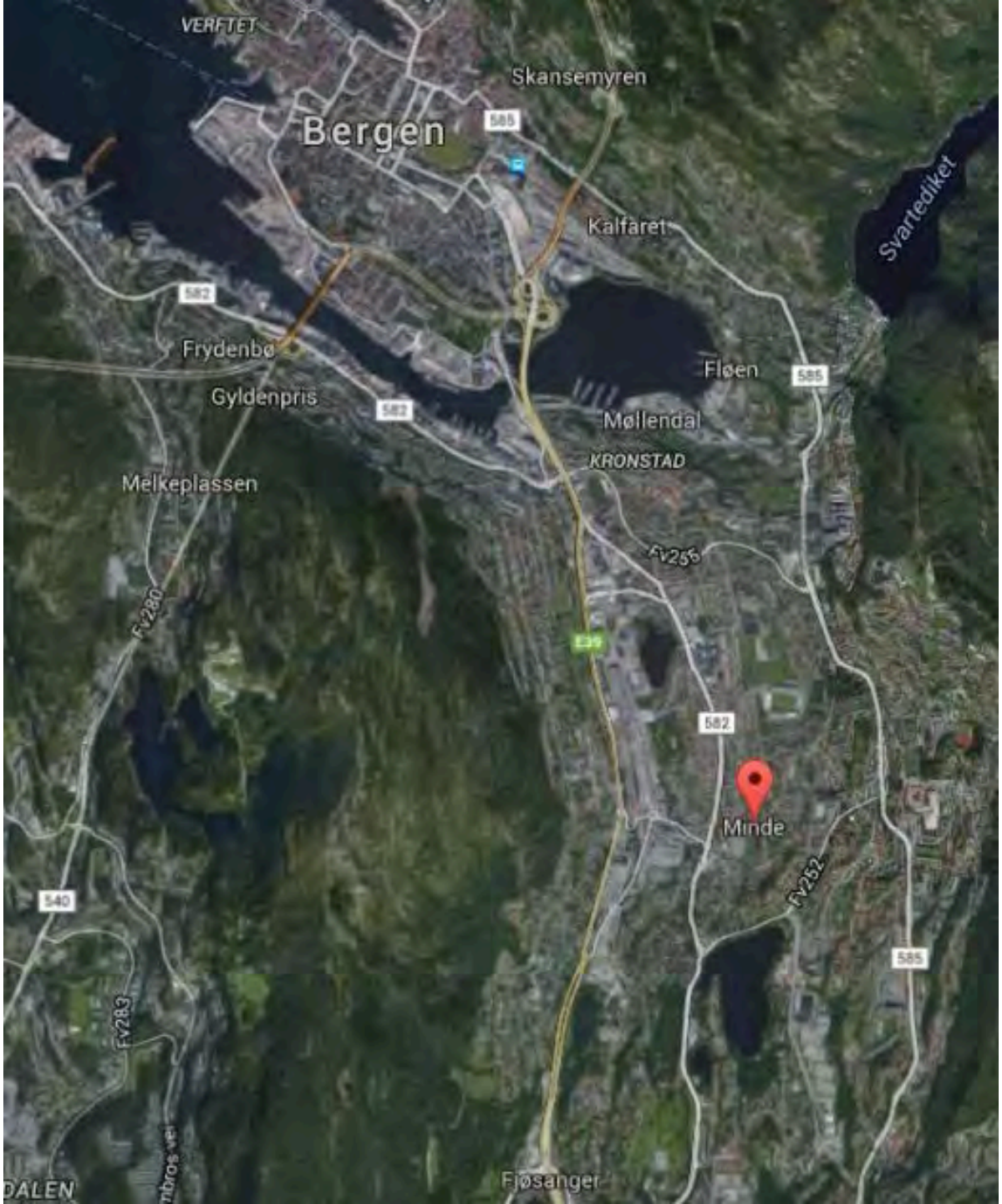
Vegnettets betydning for byutviklingen

“Mind the Mindemyren”

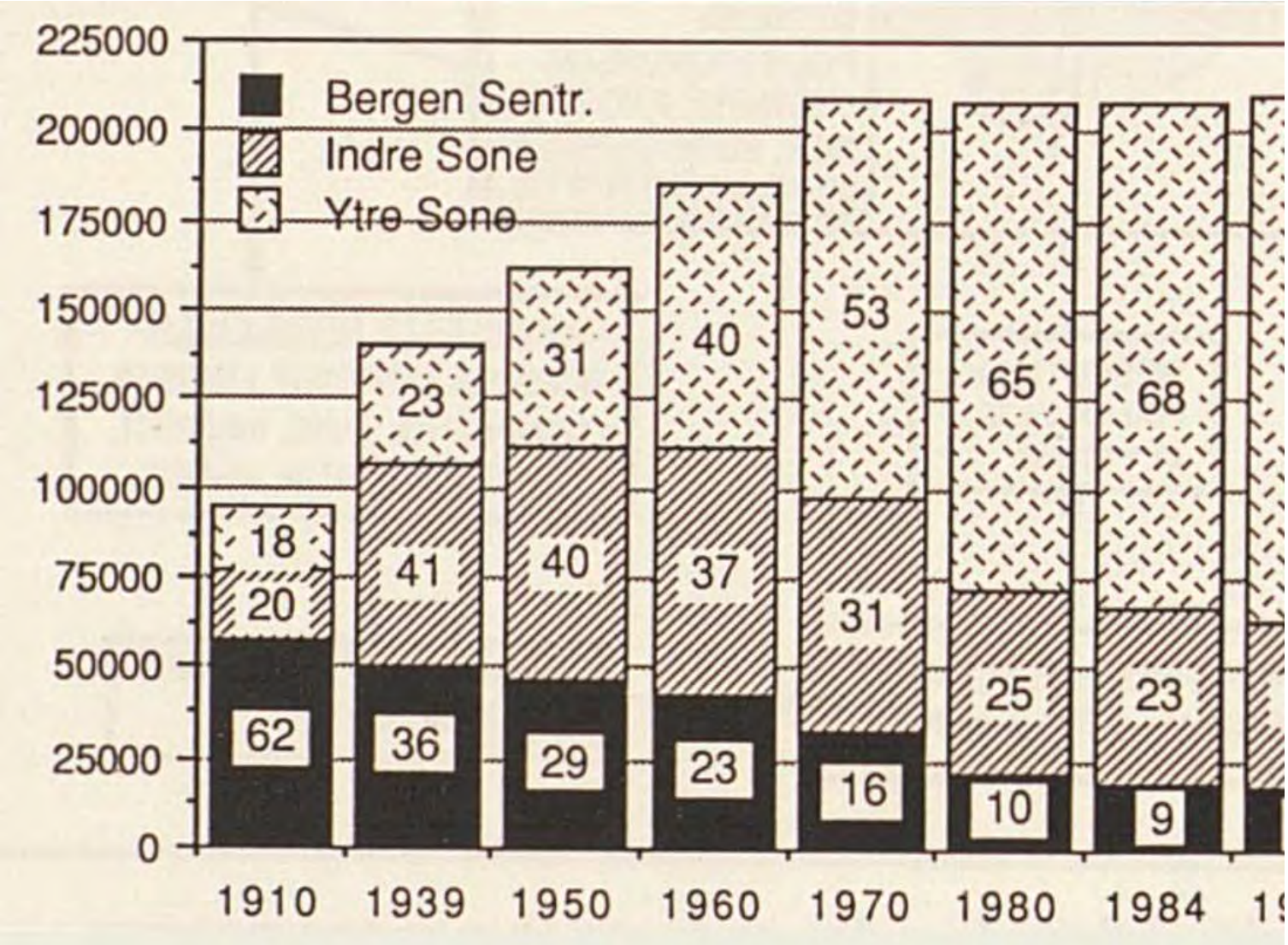
Akkelies van Nes

Western Norway University of Applied Sciences

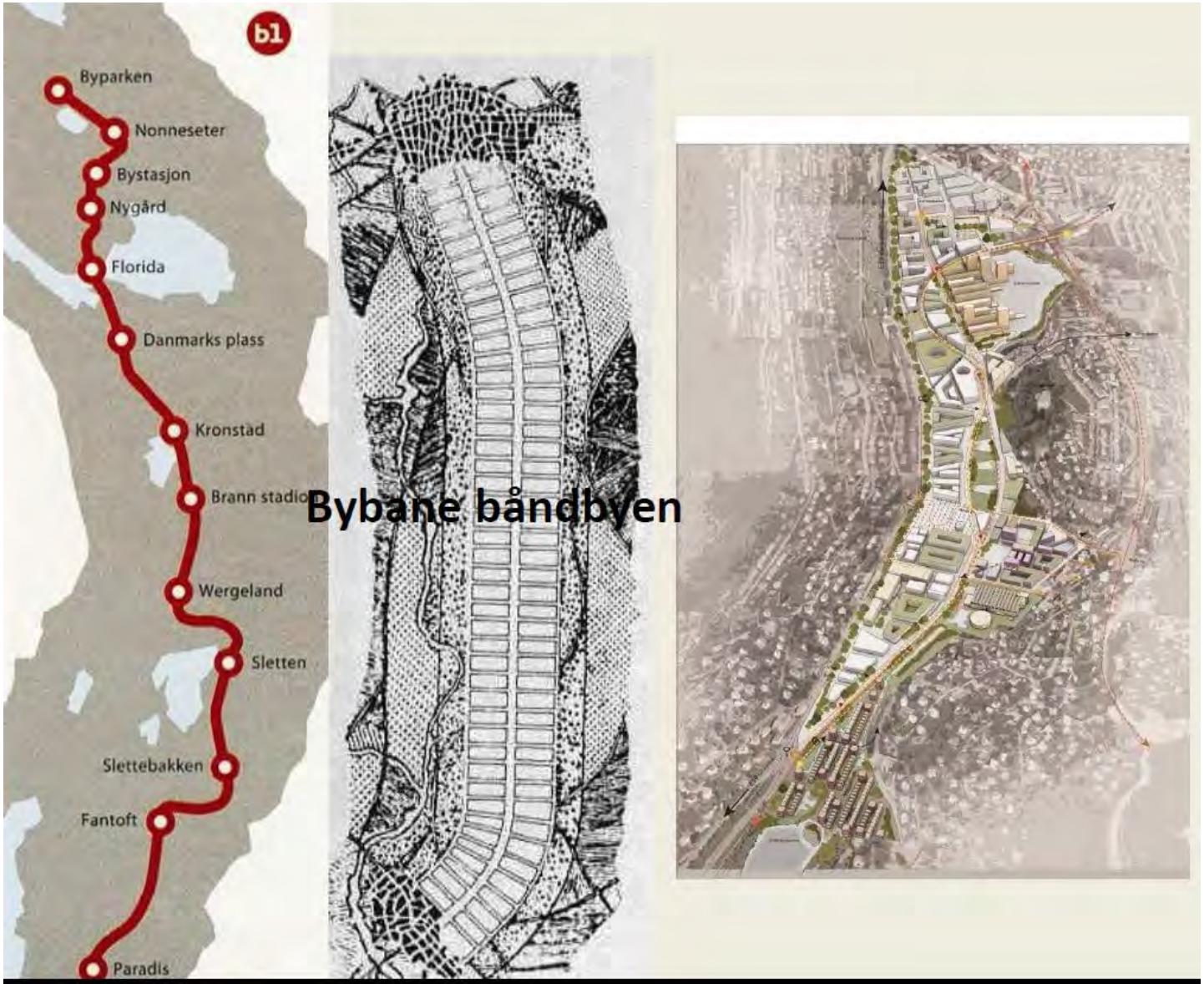

VERFTET
Skansemyren
Bergen
585
Kalfaret
Svartediket
582
Frydenbø
Gyldenpris
582
Fløen
585
Møllendal
KRONSTAD
Melkeplassen
Fv256
Fv280
E39
582
Minde
Fv252
540
585
Fv283
Fjøsanger
DALEN

Paradigmeskifte i arealplanleggingen - fra det norske spredtstedet til den kompakte byen

Urban sprawl in Bergen



Bybanen – the new light rail since 2010

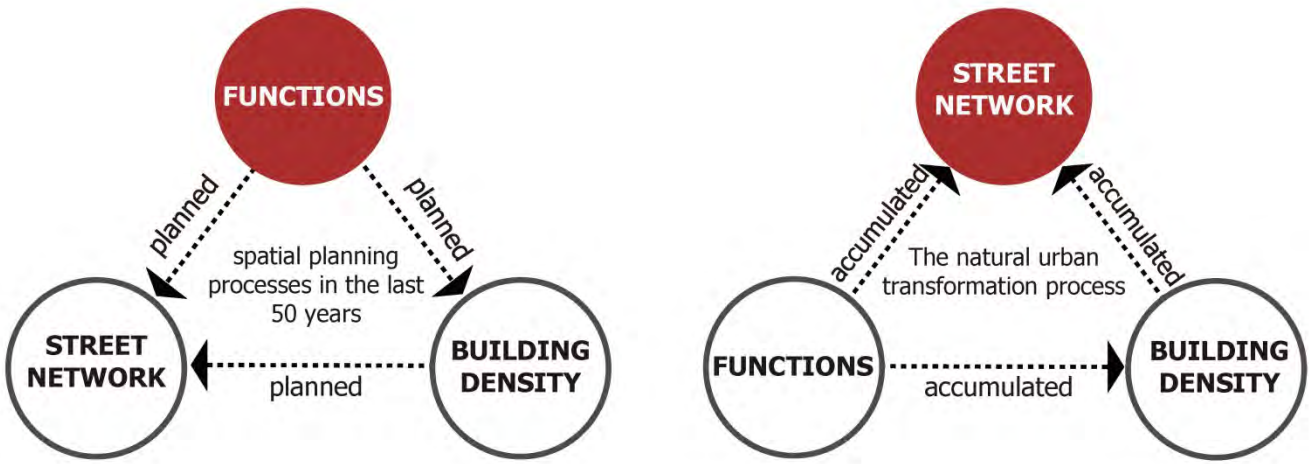


Hva betyr det å analysere byrom?

- Representere virkeligheten som modeller
- Beregninger av rommelige forhold

- Teste ut rommelige forandringer i en før og etter situasjon (design/plan)
- Teste ut hvordan rommelige forhold gir ulike effekter på lokaliseringen av sosiale og økonomiske aktiviteter i byer (forskning)

Den naturlige urbane transformasjonsprosessen



Metoder

- Space syntax – analyser av veinettet
- Spacematrix – analyser av bebyggelsestetthet
- MXI – analyser av grad av multifunksjonell arealbruk

Hva er Space Syntax?

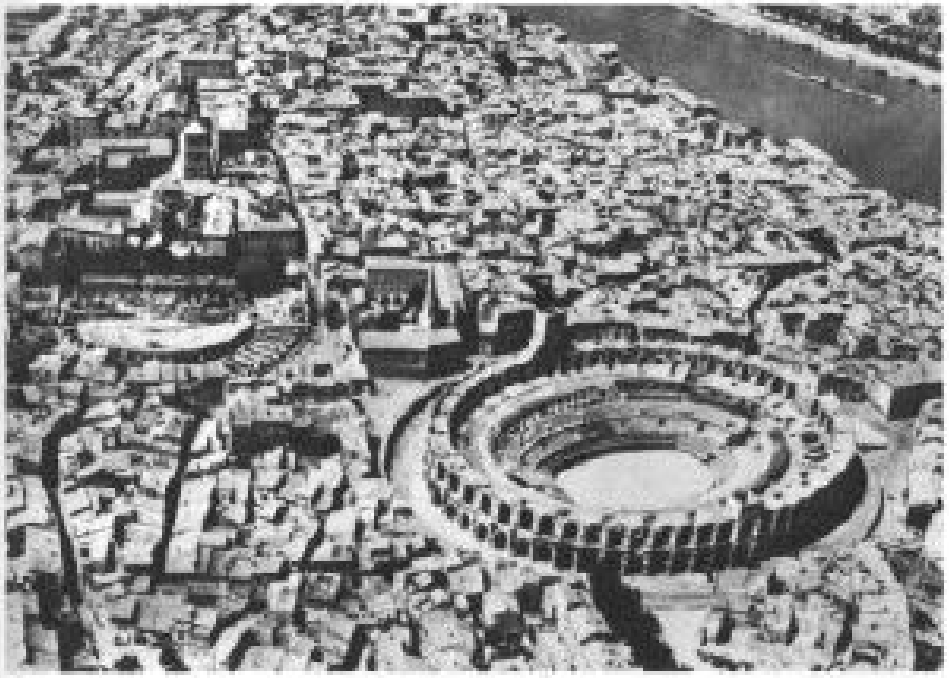
- Et set med definisjoner av “space” (byrom)
- Et sett med teknikker for å analyse gate og veinettet
- Et sett med teknikker for å observere hvordan gate og veinettet forholder seg til arealbruk, trafikkflyt, lokalisering av forretninger, og lokalisering av ulike type sosiale (og anti-sosiale) aktiviteter
- Et sett med teorier om hvordan byromsnettverket forholder seg til sosiale, økonomiske og kognitive faktorer som former byen og som blir påvirket av byenes fysiske form

‘To-movement’potentials

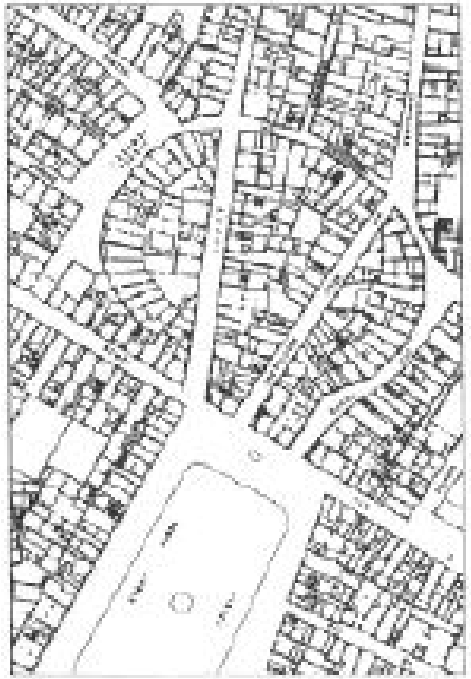
- Metrisk avstand – den korteste veien
- Topologisk avstand – veien med den minste antall retningsforandringer
- Geometrisk avstand – veien med den minste antall grad av vinkel forandringer

1. Definisjon av SPACE (byrom)

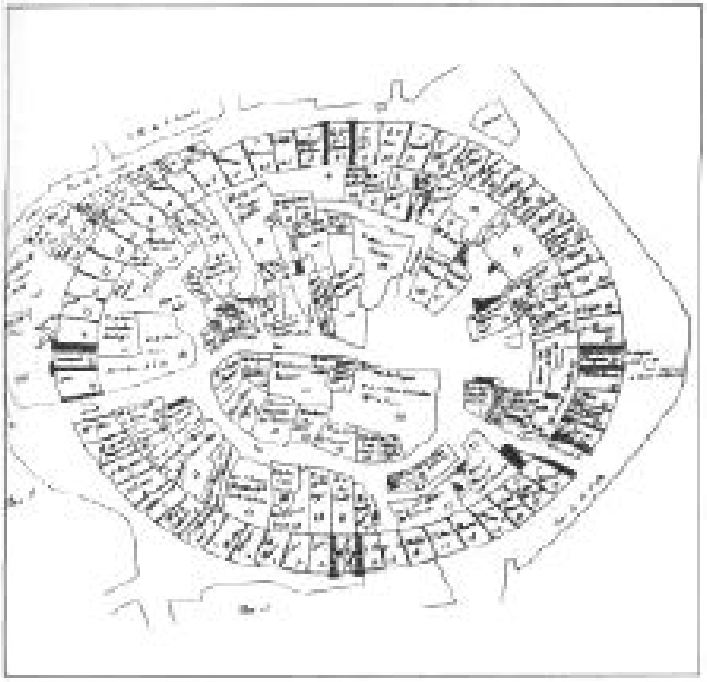
- **Intrinsic properties of space**: Built form and meaning
- Volumer, tekstur, form.
- Vårt språk kan lett beskrive dette fordi det er direkte synlig for oss: „en smal gate, et massivt bygg, en åpen plass, ….. ect“

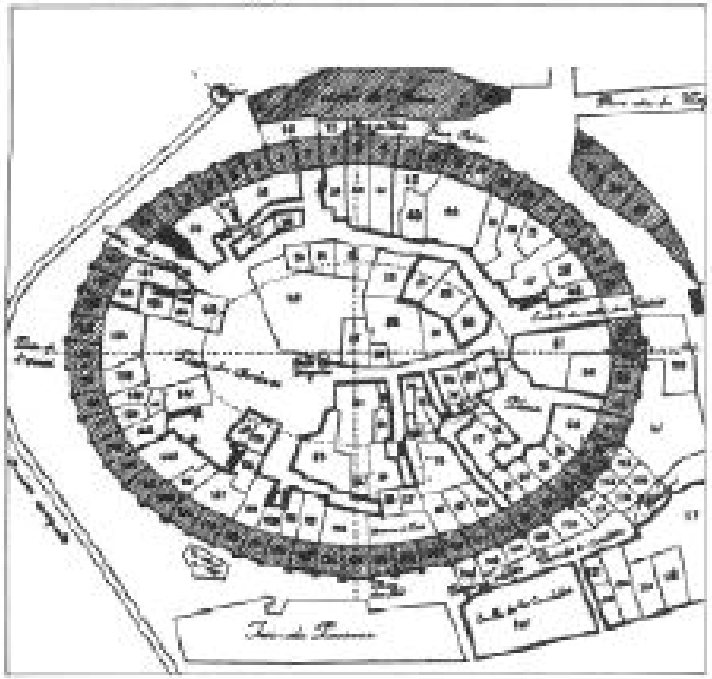


55



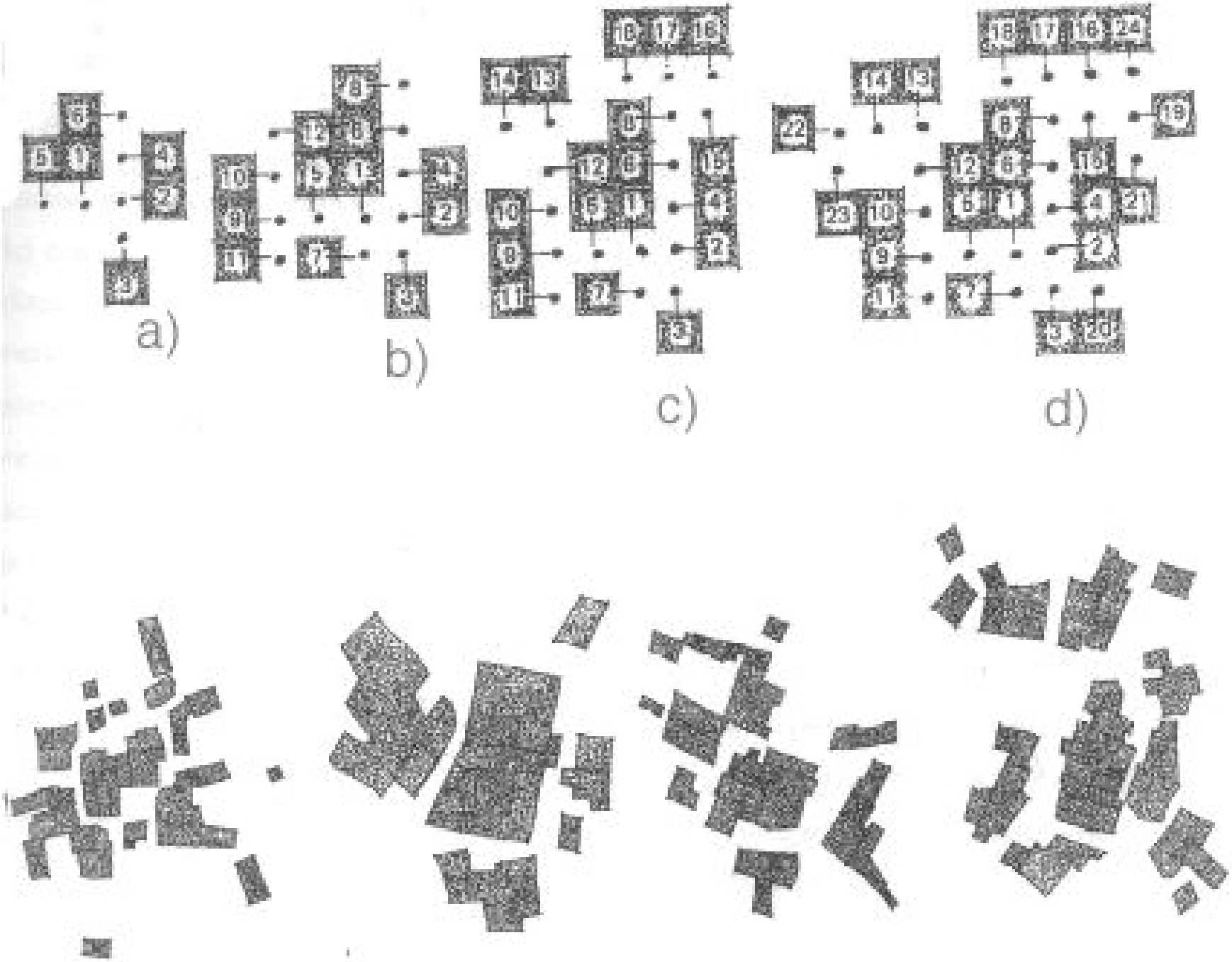
56





Extrinsic properties of space

- Topologiske forhold
- Vanskelig å besrive med ord
- Bruk av modeller
- Volumer, avstand, størrelser er ikke temaet her. Det dreier seg om rommelige forhold
- Built form and function


a)
b)
c)
d)

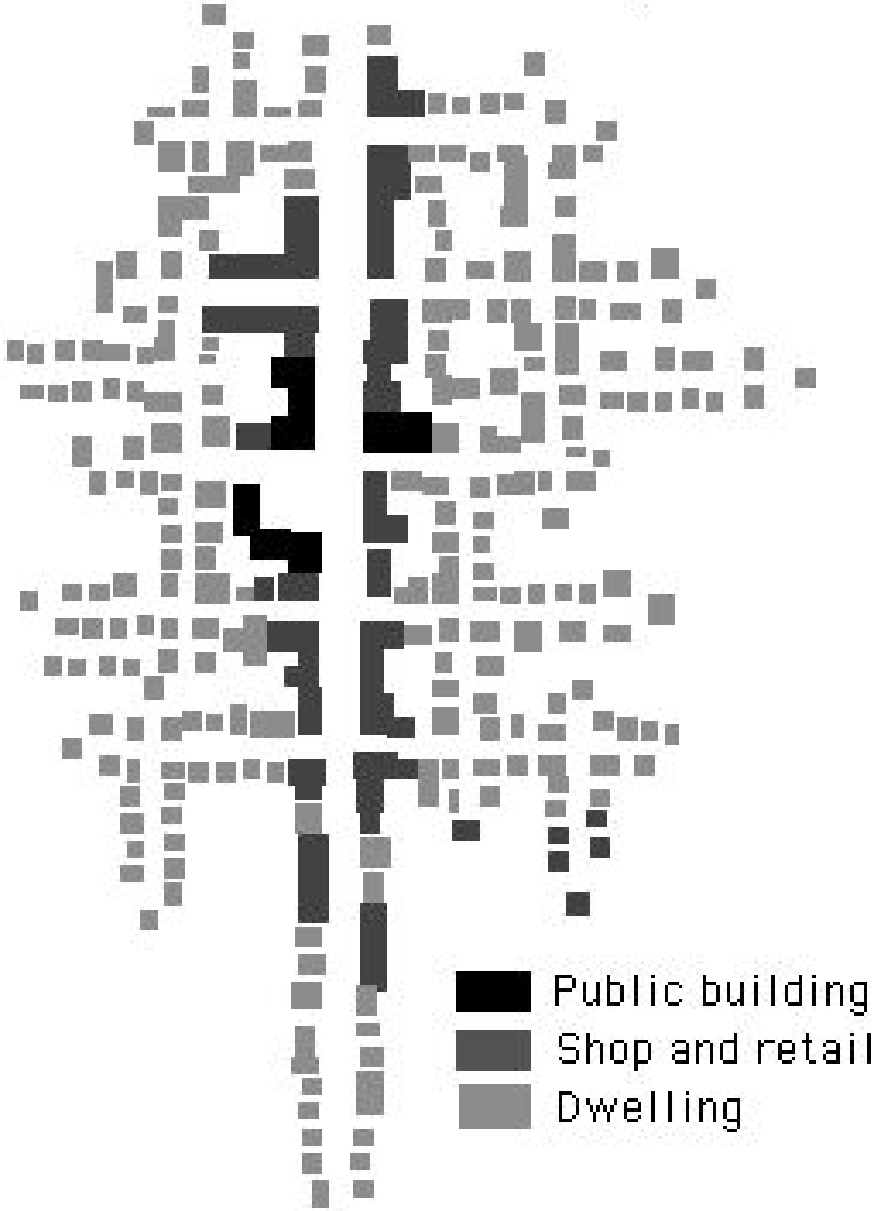
2. Analyseteknikkene

- The justified graph

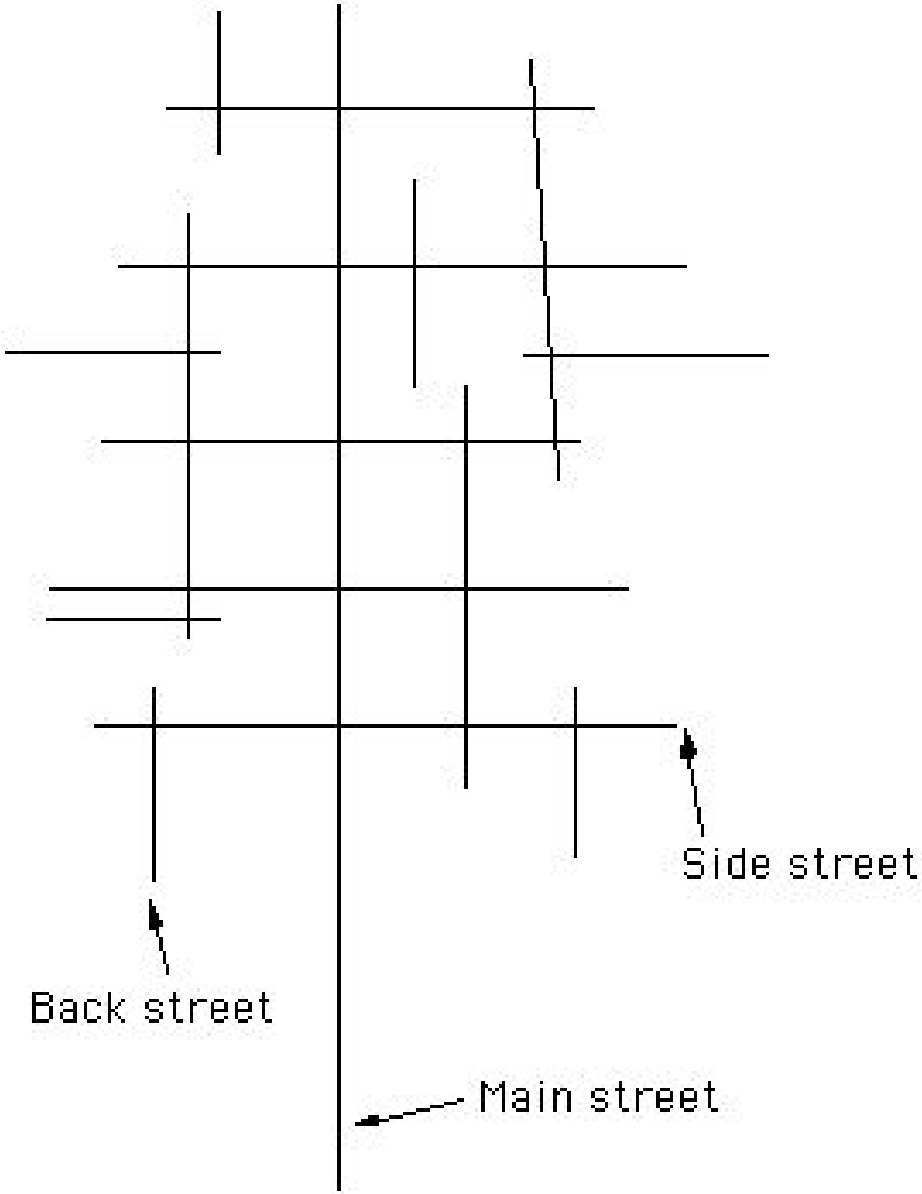
- Basert på graph theory

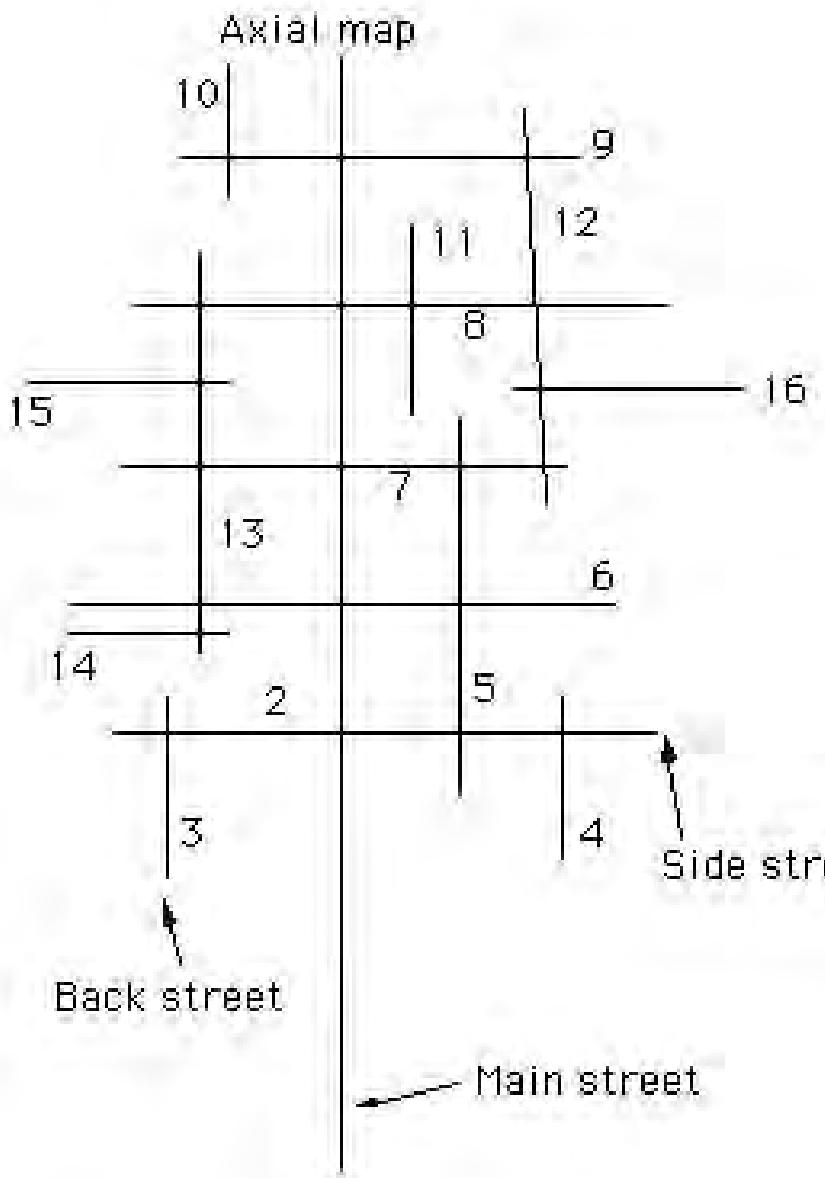
- Det dreier seg kun om hvordan et fysisk rom forholder seg til alle andre fysiske rom

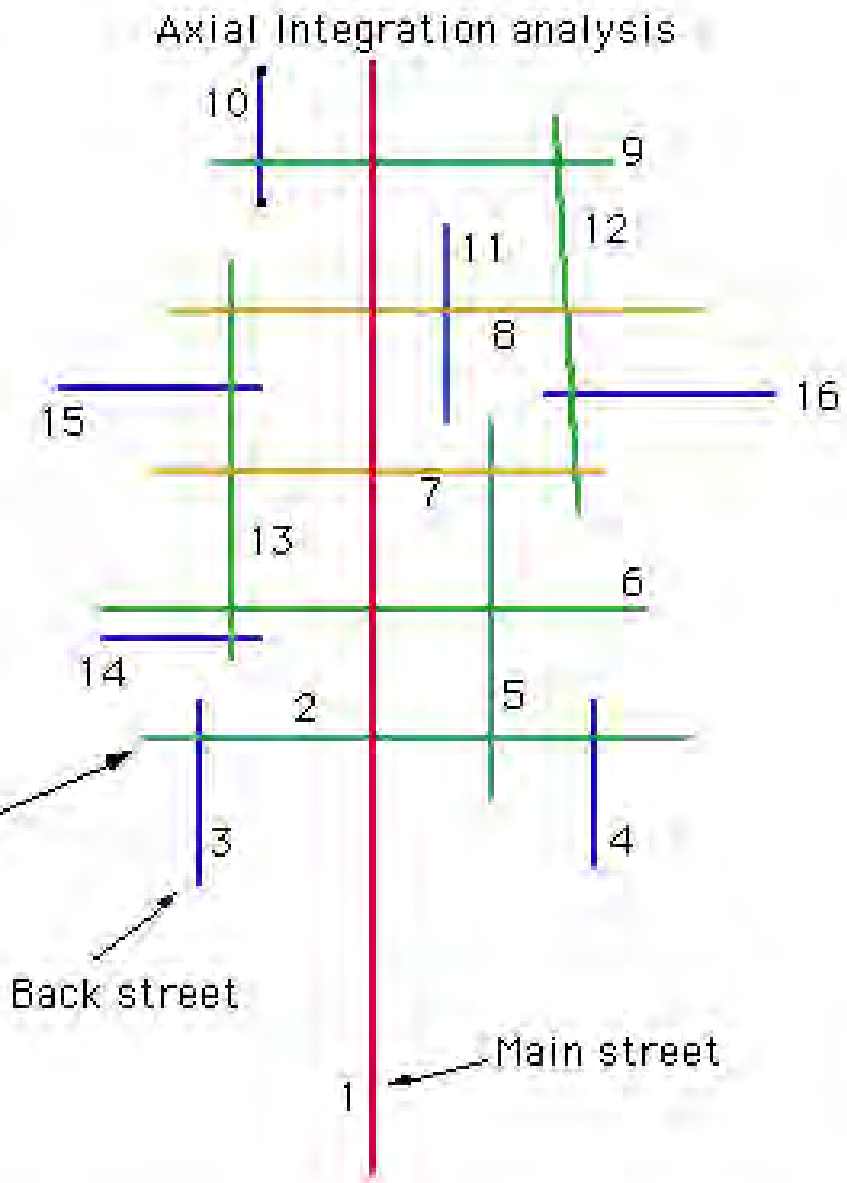
The content inside its buildings



The intrinsic description of its public spaces




Axial map
10
9
12
11
8
15
16
7
13
6
14
2
5
3
4
Side street
Back street
Main street


Axial Integration analysis
10
9
12
11
8
15
16
7
13
6
14
2
5
3
4
Back street
Main street
1

Calculating axial integration:

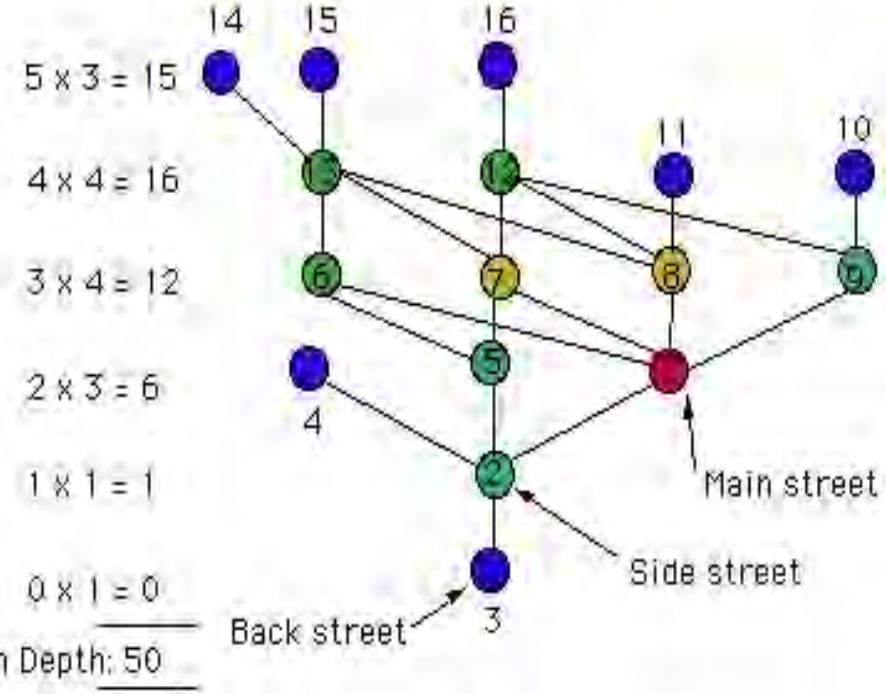
Mean depth for each axe (MD):
MD = sum depth/k - 1
k = number of axes in a system
sum depth = the topological depth from each axe to all other axes
Dk = diamond value

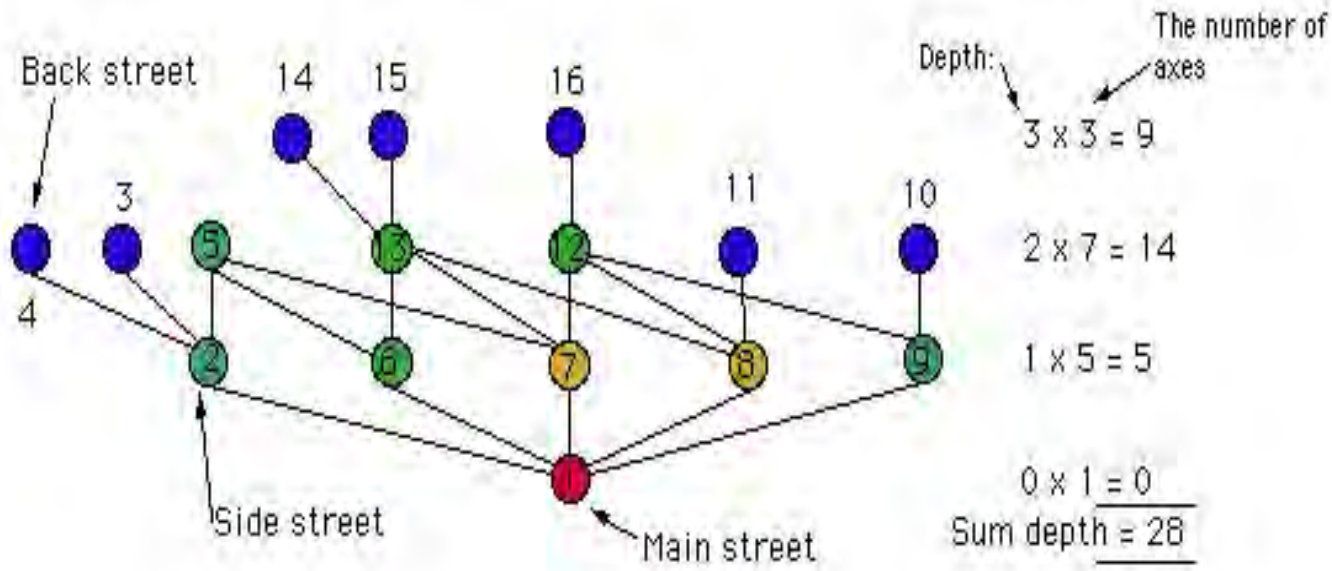
Calculating the back street axe:
(MD) = sum depth/k -1 = 50/16 - 1 = 3,333333

Real assymetry (RA) = 2(MD - 1)/k - 2 = 2(3,3333333 - 1)/16 - 2 = 0,33333333

Real relative assymetry (RRA) = RA/Dk = 0,33333333333/0,086 = 3,8759689922

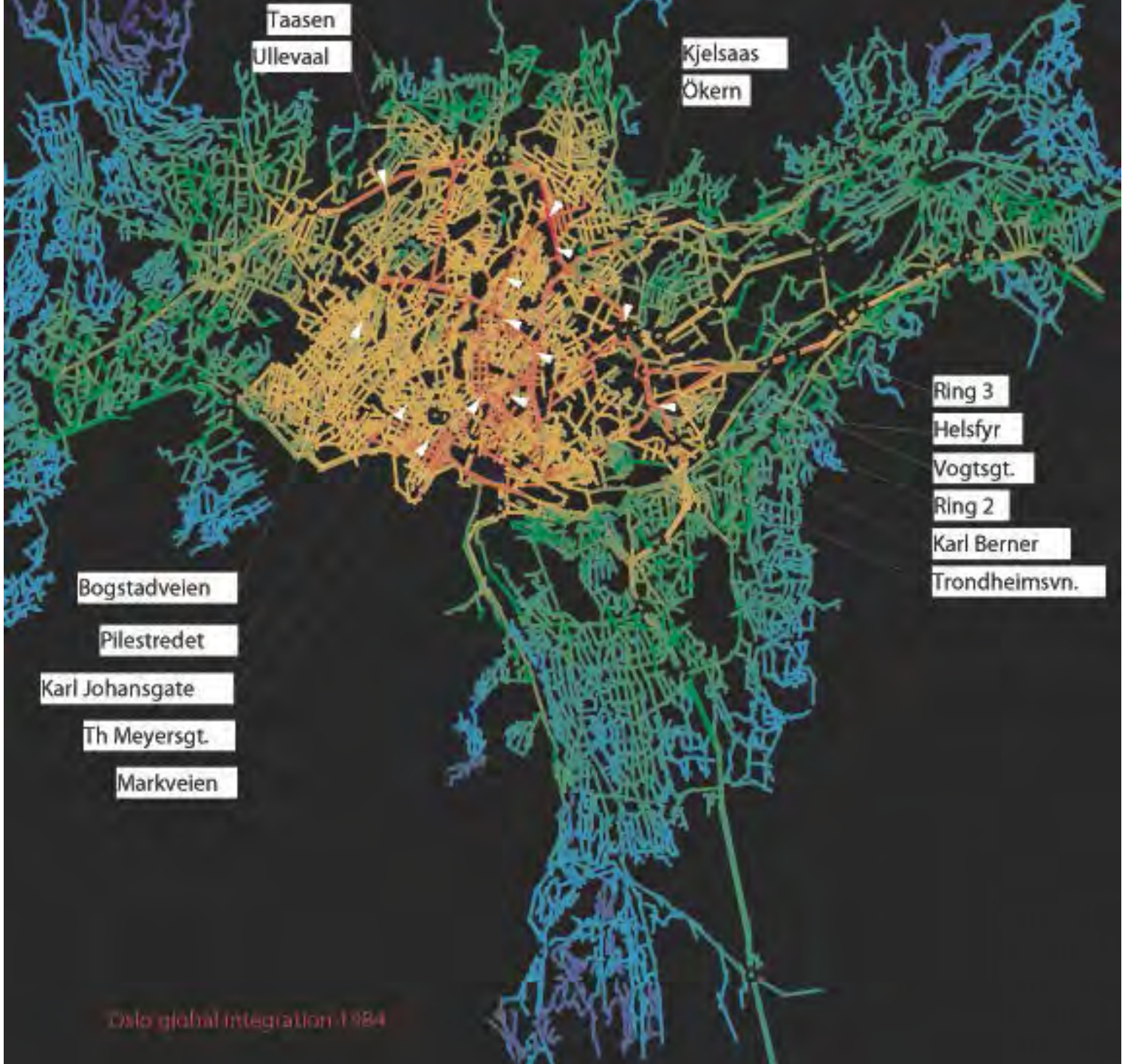
Integration value of the back street: 1/RRA = 1/3,8759689922 = 0,258

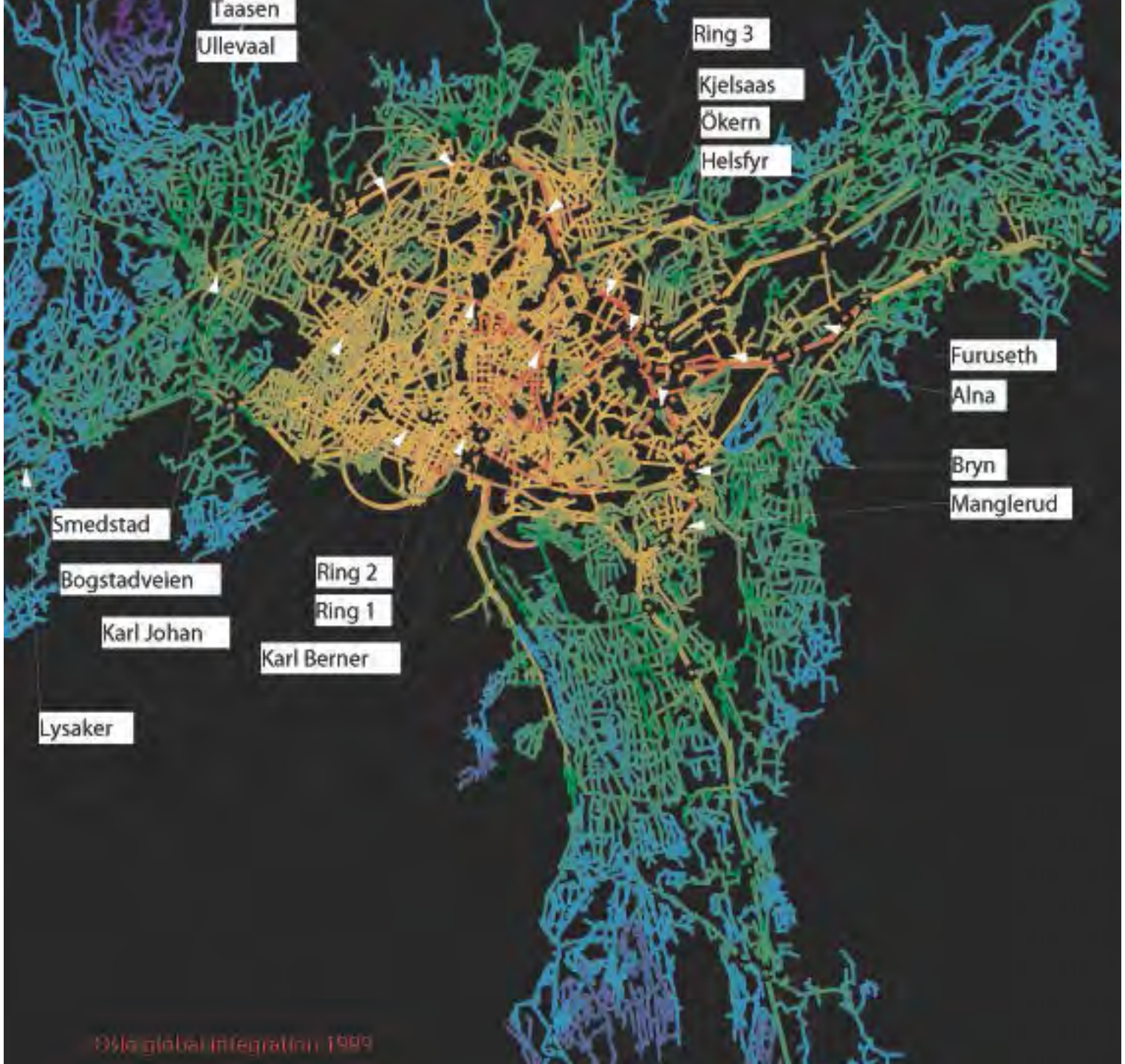




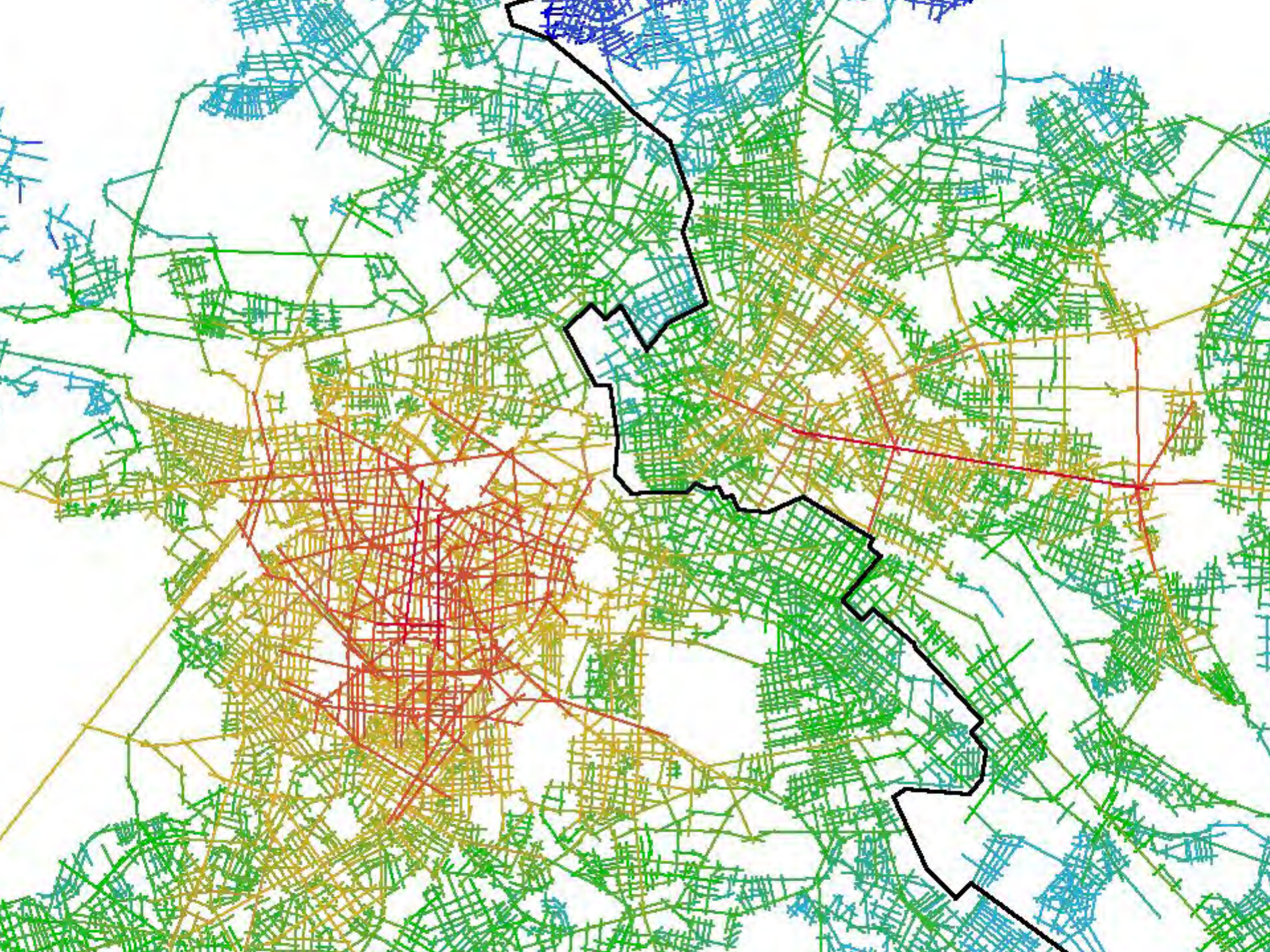
Oslo global integration 1929
Waldermar Thranes gate
Th Meyersgate
Markveien
Torggata
Storgata
Bogstadveien
Ullevaalsveien
Pilestredet
Karl Johans Gate

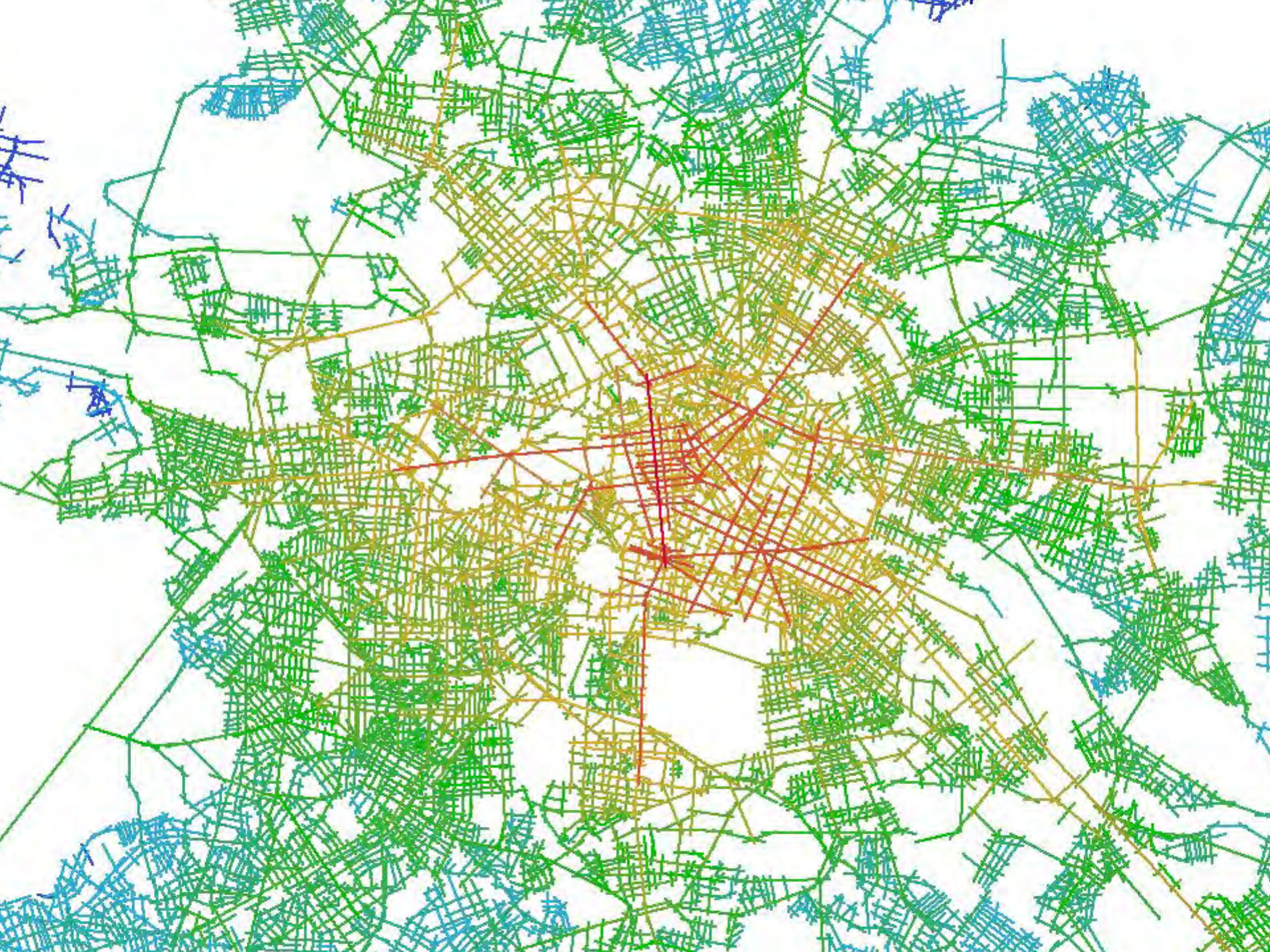
Vogtsgt.
Ring 2
Sannegt.
Karl Berner
Toftesgt.
Th Meyersgt.
Markveien
Bogstadveien
Pilestredet
Karl Johansgate
Oslo global integration 1954

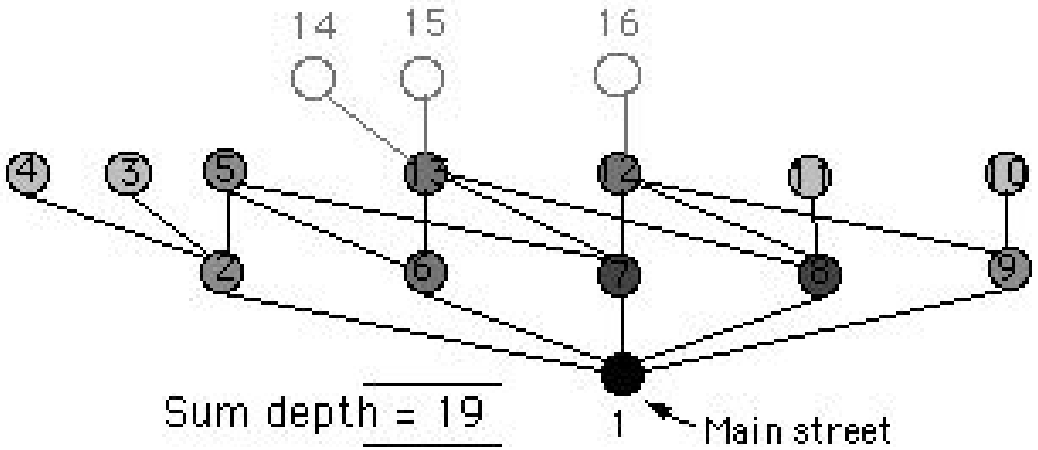

Taasen
Ullevaal
Kjelsaas
Ökern
Ring 3
Helsfyr
Vogtsgt.
Ring 2
Karl Berner
Trondheimsvn.
Bogstadveien
Pilestredet
Karl Johansgate
Th Meyersgt.
Markveien
Oslo global integration 1984


Taasen
Ullevaal
Ring 3
Kjelsaas
Ökern
Helsfyr
Furuseth
Alna
Bryn
Manglerud
Smedstad
Bogstadveien
Ring 2
Ring 1
Karl Johan
Karl Berner
Lysaker
Oslo global integration 1999

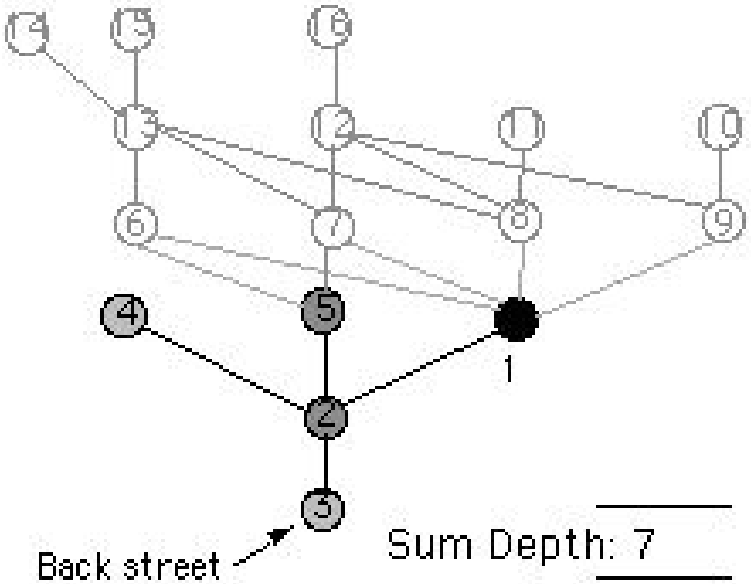
PHOTONET.DE







Sum depth = 19



Sum Depth: 7

Calculating the main street axe:
(MD) = sum local depth/k local -1 = 19/13 - 1 = 1,583333333

Real asymmetry (RA) = 2(MD - 1)/k - 2 =
2(1,583333333 - 1)/13 - 2 = 0,10606060606

Real relative asymmetry (RRA) = RA/Dk =
0,10606060606/0,276 =0,38427755819

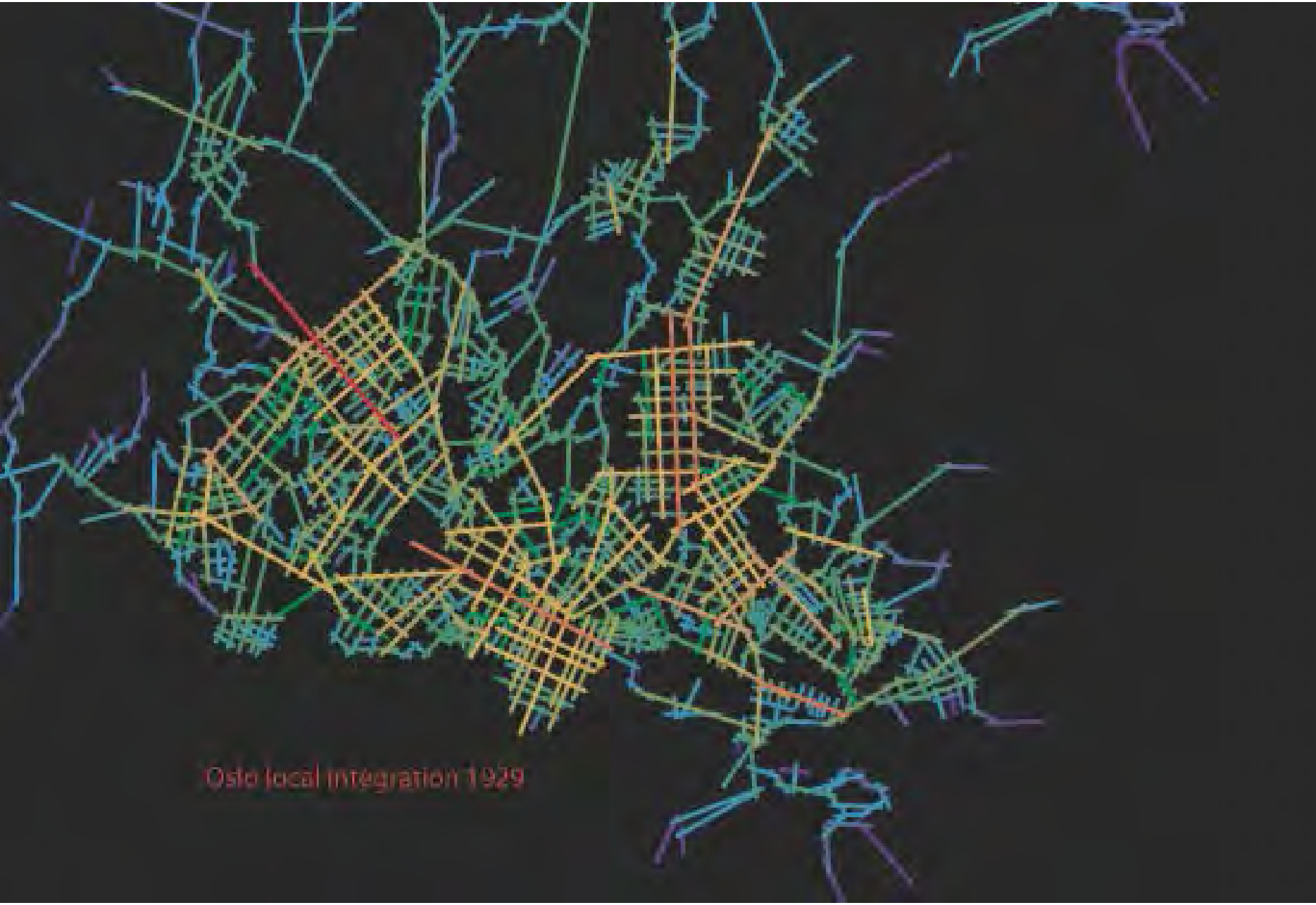
Local integration value of the main street: (1/RRA) =
1/0,38427755819 = **2,6022857143**

Calculating the back street axe:
(MD) = sum local depth/k -1 = 7/5 - 1 = 1,75

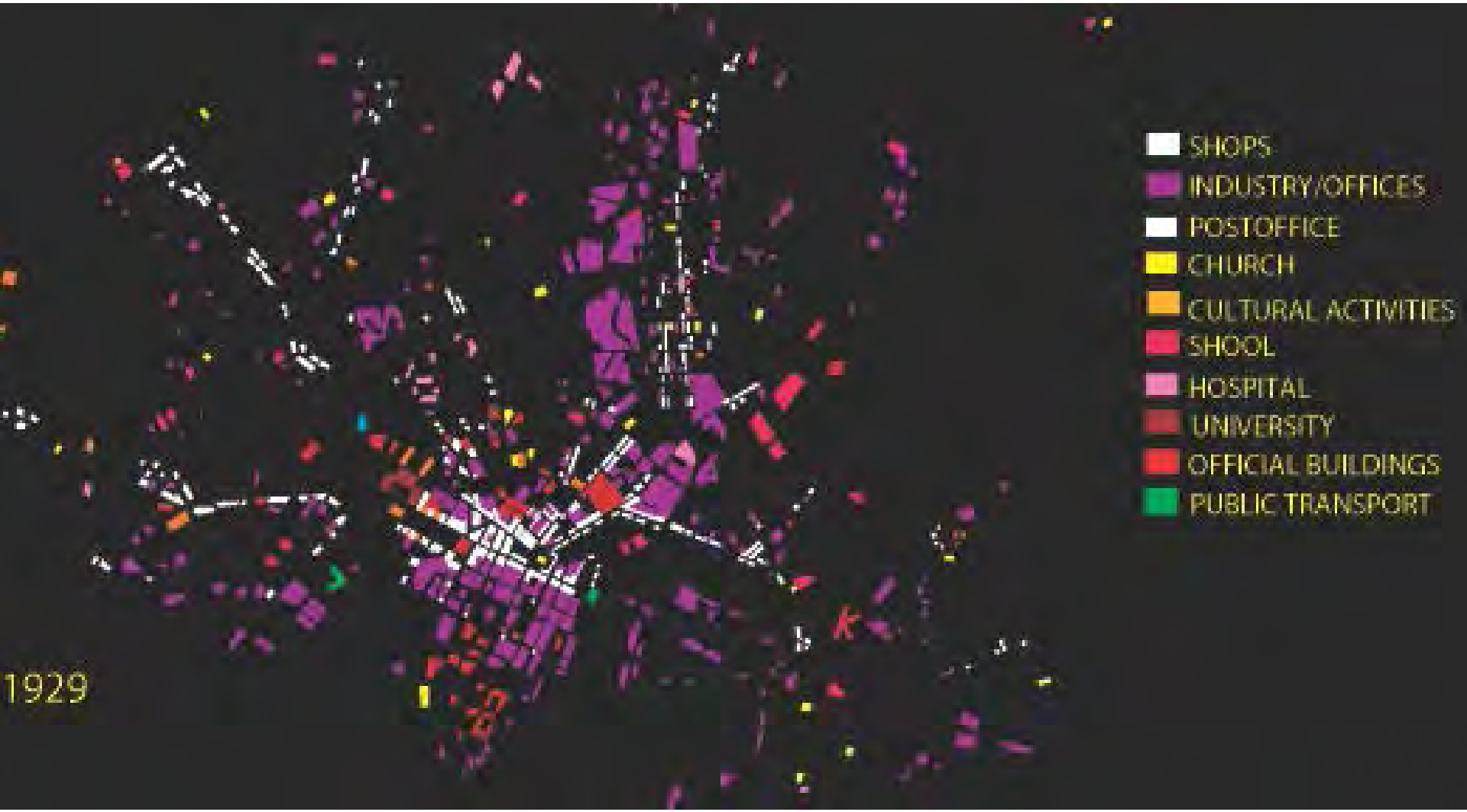
Real asymmetry (RA) = 2(MD - 1)/k - 2 =
2(1,75 - 1)/5 - 2 = 0,5

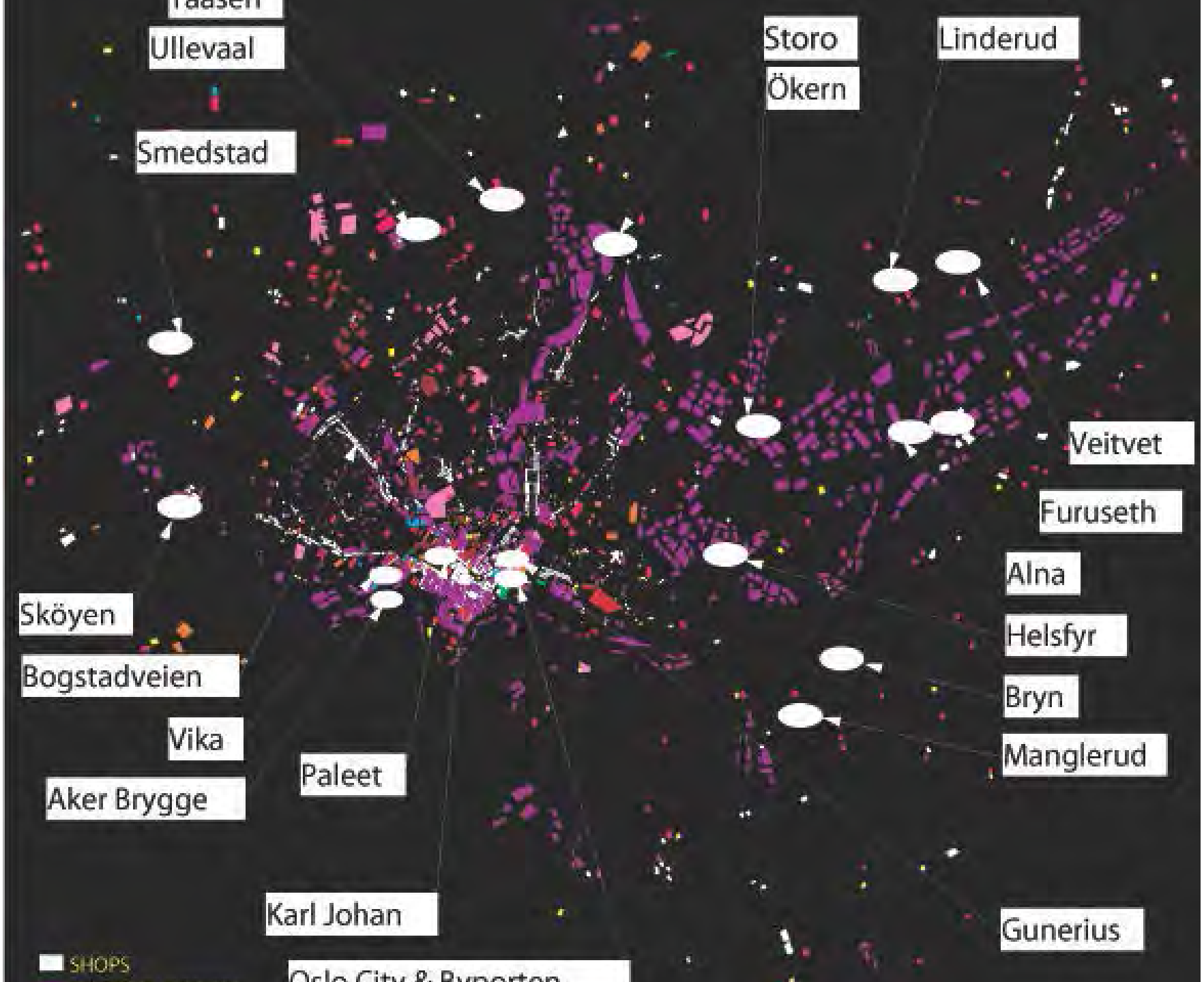
Real relative asymmetry (RRA) = RA/Dk =
0,5/0,352 = 1,4204545455

Local integration value of the back street: (1/RRA) =
1/1,4204545455 = **0,7039999998**


Oslo local integration 1929

Ring 3
Ring 2
Vogtsgt
Th Meyers gt
Ring 1
Markveien
Bogstadveien
Karl Johansgate
Oslo local integration 1999


SHOPS
INDUSTRY/OFFICES
POSTOFFICE
CHURCH
CULTURAL ACTIVITIES
SHOOL
HOSPITAL
UNIVERSITY
OFFICIAL BUILDINGS
PUBLIC TRANSPORT
1929


Ullevaal
Smedstad
Storo
Ökern
Linderud
Veitvet
Furuseth
Alna
Helsfyr
Bryn
Manglerud
Sköyen
Bogstadveien
Vika
Aker Brygge
Paleet
Karl Johan
Gunerius
SHOPS

Manglerud
INTERIØR - JERNVARE
KIOSK
LEGE - TANNLEGE
LEKER
MUSIKK
OPTIKER
PARFYMERI
RENSERI
REISEUTSTYR - VESKER
SERVERINGSSTEDER
SKOTØY
SPORT
ZOO
65 BUTIKKER
10-20 (18)
10-20 (10-1

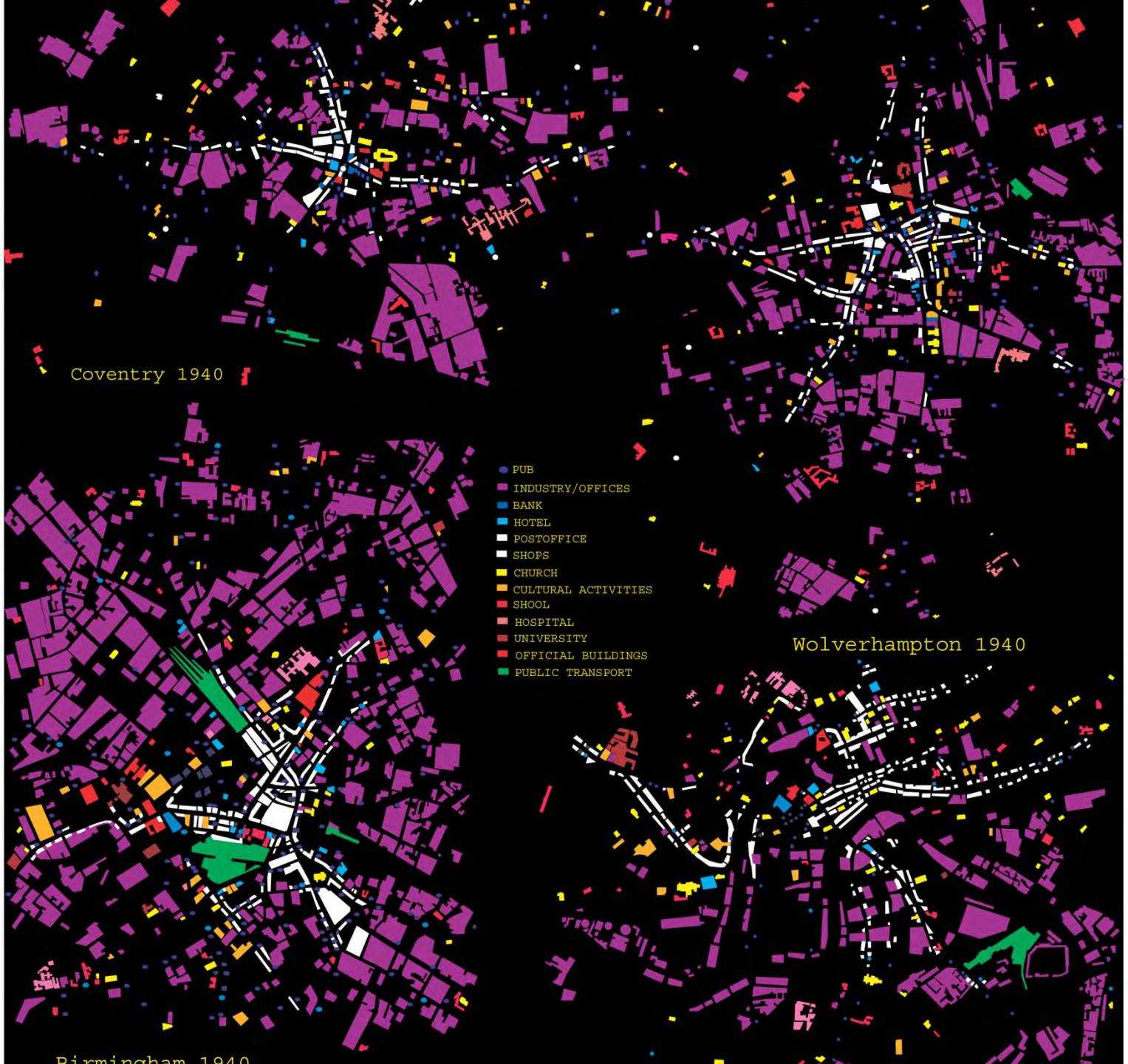
TIME

McDonald's
Kodak EXPRESS
DRESS MANN
KappAhl
H&M
ARTS & CRAFT
VING
THUN
ETABLERT 1857
3 BRØDRE
MARIA

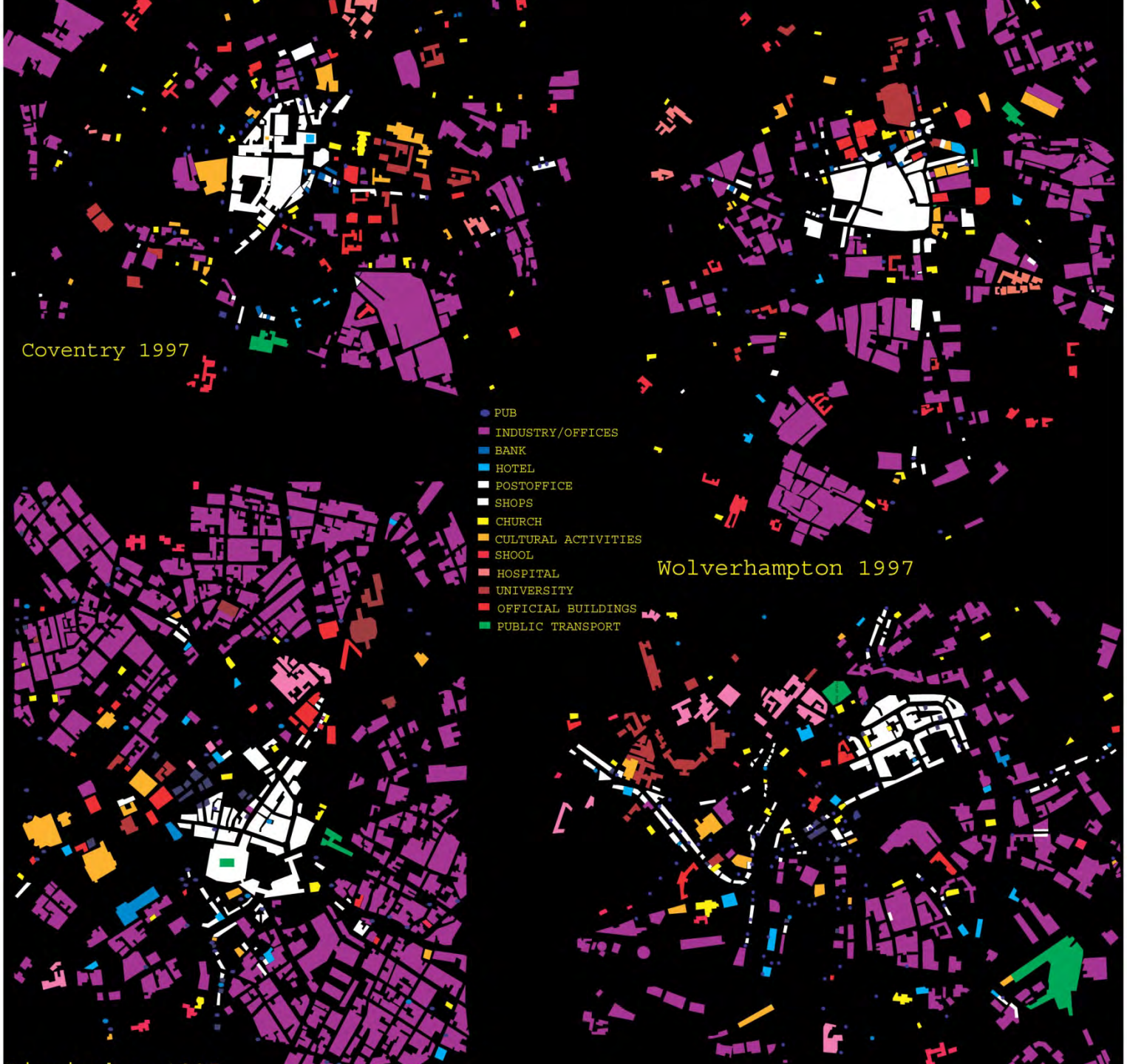
Coventry 1940

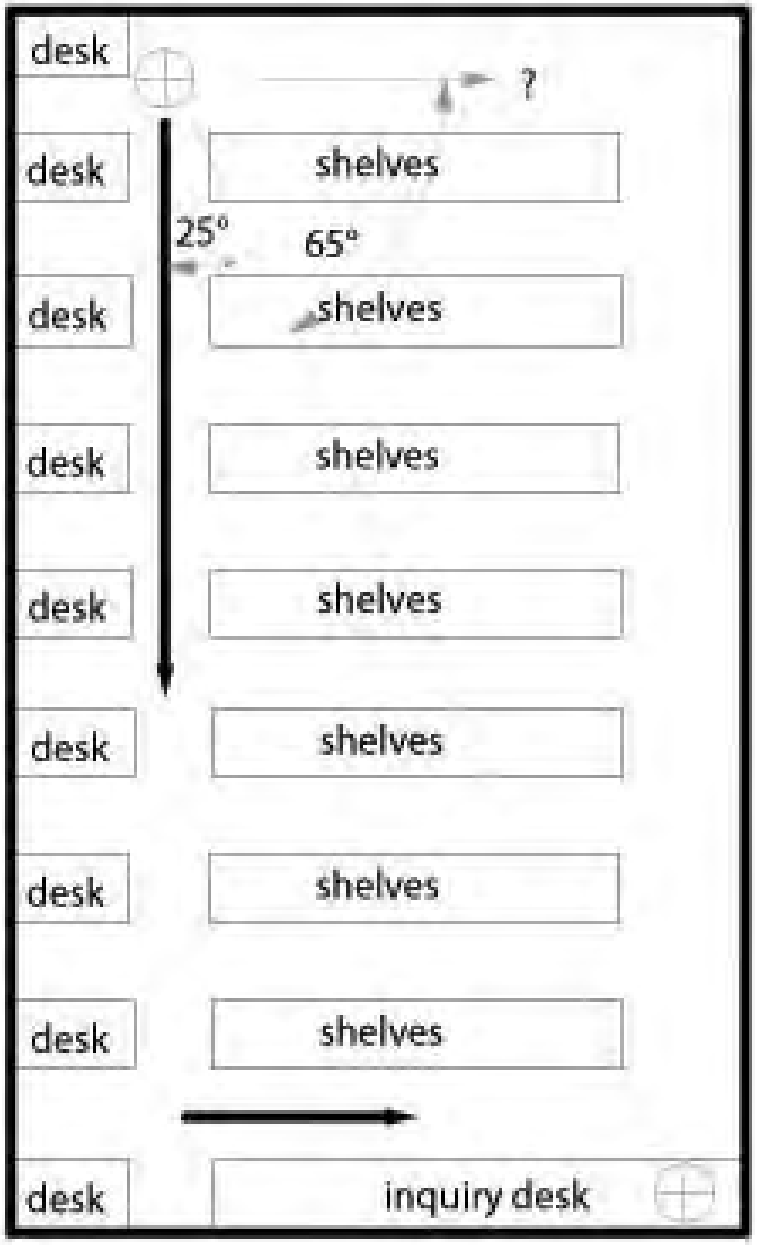
Wolverhampton 1940

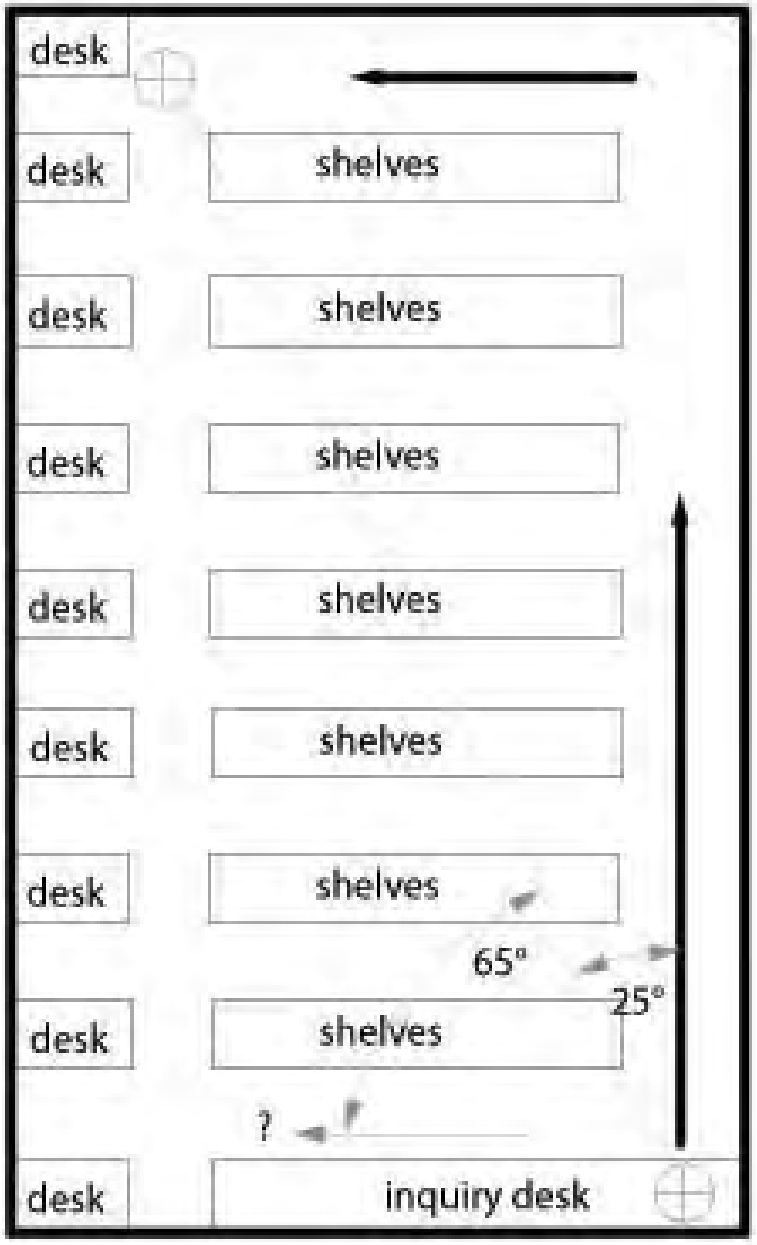
Bristol 1940


Coventry 1940
Wolverhampton 1940
Birmingham 1940
PUB
INDUSTRY/OFFICES
BANK
HOTEL
POSTOFFICE
SHOPS
CHURCH
CULTURAL ACTIVITIES
SHOOL
HOSPITAL
UNIVERSITY
OFFICIAL BUILDINGS
PUBLIC TRANSPORT

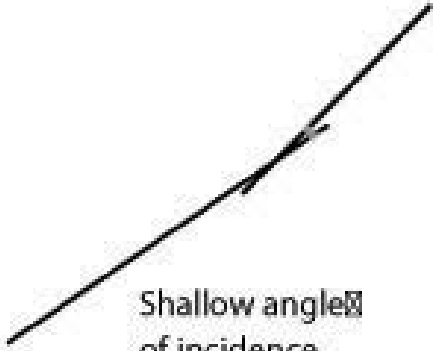
Coventry 1997
Wolverhampton 1997


Coventry 1997
Wolverhampton 1997
PUB
INDUSTRY/OFFICES
BANK
HOTEL
POSTOFFICE
SHOPS
CHURCH
CULTURAL ACTIVITIES
SHOOL
HOSPITAL
UNIVERSITY
OFFICIAL BUILDINGS
PUBLIC TRANSPORT

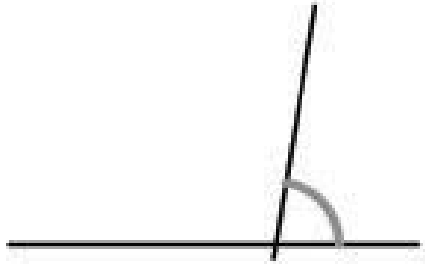

desk
?
desk
shelves
25°
65°
desk
shelves
desk
shelves
desk
shelves
desk
shelves
desk
shelves
desk
shelves
desk
inquiry desk


desk
desk
shelves
desk
shelves
desk
shelves
desk
shelves
desk
shelves
desk
shelves
65°
25°
desk
shelves
?
desk
inquiry desk

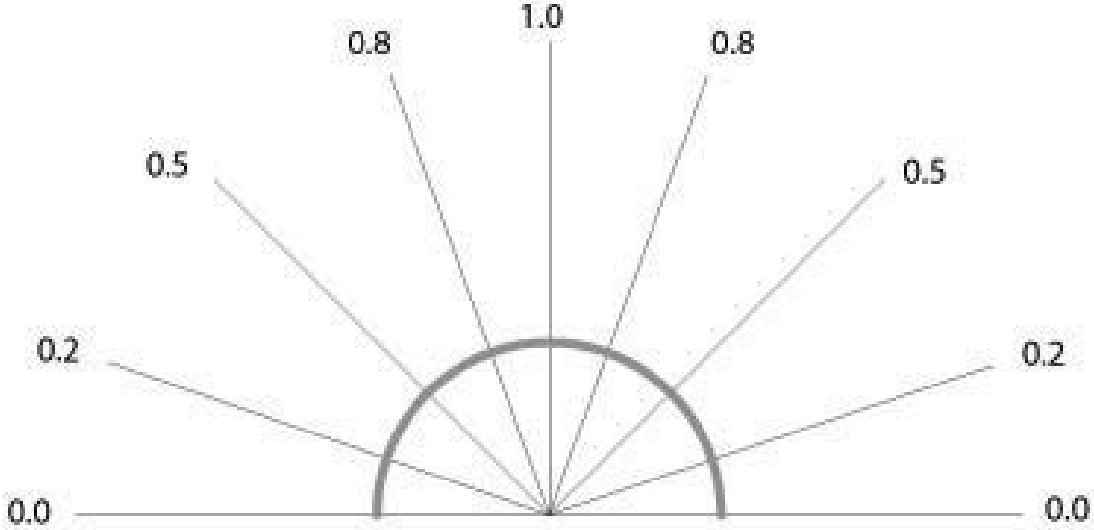
Delft



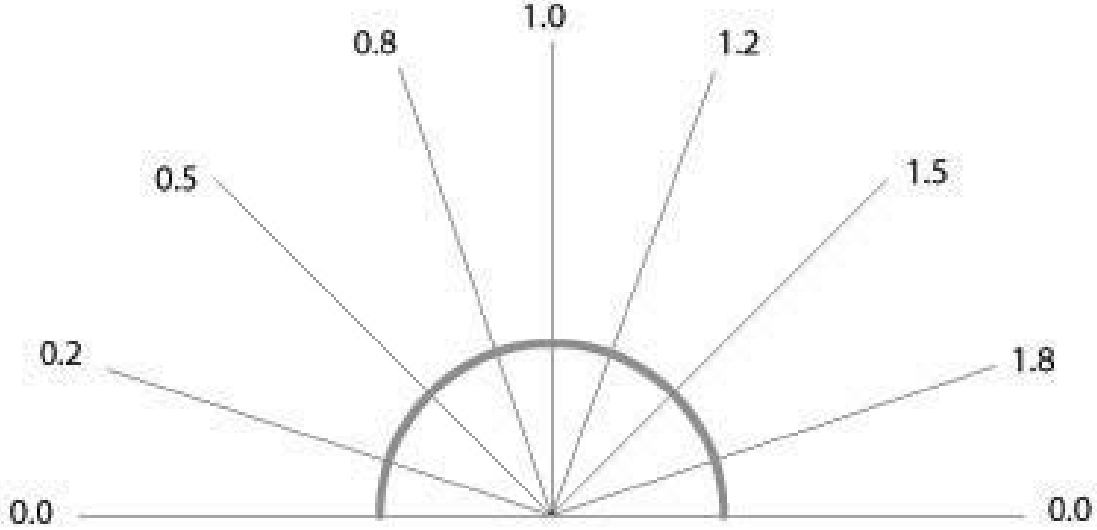
Shallow angle of incidence



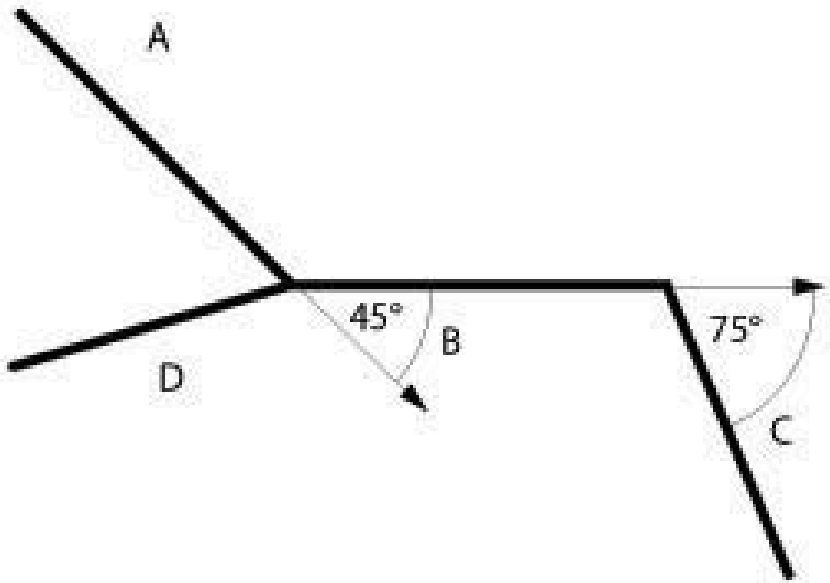
Sharp angle of incidence

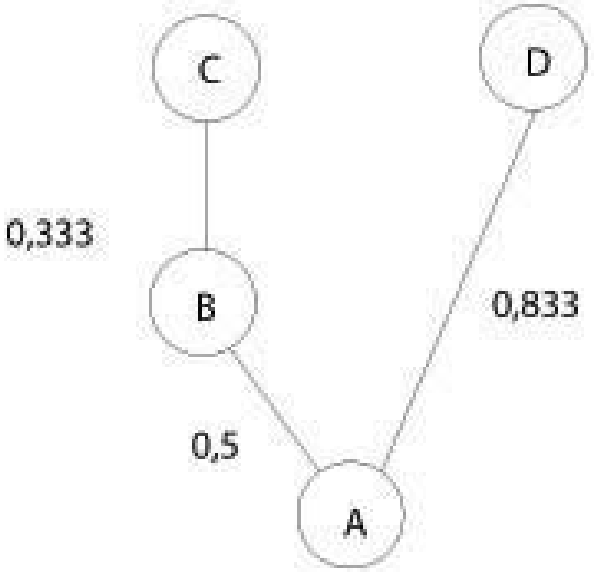


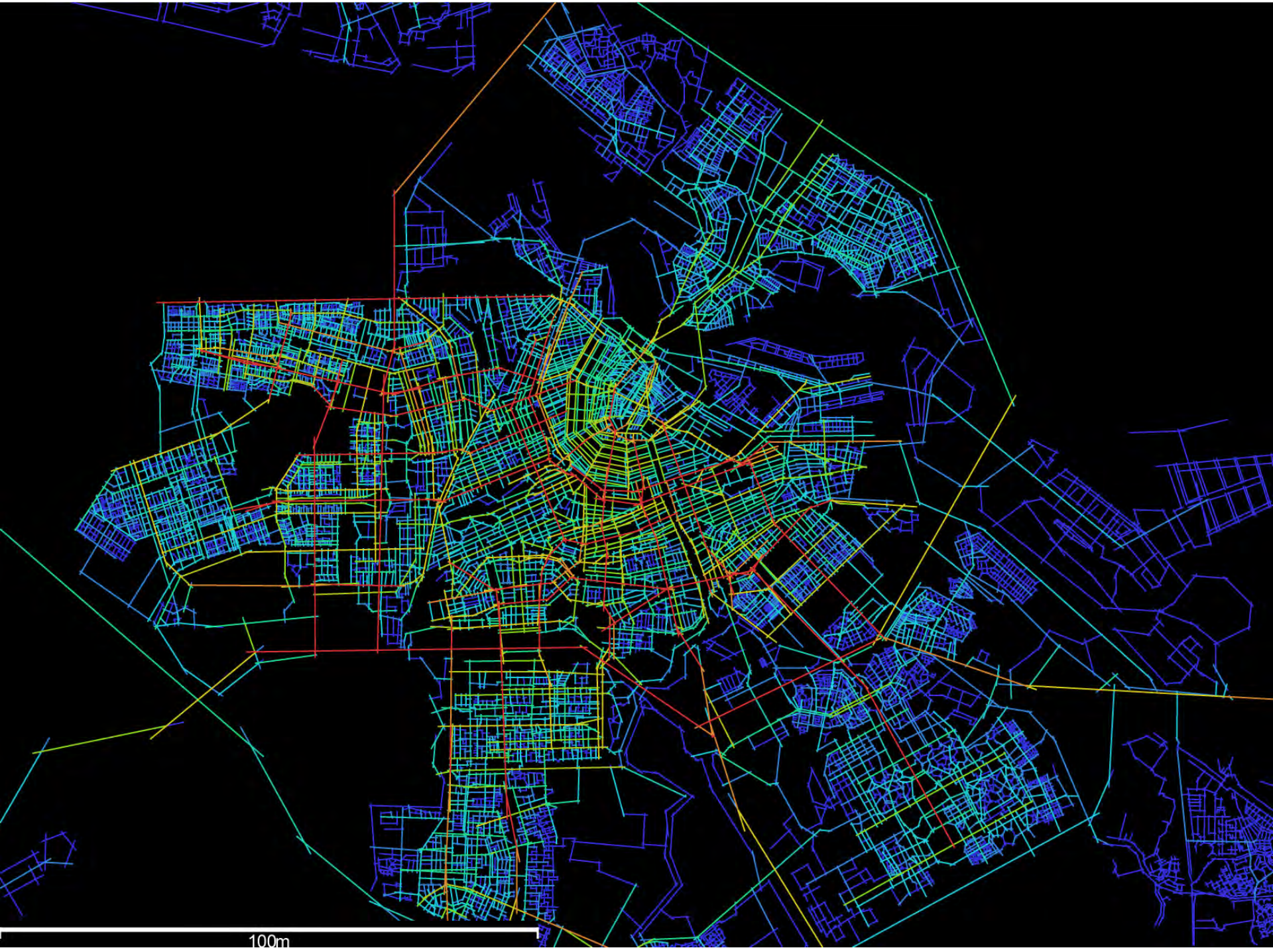
Angular weightning used in Meanda

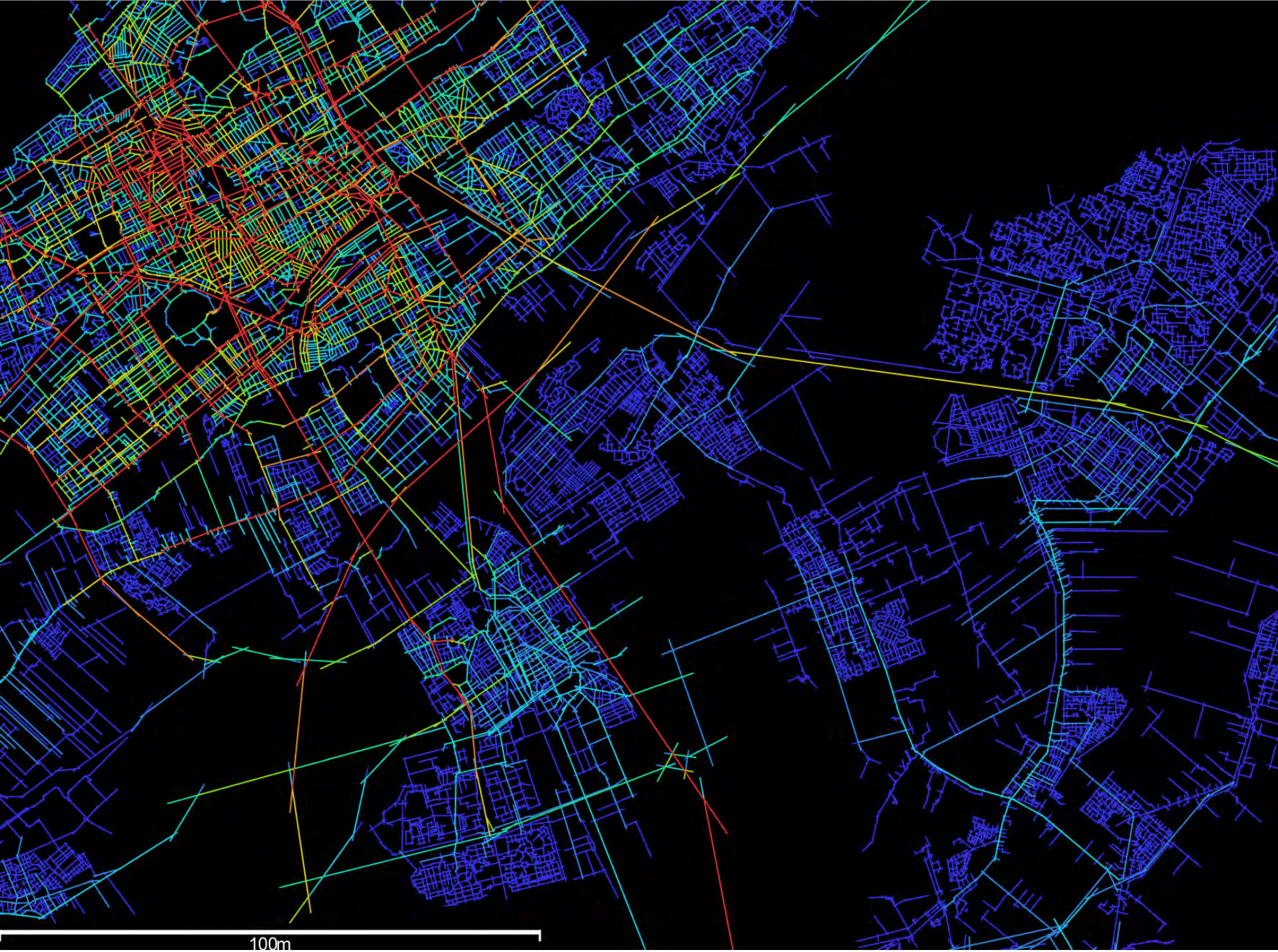


Angular weightning used in Depthmap


A
D
45°
B
75°
C


C
D
0,333
B
0,833
0,5
A


100m

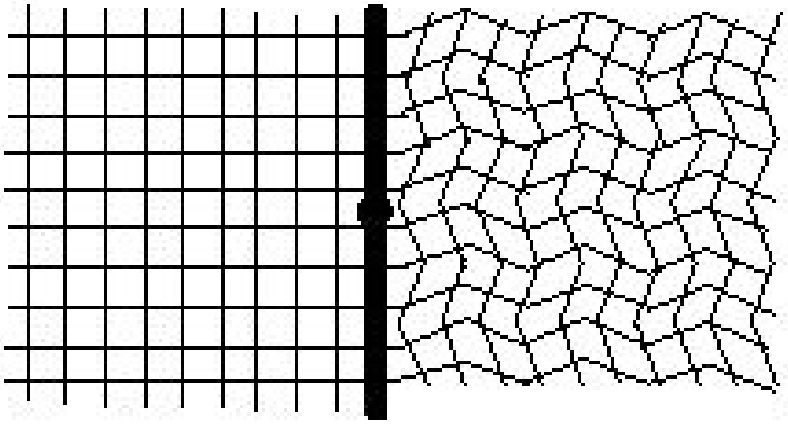

100m

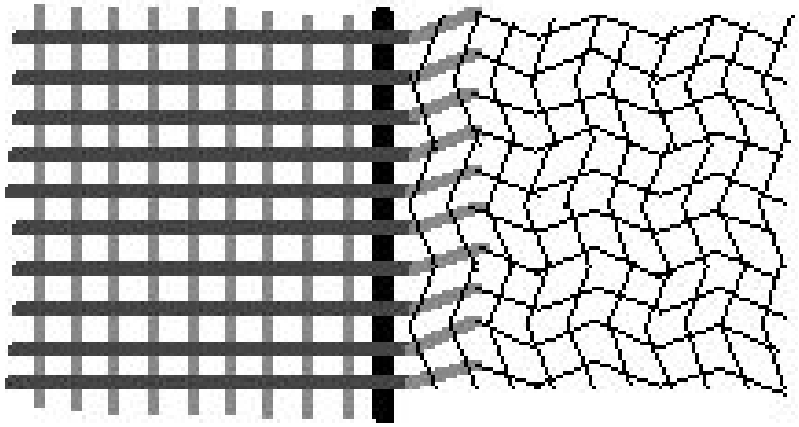
Forskjell mellom distanse og radius

- Topologisk distanse – minst antall retningsforandringer
- Geometrisk distanse – minst antall “angular deviation”
- Metrisk distanse – den korteste veien

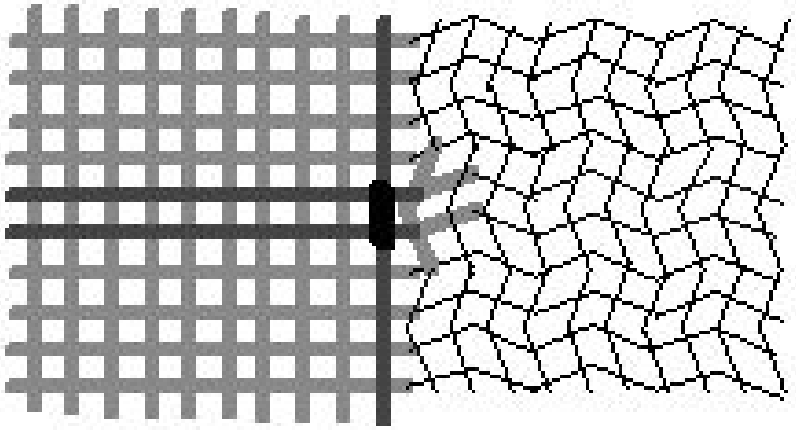
Forskjell melloom distanse og radius

- Topologisk radius – antall retningsforandring fra en gate **akse**
- Geometrisk radius – antall “angular deviation” fra en gate **segment**
- Metrisk radius – metrisk avstand fra en gate **segment**

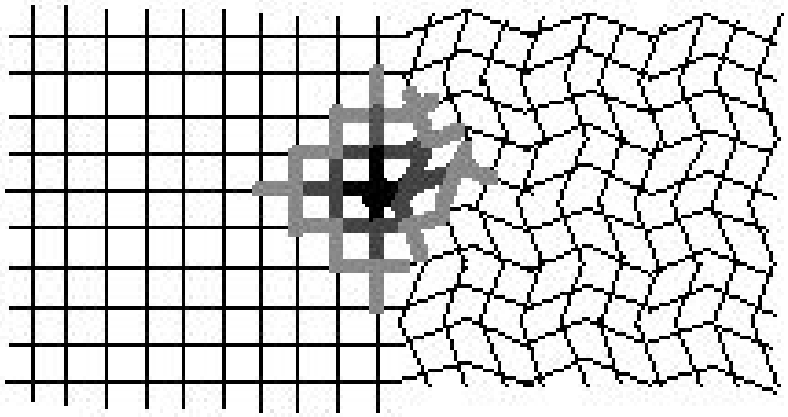




Topological radius: R=2:
two direction changes away from the thick line



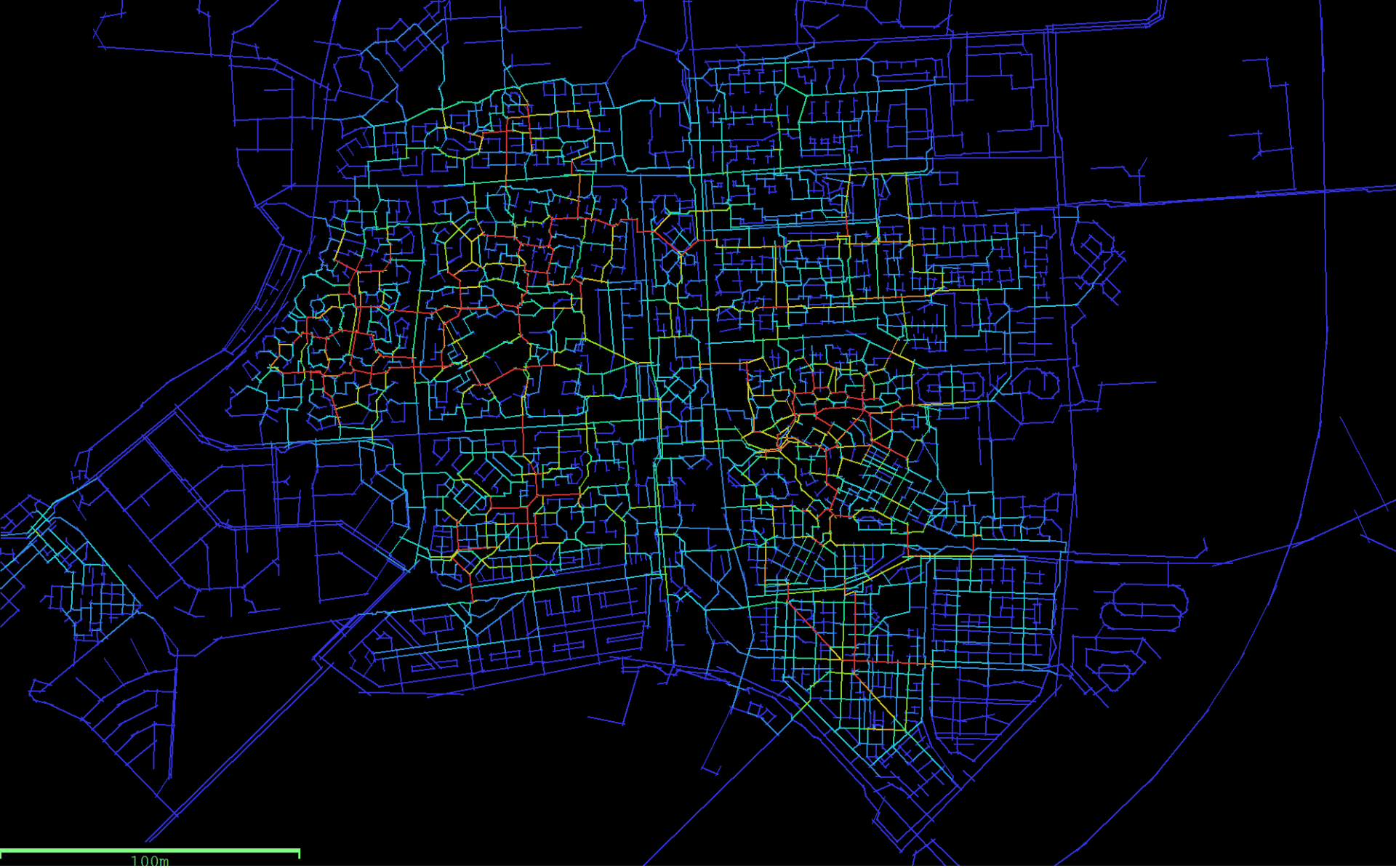
Topological radius: R=2:
two direction changes away from the segment

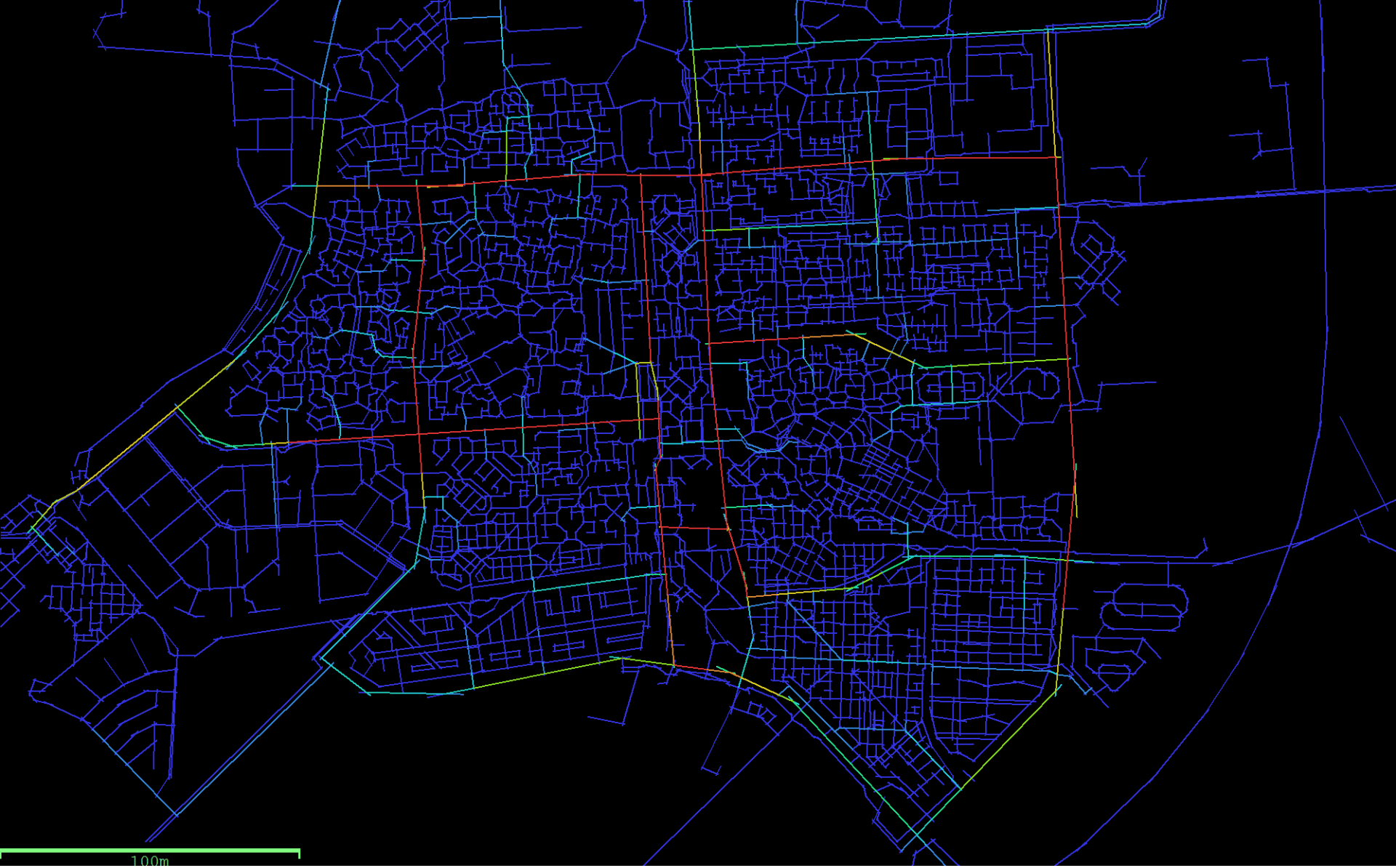


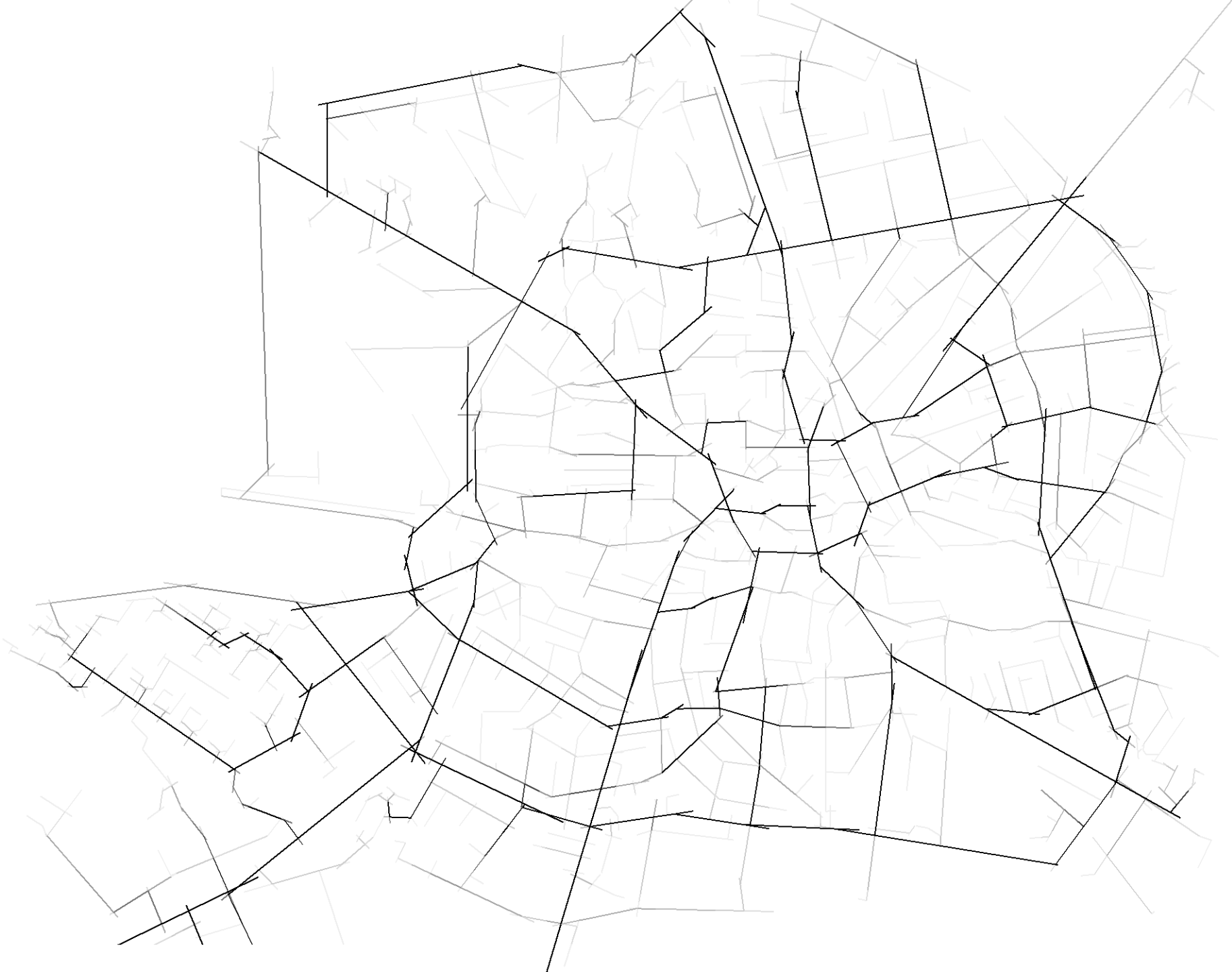
Metrical radius: R=3:
3 units away from the point

10m

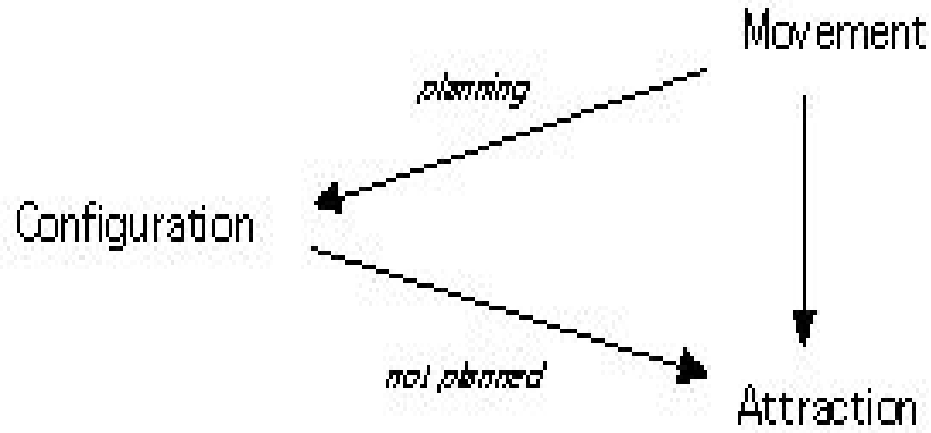
10m


100m

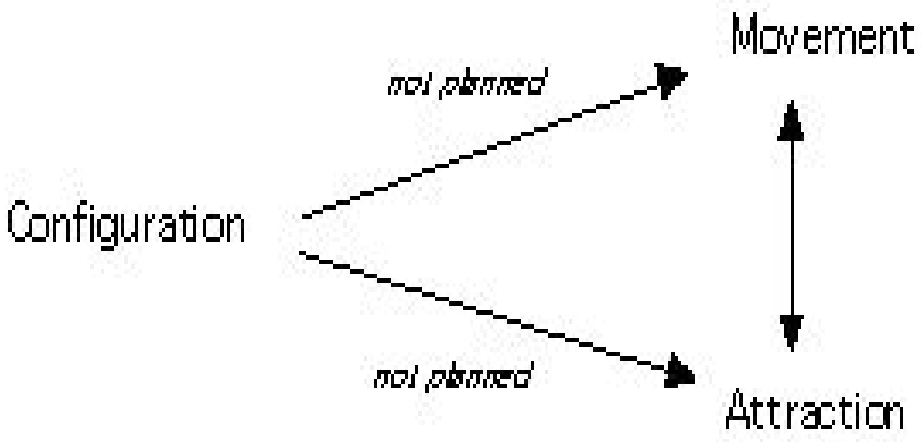

100m



3. TEORIBYGGING:
To motstridende syn på vegnettets rolle og lokalisering av funksjoner

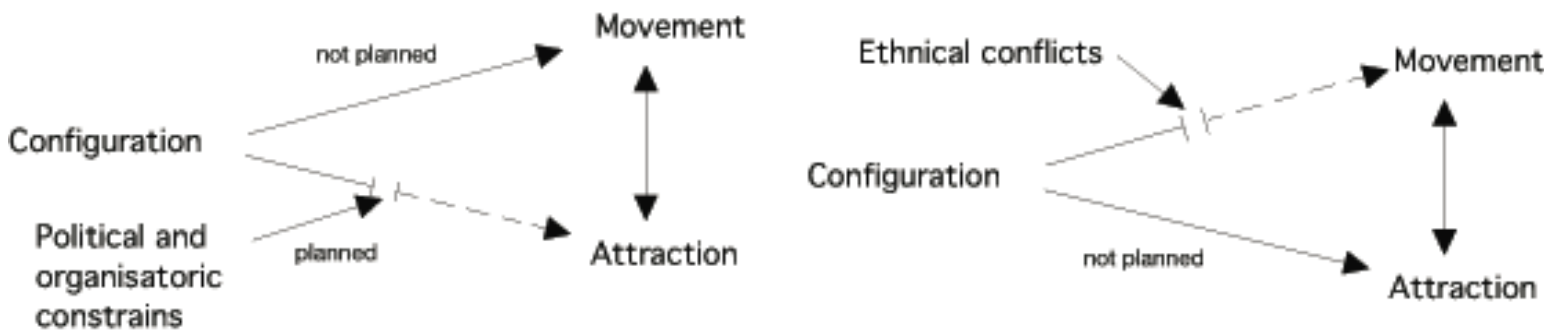


The Buchanan Report

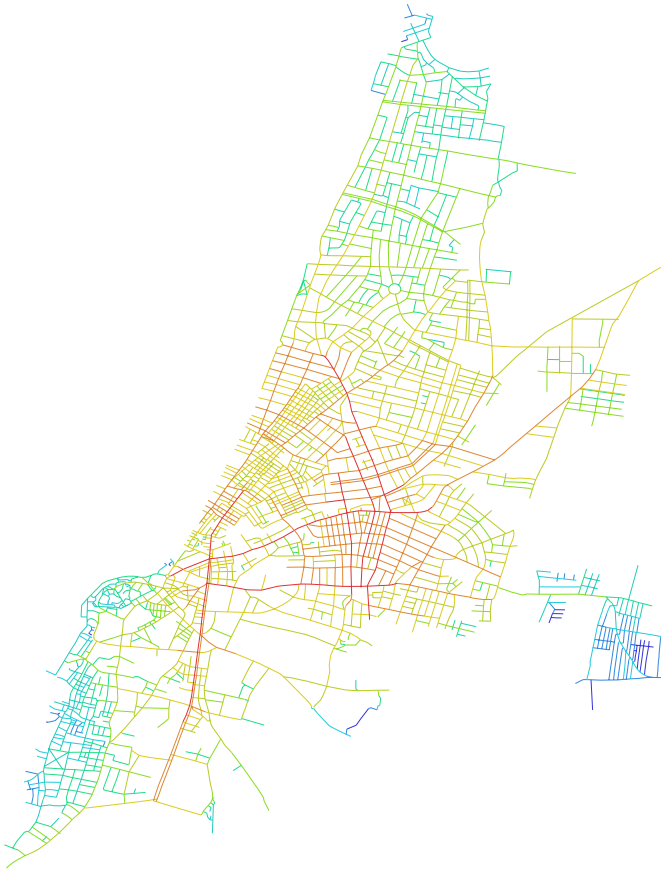


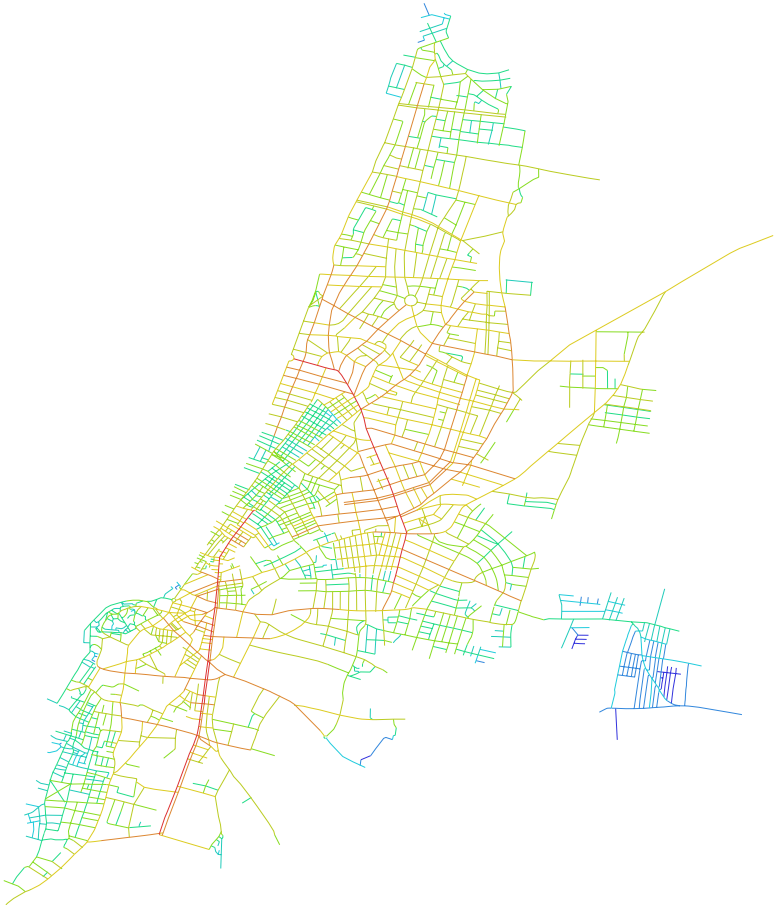
The Theory of the natural movement economic process

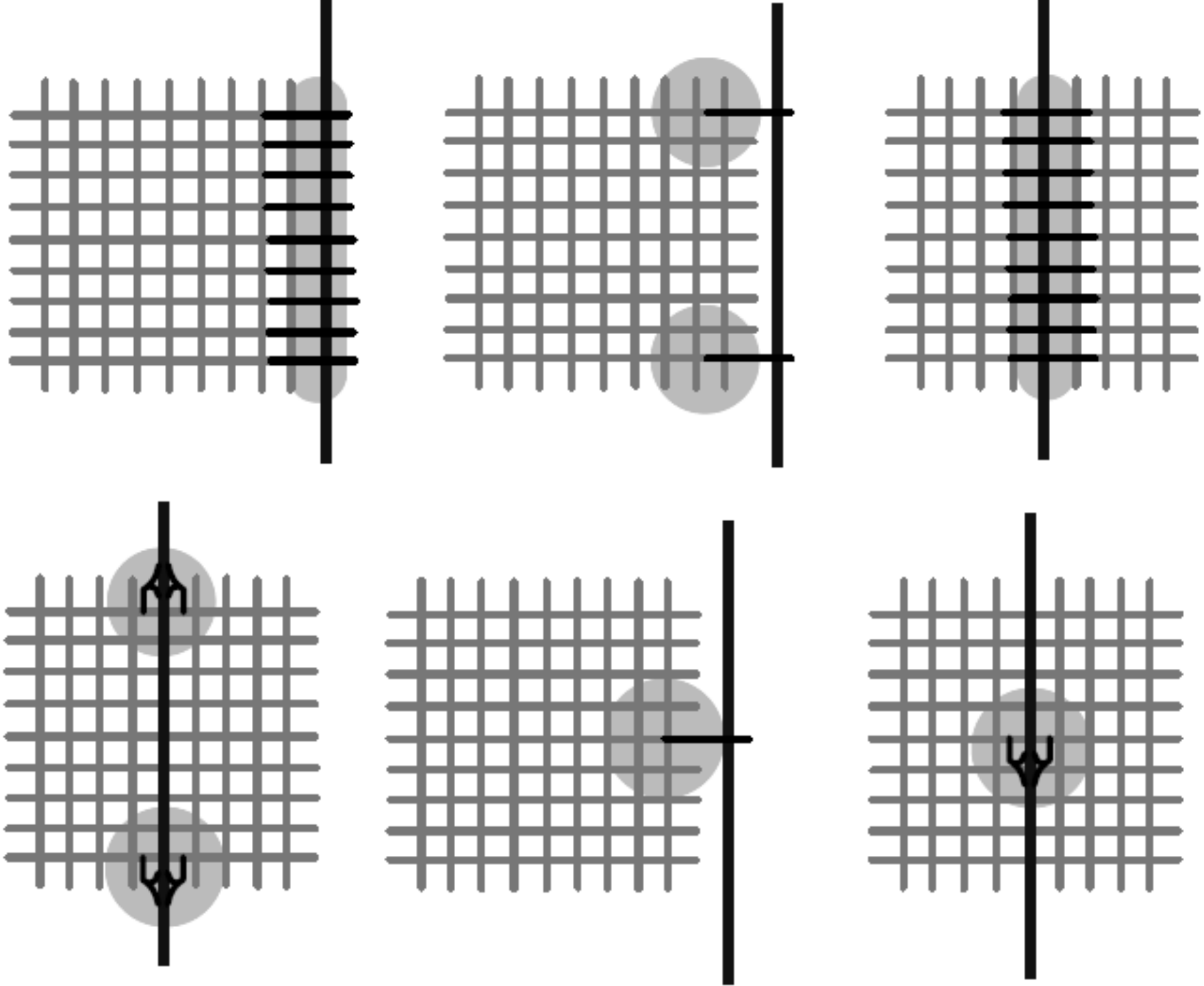
The distortive forces on the theory of the natural movement economy process

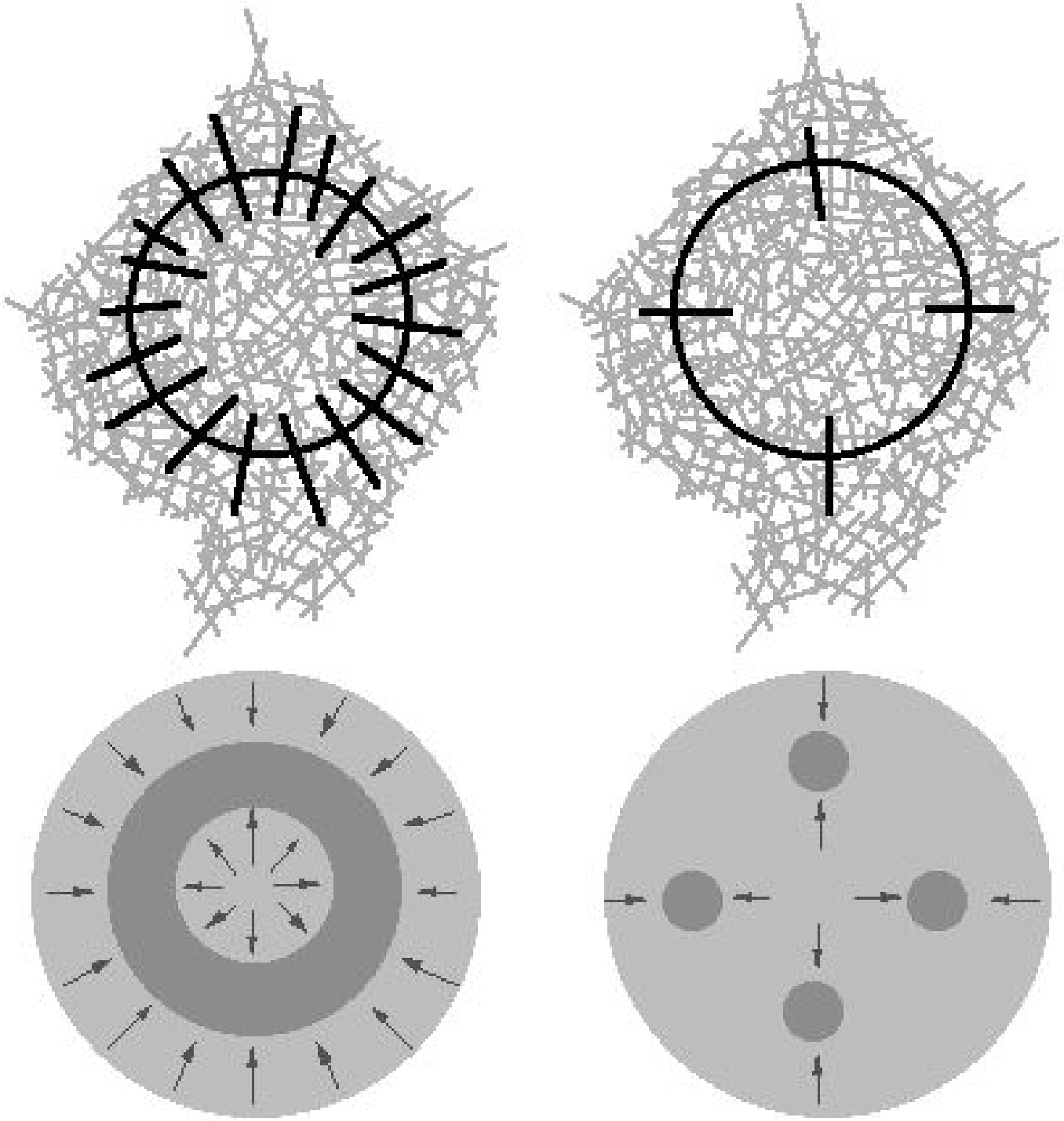


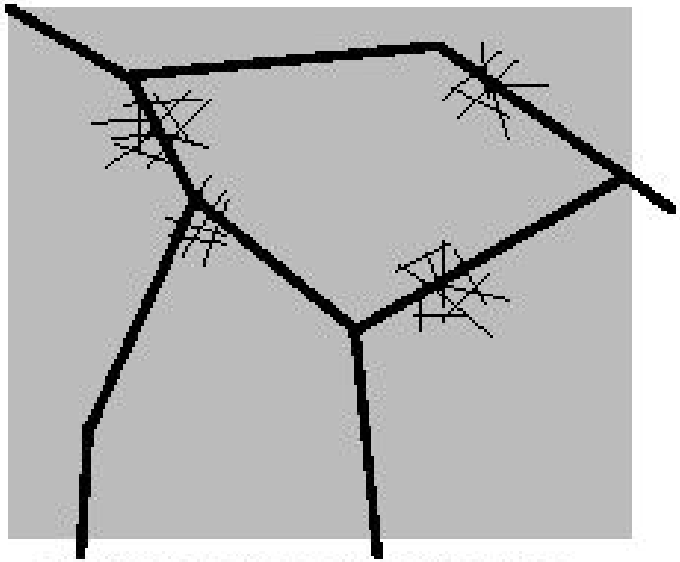
Jaffa – Tel Aviv conflict of 1944



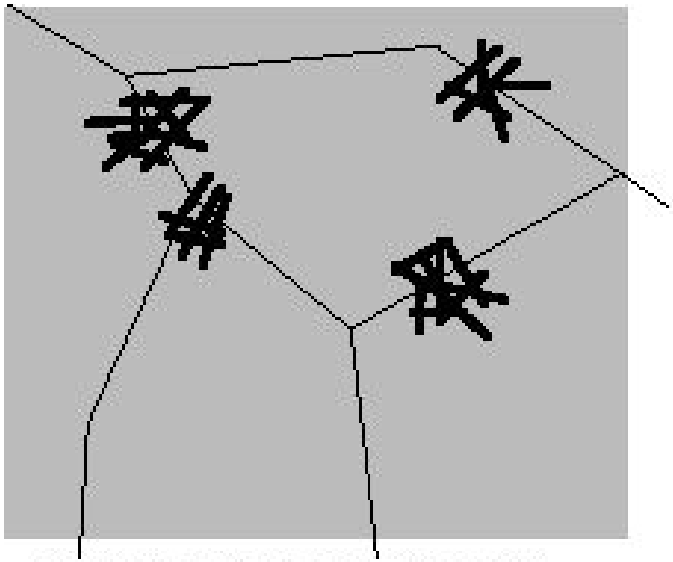




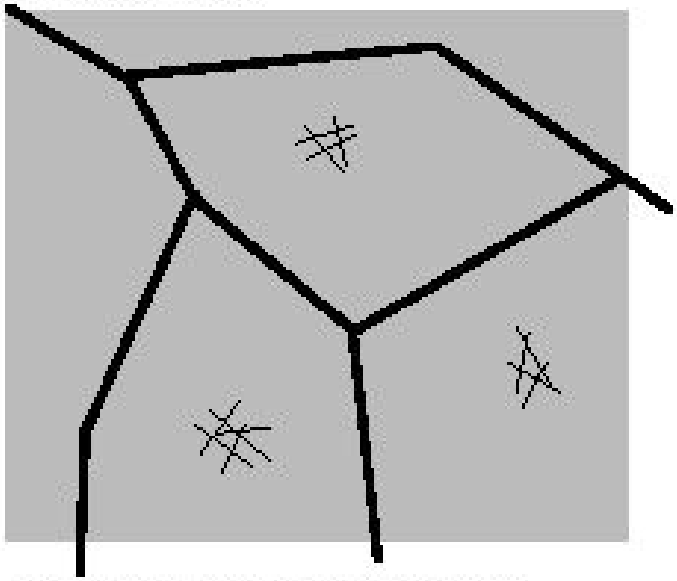




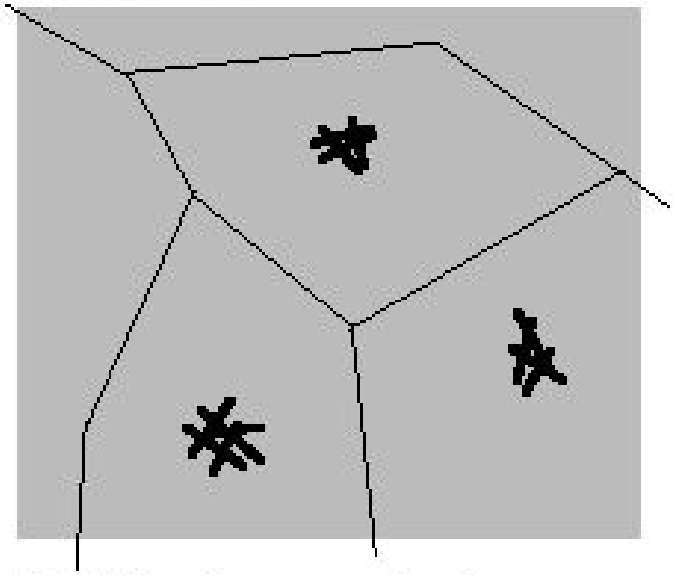
Traditional urban area with a high metrical radius



Traditional urban area with a low metrical radius



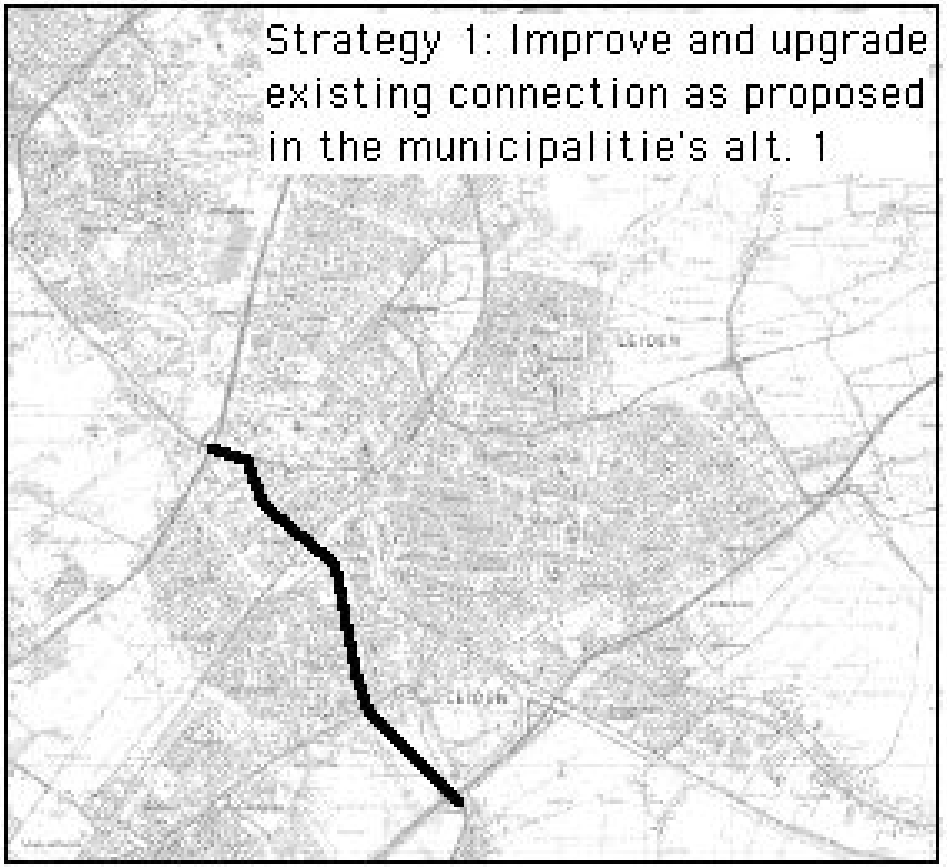
Post War urban area with a high metrical radius

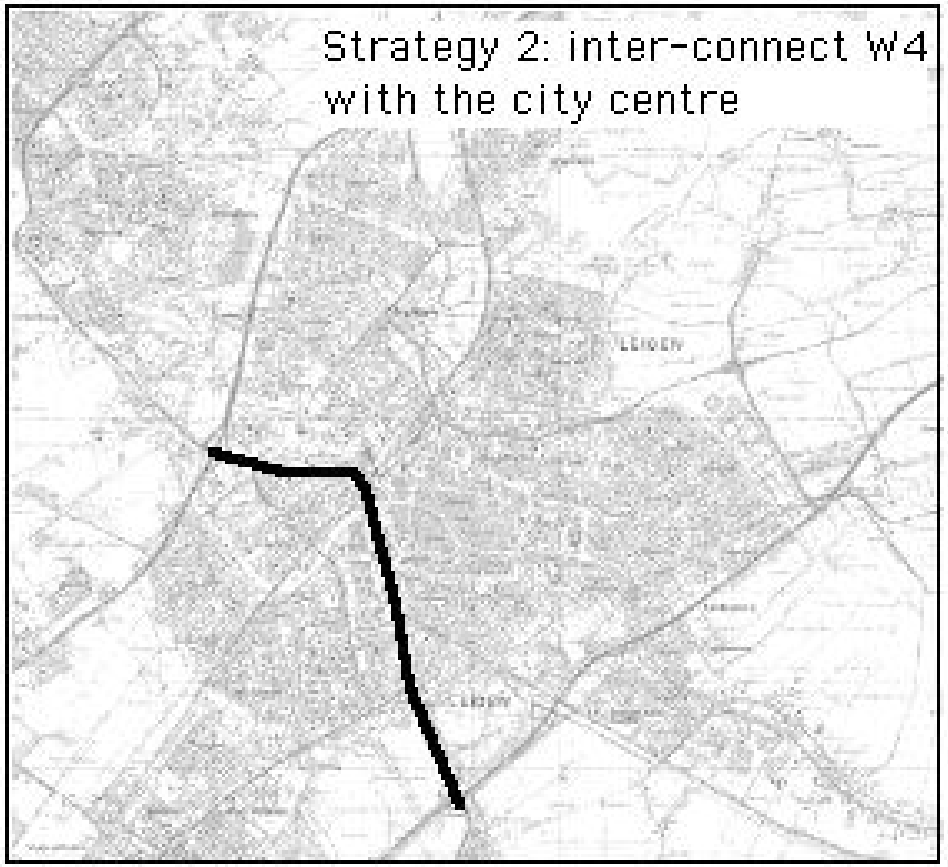


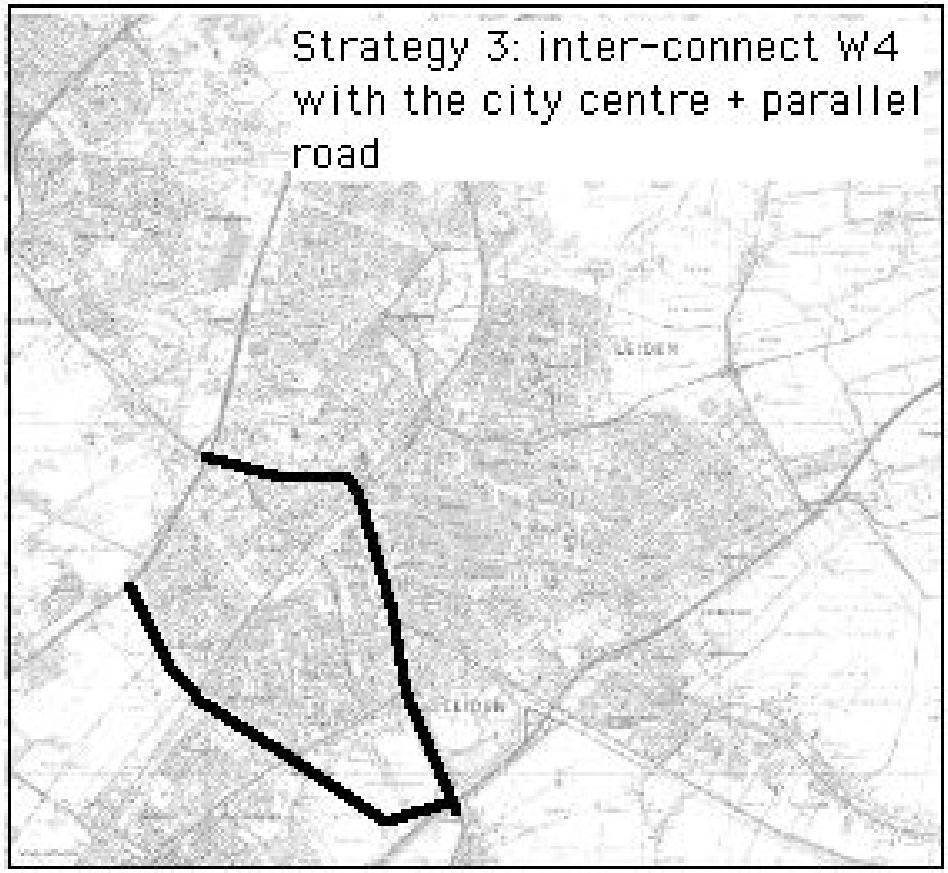
Post War urban area with a low metrical radius

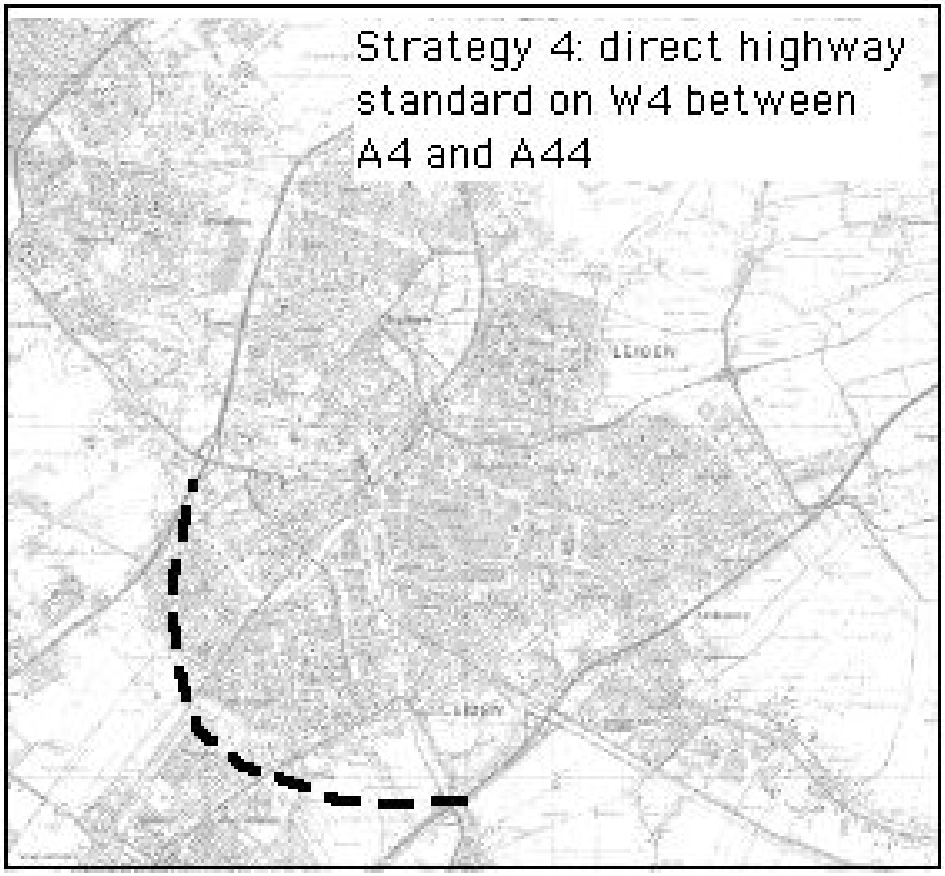
Bruk av Space Syntax i konsekvensanalyser

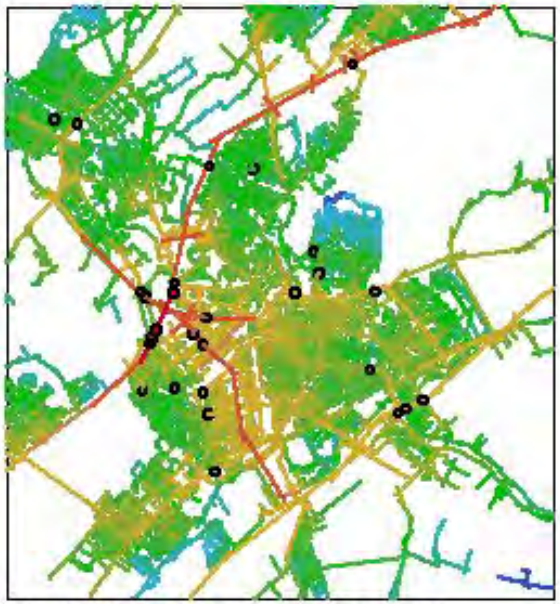
- Beregner de rommelige endringene i vegnettet i en før- og etter situasjon
- Gir indikasjoner på potensielle lokaliseringer av forretninger og trafikkvolum(biler og fotgjengere)
- Gir indikasjoner på om eksisterende forretningsområder vil forbedres eller tape tilgjengelighet i de nye planforslagene av vei- og gatenettet.


Strategy 1: Improve and upgrade existing connection as proposed in the municipalitie's alt. 1
LEIDEN
LEIDEN

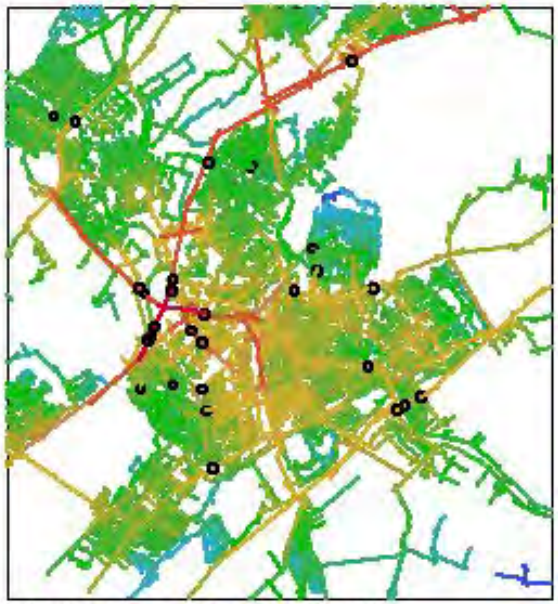

Strategy 2: inter-connect W4 with the city centre
LEIDEN
LEIDEN


Strategy 3: inter-connect W4 with the city centre + parallel road
LEIDEN
LEIDEN

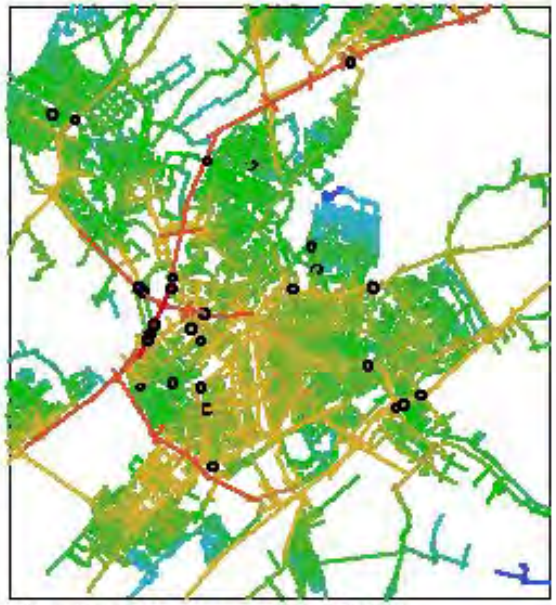

Strategy 4: direct highway standard on W4 between A4 and A44
LEIDEN
LEIDEN



Strategy 1: Improve and upgrade existing connection as proposed in the municipalitie's alt. 1



Strategy 2: inter-connect W4 with the city centre

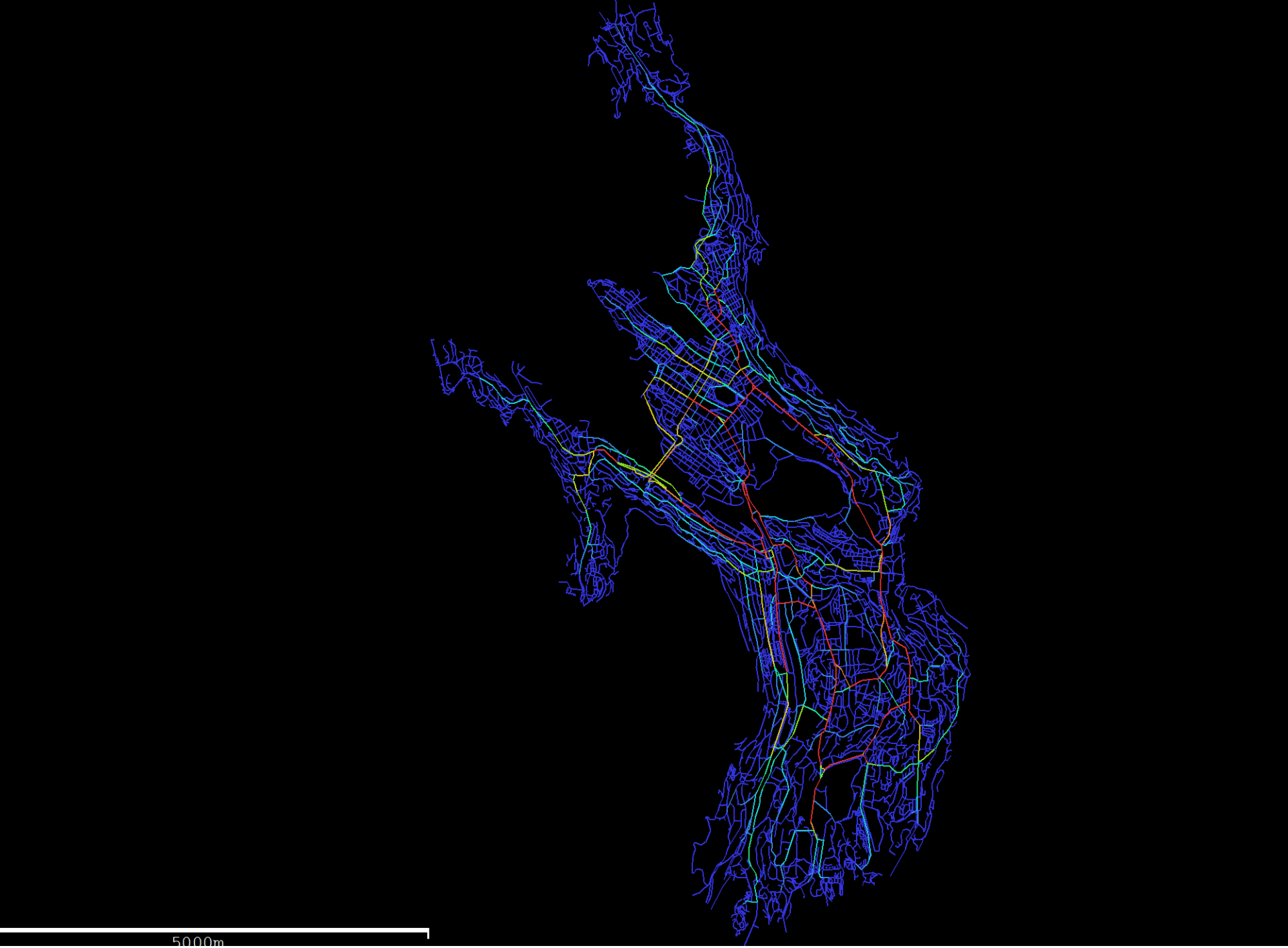


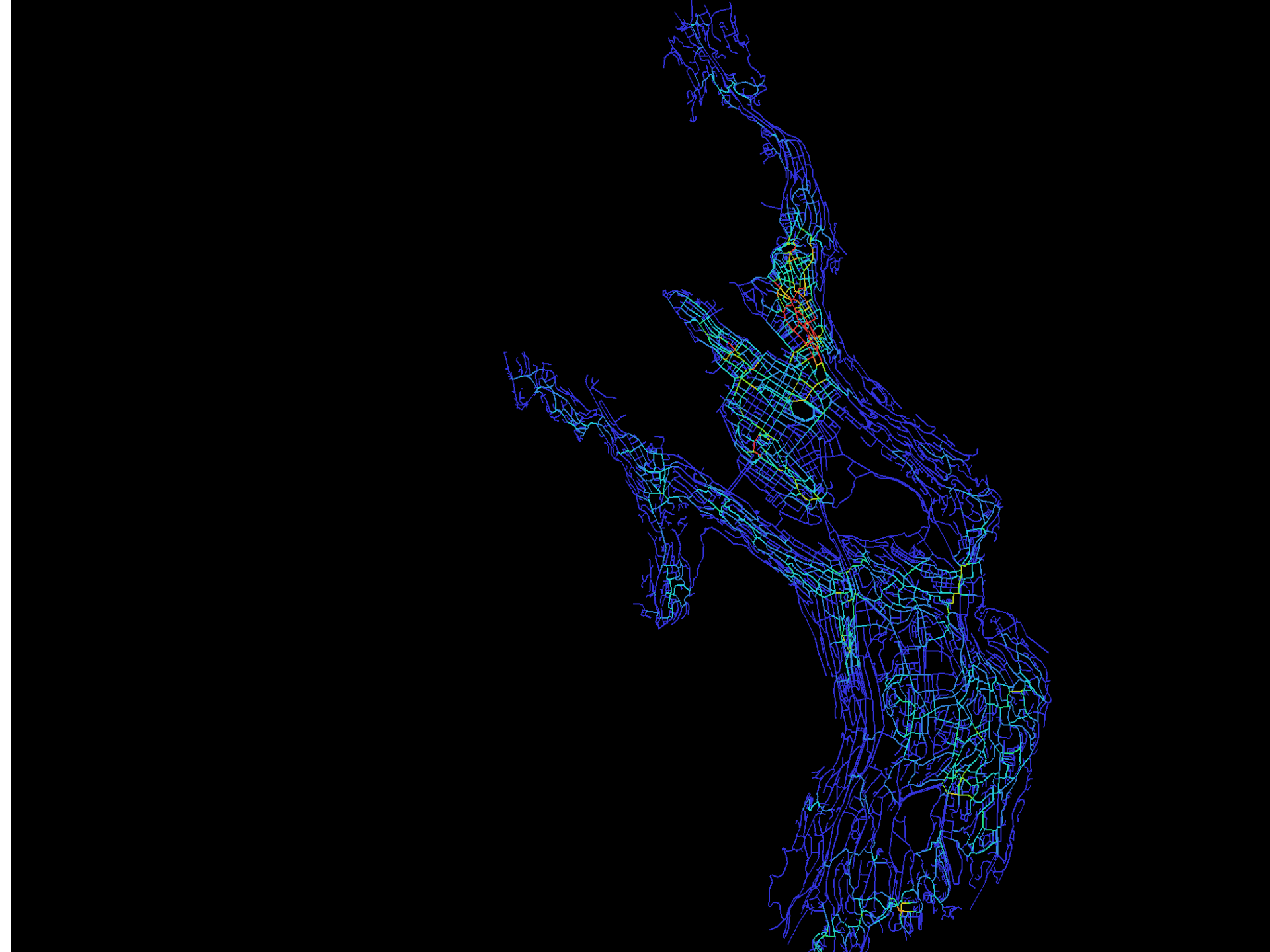
Strategy 3: inter-connect W4 with the city centre + parallel road

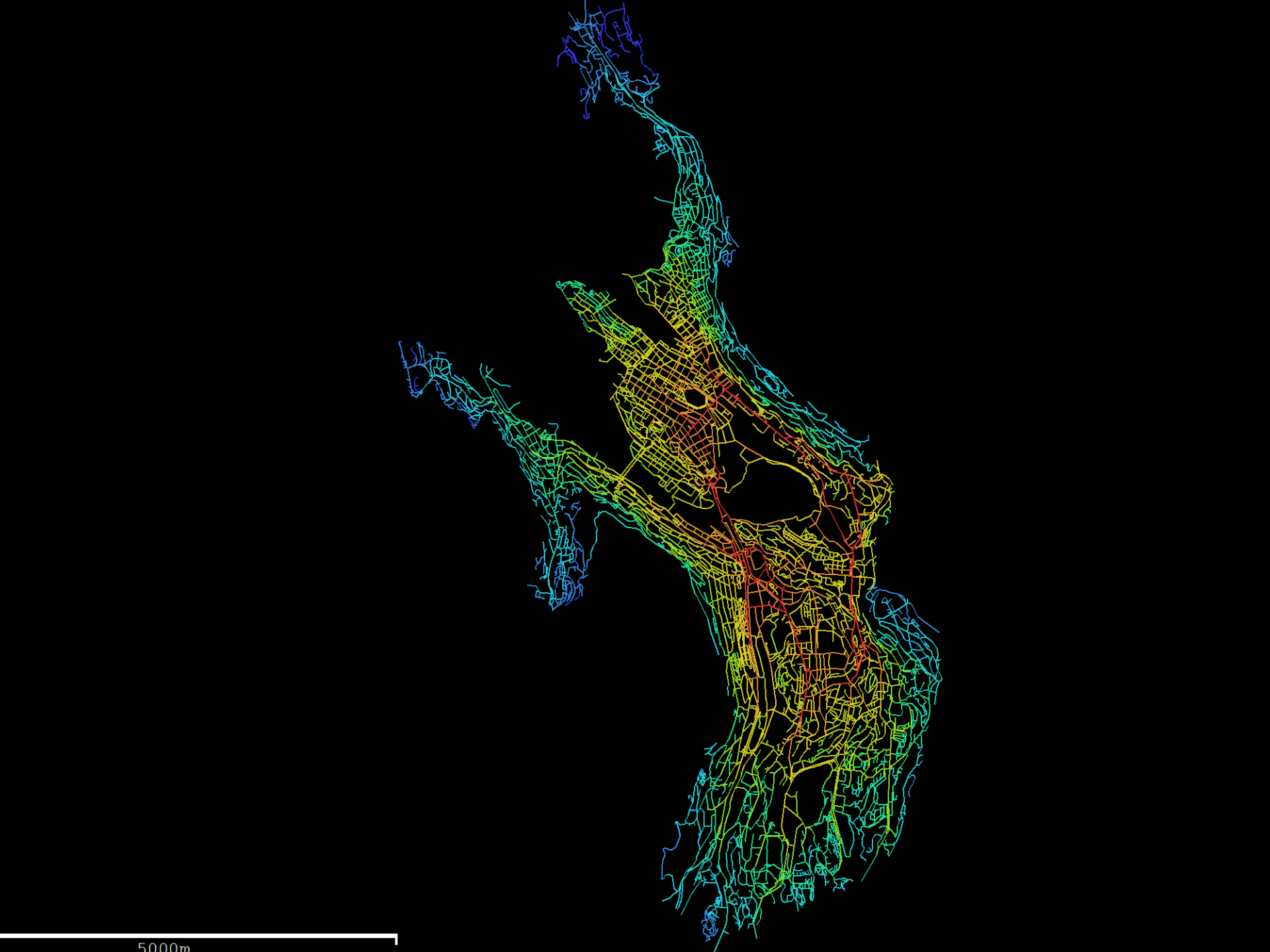
Strategy 4: direct highway standard on W4 between A4 and A44

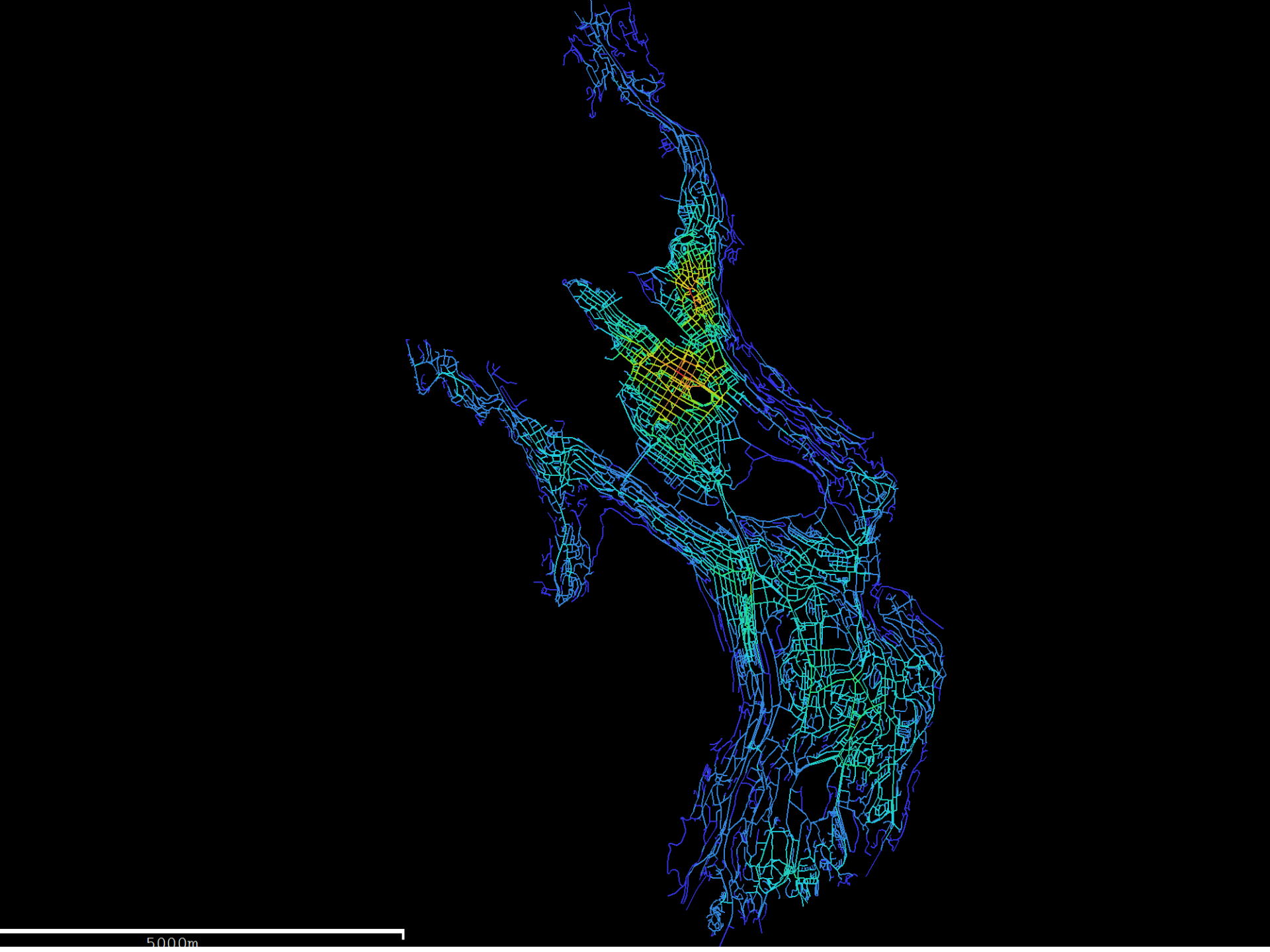
Konklusjon

- Veg- og gatenettet styrer byutviklingen. Byens ‘armatur’
- Bebyggelsestetthet avhenger av gate og vegnettets struktur
- Grad av mangfold av funksjoner avhenger av formen av bebyggelsestetthet og gatenettets struktur


5000m




5000m


5000m

Several plan suggestions

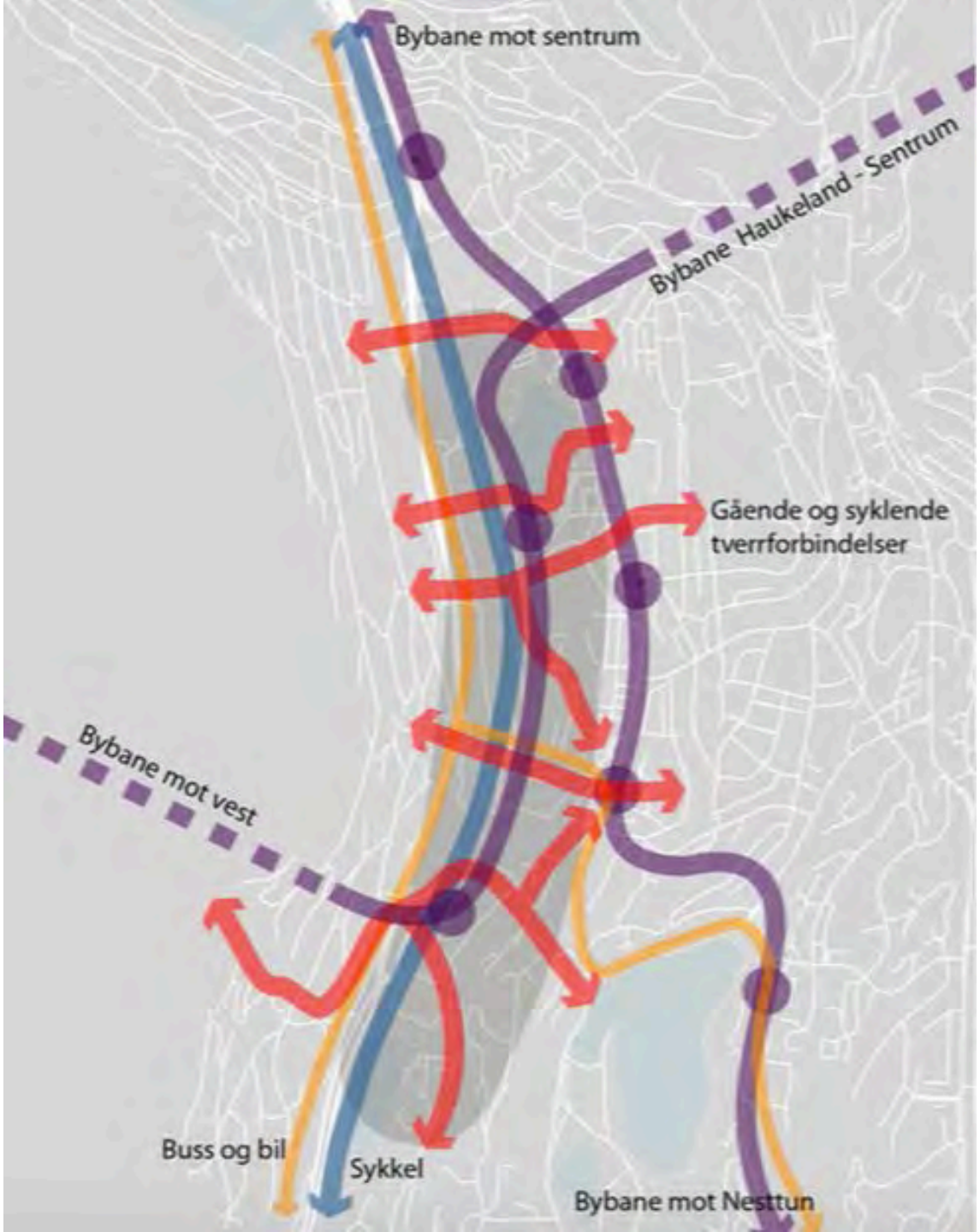
PROSESS parallelloppdrag

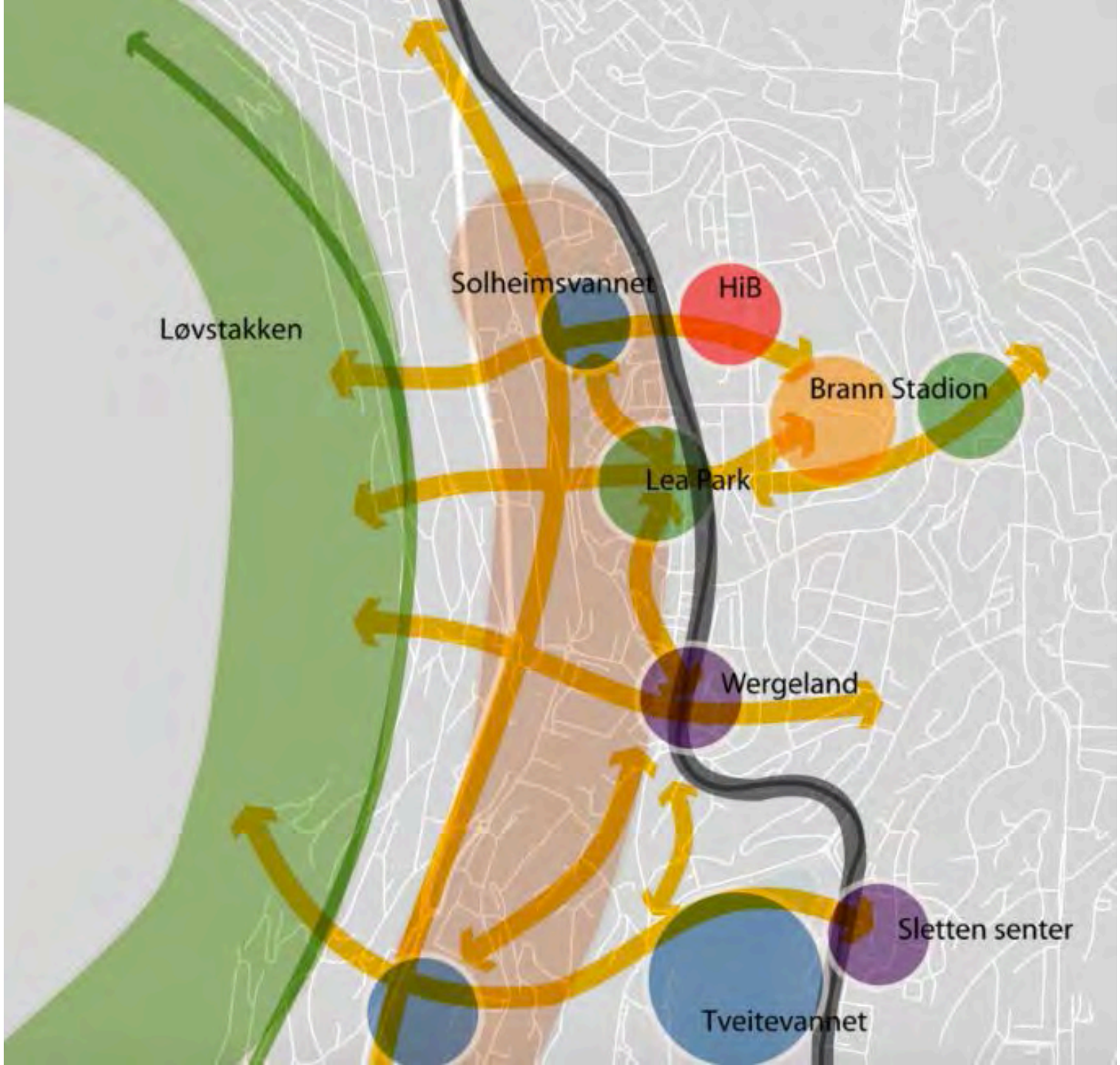
Asplan Viak

Arkitektgruppen Cubus

Waardal/lunde, Metropolitan workshop

Dark arkitekter


Bybane mot sentrum
Bybane Haukeland - Sentrum
Gående og syklende
tverrforbindelser
Bybane mot vest
Buss og bil
Sykkel
Bybane mot Nesttun


Løvstakken
Solheimsvannet
HiB
Brann Stadion
Lea Park
Wergeland
Sletten senter
Tveitevannet

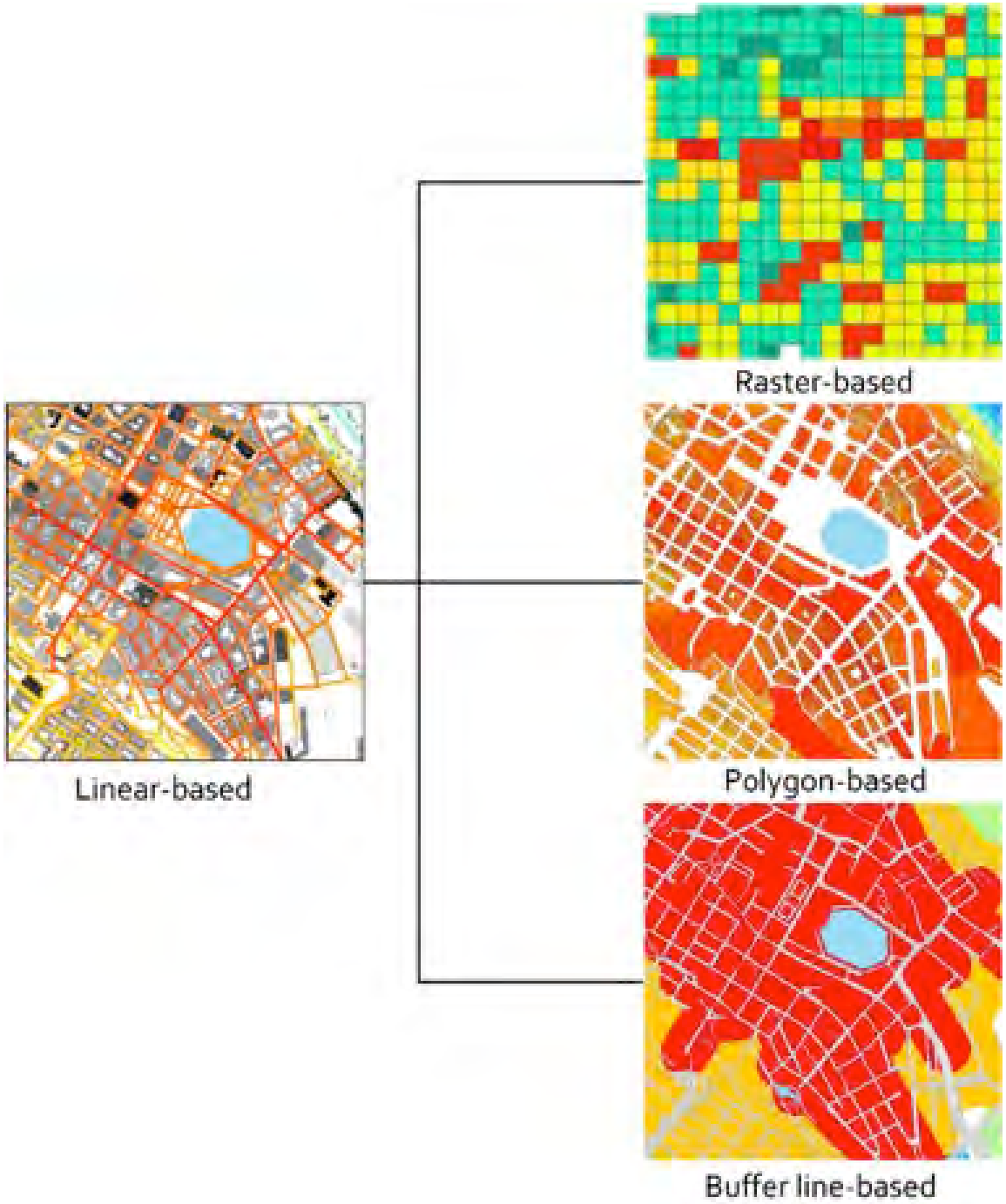
DEGREE OF URBANITY

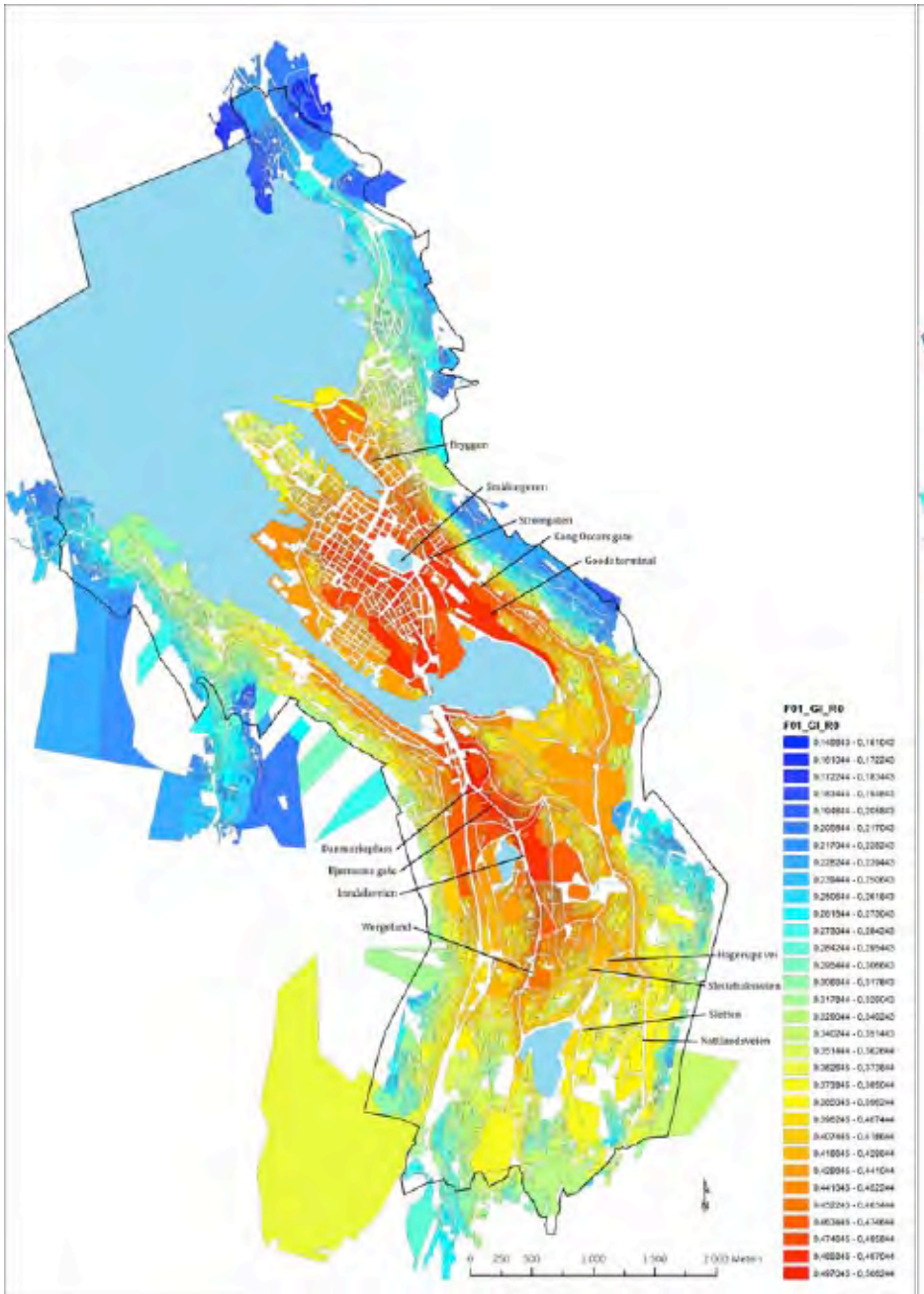
SOCIO-ECONOMIC PERFORMANCES
INFLUENCED BY URBAN FORM

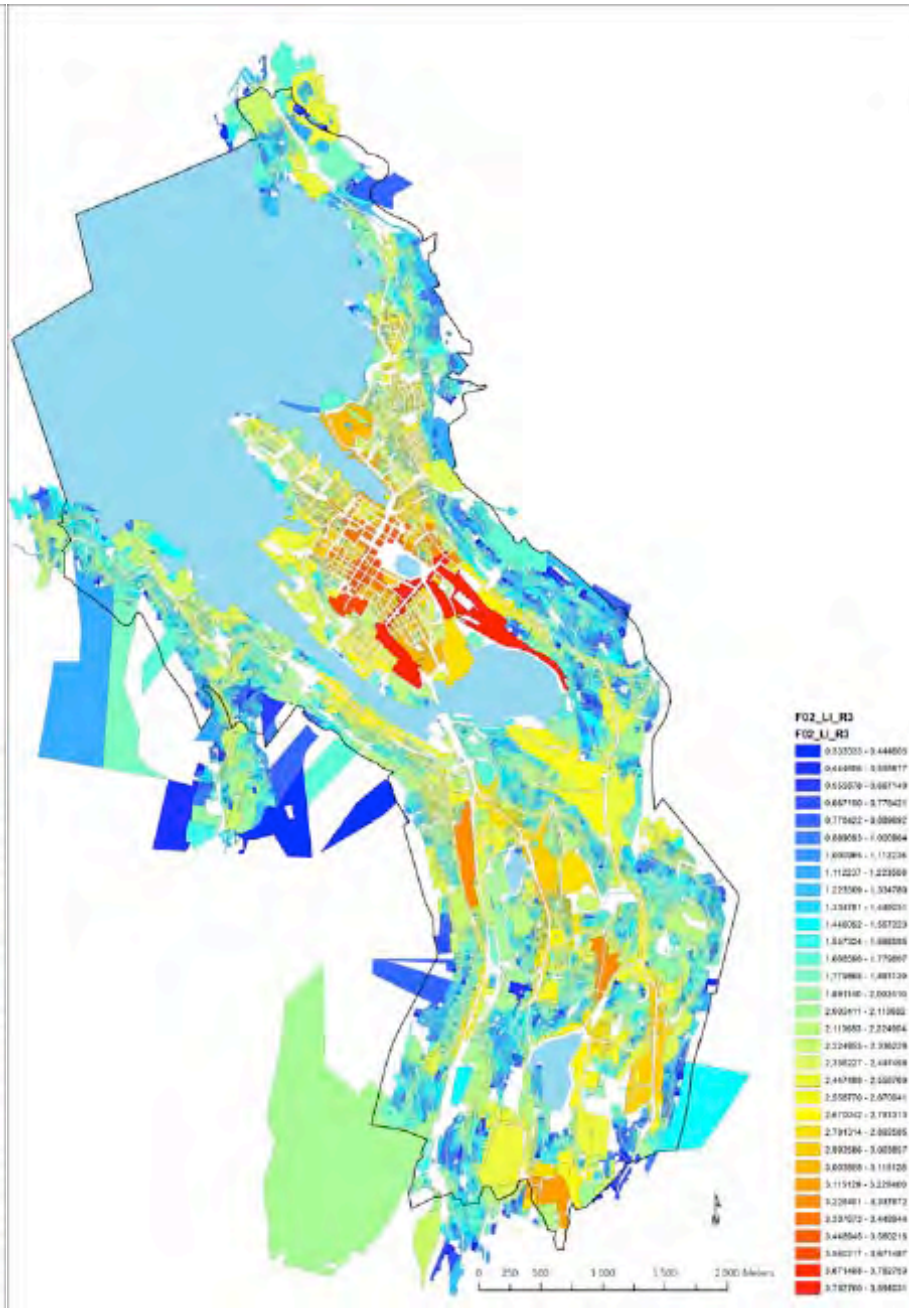
LAND USE MIX

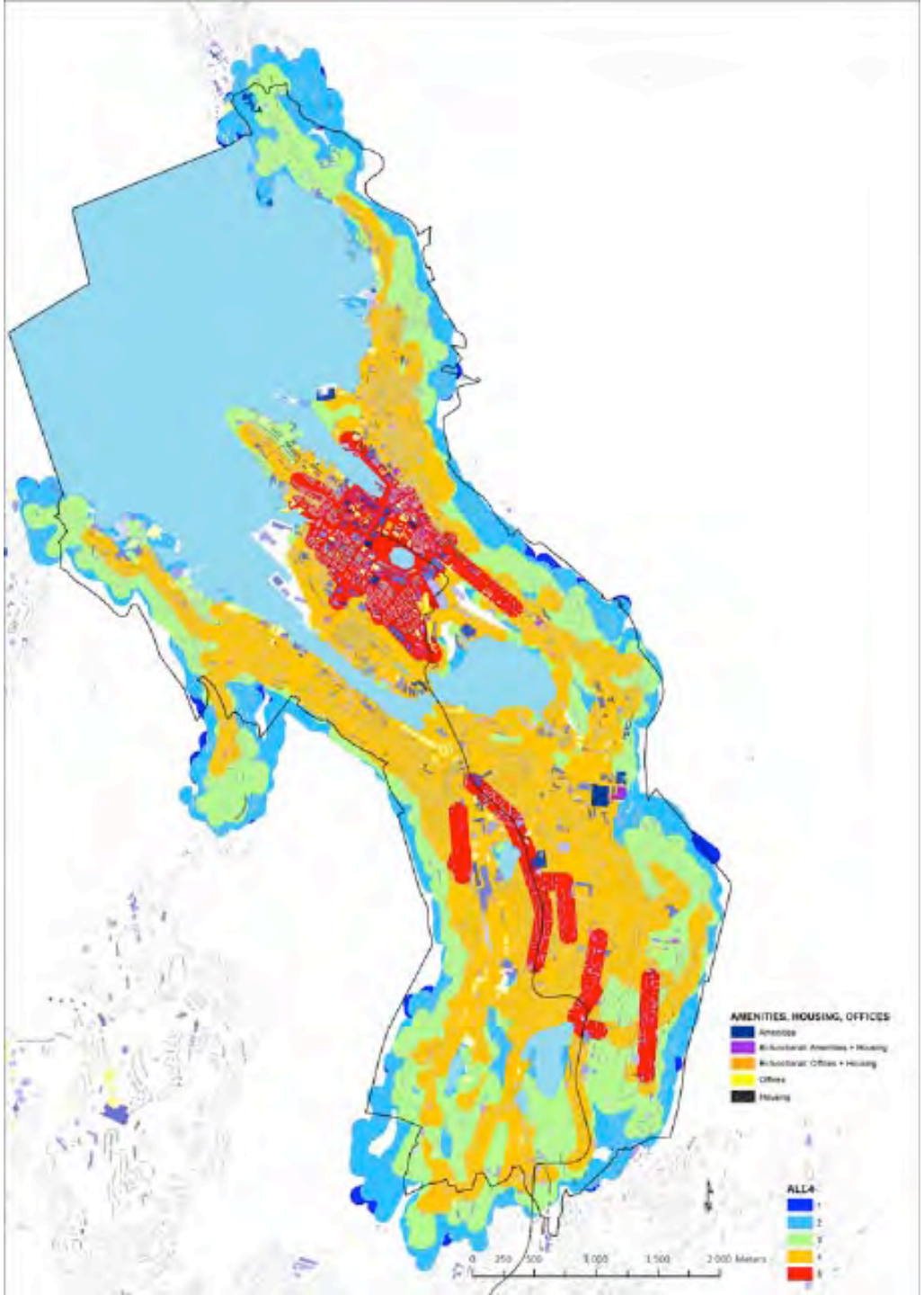
DENSITY & BUILDING TYPES

STREET NETWORK CONFIGURATION


Raster-based
Linear-based
Polygon-based
Buffer line-based


F01_GI_R0
F01_GI_R9
0 250 500 1 000 1 500 2 000 Meters


F02_LI_R3
F02_LI_R3
0 250 500 1 000 1 500 2 000 Meters


AMENITIES, HOUSING, OFFICES
Amenities
Bi-functional: Amenities + Housing
Bi-functional: Offices + Housing
Offices
Housing
ALL4
1
2
3
4
5
0 250 500 1,000 1,500 2,000 Meters

A. HGI + HLI
- Build dense & high
- High degree of function mix
B. LGI + HLI
- Dense housing blocks
- Local functions on ground floor level
C. HGI + LLI
- Dense housing blocks
- Improve local street network
- Local shops
D. LGI + LLI
-(Dense) housing blocks

Mixed angular step depth from light rail stops today

Mixed test case angular step depth from light rail stops

Bergen 2017 Global angular integration

Minde test case Local angular integration

Bergen 2017 Local angular integration

Minde test case local angular integration

Mind the Mindemyren!!!

- Mindemyren har potensialer til å bli Bergen's andre senter.

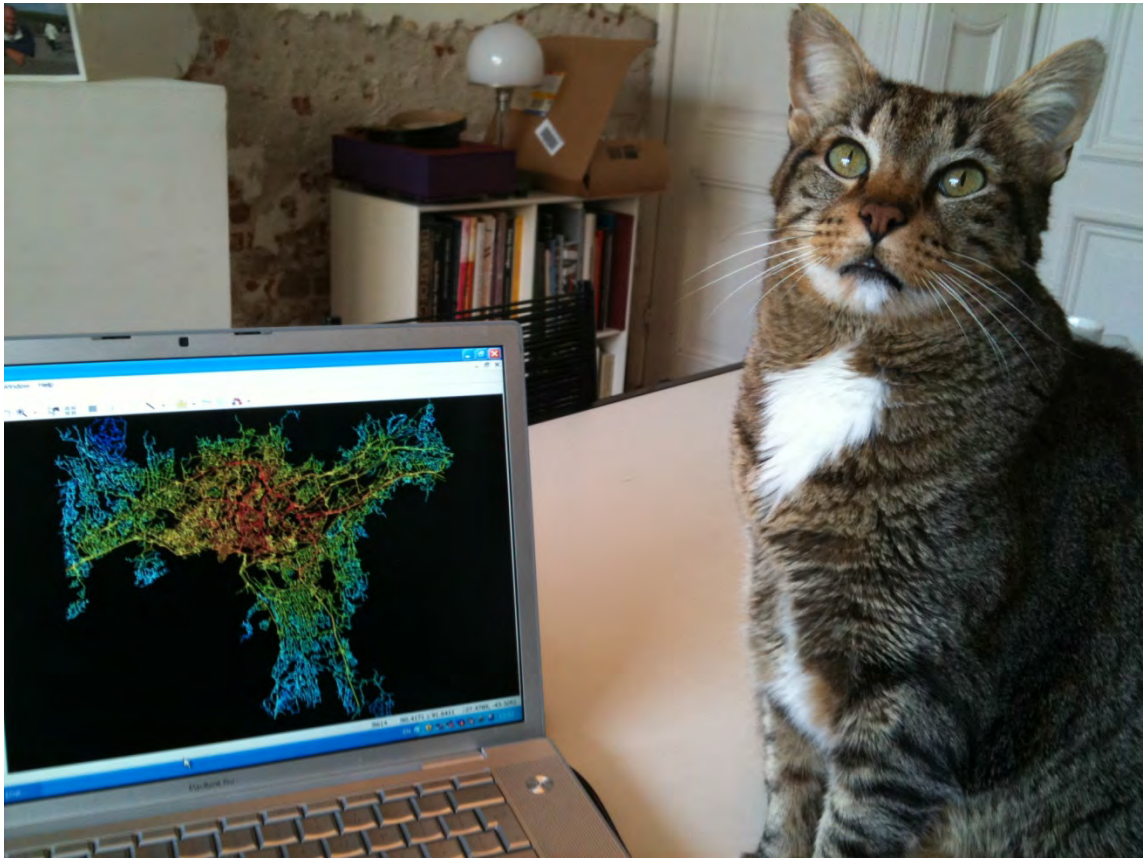
- …alt avhenger av hvordan den lokale integrasjonen vil bli på gatenettet inne i området og hvordan dette gatenettet knytter seg til hoverruter og omkringliggende nabolag.

Fremtidens utfordringer

- Vi har bygget mange dårlige byområder de siste 50 årene…..
- Derfor er det på tide å ta lærdom av disse og studere forholdet mellom vegnettet, fysisk form og sosciale aktiviteter fra tradisjonelle byområder som fungerer bra….
- …og å tilpasse denne kunnskapen i planlegging, vegbygging, design retningslinjer, byfornyelse, og arkitektur.

Vegingeniøren er byutvikleren!

- Det avhenger av hvordan vegingeniørens foreslåtte veg- og gate løsninger bidrar til å **integrere**, **segregere**, **blokkere** eller **forbinde** ulike byområder/nabolag med hverandre
- Veg er mer enn bare veg! Det er ‘armaturen’ for det sociale og økonimske livet i byer og tettsteder.



Tusen takk....

avn@hvl.no