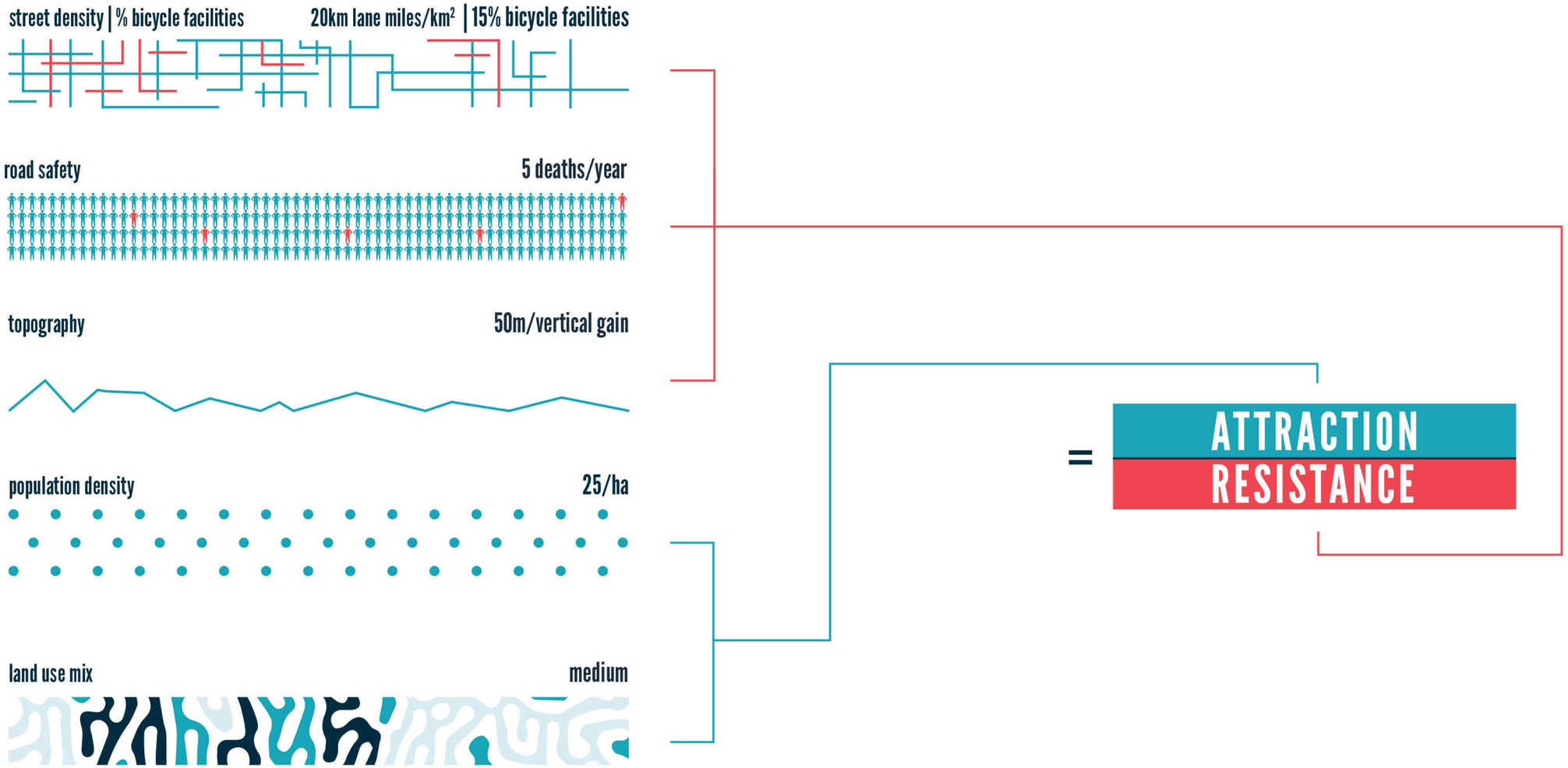


$$\text{ACCESS} = \frac{m_1 m_2}{d^2}$$

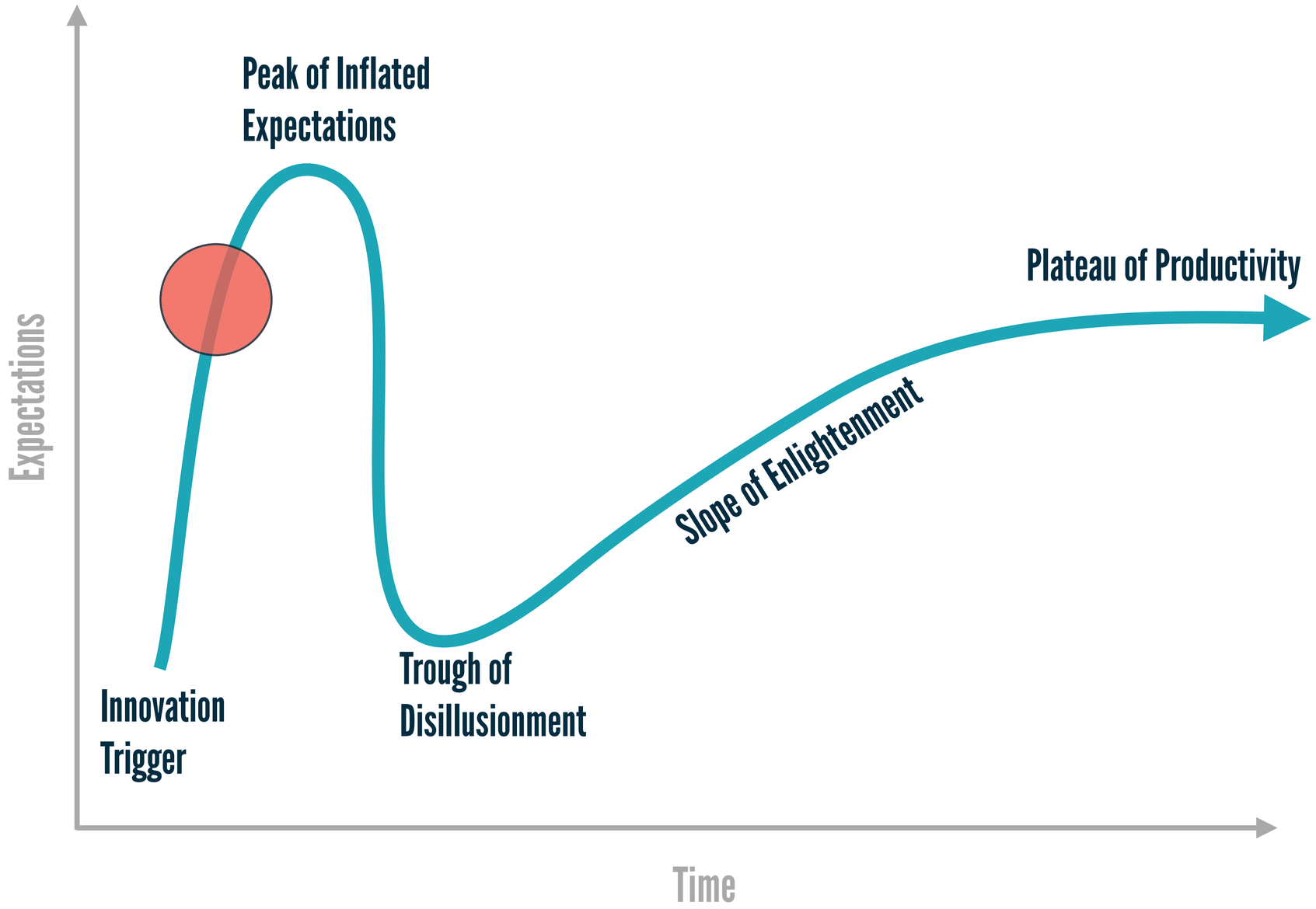
ATTRACTION
PROXIMITY TO DESTINATIONS

RESISTANCE
CONNECTIONS TO DESTINATIONS

ACCESS & IMPORTANT URBAN FORM DETERMINANTS



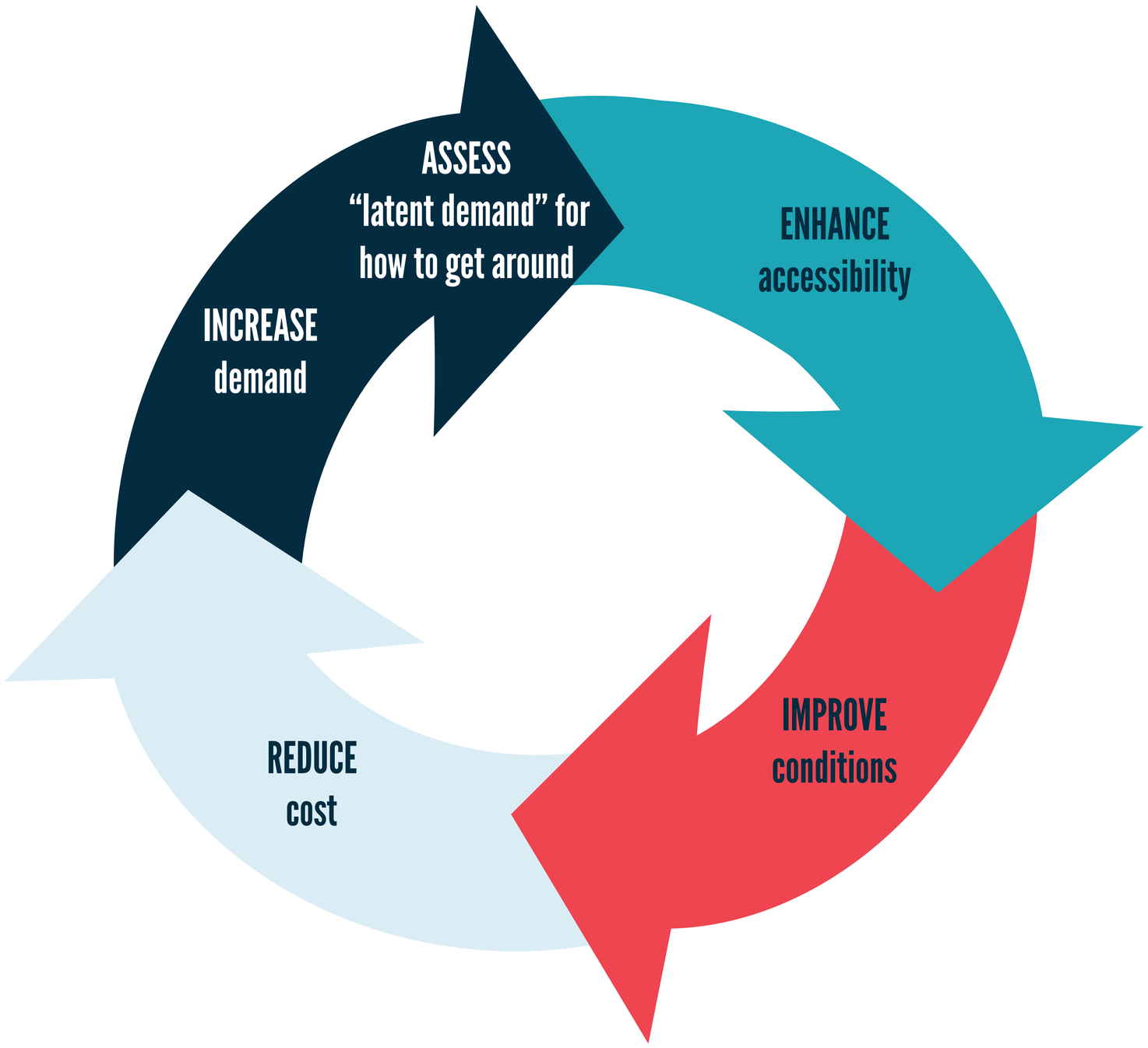
2 - ADAPT CITY STREETS



source: Gartner hype cycle

Images from: Urban Mobility: A New Design Approach for Urban Public Space. AWNB by Ben Immers, Bart Egeter, Johan Diepens, Paul Weststrate, 2016.

TRANSPORT'S POSITIVE INFRASTRUCTURE FEEDBACK LOOP

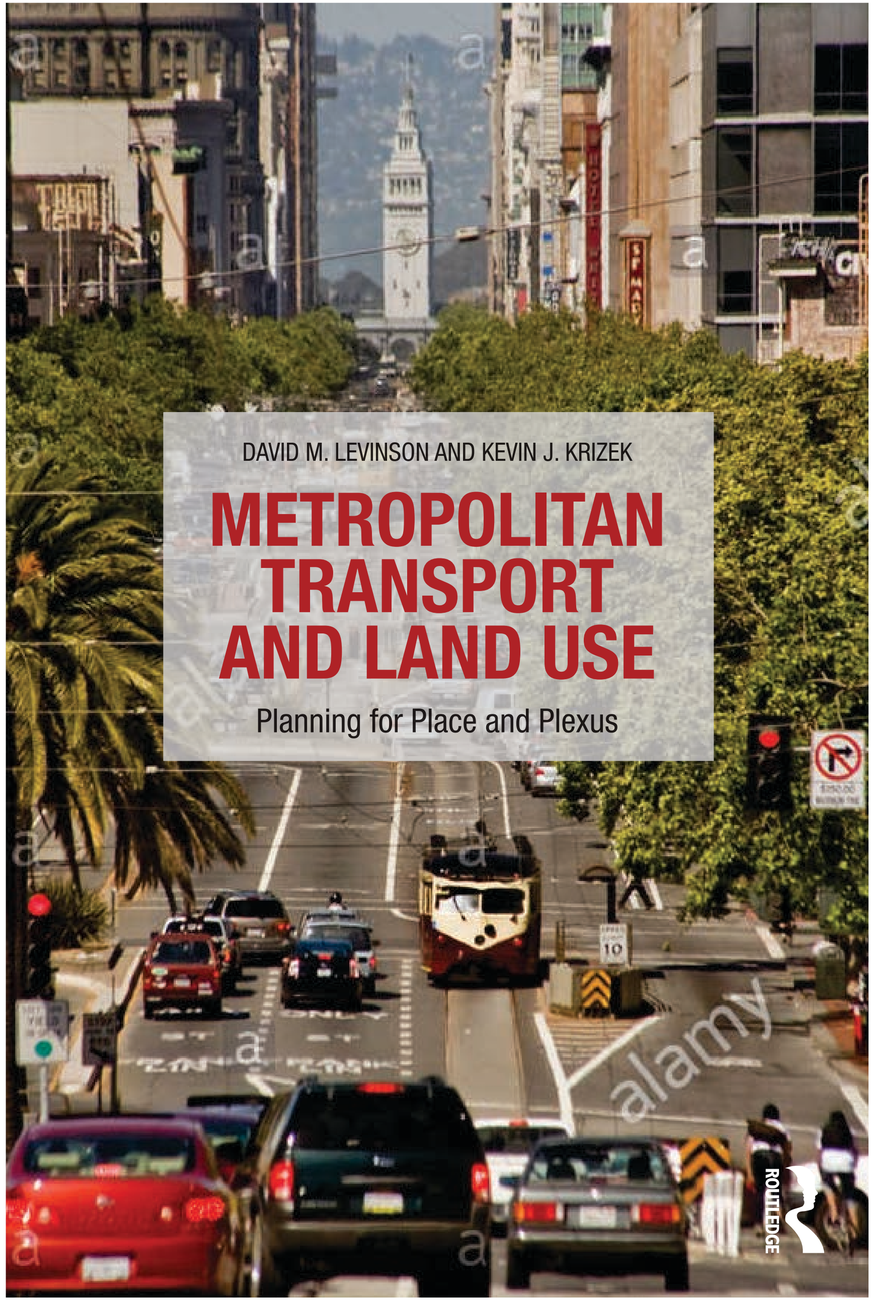


Adapted from: "Diamond of Assembly" (Chapter 12, Planning for Place and Plexus: Metropolitan Land Use and Transport) & prompted by David Levinson

The End of Traffic & the Future of Access

A Roadmap to the New Transport Landscape

David M. Levinson • Kevin J. Krizek

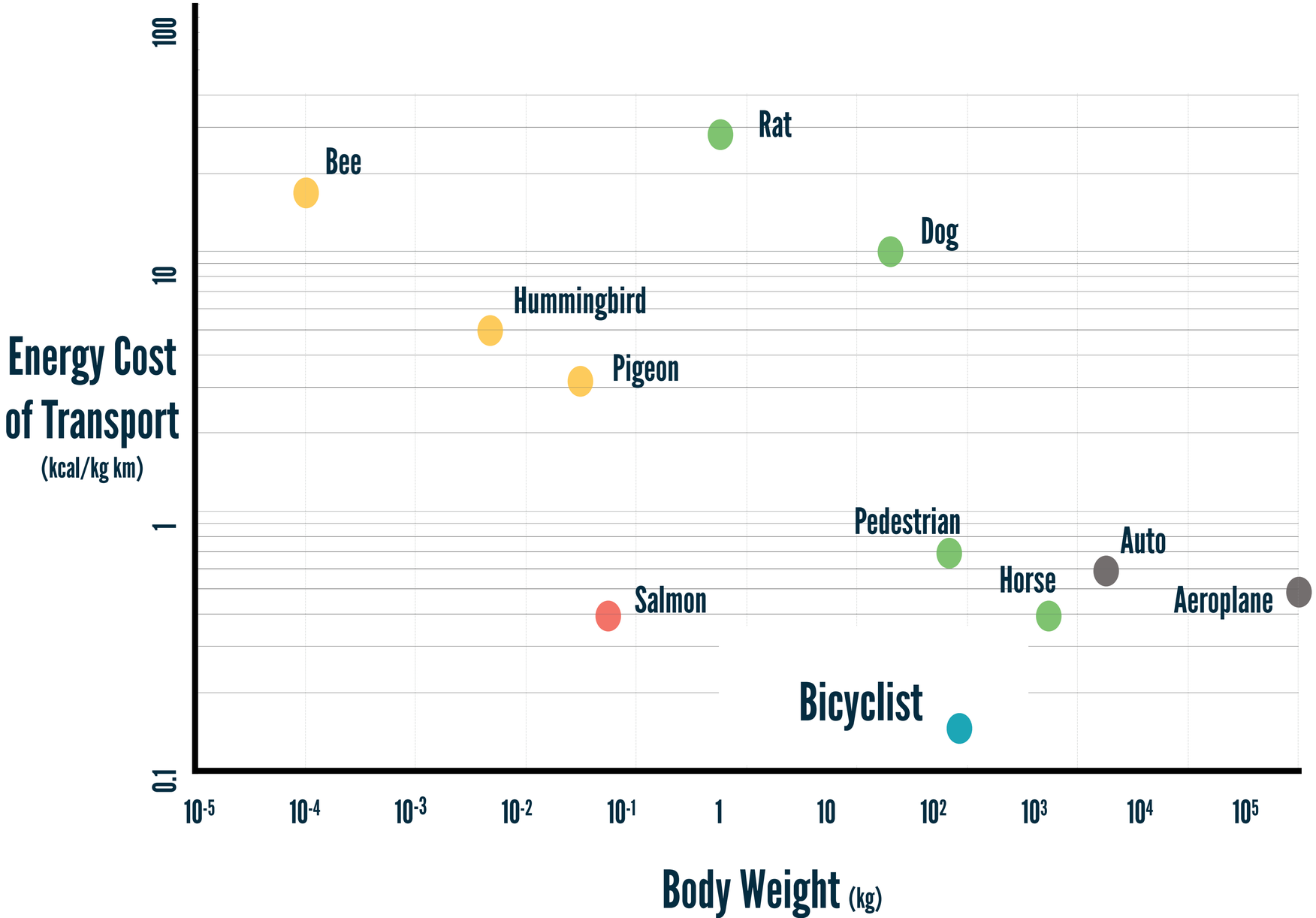


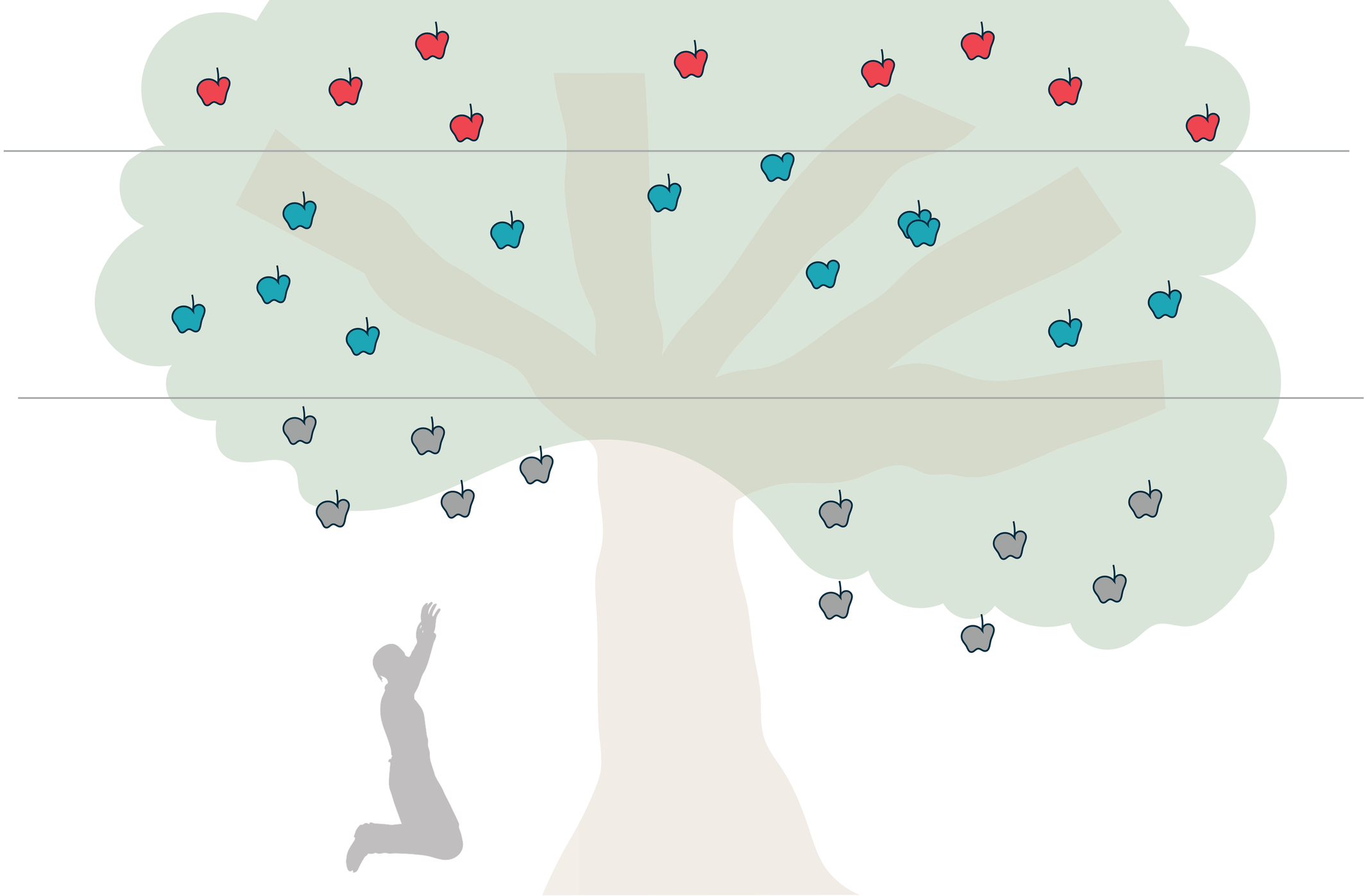
Bendik Kalkenborn 2015

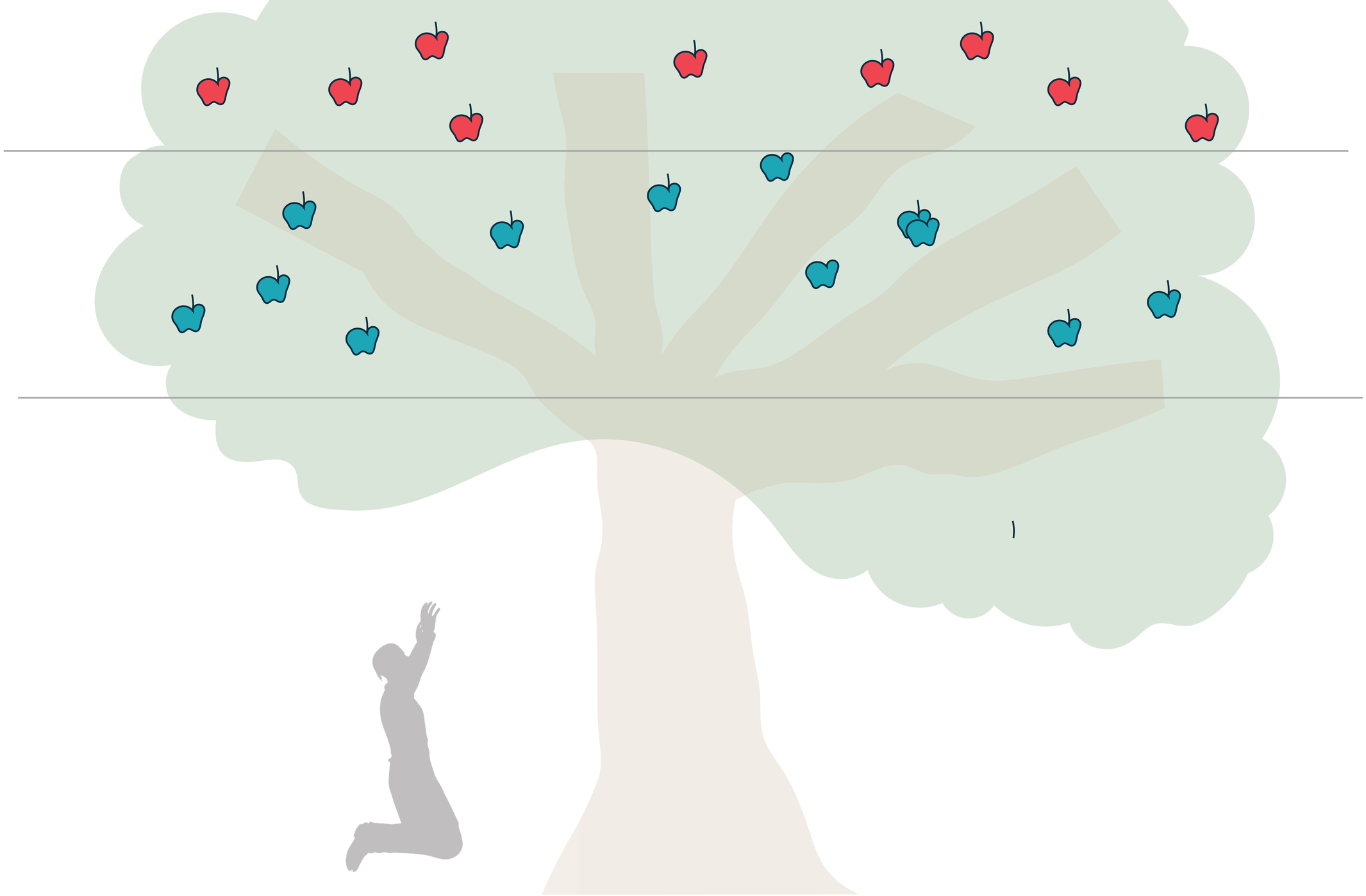
63rd STR
154
594

3 - LEVERAGE STRENGTHS

FORMS OF TRANSPORT HAVE BIG DIFFERENCES IN ENERGY EFFICIENCY







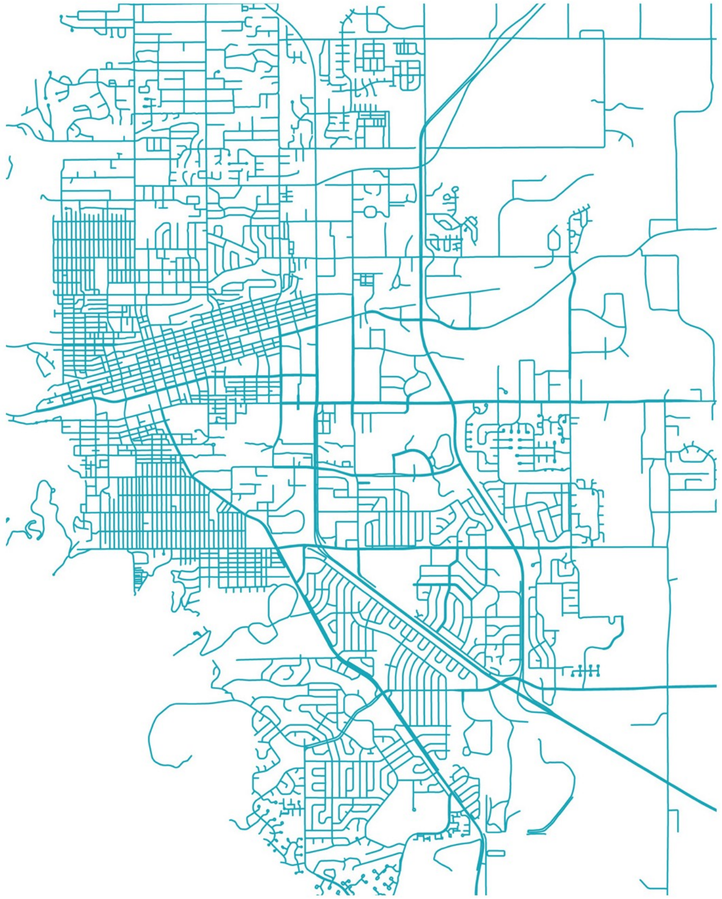
BOULDER
United States

AMSTERDAM
The Netherlands

MEDELLIN
Colombia

BOULDER

United States

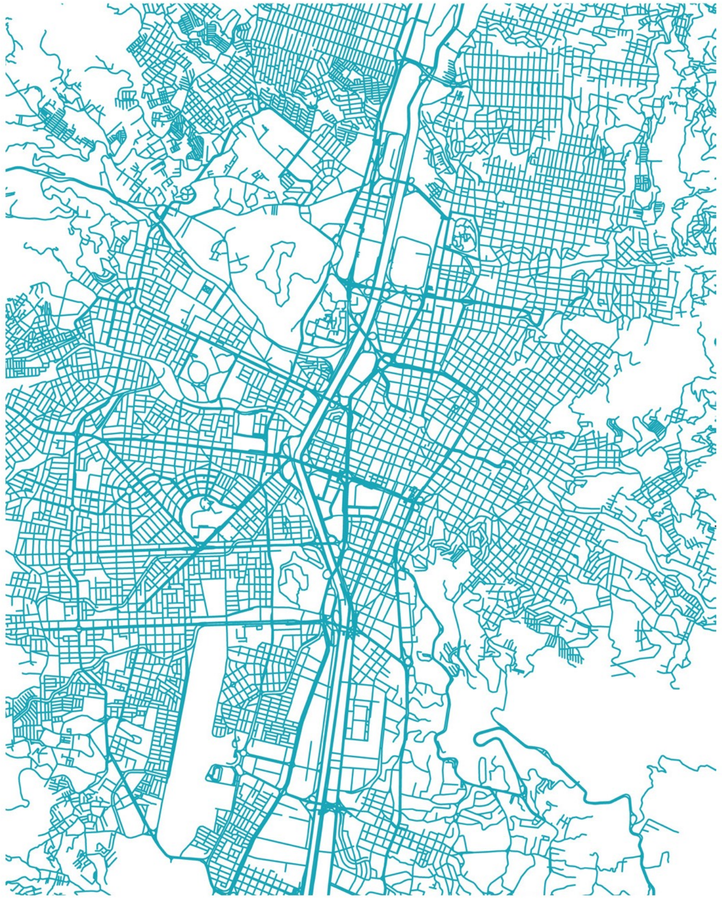


AMSTERDAM

The Netherlands

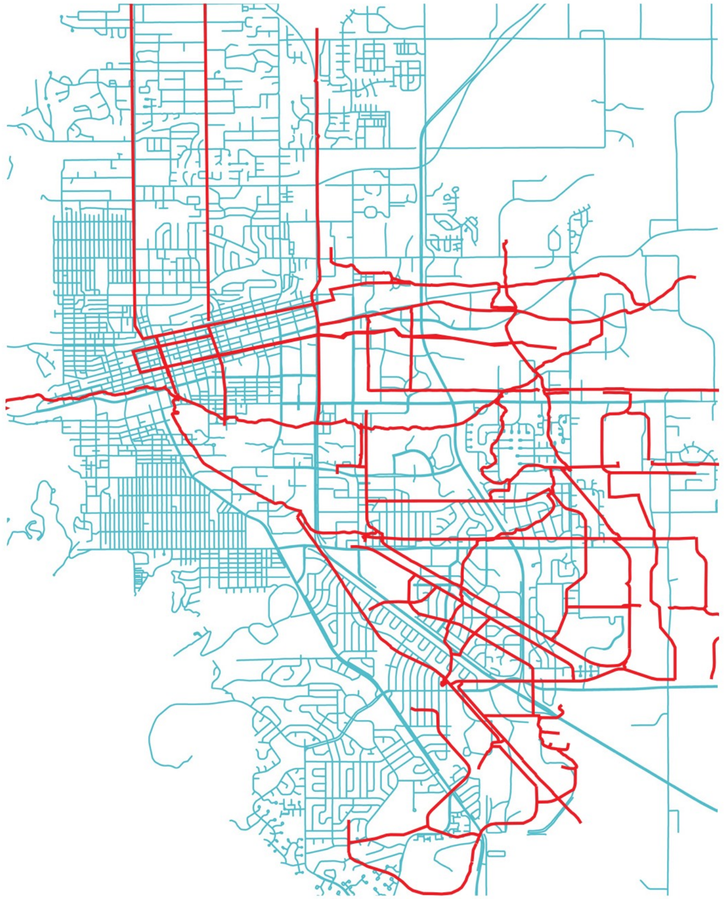
MEDELLIN

Colombia



BOULDER

United States



25% bicycle lanes

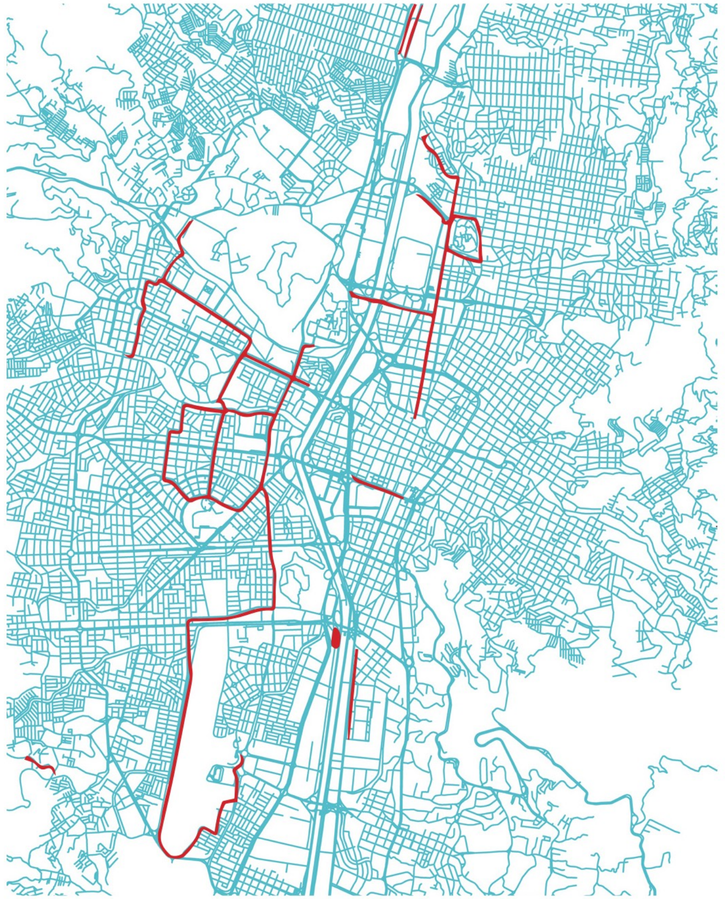
AMSTERDAM

The Netherlands

80% bicycle lanes

MEDELLIN

Colombia



10% bicycle lanes

BOULDER
United States

street density | % bicycle facilities

8km lane miles/km² | 25% bicycle lanes

AMSTERDAM
The Netherlands

28km lane miles/km² | 80% bicycle lanes

MEDELLIN
Colombia

25km lane miles/km² | 10% bicycle lanes

BOULDER
United States

street density | % bicycle facilities

8km lane miles/km² | 25% bicycle lanes

road safety

4 deaths/ year

topography

180m/vertical gain

population density

15/ha

land use mix

low

AMSTERDAM
The Netherlands

28km lane miles/km² | 80% bicycle lanes

MEDELLIN
Colombia

25km lane miles/km² | 10% bicycle lanes

Street density and percent of bicycle facilities calculated from GIS; road safety interpreted from annual averages for pedestrian/bicycle related deaths; values for topography gleaned from elevation data; population density recalculated using values from wikipedia and for entire city, not restricted to the area shown earlier; land use mix assessed experientially.

BOULDER
United States

street density | % bicycle facilities — 8km lane miles/km² | 25% bicycle lanes

road safety — 4 deaths/ year

topography — 180m/vertical gain

population density — 15/ha

land use mix — low

AMSTERDAM
The Netherlands

28km lane miles/km² | 80% bicycle lanes

2 deaths/year

10m/vertical gain

50/ha

high

MEDELLIN
Colombia

25km lane miles/km² | 10% bicycle lanes

100 deaths/year

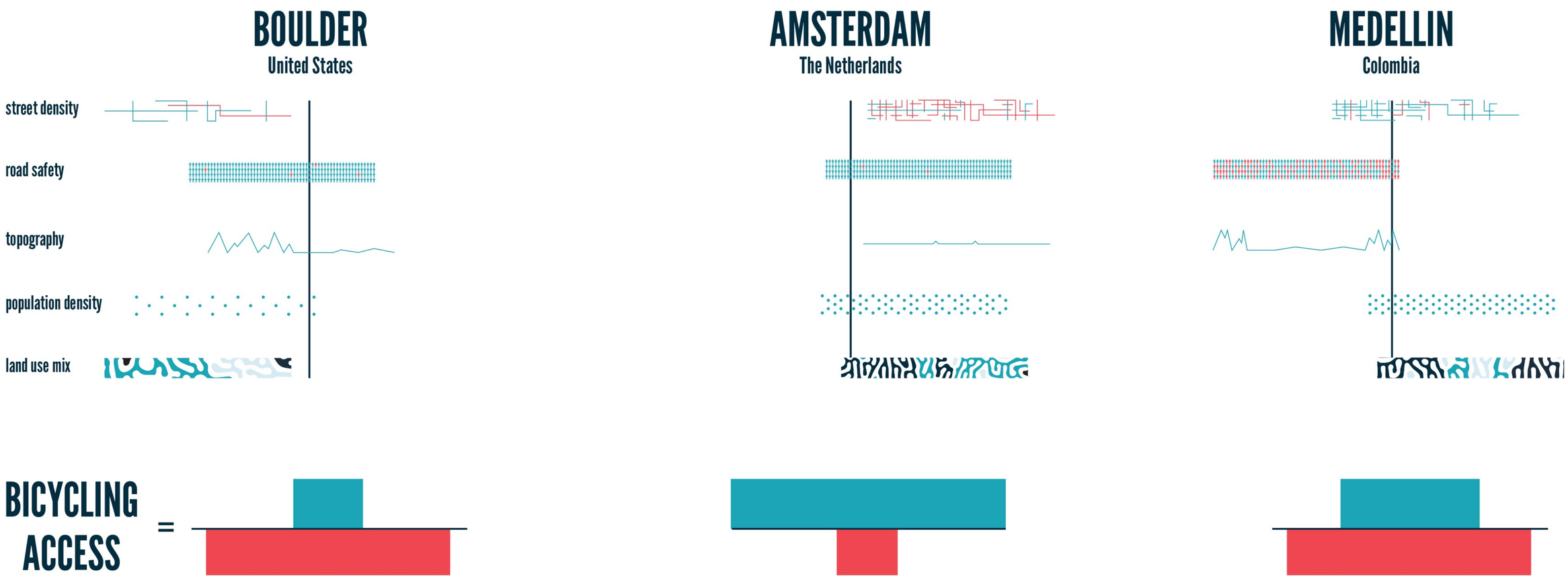
350m/vertical gain

70/ha

high

Street density and percent of bicycle facilities calculated from GIS; road safety interpreted from annual averages for pedestrian/bicycle related deaths; values for topography gleaned from elevation data; population density recalculated using values from wikipedia and for entire city, not restricted to the area shown earlier; land use mix assessed experientially.

THRESHOLDS to MEASURE and ADVANCE BICYCLING ACCESS



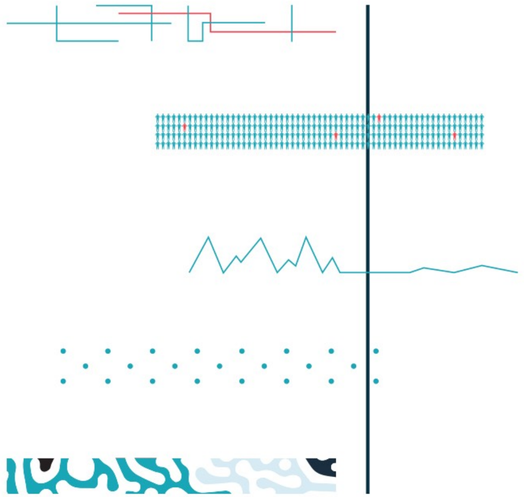
$$\frac{m_1 m_2}{d^2}$$

ATTRACTION

RESISTANCE

BOULDER

United States



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THANKS TO: JIM CHARLIER, WILL TOOR, ALANA WILSON, KRISTA NORDBACK, DAVE NEWPORT, DAVID KANG, HEIDI VAN GENDEREN, ROBIN MCWATERS & OTHERS

Environmental Design
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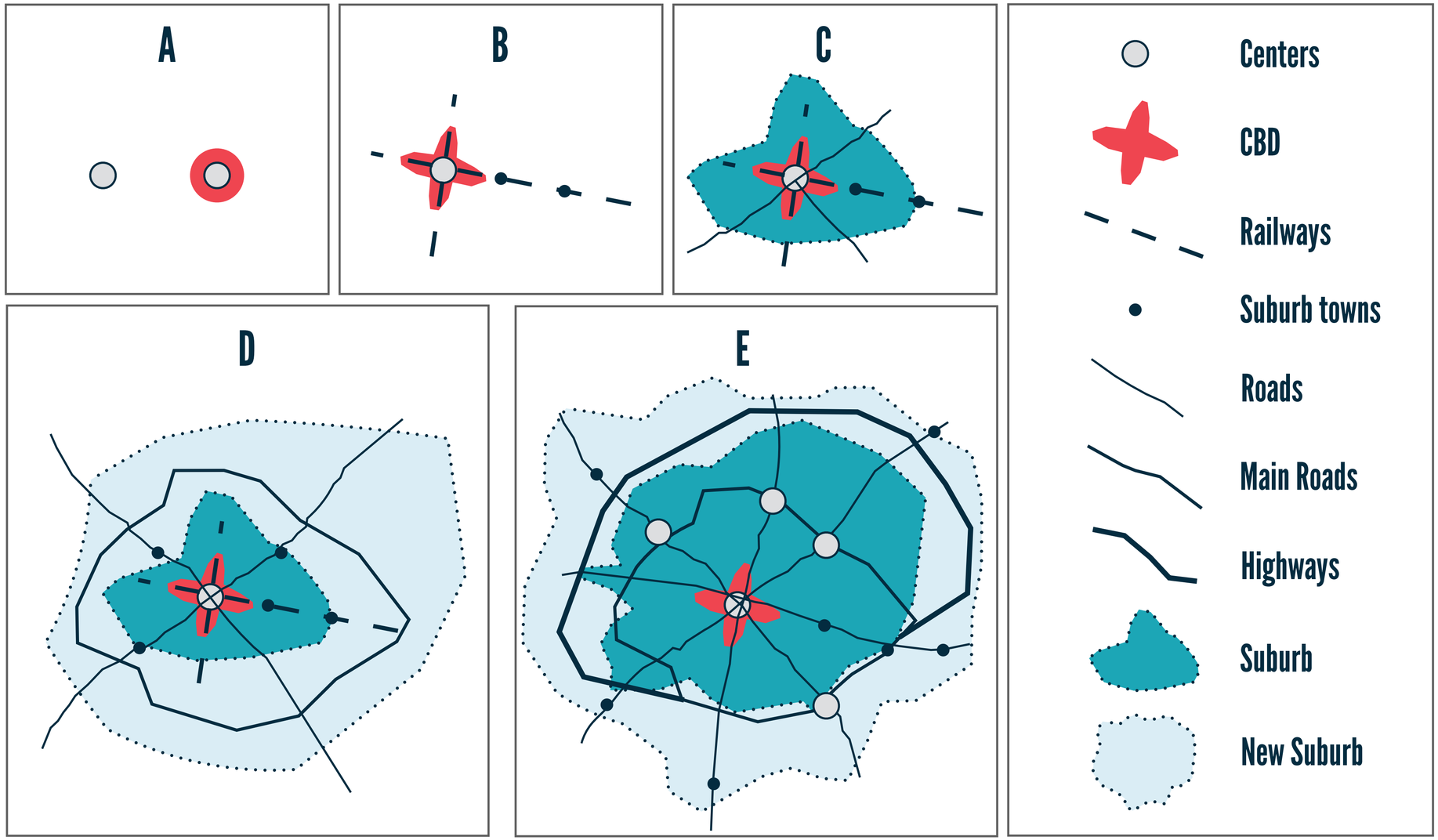
Radboud University

TRANSPORT & CHANGING URBAN LANDSCAPES



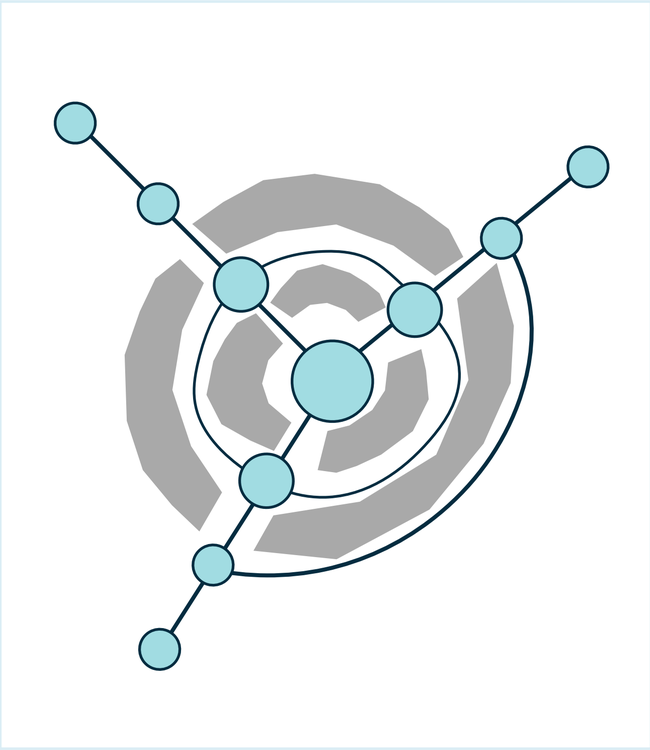
Adapted from: Taaffe E.J., Gauthier H.L. and O'Kelly M.E. (1996) Geography of Transportation (second edition).

URBAN CHANGE PROCESSES

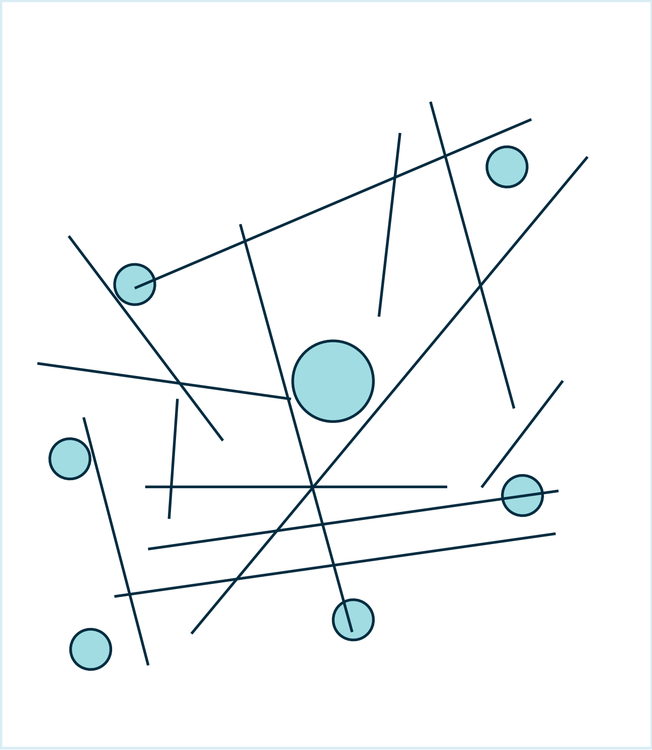
LEVEL	CHANGE PROCESS	STOCK AFFECTED	RESPONSE TIME (YEARS)	RESPONSE DURATION (YEARS)	RESPONSE LEVEL	REVERSIBILITY
1. Slow	industrial construction	industrial buildings			LOW	very low
	residential construction	residential buildings			LOW	low
	transport construction	transport system			LOW	nearly irreversible
2. Medium Speed	economic change	employment/unemployment			MED	reversible
	demographic change	population/households			LOW/HIGH	partly reversible
	technological change	transport equipment			MED	very low
3. Fast	labor mobility	workplace occupancy			HIGH	reversible
	residential mobility	housing occupancy			HIGH	reversible
	daily mobility	traffic			HIGH	reversible

TRANSIT & URBAN FORM

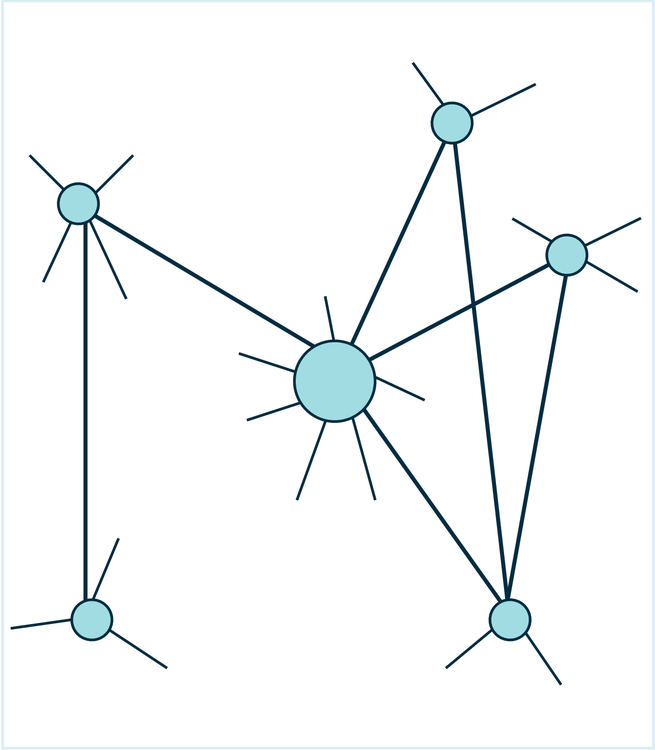
Adaptive Cities

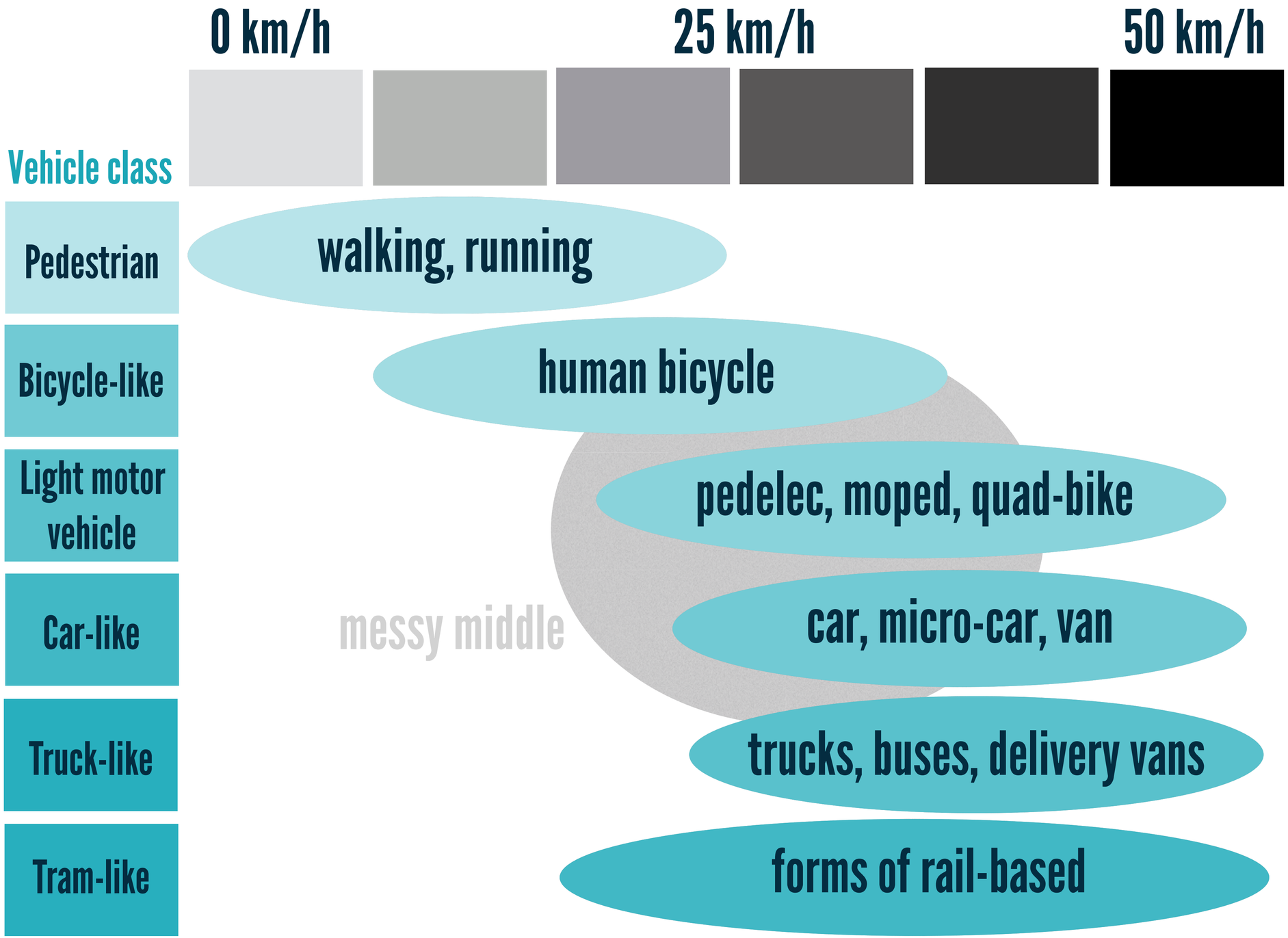


Adaptive Transit



Hybrids





Adapted from: Urban Mobility: A New Design Approach for Urban Public Space. AWNB by Ben Immers, Bart Egeter, Johan Diepens, Paul Weststrate, 2016.

BOULDER
United States

AMSTERDAM
The Netherlands

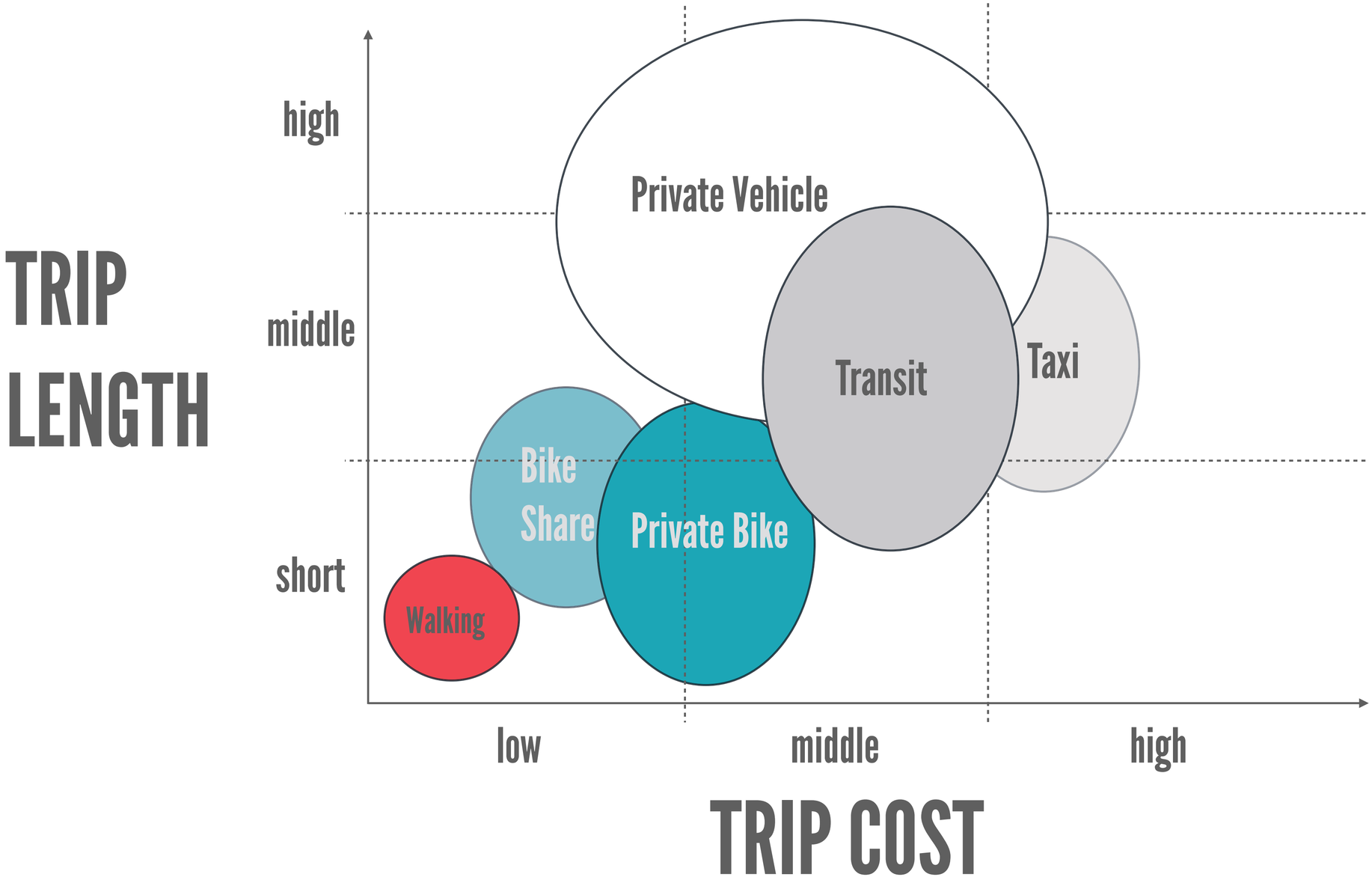
MEDELLIN
Colombia

population density
people / ha

15

50

70


TRIP LENGTH
high
middle
short
Private Vehicle
Transit
Taxi
Bike Share
Private Bike
Walking
low
middle
high
TRIP COST

CHAPTER V

WAYS TO THE NEOTECHNIC CITY

The transition from paleotechnic to neotechnic in actual progress around us; yet need of strongly emphasising these two types of Evolution as Inferno and Eutopia respectively. Necessity of ideal conceptions for every scien[illegible], therefore, of Paradise and Inferno fo[illegible] than for theology and psychology.

The beauty of cities is of no mere sentimental interest: the æsthetic factor is recognised in war, in medicine, as at once a symptom of efficiency and health, and an aid to them. The limitation of past romantic criticisms of paleotechnic cities is thus avoided.

The cleansing of the city; starting from its mountain and moorland water-supply area, and proceeding inwards to meet town-planning extensions. These extend naturally star-wise along main thoroughfares, leaving unbuilt rustic areas between. These kept from growing together by here placing schools, playgrounds, allotments, gardens, etc. Value of opportunities of activity for youth, and for citizenship: ci[illegible].

Cleansing of slums [illegible] and creation of open spaces. As larger factories, b[illegible] move to environs, small workshops may be grouped into their place, and sites thus left clear for open spacing. Needed concentration of garages; demolition of unnecessary mews; formation of garden-courts, etc. Such minor changes prepare for greater. Poseidon at Dunfermline.

In Chapter II. we viewed our immense coalfield city-groups, our conurbations, as in the process of indefinite growth; while in the next chapter we presented the thre[illegible] lower industry and cheaper life [illegible] kindred lands, not only by internal exhaustion of coalfields, or by com-

WHENCE

HOW

WITHER

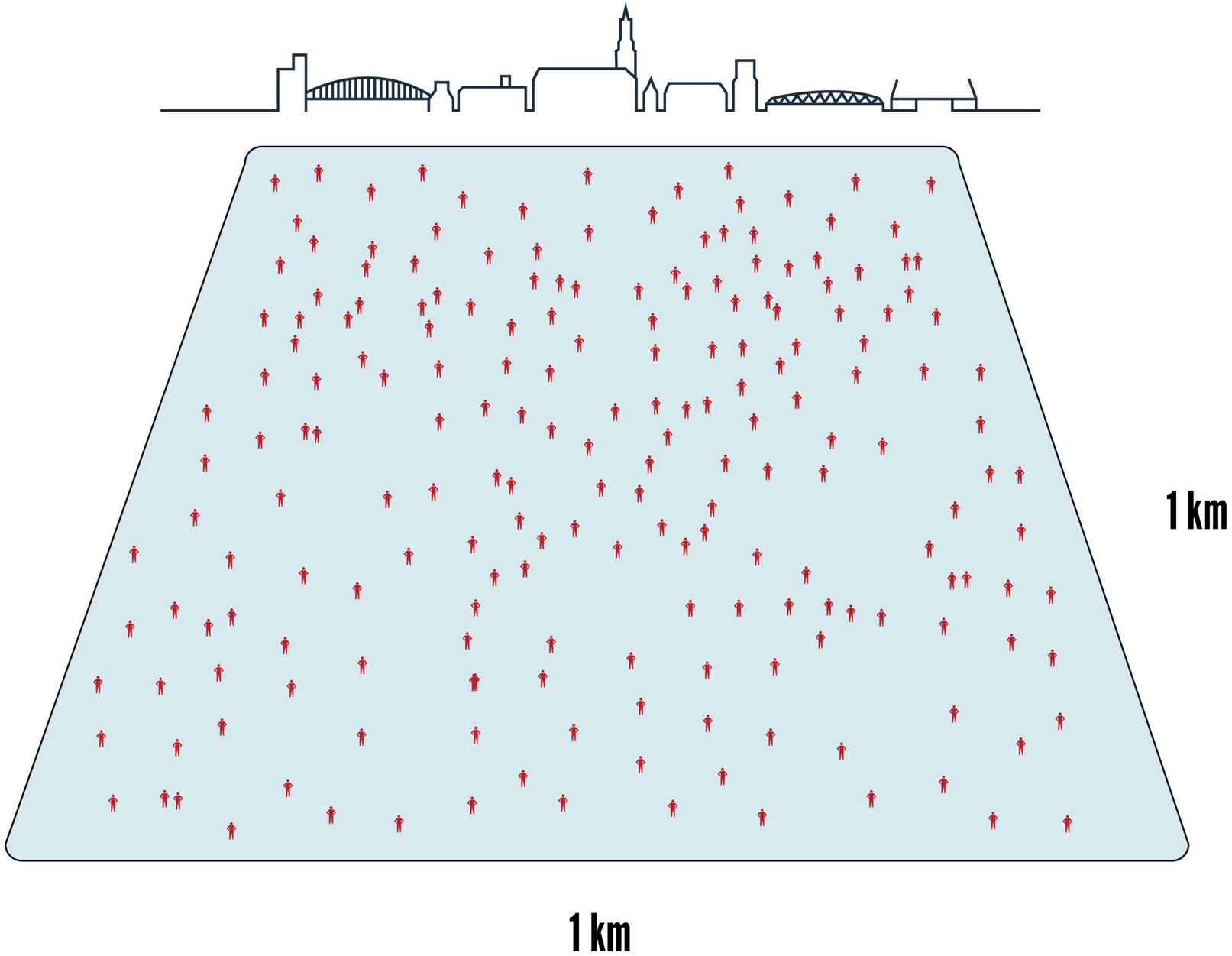
petition upon lower levels, but rather by competition upon a higher one—that of the neotechnic order, now so plainly arising in other lands—Norway being but the best example, as having no paleotechnic development to speak of.

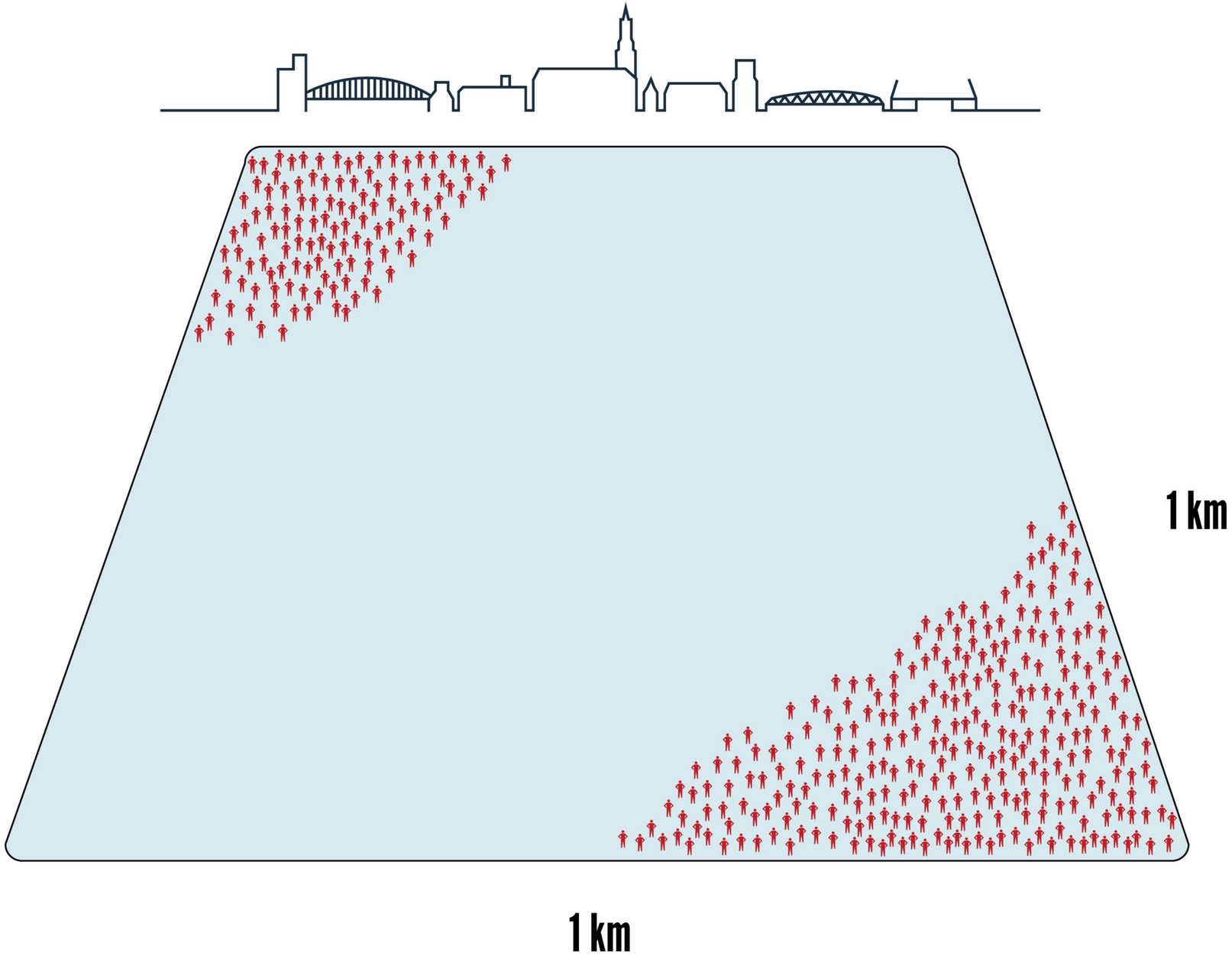
Yet, as already indicated, and as the reader must once and again have felt—this neotechnic order is open to us also; we have had no small part in initiating it. Where better may this advance than in a land, one of the best situated of any, still of cheap [illegible], of ample and industrious population? not to speak of resources still only opening, like water-courses and peat-b[illegible] and tides. Each inventor is busy with his part of this complex task, and the integration of such progresses is one main [illegible].

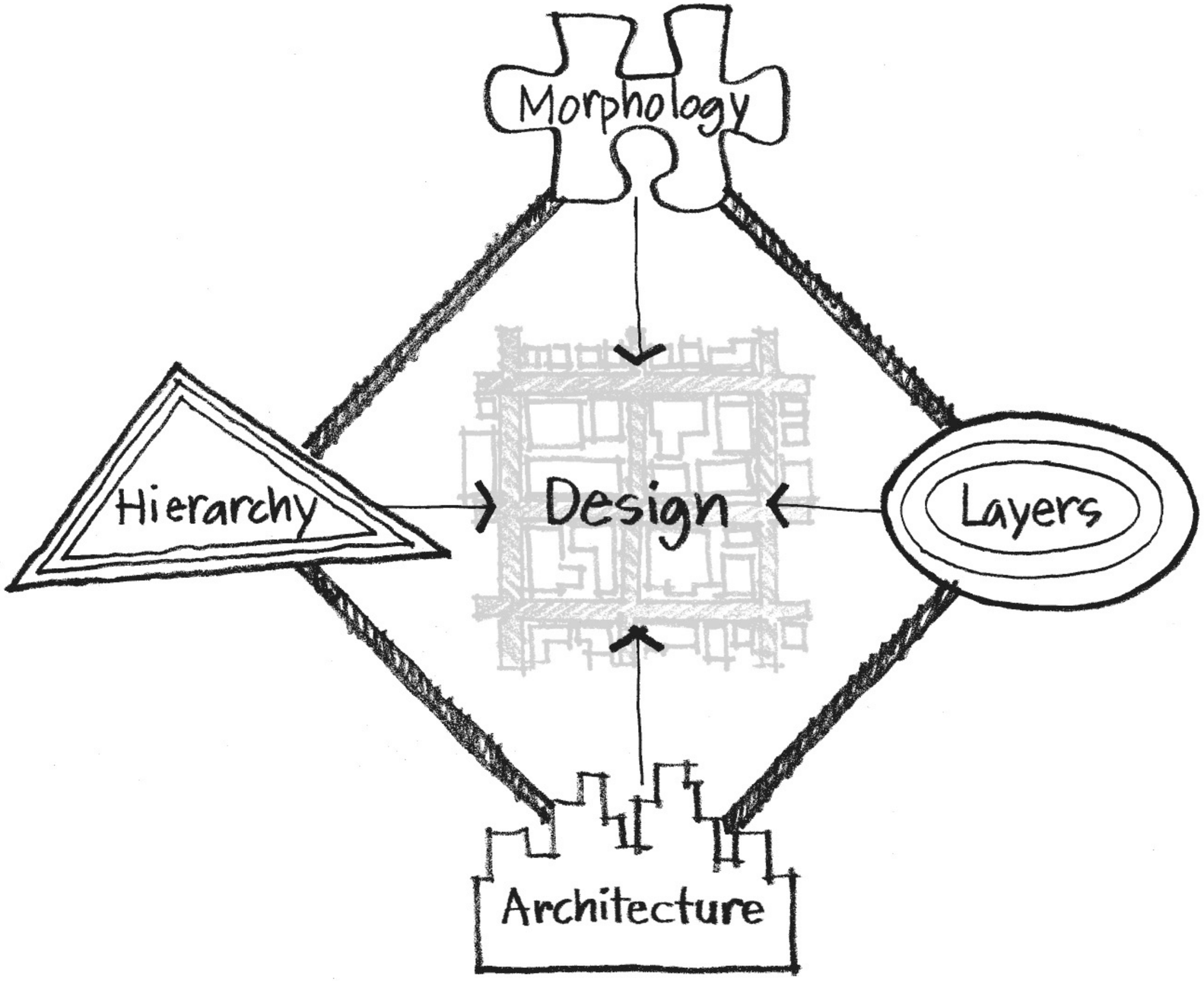
Since cities are thus in transition, is a defence needed [illegible] forking of the path of evolution—industrial, social, civic? Our general view of the paleotechnic city has [illegible] has not been said. Its evils—as per its reporters' columns, its realistic novels, its problem plays—are here vi[illegible] and commercial level, and thus normal to it, not removab[illegible] philanthropists, who alike too much, but potence symptoms. A view surely pessimistic enough! Yet this pessimism is but apparent; its faith is in the

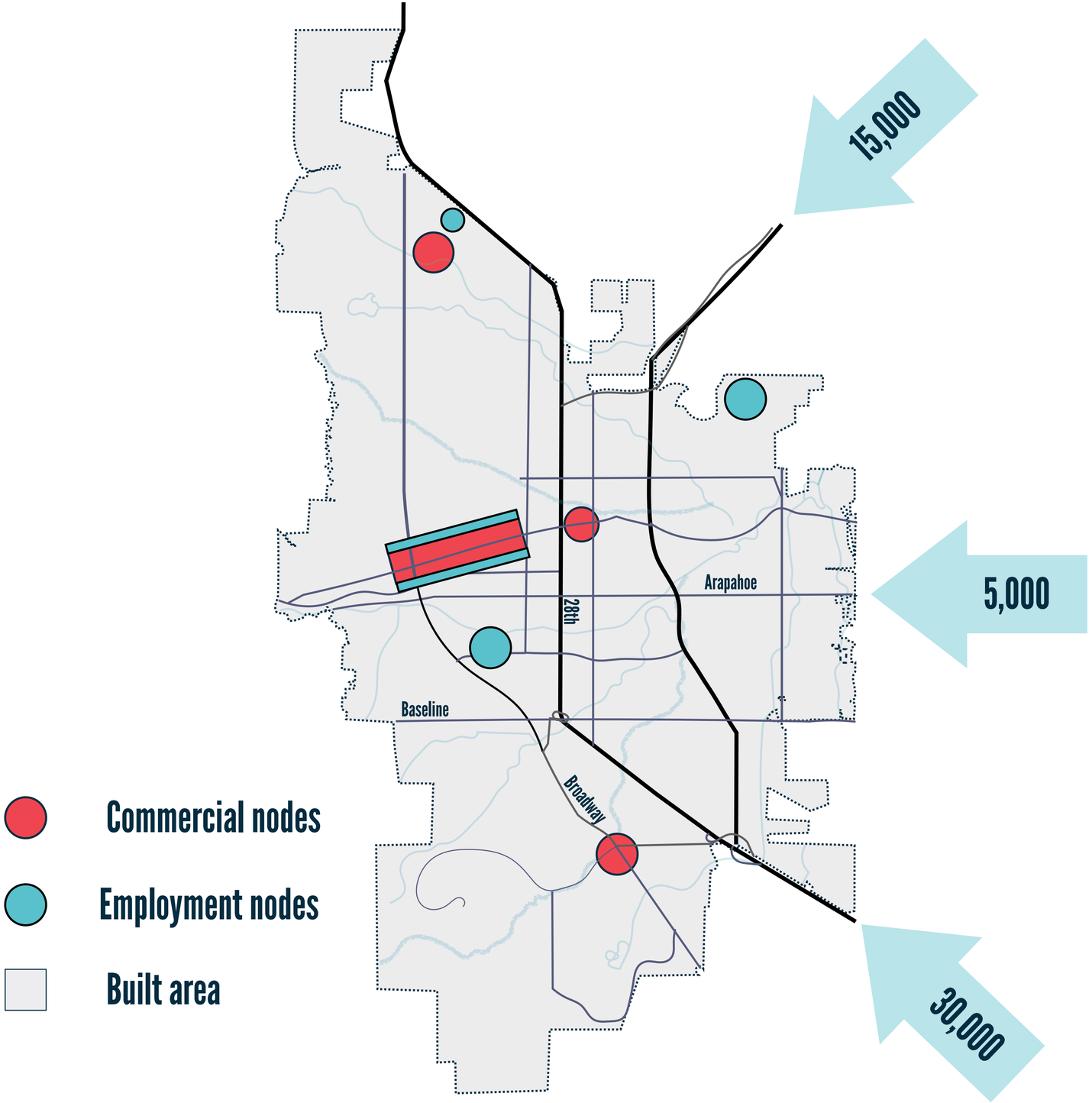
"Evolution is most plainly, swiftly in progress, most manifest, yet most mysterious...the patterns here seem simple, there intricate, often mazy beyond our unravelling, and all well-nigh

from: Patrick Geddes, Cities in Evolution, 1915


1 km
1 km


1 km
1 km


Morphology
Hierarchy
Design
Layers
Architecture


15,000
5,000
30,000
Arapahoe
28th
Baseline
Broadway
Commercial nodes
Employment nodes
Built area

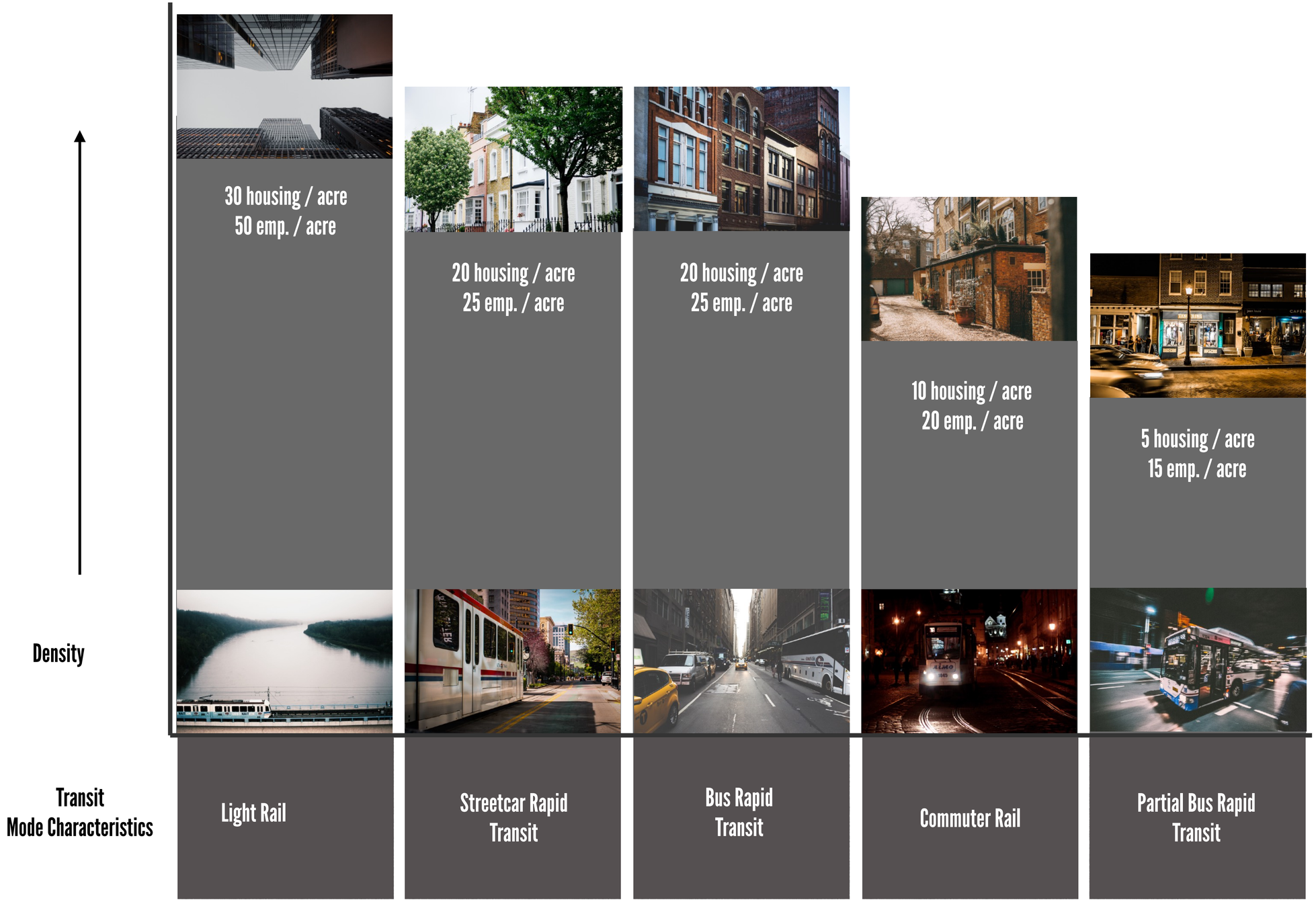
FUTURE PREMISES & GIVENS:

1. Transport solutions vary widely by context & culture
2. Development densities will increase
3. Robots are coming
4. Flows (inc. humans) will be accurately monitored
5. Humans prefer to travel (& not cloister-up at home)
6. Gains in energy efficiency will nudge policies

WHY (PURPOSE)?

HOW (MODE)?

HOW FAR?



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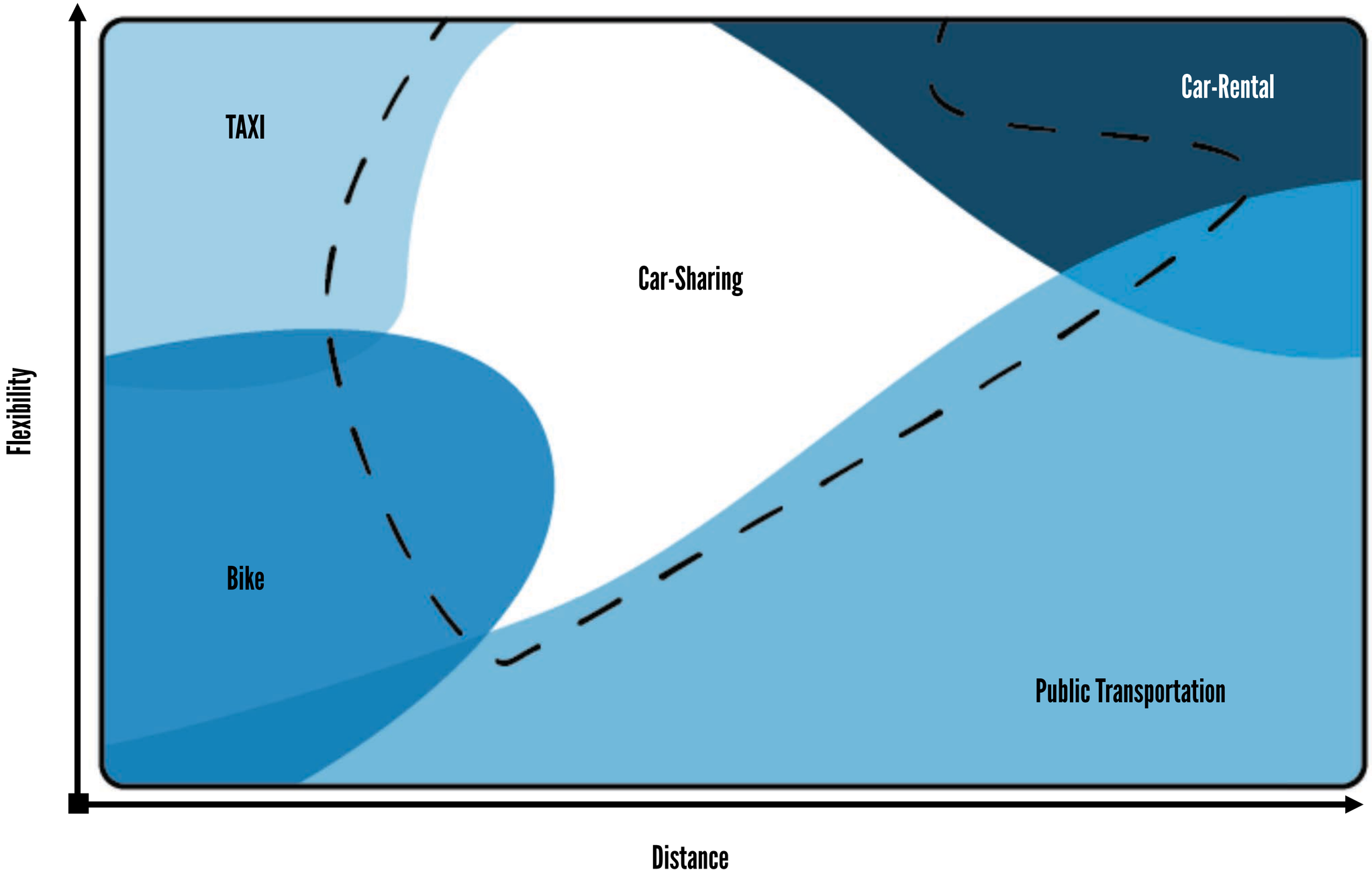

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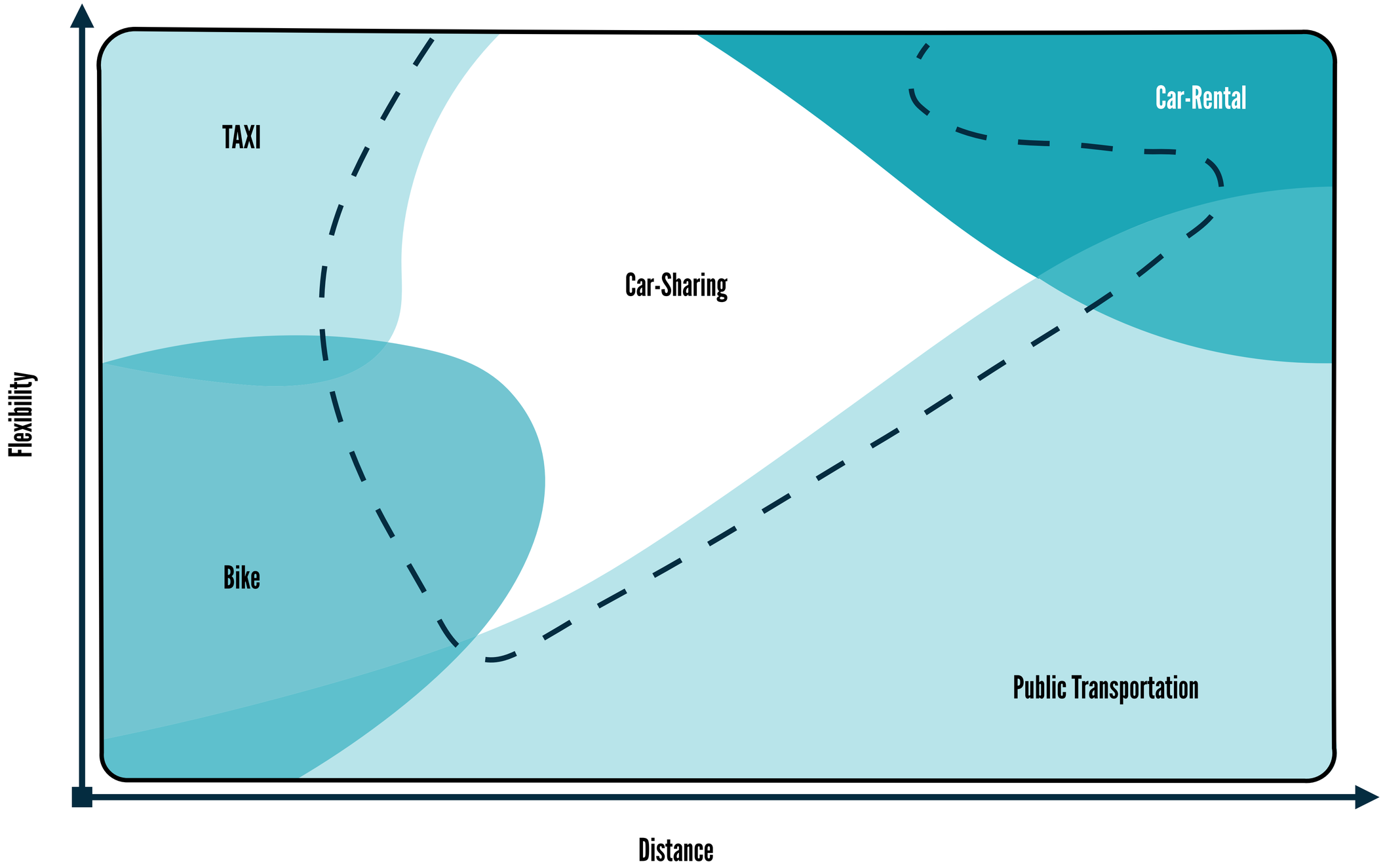

Adapted from *Sustainable Transportation Planning* (p. 206), by J. Tumlin Copyright 2017 by John Wiley & Sons, Inc.

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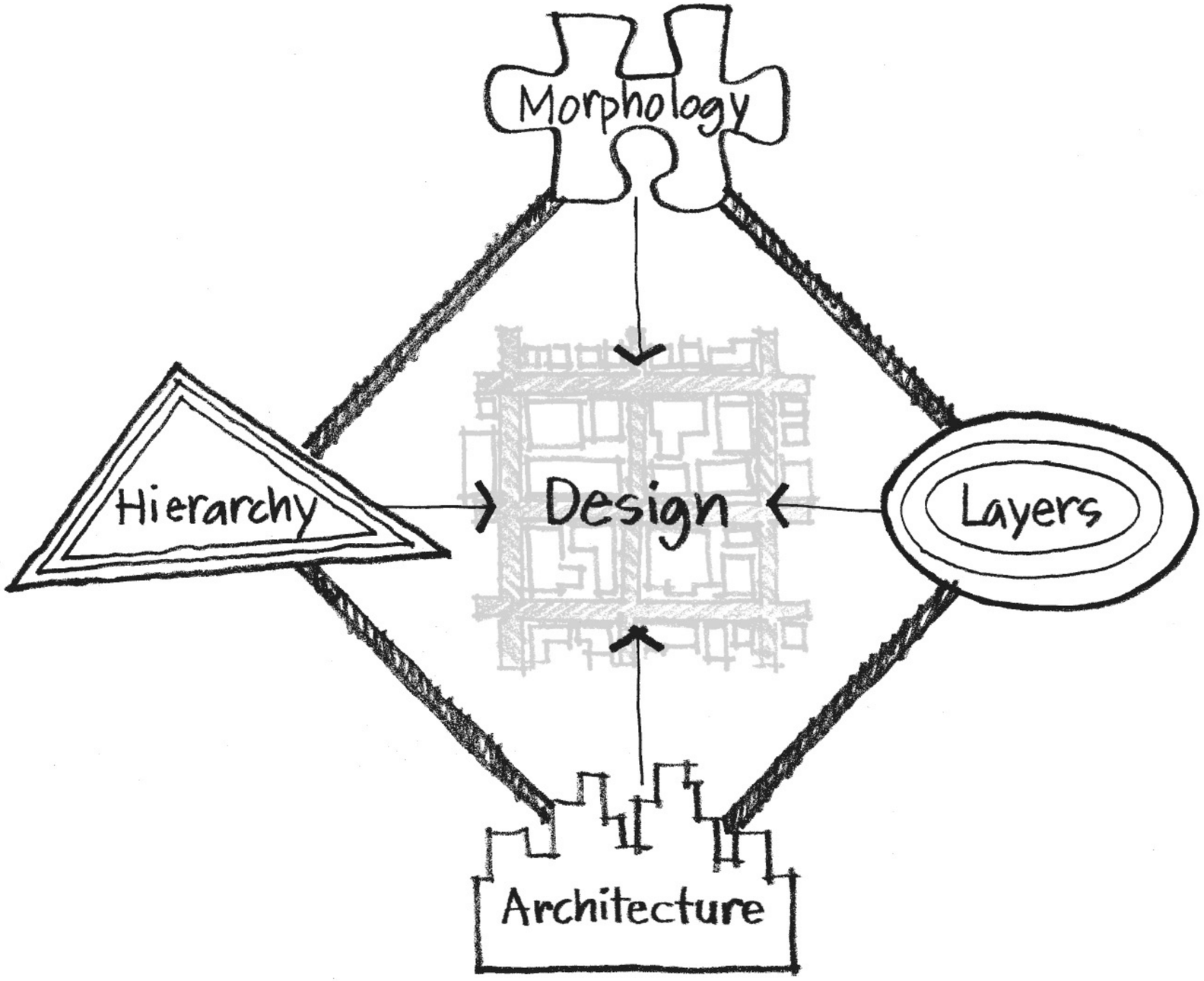
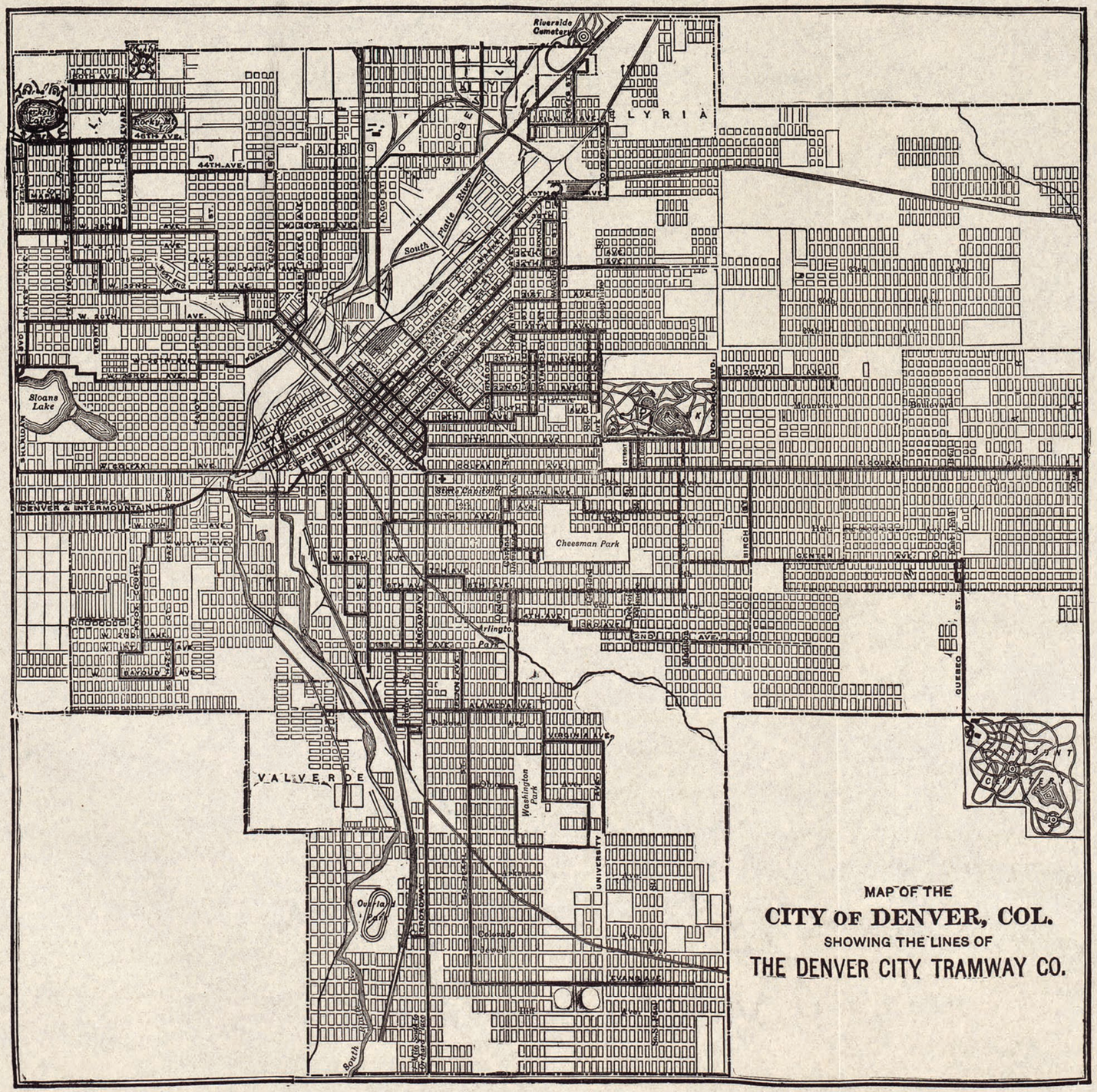
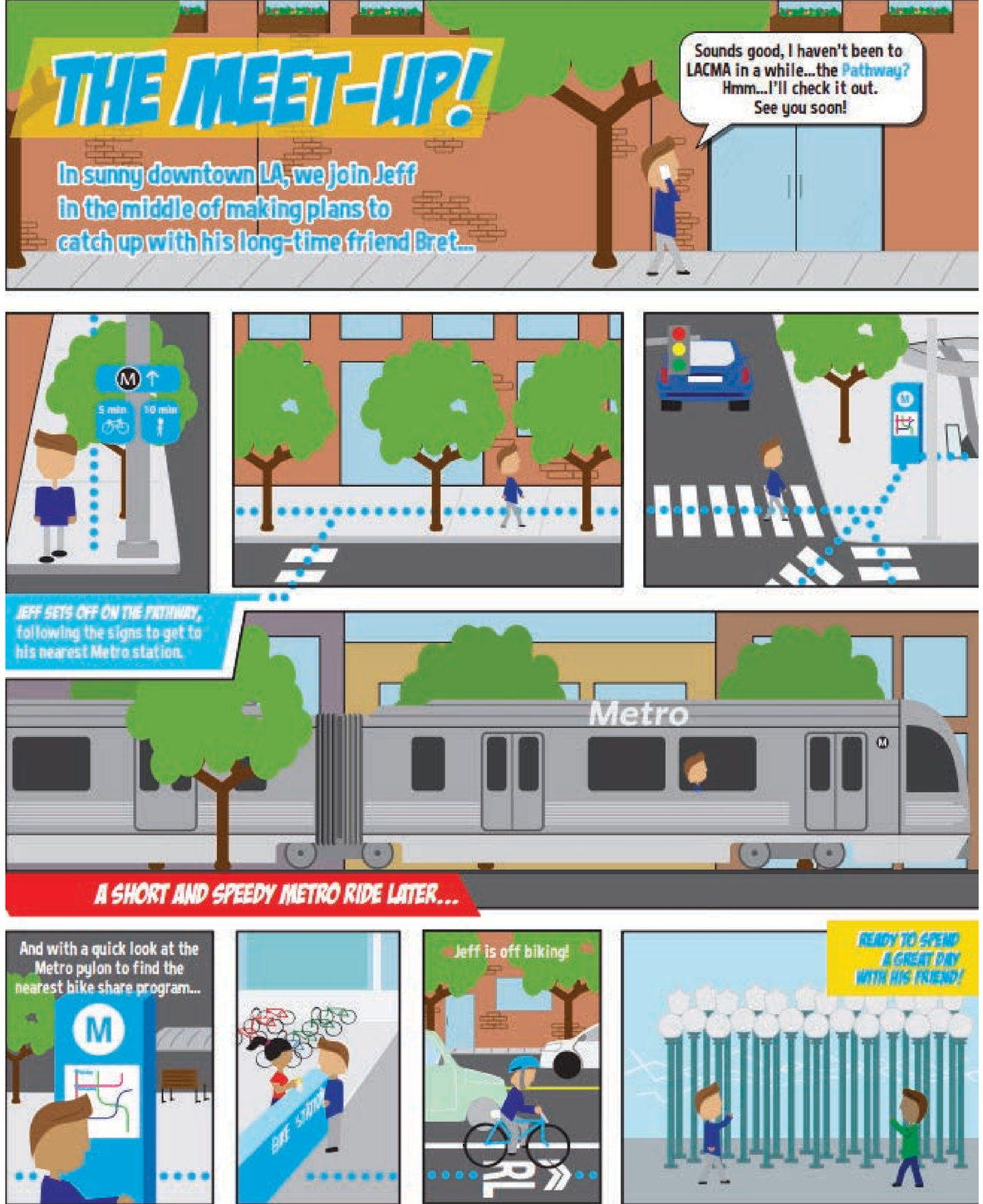
THERE ARE OTHER FACTORS

STICKING POINTS:

1. How to assign speed thresholds (3, 4, 5 or more)
2. Which corridors
3. Deal with intersections
4. Pedestrians
5. Delineating where city starts and stops
6. Enforcement
7. Feedback mechanisms

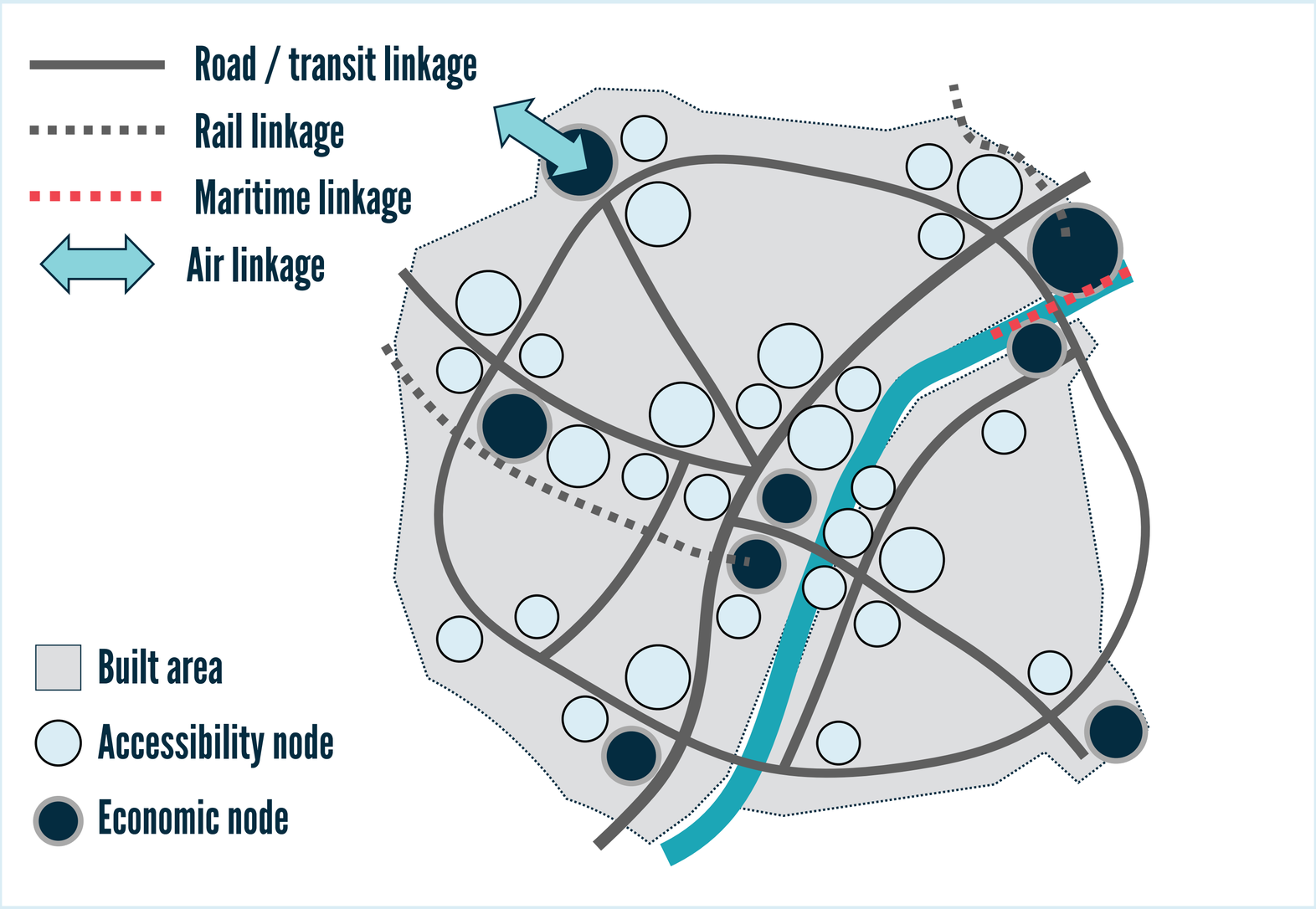

Morphology
Hierarchy
Design
Layers
Architecture


Riverside Cemetery
ELYRIA
Sloans Lake
DENVER & INTERMOUNTAIN
Cheesman Park
Arlington Park
Washington Park
VALVERDE
Overland Park
South Platte River
Mountview Boulevard
Colorado Jewel
Mile Sewer Orchard Place
South Ruth
QUEBEC ST.
BIRCH ST.
UNIVERSITY
BROADWAY
COLFAX AVE.
44TH AVE.
W. 20TH AVE.
W. 6TH AVE.
W. 8TH AVE.
W. 9TH AVE.
W. 10TH AVE.
W. 2ND AVE.
W. 1ST AVE.
W. BAYOUD AVE.
ALAMEDA AVE.
VIRGINIA AVE.
EVANS AVE.
CENTER AVE.
E. COLFAX AVE.
25TH AVE.
30TH AVE.
MAP OF THE
CITY OF DENVER, COL.
SHOWING THE LINES OF
THE DENVER CITY TRAMWAY CO.


THE MEET-UP!
In sunny downtown LA, we join Jeff in the middle of making plans to catch up with his long-time friend Bret...
Sounds good, I haven't been to LACMA in a while...the Pathway? Hmm...I'll check it out. See you soon!
5 min
10 min
JEFF SETS OFF ON THE PATHWAY, following the signs to get to his nearest Metro station.
Metro
A SHORT AND SPEEDY METRO RIDE LATER...
And with a quick look at the Metro pylon to find the nearest bike share program...
BIKE STATION
Jeff is off biking!
READY TO SPEND A GREAT DAY WITH HIS FRIEND!

RULES OF THUMB FOR DESIGNING STREETS

1. Undivided streets, < three lanes
2. When divided by a raised median, < four lanes—two lanes in each direction, with left-turn lanes provided adjacent to a traffic separator at intersections; right-turn lanes may also be provided.
3. Divided streets, can be > six lanes wide, but heed caution w/ intersection design (i.e., crossing distances short). At any intersection approach, only one left-turn lane may be added, small corner radii should be used, and right-turn lanes are discouraged and if used they must include channelizing islands to reduce pedestrian conflicts and crossing distance.
4. One-way streets, < three lanes.

Adapted from *Sustainable Transportation Planning* (p. 155), J. Tumlin

NODES, LINKAGES & URBAN FORM