SPATIAL INDICATORS AND METRICS
MAPPING & REPRESENTATION

TODAY'S CLASS

PART 1

1. Why measure?
2. Indicators, metrics, targets
3. Spatial indicators of green network planning

PART 2

4. Principles of mapping & visualizing metrics

WHY MEASURE?
MEASURE WHAT?

WHY MEASURE?

*Measuring clarifies and **elevates importance** (to many)*

*Enables **comparisons** between alternatives— which performs better and by how much?*

***Words + pictures + numbers** speaks to a larger audience*

MEASURE WHAT?

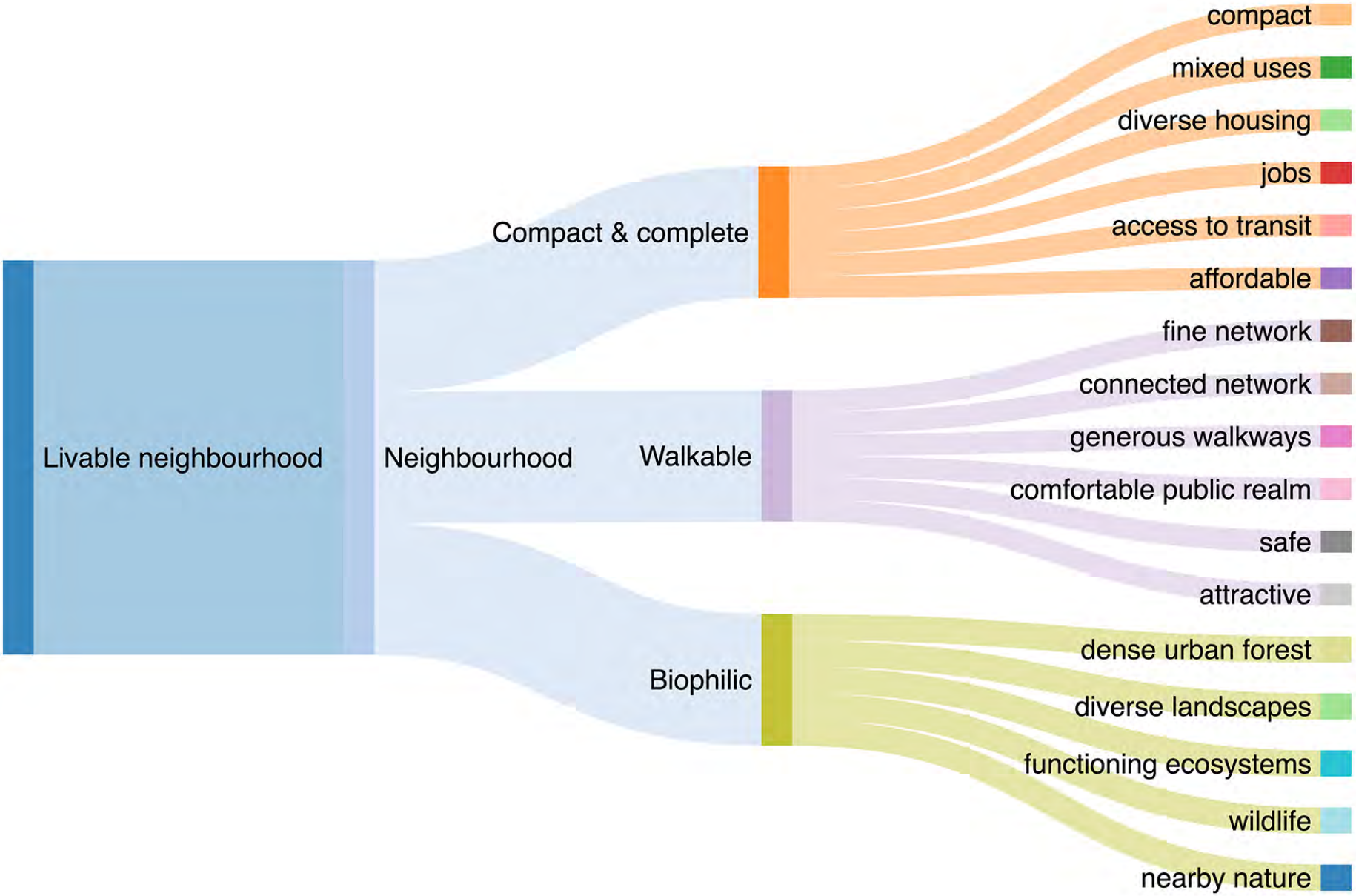
UNDERSTANDING/REPRESENTING URBAN SYSTEMS

CITIES ARE COMPLEX SYSTEMS OF SYSTEMS

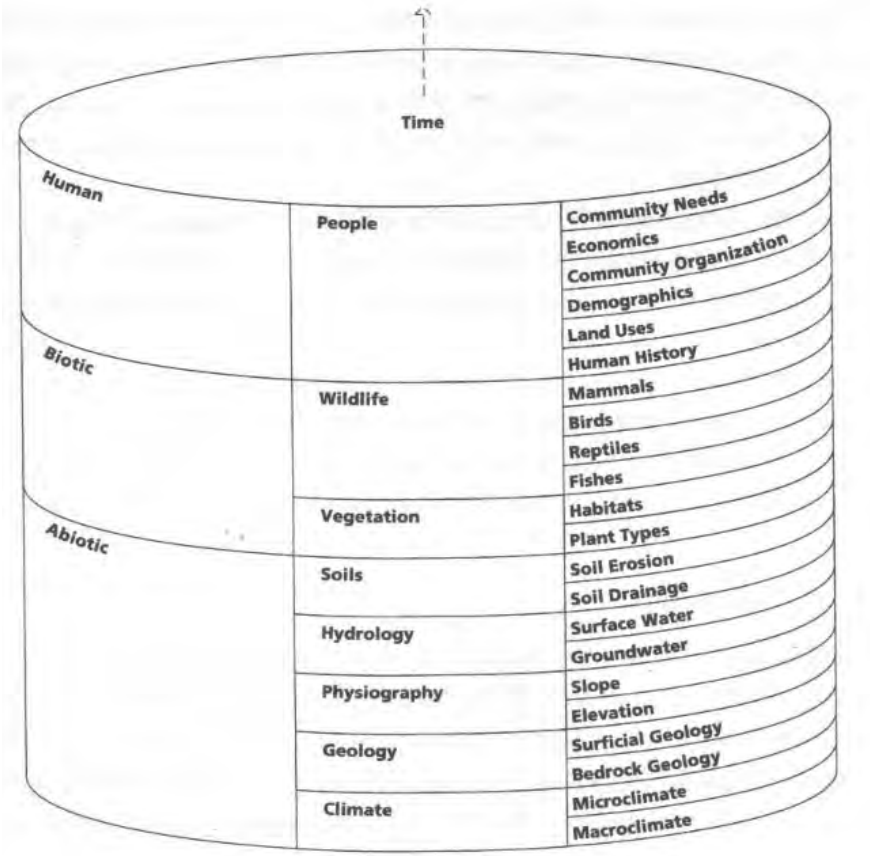
INPUTS
energy
water
goods
food
transportation
people
.....

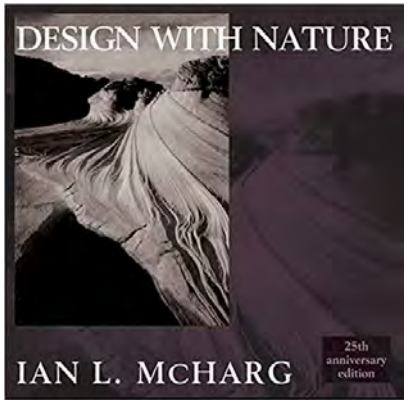
OUTPUTS
GHG emissions
sewage
runoff
trash
exports
people
.....

DE-LAMINATING SYSTEMS



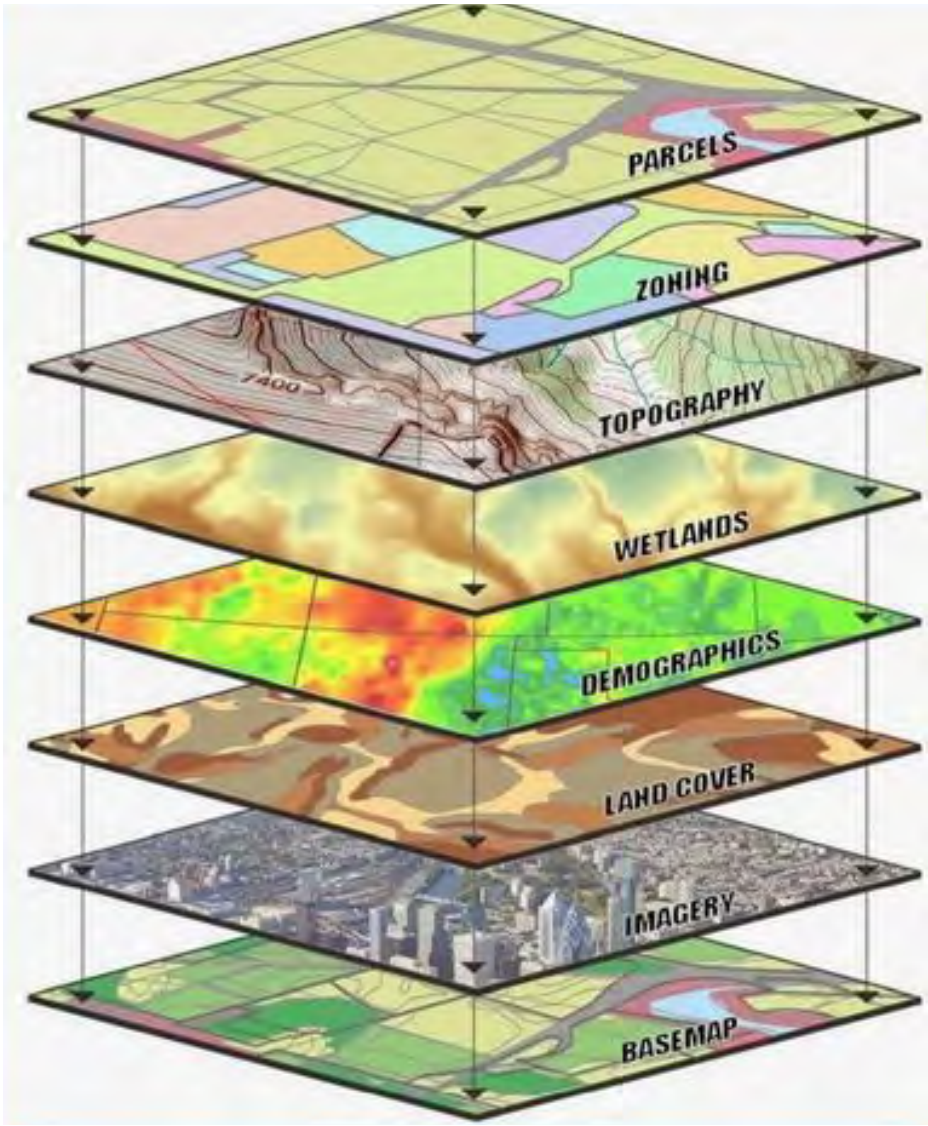
DE-LAMINATING SYSTEMS





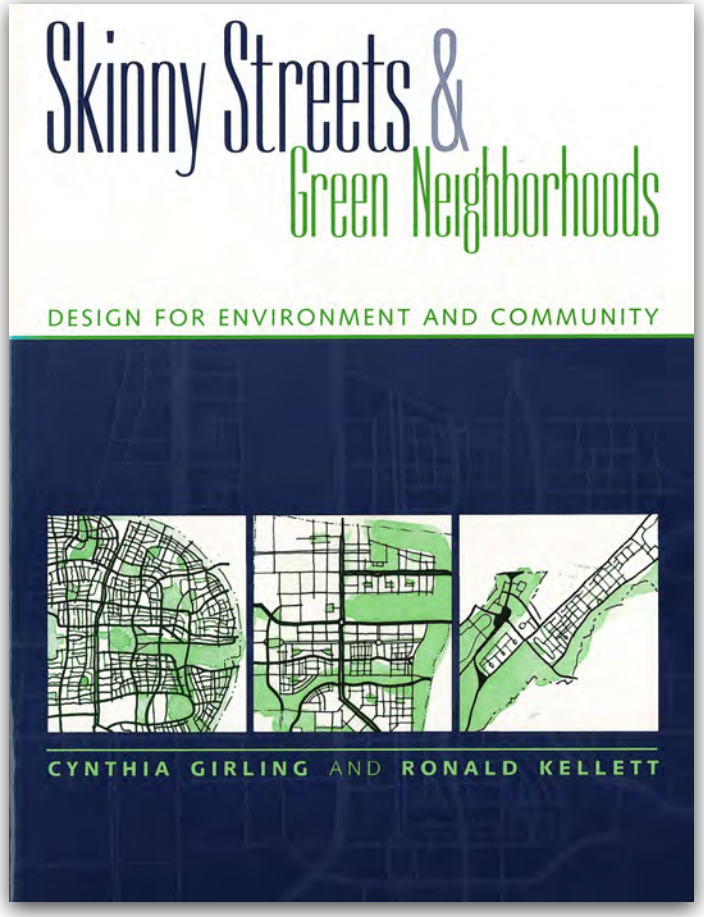
Ian McHarg's

"layer cake"



"Father" of GIS

"SKINNY STREETS" APPROACH



2005

*What are the essential **spatial** urban form drivers of green (sustainable) neighbourhoods?*

What should we represent and measure to compare different neighbourhoods?

VOCABULARY

GREEN *serving primarily ecological **functions***

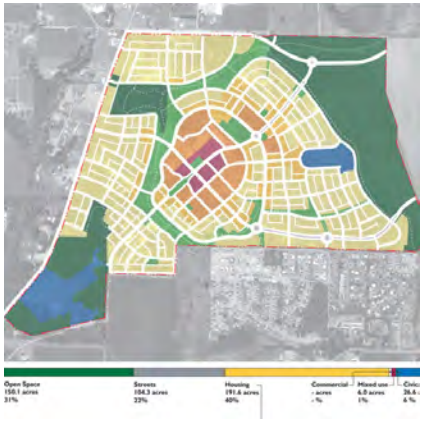
GRAY *serving primarily urban **functions***

NETWORK *spatial corridors and systems*

FABRIC *residual spaces 'within' networks*

Spatial—
*urban **form***

Villebois, Wilsonville, OR 2003

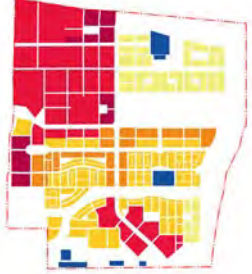


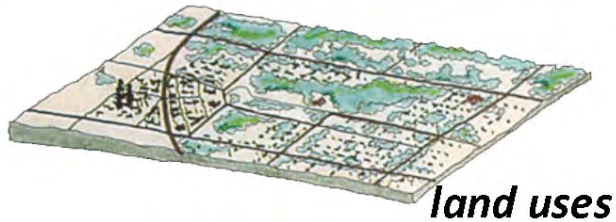
GRAY FABRIC

GRAY NETWORK

GREEN NETWORK & FABRIC

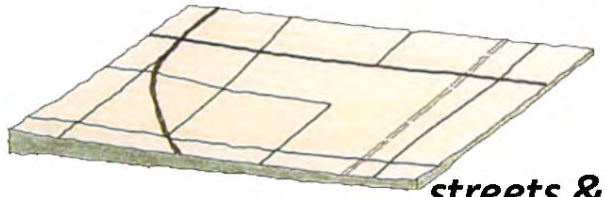
Grey fabric
aka land uses





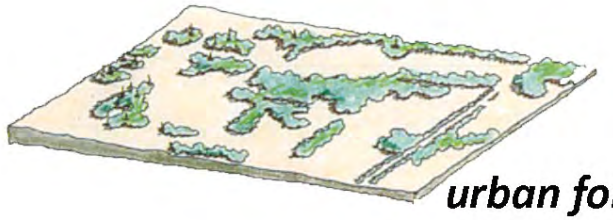
land uses

Grey networks
aka circulation



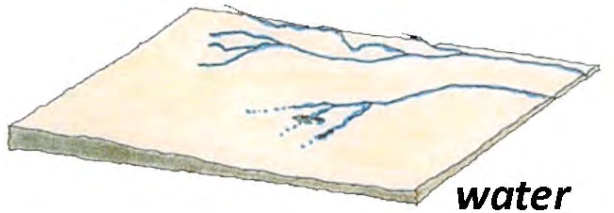
streets & utilities

Green networks
& fabric



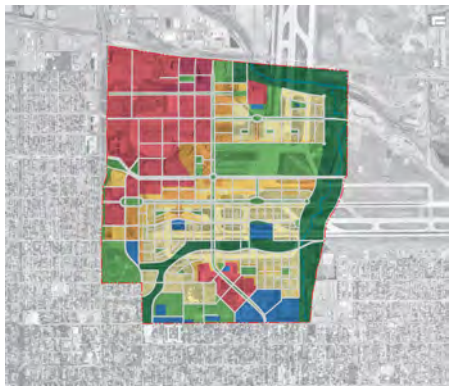
urban forest

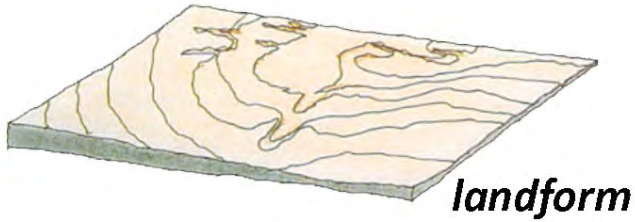
??



water

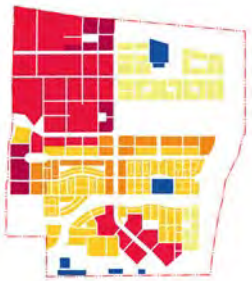
Grey fabric
in context

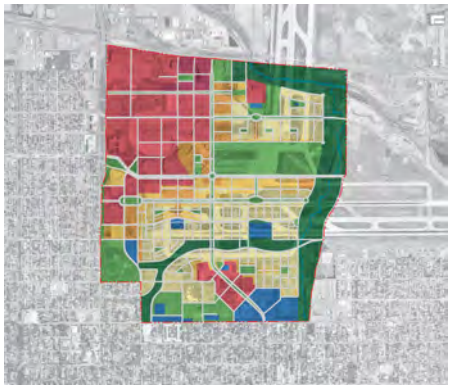




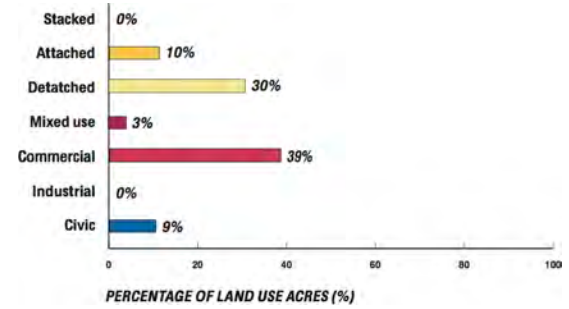
landform

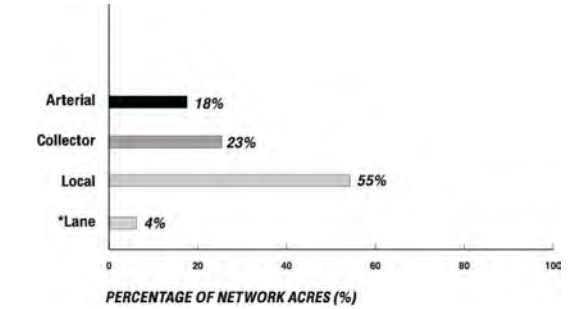
MEASURING

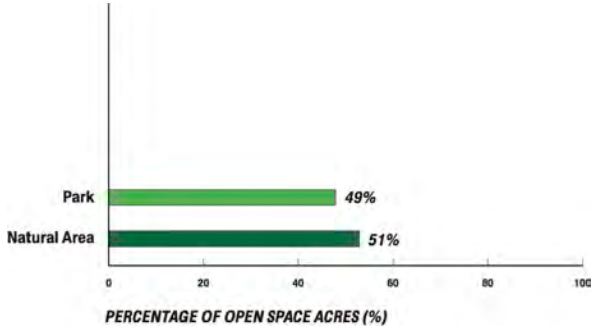




TYPE

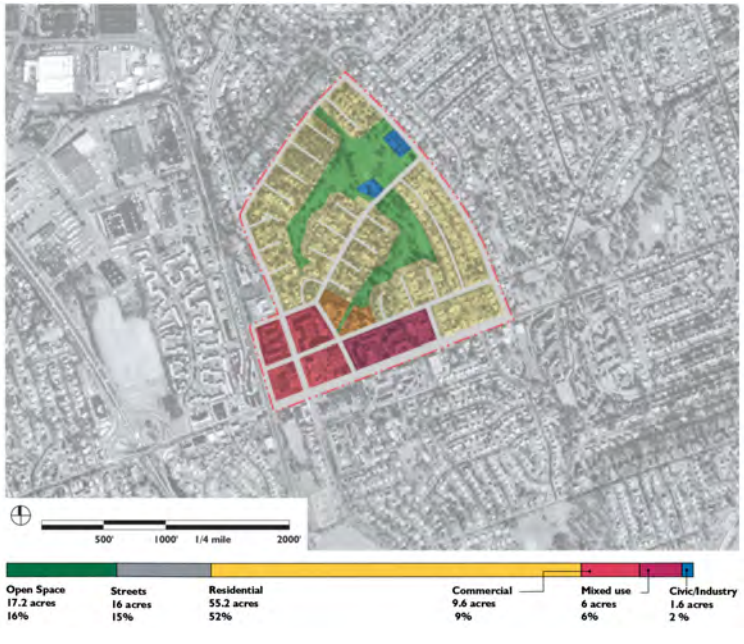


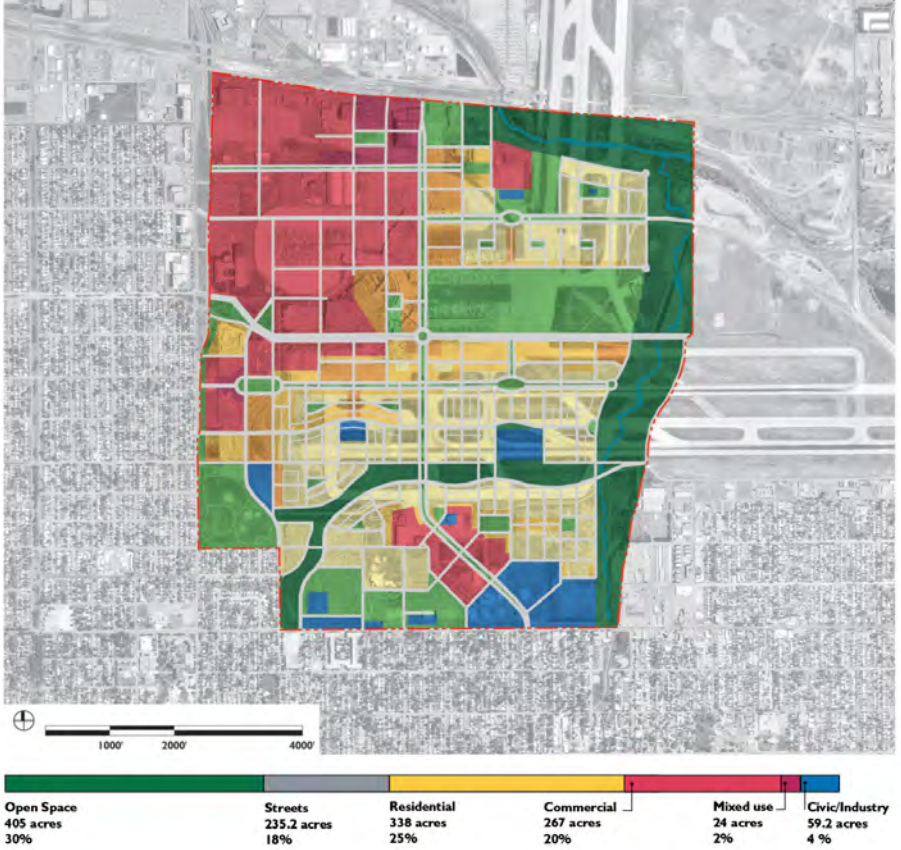


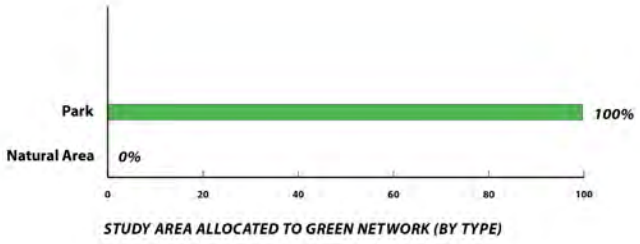


%

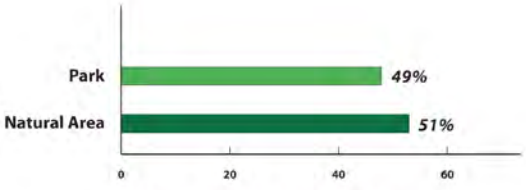
RADBURN V STAPLETON







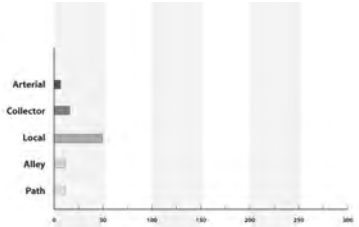
STUDY AREA ALLOCATED TO GREEN NETWORK (BY TYPE)

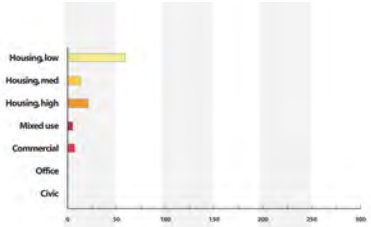


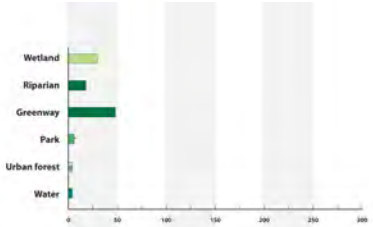
PERCENTAGE OF OPEN SPACE ACRES (%)

ROYAL NODE

Placeholder text explaining the basic gists for Royal Node and its implications on quantitative breakdown of grey and green elements. Much of the street network consists of neighborhood/ local streets composed of 75' ROW with landscape strips, onstreet parking, sidewalks and 12' travel lanes.



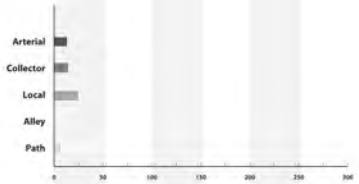


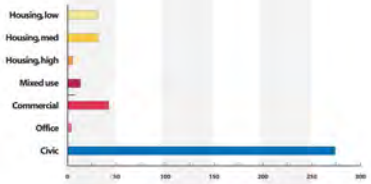


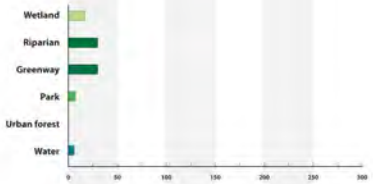
acres

NW LANDING

Placeholder text explaining the basic gists for Royal Node and its implications on quantitative breakdown of grey and green elements. Much of the street network consists of neighborhood/ local streets composed of 75' ROW with landscape strips, onstreet parking, sidewalks and 12' travel lanes.

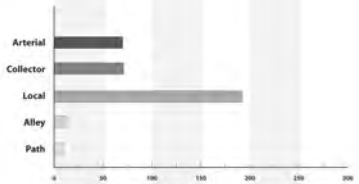


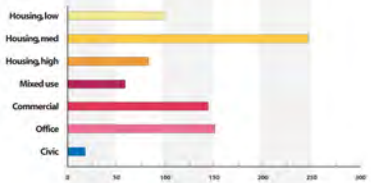


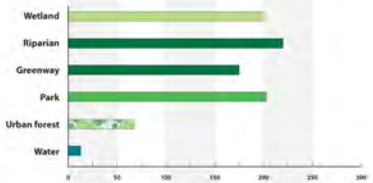


STAPLETON

Placeholder text explaining the basic gists for Royal Node and its implications on quantitative breakdown of grey and green elements. Much of the street network consists of neighborhood/ local streets composed of 75' ROW with landscape strips, onstreet parking, sidewalks and 12' travel lanes.

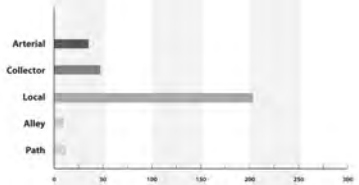


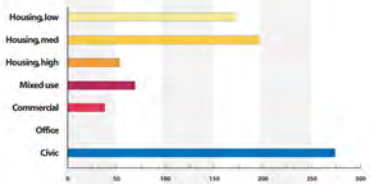


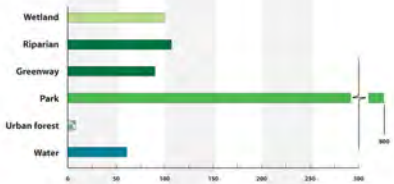


LOWRY

Placeholder text explaining the basic gists for Royal Node and its implications on quantitative breakdown of grey and green elements. Much of the street network consists of neighborhood/ local streets composed of 75' ROW with landscape strips, onstreet parking, sidewalks and 12' travel lanes.







DECISION-MAKING FRAMEWORKS

Decision framework used by Design Centre for Sustainability

What are indicators?

INDICATOR:

Ways to to evaluate progress toward goals and objectives

PURPOSE— explicit relationships between big picture goals and specific strategies or actions

- compare one alternative to another

INDICATORS

- *each indicator— **an expression of a desired outcome + a measure for evaluation/comparison***
- *reveal desirable performance*
- *basis for comparing one proposition to another*

Primary source:
Kellett, Ronald. 2009. "Sustainability Indicators for Computer- Based Tools in Community Design FINAL REPORT." Ottawa, ON.

What are metrics? and targets?

METRIC= Method for measuring or measurements

TARGETS:

Very specific numeric goals

METRICS

*Metrics are the **actual measures of performance** that enable consistent measurement of most important factors.*

- *should be logical and well visualized*
- *must be relatively easy to measure and objective*
- *common and accepted in research*

5/ ACCESS TO NATURE

GOAL

GOAL: VANCOUVER RESIDENTS ENJOY INCOMPARABLE ACCESS TO GREEN SPACES, INCLUDING THE WORLD'S MOST SPECTACULAR URBAN FOREST.

2020 TARGETS:

TARGET

1. ALL VANCOUVER RESIDENTS LIVE WITHIN A FIVE-MINUTE WALK OF A PARK, GREENWAY OR OTHER GREEN SPACE.

Indicator/metric

Indicator: Percent of city's land base within a five minute walk to a green space.

Baseline (2010): 92.6%

Actual (2014): 92.7% (+0.1%)

TARGET

2. PLANT 150,000 NEW TREES.

Indicator/metric

Indicator: Total number of additional trees planted.

Baseline (2010): 0

Actual (2014): 37,000

2050 TARGET:

TARGET

INCREASE CANOPY COVER TO 22%.

metric

Baseline (2013): 18%

Note: Development of a biodiversity target is currently underway.

ALL INDICATORS vs. SPATIAL INDICATORS

***Spatial** = measurable from physical form (geographic)*

i.e. not behaviour, not opinion, not processes

City of Vancouver indicators dashboard

DASHBOARD

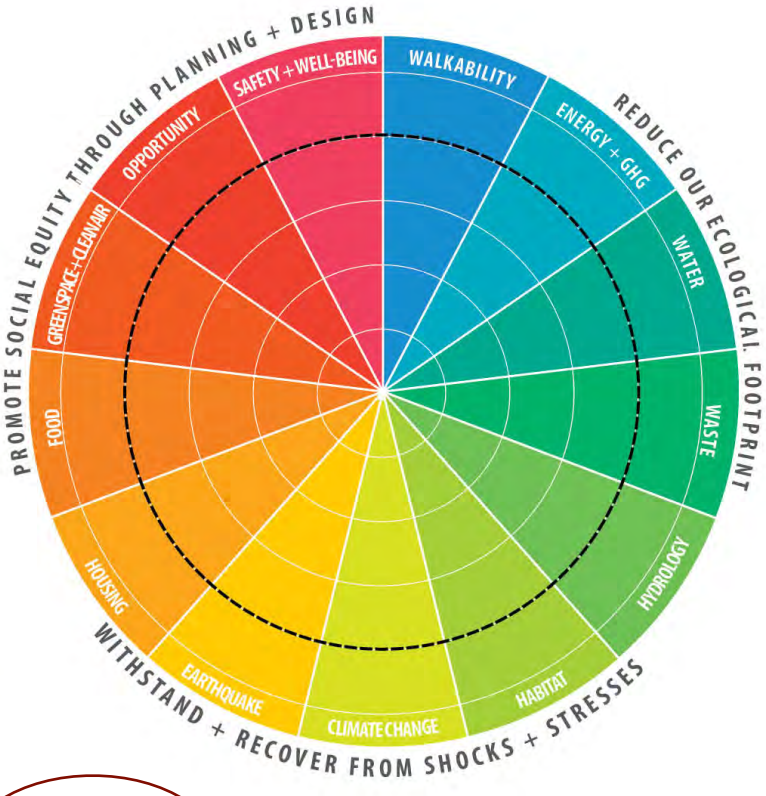
53 indicators

DATA INPUT

PARCEL	Total Land Area (m2)
	Ownership (private, public, NGO)
	Preferred Site Ranking (1-5)
	Walkability Rating (refer to Walkability Index)
	Transit Proximity Rating (refer to Transit
	Cycling Proximing Rating (refer to Cycling
	Disaster Hub Proximity Rating
	Healthy Food Proximity Rating
	Childcare Proximity Ranking
	Education Proximity Ranking
	Employment Proximity Ranking
	Information Technology Access Ranking
	Seismic Vulnerability Rating_Site
	Seismic Vulnerability Rating_Design
	Sea Level Rise Vulnerability Rating
	Critical Infrastructure Vulnerability Rating
	Total Building Gross Floor Area
	Total Residential Building Area_Tenure
	Sub-Total Residential Area (supportive housing/
	Sub-Total Residential Area (non-market
	Sub-Total Residential Area (purpose-built
	Sub-Total Residential Area (market housing)
	Total Commercial Building Area
	Sub-Total Commercial Area (green jobs)
	Sub-Total Commercial Area (resilient jobs)
	Sub-Total Commercial Area (living wage jobs)
	Sub-Total Commercial Area (other jobs)
	Total Civic Building Area (culture, sport,
	Total Communal Amenity Space Area (m2)
	Average Residential Unit Area
	Average Household Size
	Average Floor Area per FTE employee
	On-Site Renewable Energy
	On-Site Wastewater Treatment (ranking)
	Photovoltaic Potential
	Urban Heat Island
	Energy Performance Target (ranking)
	Water Performance Target (ranking)
	Waste Performance Target (ranking)
	Food Performance Target (ranking)
	Construction type_embodied energy (ranking
	Construction type_seismic performance (ranking
	Construction type_material (ranking 1-5)
	Total Parking Stalls
	Total Electric Charging Stations
	Total Car Share Parking Stalls
	Effective Pervious Area (m2)
	Total Tree Canopy (m2)
	On-Slab Softscape (m2)
	Off-Slab Softscape (m2)
	Rainwater Storage Capacity (m3)
STREETS	Total Right-of-Way Width (m)
	Design Speed
	Design Volume
	Truck Route (y/n)
	Curb-to-Curb Width (m)
	Boulevard Width (m)
	Softscale Width (m)
	Sidewalk Width (m)
	Tree Canopy Width (m)
	Rainwater Storage Capacity (m3)
	Total Effective Pervious Area (%)
	Total Parking Stalls
	Total Electric Charging Stations
	Total Car Share Parking Stalls
OPEN SPACE	Total Land Area (m2)
	Existing Condition (Ranking 1-5)
	Effective Pervious Area (%)
	Solar Access (Ranking 1-5)
	Index of Open Space Functionality
	Index of Habitat Quality
	Rainwater Storage Capactiy

INDICATOR	METRIC	TARGET
Preferred Sites	Ranking (1 to 5)	4
Intersection Density	Number of intersections / acre	0.625
Proximity to Daily Needs	% of GFA within 400m of daily needs	90
Residential Density	People per acre (net parks)	30
Land Use Diversity	Simpson's Diversity Index	0.6
Jobs-Housing Balance	Job : Dwelling Ratio	1.5
Pedestrian Connectivity	Connectivity metric	xx
Pedestrian Comfort	% of network that is pedestrian-friendly	xx
On-Site Renewable Energy	% of on-site renewable energy	35%
Photovoltaic Potential	Photovoltaic Envelope to Floor Area Index	xx
Building Energy Performance	% GFA built to LEED Gold or equivalent energy	80
Embodied Energy	Embodied Energy Index	xx
Renewable Electricity Grid	% Electric Charging Stations	xx
Low Carbon Transit	% GFA within 400m of Low Carbon Transit	80%
Cycling Infrastructure	Cycling Infrastructure Index	xx
On-Site Parking Provision	Parking : Dwelling/Job Ratio	xx
Car Share Parking Ratio	Car Share Parking Ratio	xx
Water Consumption	% GFA Built to LEED Gold or Equivalent Water	80%
Wastewater Treatment	% of Waste Water Re-Used	35%
Organic Waste Diversion	% of organic material recycled	80%
Integrated Waste Mgt	% of GFA served by IWM facilities	80%
Effective Pervious Area	% Effective Pervious Area	90%
Green Streets	% Green Streets	80%
Natural Habitat	% of Site Protected + Managed as Habitat	20%
Park Functionality	Index of Urban Park Functionality	xx
Habitat Connectivity	Metric of Habitat Connectivity	xx
Water Storage	Storage Capacity : Demand Ratio	ratio
Flooding Mitigation	Flooding Mitigation - Slow, Store, Infiltrate	xx
Flooding Adaptation	Flooding Adaptation - Design Response	xx
Sea Level Rise	Sea Level Rise	xx
Urban Heat Island	Urban Heat Island	xx
Liquifaction	Liquifaction	xx
Building Seismic Performance	Building Seismic Performance	xx
Disaster Hub	Disaster Hub	xx
Critical Infrastructure	Critical Infrastructure	xx
Housing Tenure Diversity	Housing Tenure Diversity	xx
Affordable Housing	Affordable Housing	xx
Family Housing	Family Housing	xx
Accessible Housing	Accessible Housing	xx
District Food Production	District Food Production	xx
Access to Food Assets	Access to Food Assets	xx
Access to Healthy Food	Access to Healthy Food	xx
Green Space Proximity	Green Space Proximity	xx
Green Streets Proximity	Green Streets Proximity	xx
Street-Level Air Quality	Street-Level Air Quality	xx
Access to Quality Childcare	Access to Quality Childcare	xx
Access to Education	Access to Education	xx
Resilient + Living Wage Jobs	Resilient + Living Wage Jobs	xx
Public Open Space	Public Open Space	xx
Public Facilities	Public Facilities	xx
Communal Amenity Space	Communal Amenity Space	xx
Safe Street Design	Safe Street Design	xx
Mental Health + Addiction	Mental Health + Addiction	xx

PROJECT EVALUATION SUMMARY



FINAL SCORE 0-1

*WHICH ARE **NOT** SPATIAL INDICATORS?*

Organic Waste Diversion	% of organic material recycled	80%
Integrated Waste Mgt	% of GFA served by IWM facilities	80%
Effective Pervious Area	% Effective Pervious Area	90%
Green Streets	% Green Streets	80%
Natural Habitat	% of Site Protected + Managed as Habitat	20%
Park Functionality	Index of Urban Park Functionality	xx
Habitat Connectivity	Metric of Habitat Connectivity	xx
Water Storage	Storage Capacity : Demand Ratio	ratio
Flooding Mitigation	Flooding Mitigation - Slow, Store, Infiltrate	xx
Flooding Adaptation	Flooding Adaptation - Design Response	xx
Sea Level Rise	Sea Level Rise	xx
Urban Heat Island	Urban Heat Island	xx
District Food Production	District Food Production	xx
Access to Food Assets	Access to Food Assets	xx
Access to Healthy Food	Access to Healthy Food	xx
Green Space Proximity	Green Space Proximity	xx
Green Streets Proximity	Green Streets Proximity	xx
Street-Level Air Quality	Street-Level Air Quality	xx
Access to Quality Childcare	Access to Quality Childcare	xx
Access to Education	Access to Education	xx
Resilient + Living Wage Jobs	Resilient + Living Wage Jobs	xx
Public Open Space	Public Open Space	xx
Public Facilities	Public Facilities	xx
Communal Amenity Space	Communal Amenity Space	xx
Safe Street Design	Safe Street Design	xx
Mental Health + Addiction	Mental Health + Addiction	xx

*WHICH ARE **NOT** SPATIAL INDICATORS?*

X	Organic Waste Diversion	% of organic material recycled	80%
X	Integrated Waste Mgt	% of GFA served by IWM facilities	80%
	Effective Pervious Area	% Effective Pervious Area	90%
	Green Streets	% Green Streets	80%
	Natural Habitat	% of Site Protected + Managed as Habitat	20%
X	Park Functionality	Index of Urban Park Functionality	xx
	Habitat Connectivity	Metric of Habitat Connectivity	xx
	Water Storage	Storage Capacity : Demand Ratio	ratio
	Flooding Mitigation	Flooding Mitigation - Slow, Store, Infiltrate	xx
X	Flooding Adaptation	Flooding Adaptation - Design Response	xx
	Sea Level Rise	Sea Level Rise	xx
	Urban Heat Island	Urban Heat Island	xx
	District Food Production	District Food Production	xx
	Access to Food Assets	Access to Food Assets	xx
X	Access to Healthy Food	Access to Healthy Food	xx
	Green Space Proximity	Green Space Proximity	xx
	Green Streets Proximity	Green Streets Proximity	xx
X	Street-Level Air Quality	Street-Level Air Quality	xx
	Access to Quality Childcare	Access to Quality Childcare	xx
X	Access to Education	Access to Education	xx
	Resilient + Living Wage Jobs	Resilient + Living Wage Jobs	xx
	Public Open Space	Public Open Space	xx
	Public Facilities	Public Facilities	xx
	Communal Amenity Space	Communal Amenity Space	xx
	Safe Street Design	Safe Street Design	xx
X	Mental Health + Addiction	Mental Health + Addiction	xx

TYPES OF SPATIAL INDICATORS

TYPES OF SPATIAL INDICATORS

Intensity— How dense or concentrated?

Distribution— Are they evenly distributed across the landscape?

Proximity— Are populations close to them? How close or far?

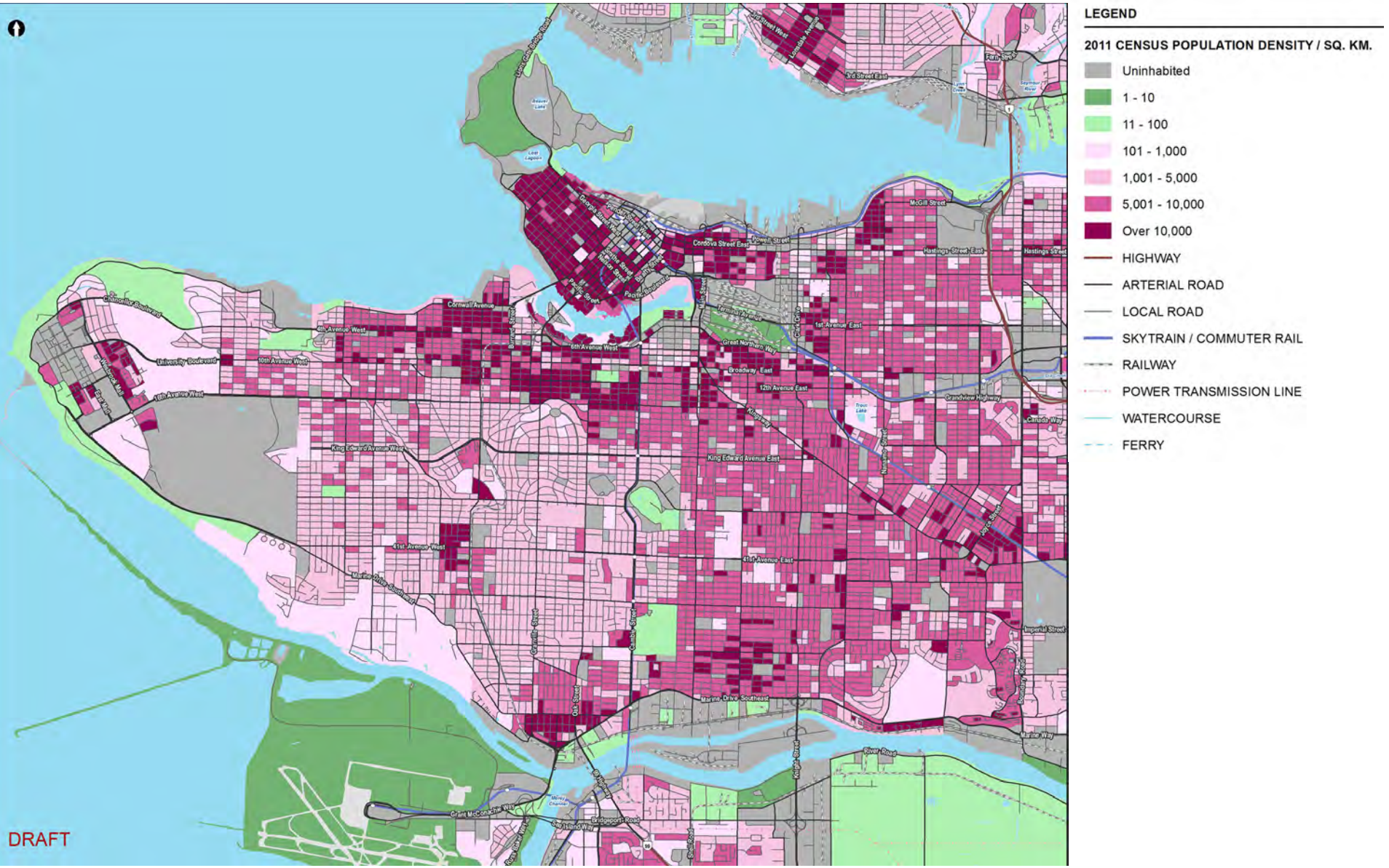
Connectivity— Are elements interconnected?

Diversity— Are all of the elements the same or similar? OR is there a diversity of elements?

TYPES OF INDICATORS

Intensity— relative density or concentration of something (people, dwellings, jobs…)

Examples: population density; dwelling density; hectares of greenspace/1000 people



From a map by Golder Associates, obtained from blogs.ubc.ca/maps/2013/07/03/vancouverpopulationdensity/

TYPES OF INDICATORS

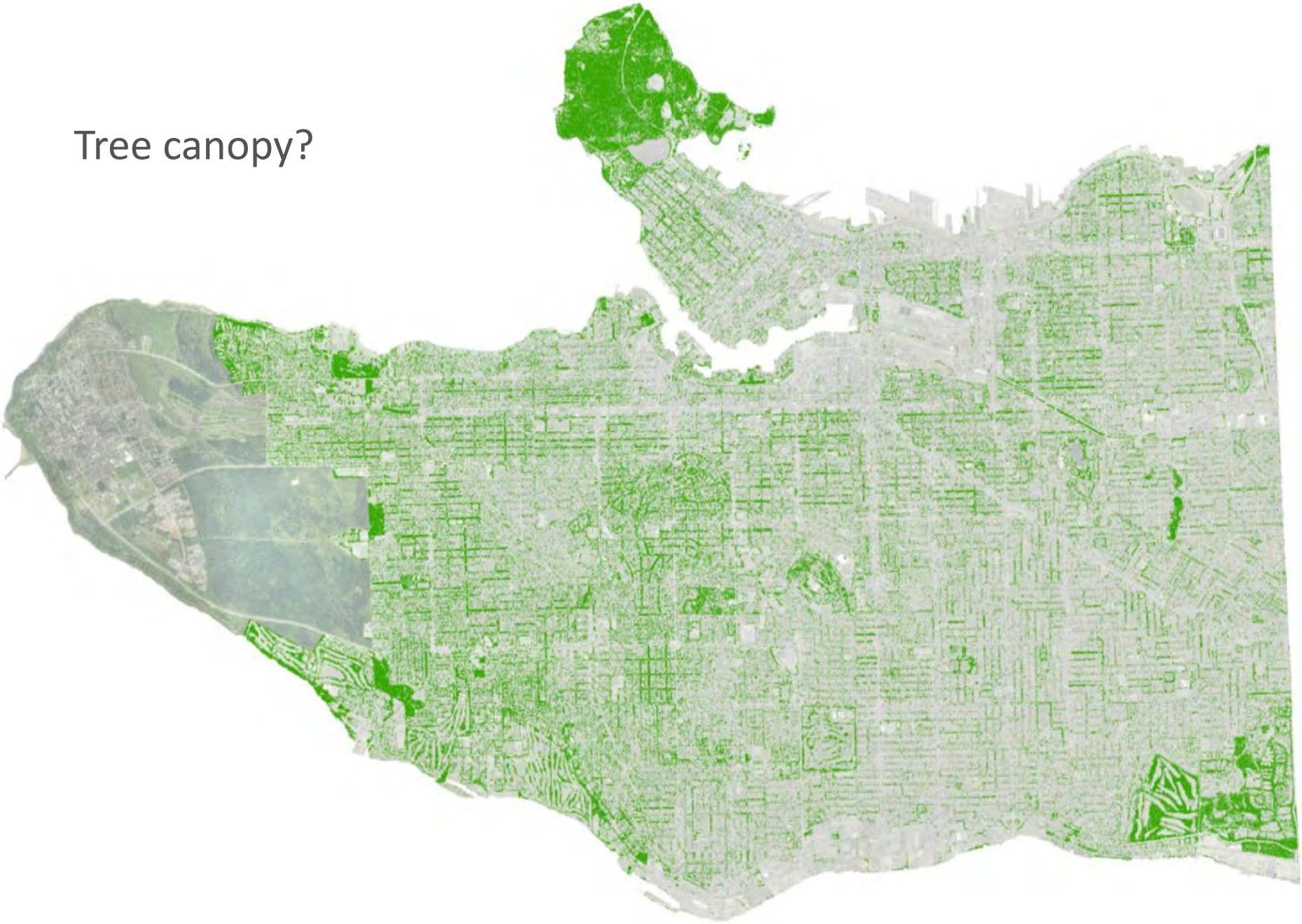
Intensity— relative density or concentration of something (people, dwellings, jobs…)

Distribution— concentration or dispersal of something (parks, community centres, habitat sites…)

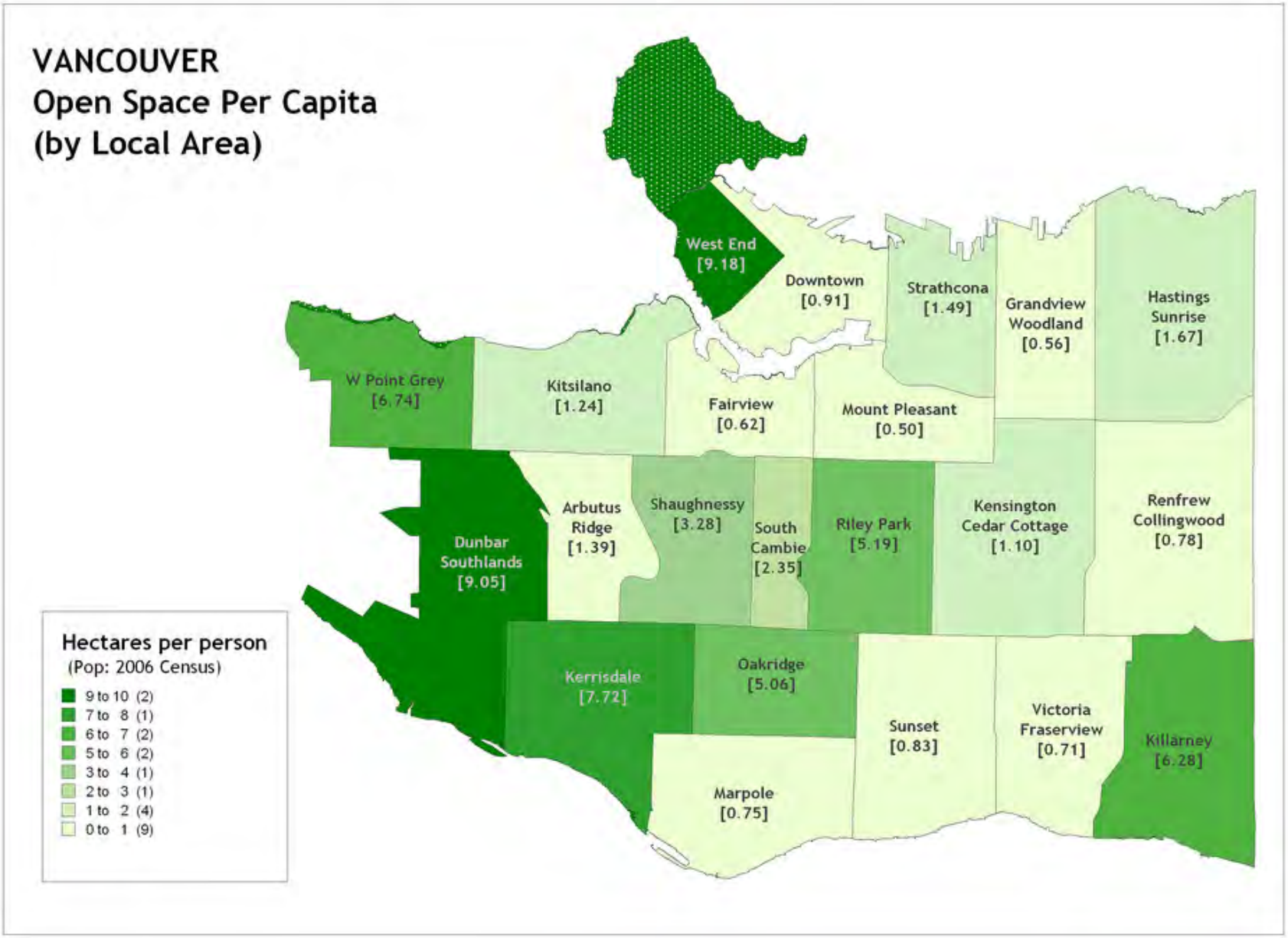
Are the beaches in Vancouver equitably distributed?

Are swimming pools equitably distributed?

Tree canopy?



INDICATOR TYPES?



From: Vancouver Public Space Network

TYPES OF INDICATORS

Intensity— relative density or concentration of something (people, dwellings, jobs…)

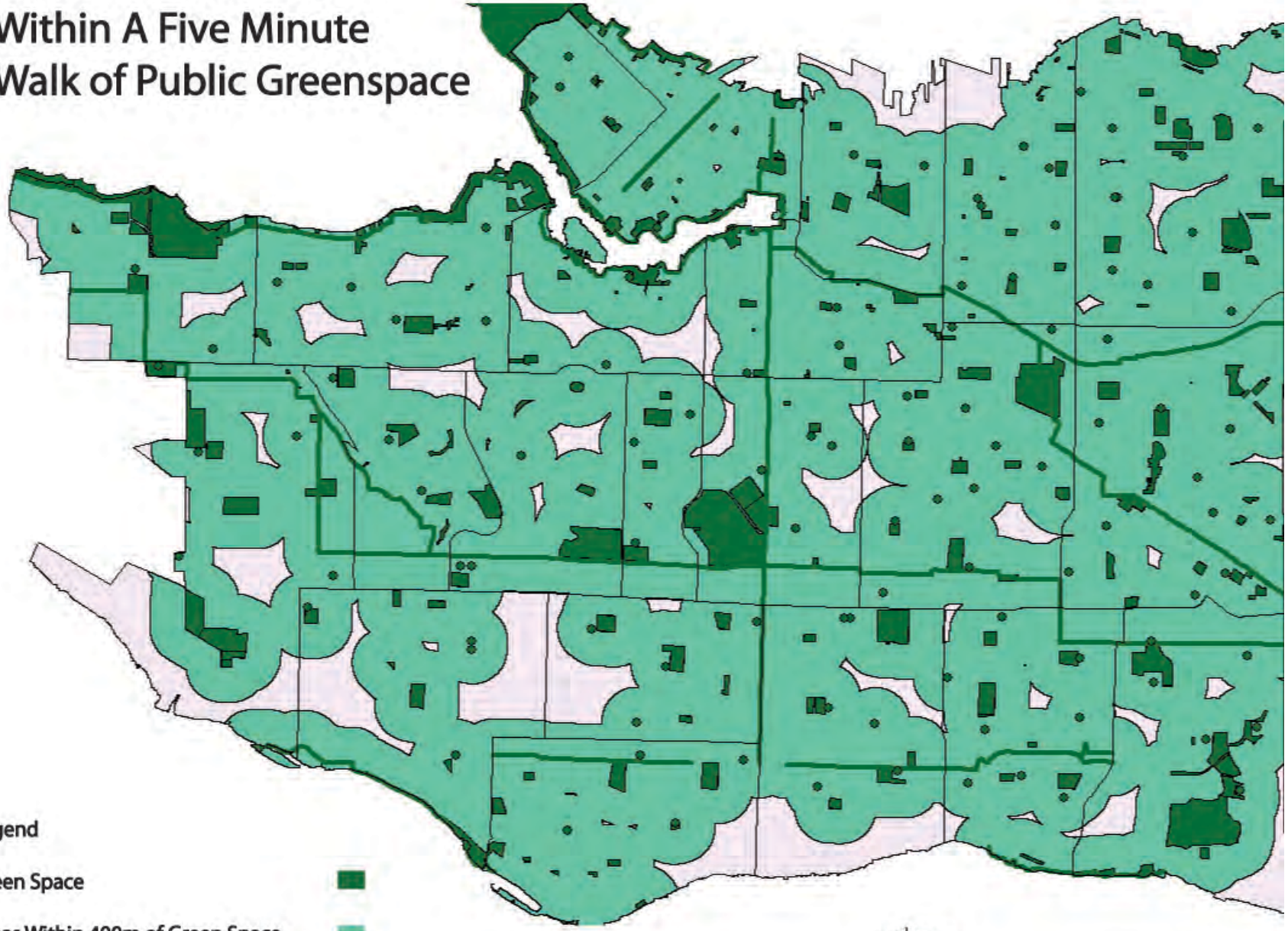
Distribution— concentration or dispersal of something (parks, community centres, habitat sites…)

Proximity— distances between something and something else (dwellings to parks or natural areas…)

i.e. distance from residences to parks or shops

OR numbers of residences or people within walking distance of parks, shops, etc.

Areas in Vancouver Within A Five Minute Walk of Public Greenspace



Riccardo Peggi
Data From: Open Data Catalogue
November 26, 2013
Coordinate System: UTM-10N

PROXIMITY- UBC Okanagen Master Plan

5 minute (400 m) walk to transit

5 minute (400 m) walk to hub

TYPES OF INDICATORS

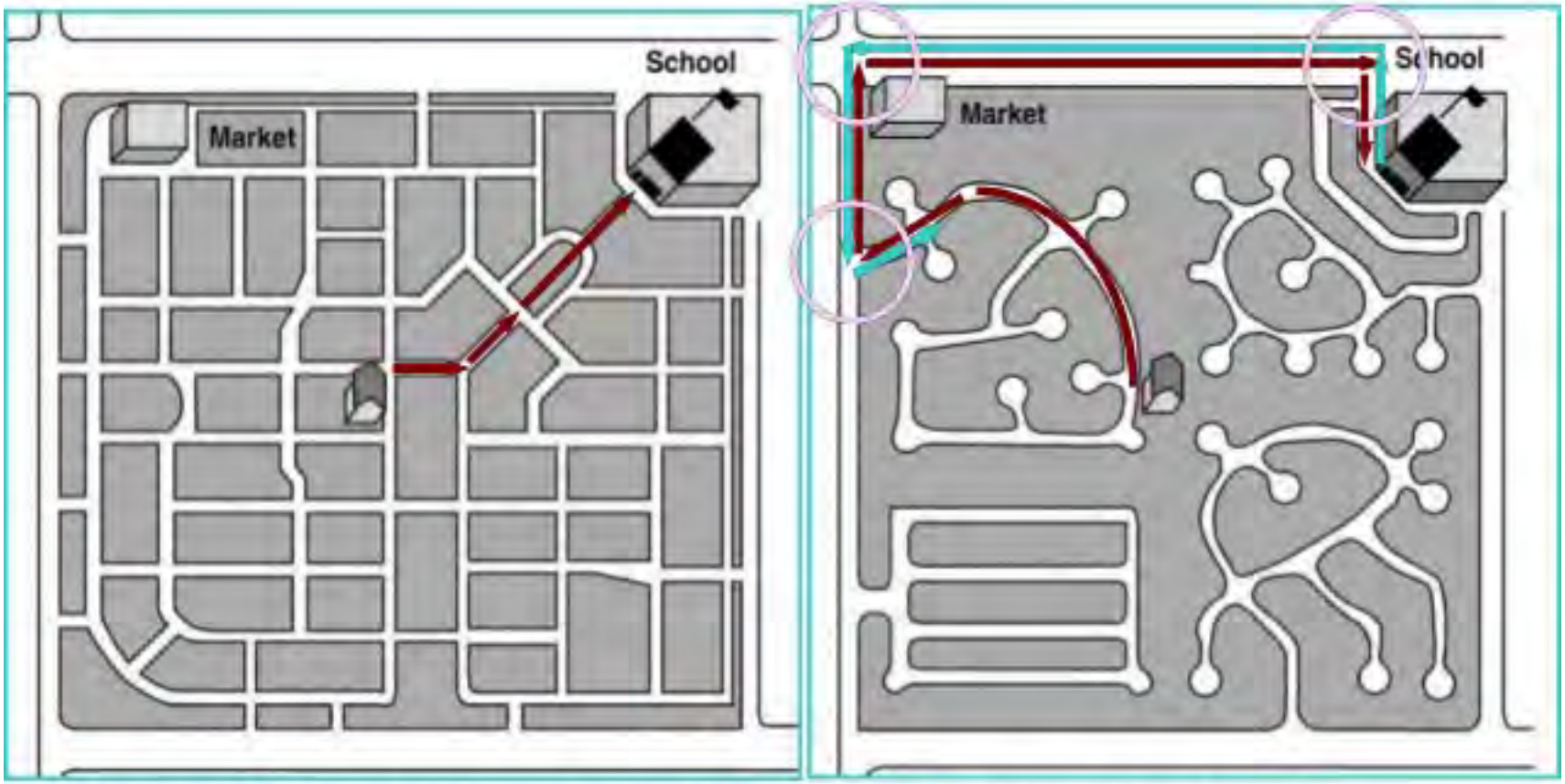
Intensity— relative density or concentration of something (people, dwellings, jobs…)

Distribution— concentration or dispersal of something (parks, community centres, habitat sites…)

Proximity— distances between something and something else (dwellings to parks or natural areas…)

Connectivity— spatial interconnectedness of a system or network (parks, habitat areas, cycling network…)

i.e. are elements physically interconnected?

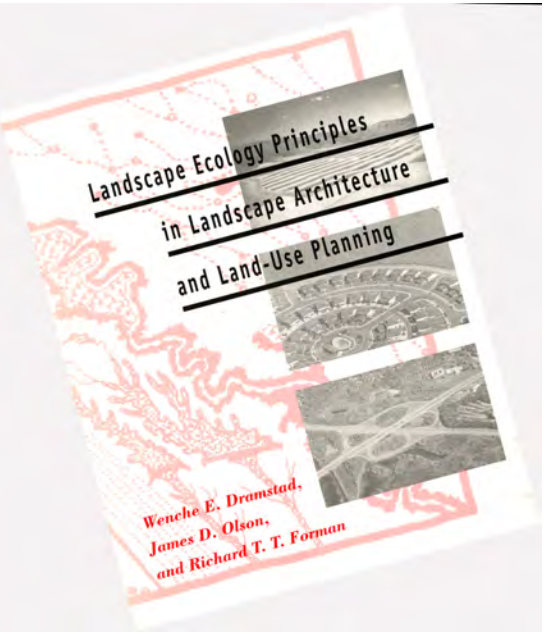


Connectivity creates a pedestrian-friendly street system by:

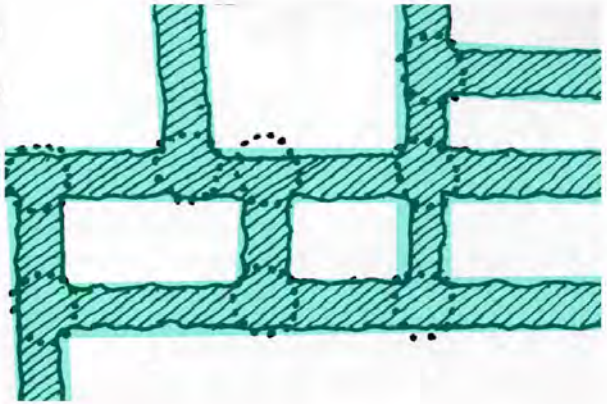
- Reducing walking distances;
- Offering more route choices, more quiet local streets;
- Dispersing traffic

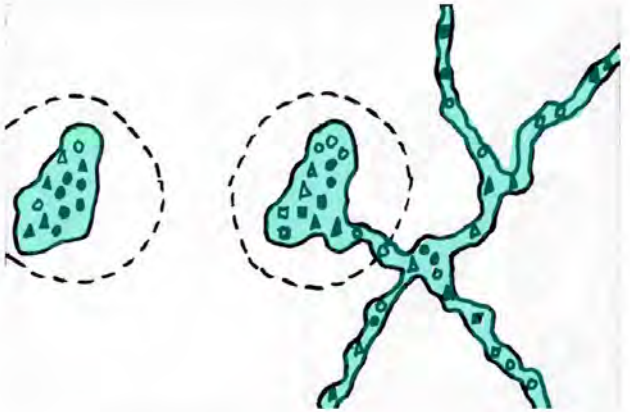
Oregon: Health and Transportation Partners

HABITAT CONNECTIVITY



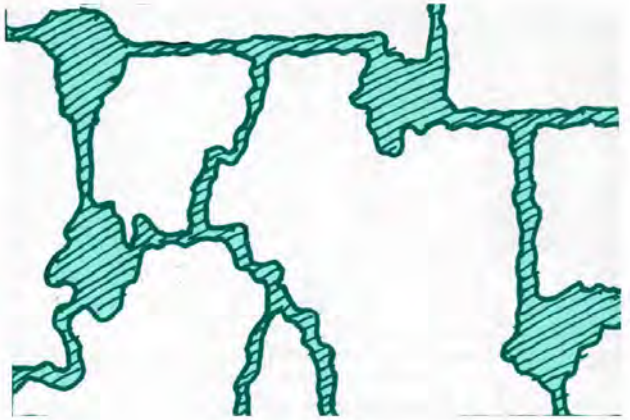
Intersecting corridors-
some species richness





Small sites & stepping stones-
better species richness

Sites connected with multiple corridors-
even better species richness



TYPES OF INDICATORS

Intensity— relative density or concentration of something (people, dwellings, jobs…)

Distribution— concentration or dispersal of something (parks, community centres, habitat sites…)

Proximity— distances between something and something else (dwellings to parks or natural areas…)

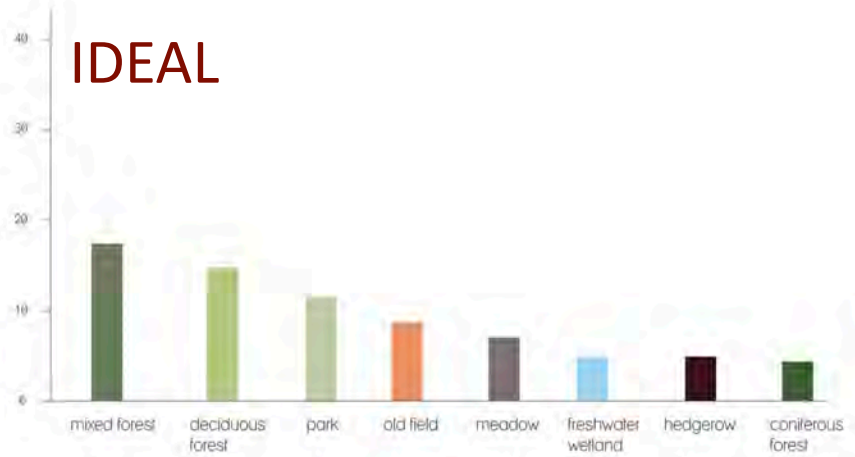
Connectivity— spatial interconnectedness of a system or network (parks, habitat areas, cycling network…)

Diversity— relative mix and variety of types of something (dwellings, shops, recreation facilities, trees…)
i.e diversity of habitat types; diversity of tree/plant species

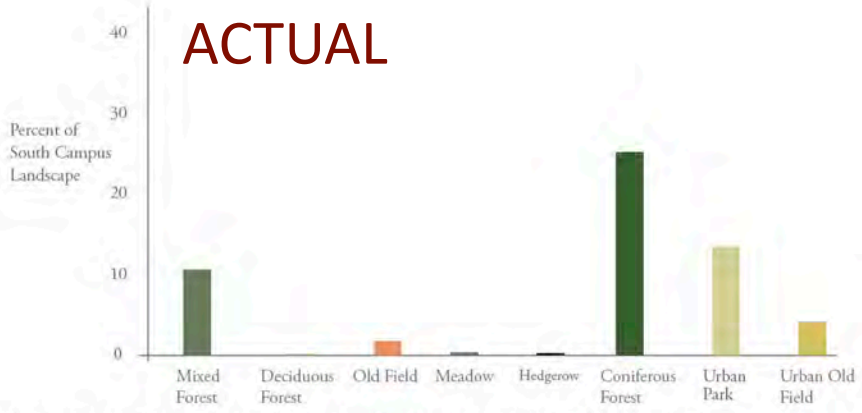
Brianne Lee, Alex Scott,
Samana Gharedaghi
Ru Jia

Source: adapted from Caylee Dyck, Mapping the biodiversity potential on the University of British Columbia Campus

IDEAL

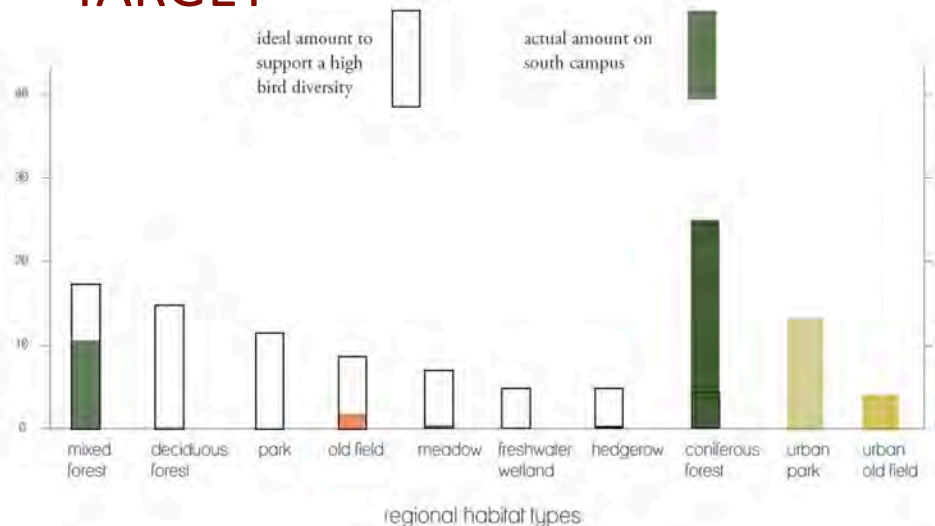


ACTUAL



Source: adapted from Caylee Dyck, Mapping the biodiversity potential on the University of British Columbia Campus

TARGET



QUESTIONS?
COMMENTS?

MAPPING AND VISUALIZING METRICS

PROJECT 2 INDICATORS

LAND COVER

% areas of green vs gray land cover (as % of study area)

LAND USE

% of each different land uses (as proportion of study area)

TREE CANOPY

% coverage of public tree canopy (as % of study area)

Diversity of public trees (species, age, mature size...)

ACCESS TO NATURE

% of study area within 100 meters & within 400 meters of “nature”

BIODIVERSITY

Area with moderate and high habitat area (ha)

% of public greenery with moderate or high habitat value (as % of all green)

+ one other metric of your choice

PRINCIPLES OF MAPPING AND METRICS

- Identify the MOST IMPORTANT aspects to represent (map)

  Understand what is being measured and why

  Make them clear/legible

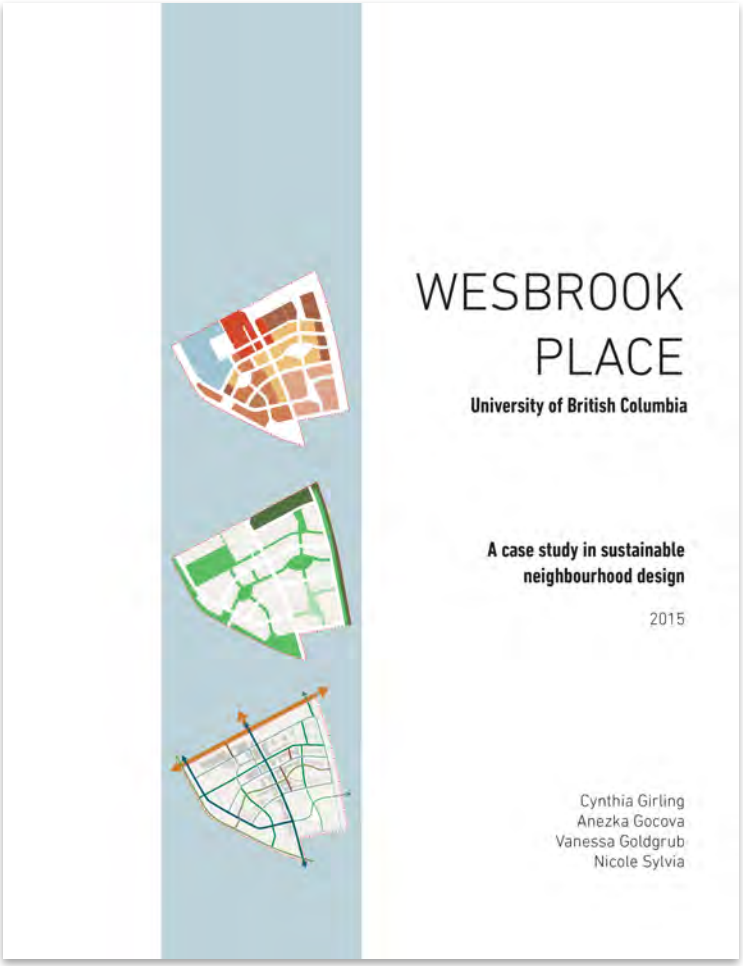
  Eliminate non-relevant information

  Cues to location

- What are the MOST INFORMATIVE metrics?

  Show maps and metrics together

SPATIAL ANALYSIS OF WESTBROOK PLACE



WESBROOK PLACE @ UBC

A compact, complete, walkable neighbourhood

A range of housing options

Easy access to transit

Green buildings

50% of residents study or work at UBC

First residents moved in 2008

GREENSPACE INTENSITY INDICATOR: % of site or land that is public open space

METRIC: ***33.7 %*** of site area is park or conservation area

Forest cover removed

2003

Figure 3.1— 2003

2009

Figure 3.1— 2009

2013

Figure 3.1— 2013

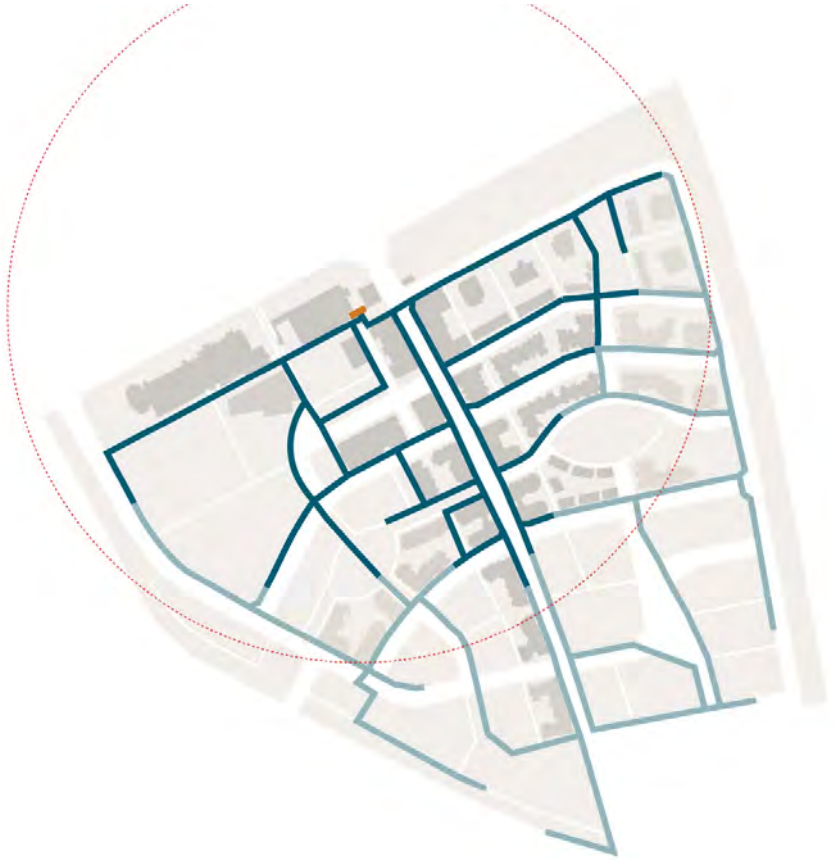
Tree canopy replaced

1400 trees planted
420 in public spaces
Potential- 38% canopy cover

WESBROOK PLACE, UBC

PROXIMITY/ ACCESS TO NATURE

residences within 5 minute walk of parks, nature etc.



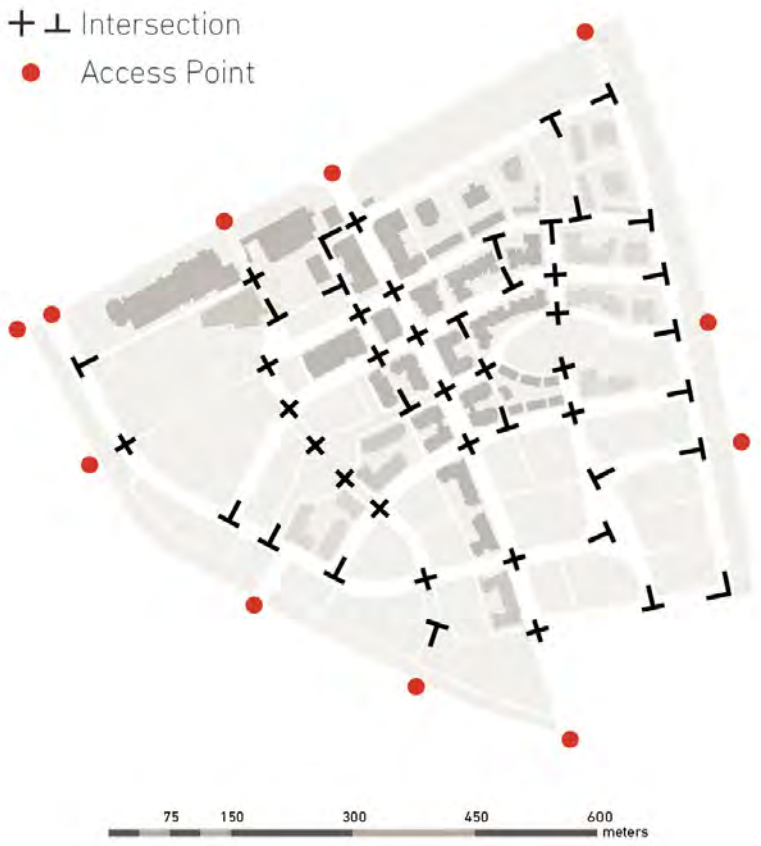
PROXIMITY/ ACCESS TO SERVICES

residences within 5 minute walk of shops

WESBROOK PLACE, UBC

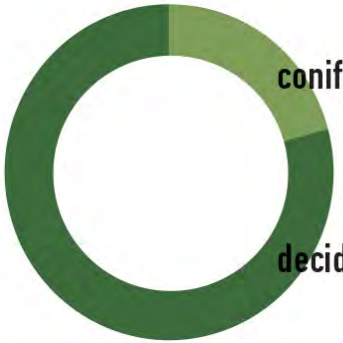
NETWORK & CONNECTIVITY

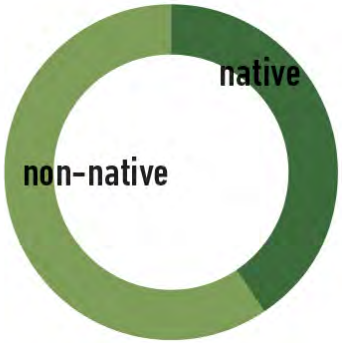
Street types and intersection density

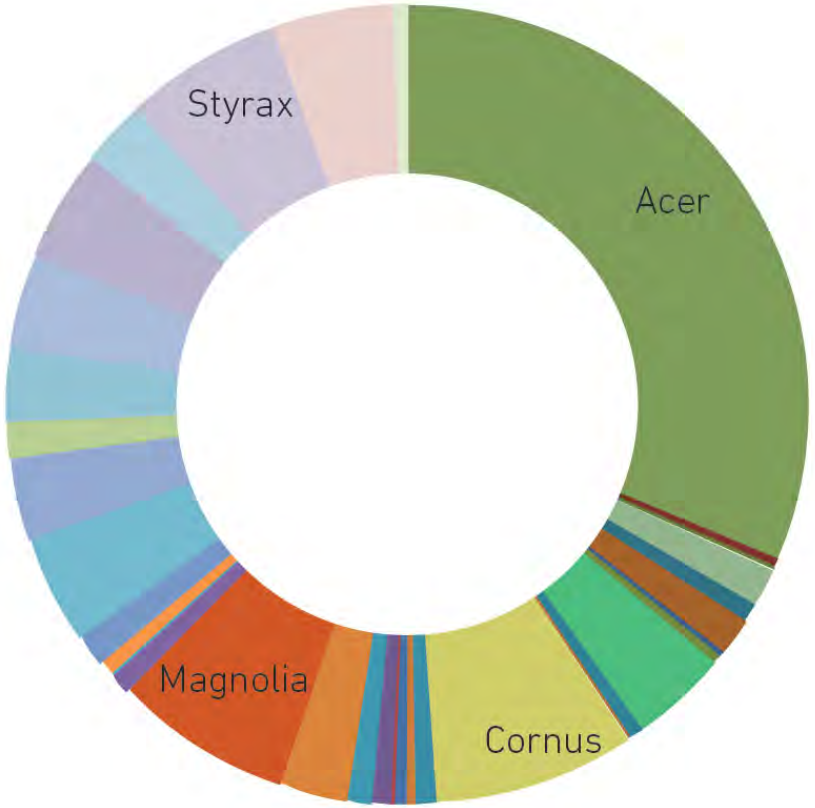


INDICATOR: Intersection density

TREE DIVERSITY (newly planted trees)







WESBROOK PLACE, UBC

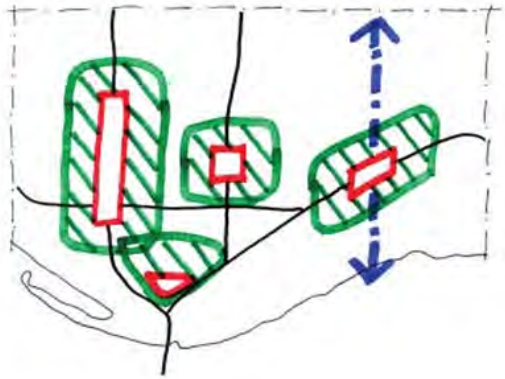
MEASURED VISUALIZATIONS of the MARPOLE COMMUNITY PLAN

Marpole Community Plan 2015

Principle 6:
Protect and enhance public open spaces, PARKS and green linkages

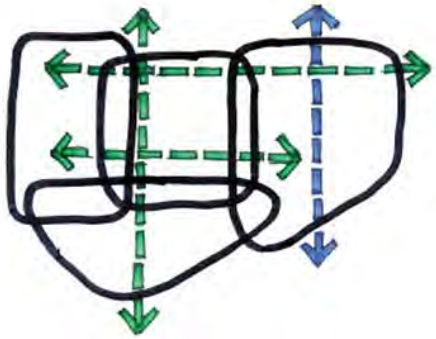
Focus Activity and Intensity

Higher densities and a mix of uses will be located close to existing shopping districts, transit services and areas where significant sustainability gains are possible (e.g., district energy sources).



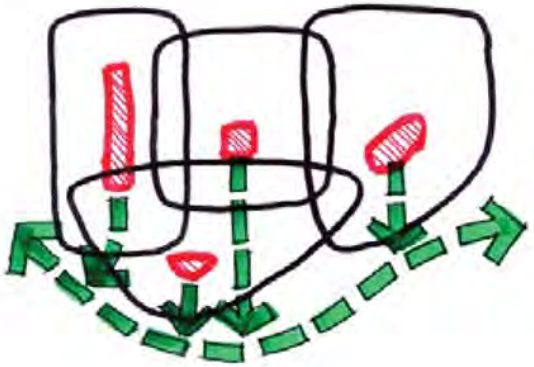
Connected Neighbourhoods

Marpole neighbourhoods will evolve to overcome the separation created by the major arterials crossing the community. Marpole will be better connected by public realm and transportation improvements.



Connected to the River

Connection to the Fraser River is an important community and city amenity. Future improvements will seek connection to its historical, industrial, recreational and ecological values.



MEASURED VISUALIZATIONS

of the MARPOLE COMMUNITY PLAN

elementslab

RESEARCH FOR URBAN DESIGN AND ENVIRONMENT

MARPOLE COMMUNITY PLAN

Comparison of how many people are within a 5 minute walk of parks and green spaces

MARPOLE COMMUNITY PLAN

EXISTING

22,733
EXISTING POPULATION

81%
OF MARPOLE RESIDENTS

70%
OF MARPOLE JOBS

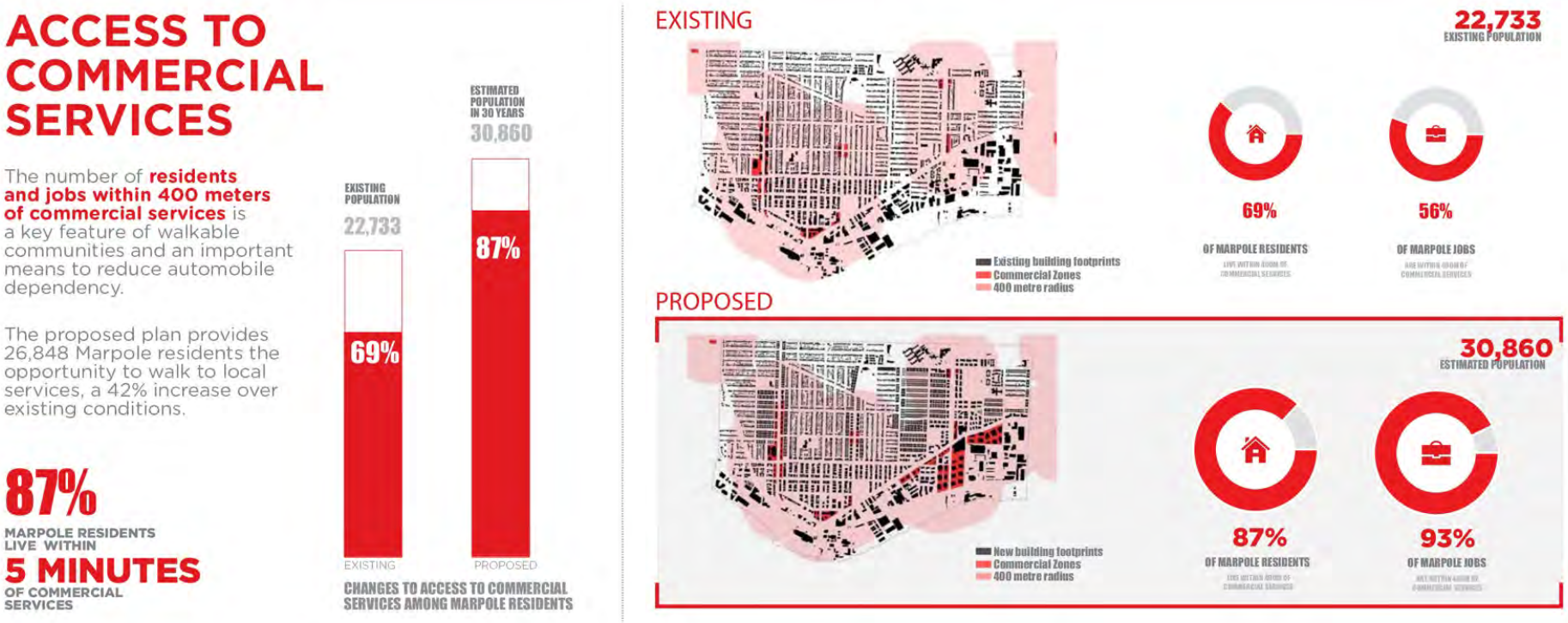
PROPOSED

30,860
ESTIMATED POPULATION

96%
OF MARPOLE RESIDENTS

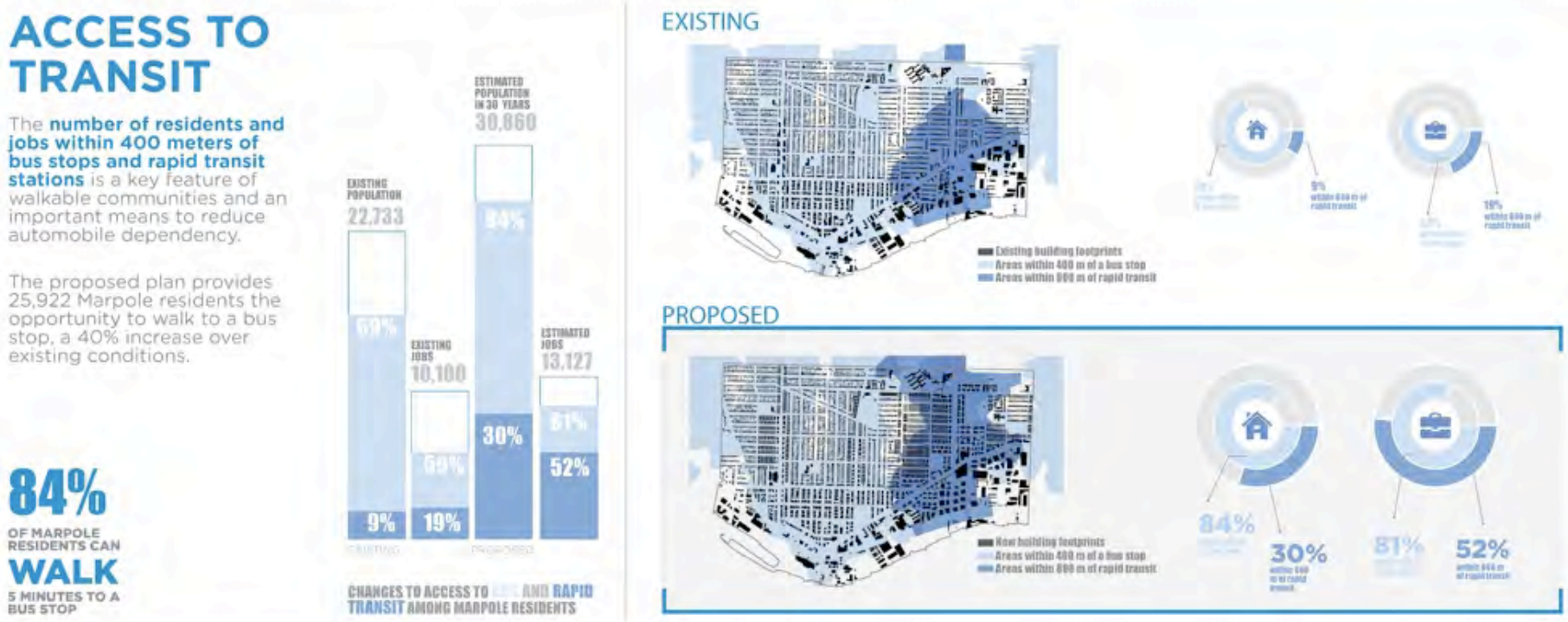
92%
OF MARPOLE JOBS

MARPOLE COMMUNITY PLAN



Comparison of how many people are within a 5 minute walk of commercial services

MARPOLE COMMUNITY PLAN



Comparison of how many people are within a 5 minute walk of transit- bus and rapid transit

EXISTING

Existing building footprints
Areas within 400 m of a bus stop
Areas within 800 m of rapid transit

PROPOSED

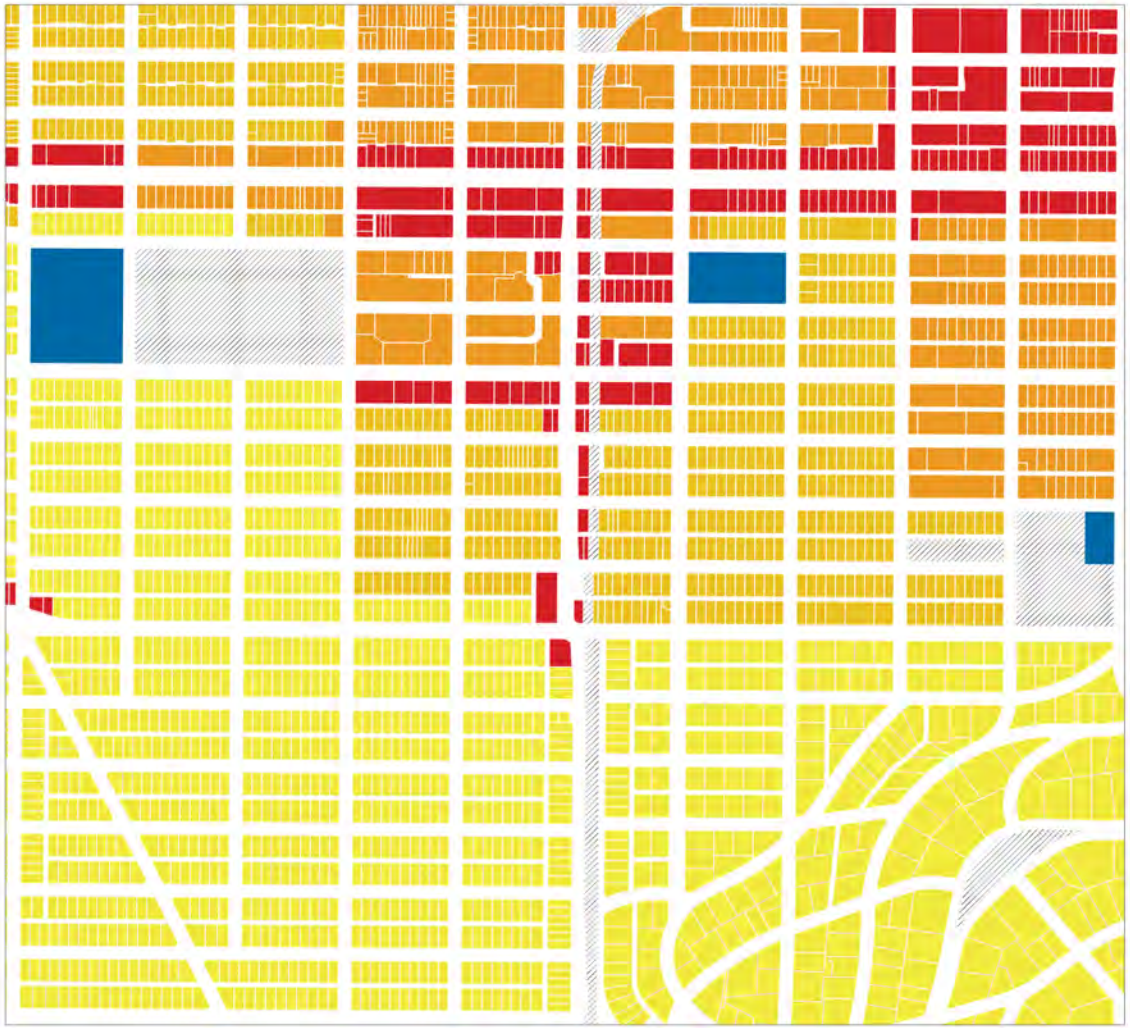
New building footprints
Areas within 400 m of a bus stop
Areas within 800 m of rapid transit

MARPOLE COMMUNITY PLAN

EXAMPLES OF STUDENT WORK FROM LAST YEAR

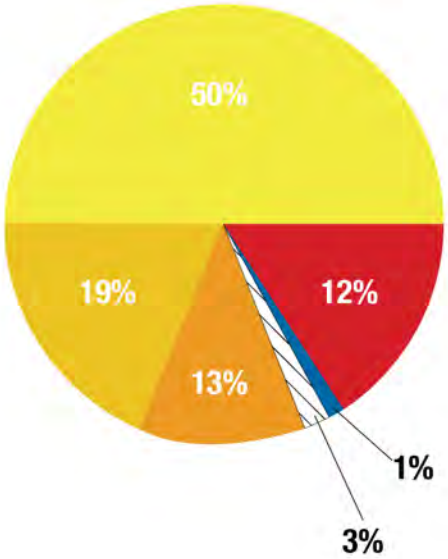
Land Use

Site 8's land use distribution is faily homogenous, with 81% of the area being residential. The overall density of the area is relatively low, with 50% of houses being single family homes.The area is predominantly private with limited access to community services. Commerce is also limited, with a lot of concentration along the Broadway corridor but very little retail elsewhere.



Land Use, 1:10 000

Land Use Distribution



Legend

- Residential (Single Family)
- Residential (2 Family)
- Residential (Multiple Families)
- Commercial
- Institutional
- Park

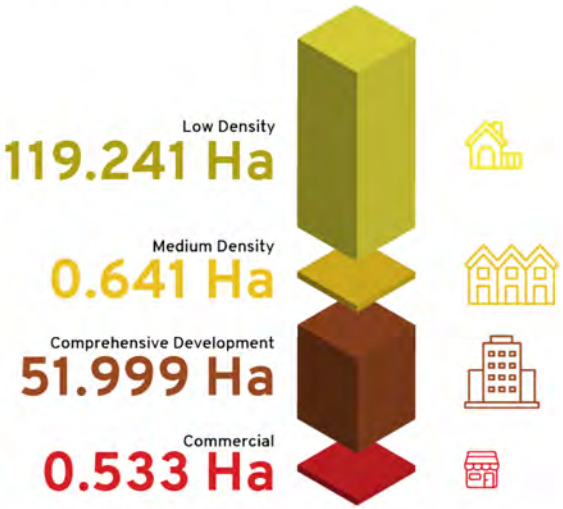
Land Use

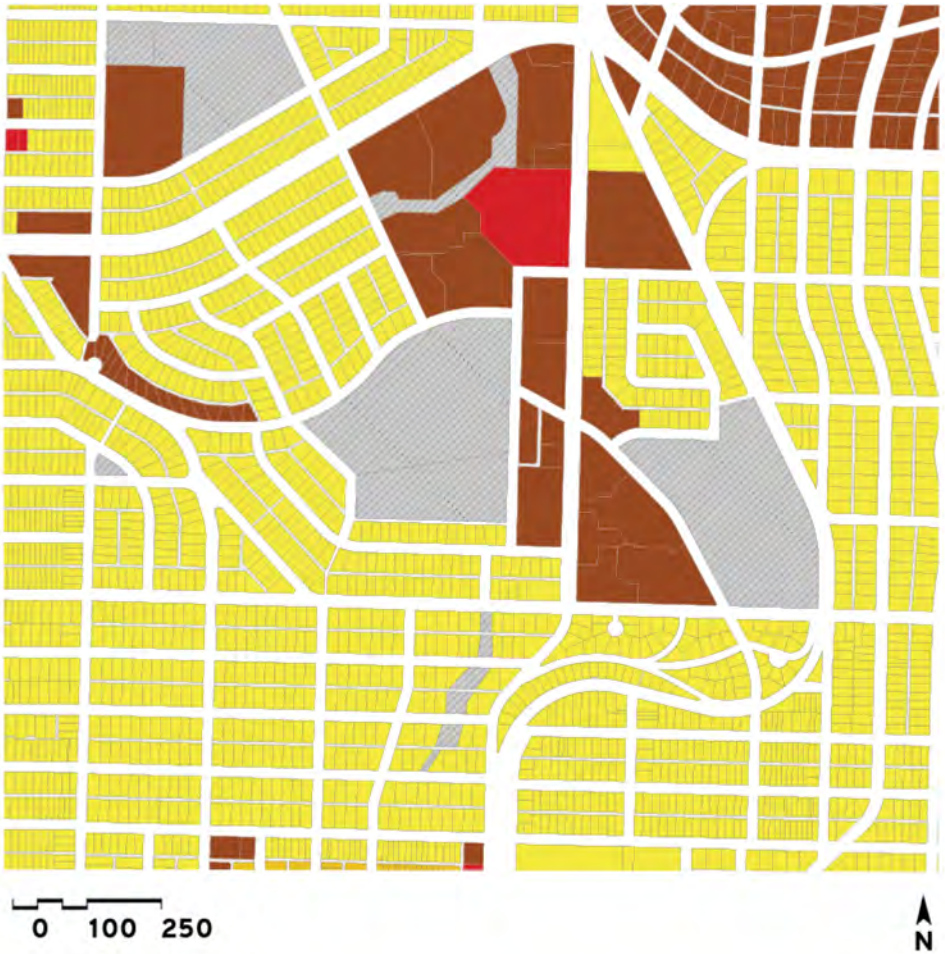
The commercial and comprehensive developments are clustered along Arbutus Street and King Edward Avenue, the main vehicular transportation networks through the site. The peripheral neighbourhoods are low density residential dwellings. Low density residential land usage is the most prominent on the site and is mainly comprised of single family homes.

Legend

- Low Density
- Medium Density
- Comprehensive Development
- Commercial
- Public

Land Use Density Area





Analysis - Tree Canopy

Legend

- Deciduous Canopy
- Evergreen Canopy
- Mixed Canopy
- Forest

Analysis

Because of the dominance of low density residential use The site consists of around 20% of canopy covered area, which is very close to the city's 2050 goal of a 22% canopy coverage. However, as some significant canopied areas are located within the Jericho Land, future development might imply a net lost of canopy within the site. New interventions on public lands or new incentives on private lands might be critical for the site to achieve the city's goal of 22% canopy coverage. Regarding the street trees on site, more than 70% of the street trees on site is deciduous. Prunus, Acer, Platanus, Malus, Tilia are the most dominant street tree genus within the site. As these genus have colourful seasonal foliages/ blooms, this also suggest a high seasonal interest in site. Forest and mixed-canopy, which typically provide high habitat and ecological values, represent of a relatively small share of canopy area on site. This could suggest the need of increasing mixed canopied area or forest through interventions on site.

Tree Canopy Map, 1:12500

Existing Tree Canopy Conditions

Site 13 is dominated by deciduous trees, with nearly 5% of street trees being classified as coniferous. This information reflects public trees only, however, private residential properties were observed with mostly deciduous trees while the Golf Course had mostly coniferous trees.

Tree canopy in Site 13, excluding trees on private property

Type of Tree Canopy

- Deciduous canopy
- Coniferous canopy
- Mixed canopy
- Forest

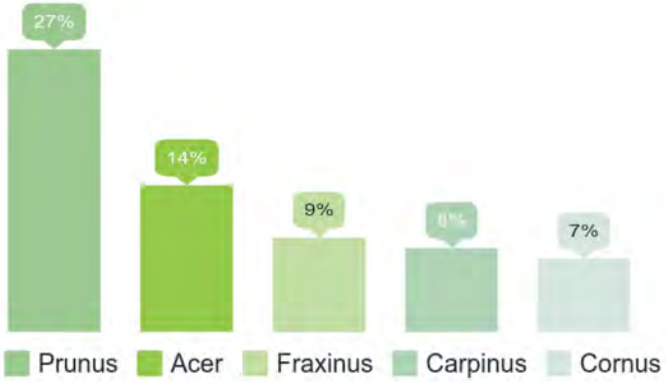
Tree Canopy Composition

95% Deciduous

5% Coniferous

17 ha of tree canopy cover

Top Tree Genuses



Assessment: Trees

While the site is dominated by cherry and maple trees, there are an assortment of genera to add diversity and reduce mono-cultural and genotypic concerns. Trees add variety and diversity of food sources, habitat, and animal niches.

Tree cover

Legend

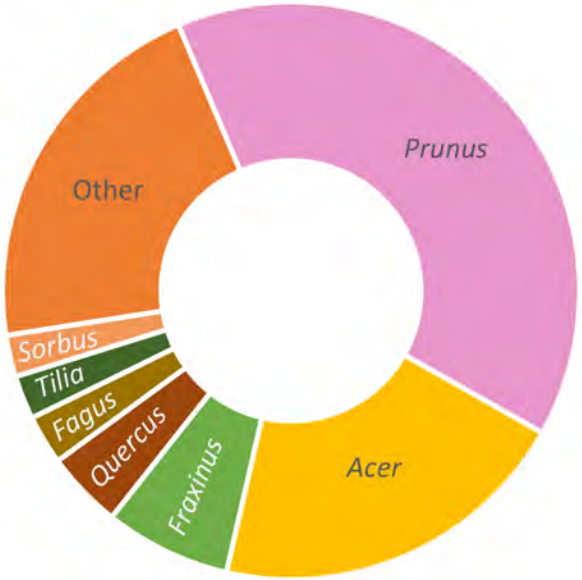
- Deciduous Canopy
- Evergreen Canopy
- Mixed Canopy
- Forest

37 ha
tree canopy cover

13%
proportion tree canopy cover

4158
individual street trees

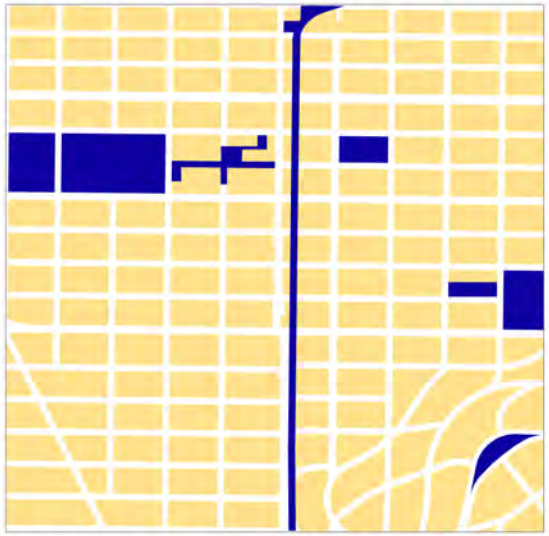
Tree composition



Proportion of street tree genera

Public Access to Nature

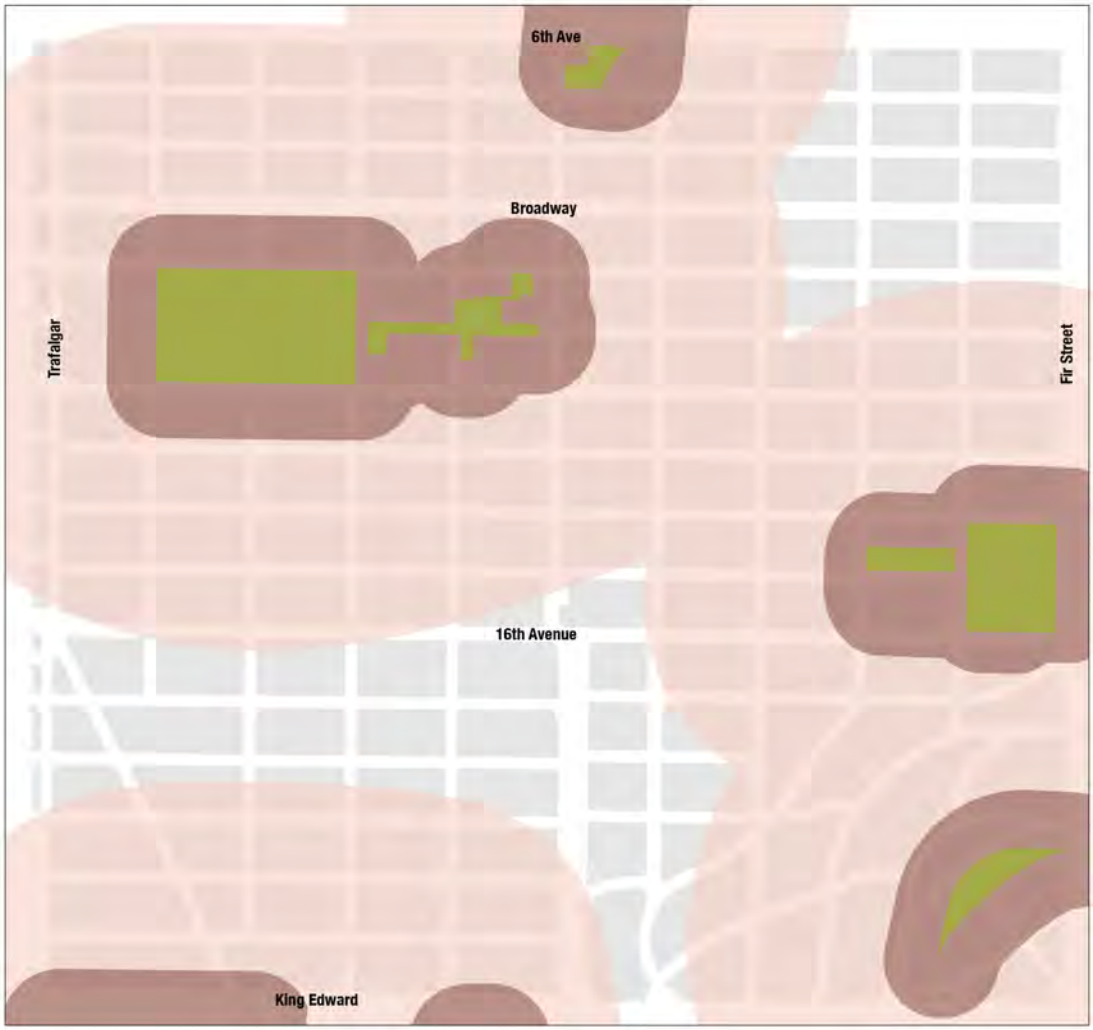
The area is predominantly private and the areas which are public are predominantly park spaces with some institutions (an elementary school & a community center). 80% of the site is within 400m of park space and there is a total of 1650 meters of walking trail, which is the Arbutus Corridor that spans the entire length of Site 8 & continues North to Granville Island.



Public vs. Private, 1:20 000

Legend

- Privately-Owned Properties
- Public Properties
- Green Space
- Areas within 100m of nature
- Areas within 400m of nature



Access to Nature, 1:10 000

Network and Circulation

The major vehicular roadways are Arbutus Street and King Edward Avenue. The Arbutus Greenway is a north-south All Ages and Abilities active transportation network. Several bike networks run through the site including the most prominent one called Ridgeway. There are also two painted bike-lanes on the site with the lengthiest one located on King Edward Avenue.

Legend

- Major Roadway
- Existing Greenway
- Painted Bike Lanes
- Local Street Bike Routes

5 Local Street Bike Routes

2 Painted Bike Lanes

2 Major Roadways

1 All Ages and Abilities Greenway

Total Road Length

82.455 Ha

PROJECT 2 MAPS AND METRICS

- Keep the base map lean and clean (ghost background)
- Isolate the important information
- Simplify and summarize the most important points

(not overly detailed)

- Pair up representation of metrics with relevant maps
- Use the class legends for your colour scheme
- Not too much text!

QUESTIONS?
COMMENTS?