ECOSYSTEMIC URBANISM AT UBC

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In partnership with
UBC Campus & Community Planning
and BCNecologia
The School of Community and Regional Planning (SCARP) student team would like to express their gratitude to the key players who supported this work. Firstly, we would like to say a huge thank you to the team at UBC Campus and Community Planning. In particular, this work would not have been possible without the continual support and significant time commitment of Gerry McGeough and Megan Shaw, and of Rachel Wiersma and Mike van der Laan, who played a key role in collecting and manipulating data for analysis. Further, thank you to our dedicated teaching team at SCARP - Maged Senbel, Jordi Honey-Rosés, and Nathan Edelson, for your ongoing support and guidance throughout this process. And finally, thank you to the team at BCNecologia - Salvador Rueda, Berta Cormenzana, Ona Riera, and Cynthia Enchave, for your support and contribution to this project.
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Introduction

The University of British Columbia (UBC) believes in sustainability as a necessity, as the ecological and human consequences of being unsustainable are devastating. Not only is it the right thing to do ethically and in terms of distributive justice, it is desirable in itself, offering the possibility of a better life for people and the planet (UBC, 2014).

As part of UBC’s commitment to sustainability, a 20-year Sustainability Strategy was developed in consultation with the community including students, faculty, staff, campus residents, the University Neighbourhood Association (UNA), Musqueam First Nation, and external community partners. The strategy guides UBC’s efforts towards not only a more sustainable university but a more sustainable world.

Since a 2015 workshop with Salvador Rueda of BCNecologia, UBC has been interested in how the organization’s theory, principles and evaluative framework can be applied on campus to support the pursuit of sustainability. Stadium Neighbourhood and the adjoining academic lands provide an opportunity to test this framework, known as Ecosystemic Urbanism, at UBC. This project aims to apply the theories and principles of the evaluative tool in the UBC context, while working to develop mixed-use design options for Stadium Neighbourhood. The work is the result of a collaboration between UBC Campus and Community Planning (C&CP), the UBC School of Community and Regional Planning (SCARP), and BCNecologia.
Vision & Objectives

UBC is a microcosm unto itself, where a person can live, work, study, and play. In an Information Age, UBC is a living laboratory, where knowledge is our currency. The planning and design of Stadium Neighbourhood will bolster this vision through embedding principles of regenerative sustainability in all aspects of its development. The new neighbourhood will be leveraged to connect the campus in its entirety, to foster new partnerships, support innovation, and improve human and environmental wellbeing.

evaluate
Ecosystemic Urbanism as a tool for measuring neighbourhood sustainability.

understand
the utility of Ecosystemic Urbanism as an analytical tool in the UBC planning context.

create
design options for Stadium Neighbourhood with respect to the principles of Ecosystemic Urbanism.
Methodology

This project was completed as part of a studio course at the University of British Columbia (UBC) in the Master of Community and Regional Planning program at the School of Community and Regional Planning (SCARP). The project was completed from September, 2016 to April, 2017.

A collaborative approach was used to achieve the objectives of the project. From September to November 2016, the SCARP student team engaged with the project partner, UBC Campus and Community Planning (C&CP), and conducted secondary research, to gain a thorough understanding of the UBC planning context. Concurrently, the students worked to analyze online publications and books on Ecosystemic Urbanism to gain an understanding of the framework and its potential utility in North America and, more specifically, at UBC. In November 2016, UBC C&CP and the student team connected with key stakeholders at BCNecologia by conference call, and began to discuss the potential applicability of Ecosystemic Urbanism at UBC. From November to December, the students worked with staff at C&CP to collect primary data inputs, which were then used by BCNecologia to study the UBC campus according to the framework.

An analysis was completed by BCNecologia and returned to the UBC team in January, 2017. The research and analysis culminated in the design of a charrette style workshop that convened 30 professionals. At the workshop, presentations and materials were provided by the student team to inform the creation of two schemes for Stadium Neighbourhood, based on the principles of Ecosystemic Urbanism. Following the workshop, the students used all prior research and analysis to inform a single design for Stadium Neighbourhood. This design embodies the principles of Ecosystemic Urbanism. The research, analysis, and design are summarized in this report.
Limitations

There were three key limiting factors in completing this work: limited time; availability of data; and the proprietary nature of Ecosystemic Urbanism. In terms of time, the project was completed in only seven months. Ecosystemic Urbanism is a highly complex, and comprehensive tool. In order to fully understand the tool, and the challenges in adapting it to the local context, it would be necessary to dedicate more than the available time. In a typical process, BCNecologia may spend up to six months analyzing the local context prior to data collection. In this project, only seven months were available to study the context, collect data, and perform an analysis.

Availability of data was another limiting factor in this work. Ecosystemic Urbanism requires specific, detailed, geolocated data. There were significant data gaps for the UBC context, and some datasets were only available at inappropriate scales or in inappropriate formats. Since it was not possible to collect all required data in the given time period, the analysis conducted by BCNecologia was incomplete and therefore did not provide a true test of the tool’s suitability to the local context.

Lastly, a significant challenge was the proprietary nature of Ecosystemic Urbanism. The framework is intended to be utilized by staff at BCNecologia. Therefore, the available publications do not provide comprehensive explanations of the methodology. The students interpreted the framework by looking at a number of different, and at times contradictory, sources. Further details on the challenges of applying Ecosystemic Urbanism in the UBC context are provided in Part 6.
ubc planning and design context.
Buildings in a sea of parking. (UBC, 1973). Until recently, UBC’s campus was dominated by cars, and parking lots, as evidenced by this aerial photo. (Source: UBC Archives)

Pedestrians on Main Mall. (UBC, current). Once dedicated to car traffic, many routes on campus are now pedestrian only zones. (Source: UBC Welcome Centre)

from...

single-use car dominated commuter campus

to...
mixed-use pedestrian-oriented complete community

part two
A Cultural Shift

UBC has undergone a major transformation in recent years. Aerial photos from the 1970s reveal buildings in a sea of parking, however, what was once a single-use commuter campus is becoming increasingly diverse. C&CP is working to create a complete community where students, staff, faculty and residents have access to all the needs of daily life and where sustainability is prioritized. The emphasis is increasingly on pedestrian experience.

Motivations for Neighbourhood

The evolution of the campus is evident in its housing stock. The first UBC neighbourhood, completed in 1989, was Hampton Place. The neighbourhood was developed with a vision of being UBC’s first multi-family unit community and is a single-use, housing development. UBC’s newest neighbourhood, Wesbrook Place, is still in the process of build-out. The neighbourhood’s vision is “to bring new rental and family housing opportunities, sustainable development and quality community amenities to the largest neighbourhood [at UBC]” (UBC Campus and Community Planning, 2017). It is a vibrant, mixed-use community where social and environmental health are top priorities. This demonstrates UBC’s gradual evolution from a commuter campus, to a bedroom community with academic lands, to a complete, mixed-use campus community. The provision of these mixed-use residential neighbourhoods are a key component of a sustainable campus.
Centre for Interactive Research on Sustainability (CIRS). Completed in 2011, CIRS is the first building on campus to embody the principles of regenerative design. (Source: UBC Blogs)

Olympic Village. This is Canada’s first LEED Platinum neighbourhood. Though it is not technically regenerative, it is built to high environmental standards, with an emphasis on energy efficiency and high quality public realm. (Source: Pinterest)
Regenerative Urbanism

One approach to move beyond the dominant sustainability narrative is regenerative design. Typically, sustainability focuses on harm reduction. Regenerative design applies whole systems thinking, and has been described as “the active restoration and regeneration of the environment; and the active pursuit of improvements in the well-being of the community” (Robinson and Cole, 2015). This is demonstrated in the diagram to the right, which represents a transition from conventional, or technical systems design, to living systems design. Conventional design, shown at the bottom left of the graphic, results in urban systems that are degrading to the land and consume more energy than they produce. Living systems design, shown at the top right of the graphic, is net-positive. These systems are self-sustaining, and create more energy than is consumed. This net-positive design is the theory behind regenerative urbanism.

The theory of regenerative design is well-understood for its potential benefits to both the environment and society. UBC’s Centre for Interactive Research on Sustainability, completed in 2011, is the first building on campus to embody the principles of regenerative design. It was built as a living lab, to help the university gain an understanding of how the principles of regenerative design can be applied to the local context. While there are no existing projects on the neighbourhood scale based on the principles of regenerative design, there are examples of developments striving towards similar goals. Olympic Village is Canada’s first LEED Platinum neighbourhood. It was built with high environmental standards and innovative energy efficiency, incorporating green roofs and solar technology. Additionally, there is a strong emphasis on the public realm, with significant space dedicated to urban agriculture and green landscaping features. While there is a trend toward regenerative design, a lack of clarity exists around its effective implementation.

Pathways to Regenerative Urbanism. While technical systems design was once the norm, there is a paradigm shift towards living systems design. (Source: Gerry McGeough 2016)
ecosystemic urbanism.
Activities in Barcelona’s *Eixample* sector.
Towards Urban Complexity
Ecosystemic Urbanism provides a framework for the implementation of regenerative urbanism. It was developed in Barcelona by BCNecologia, spearheaded by Salvador Rueda. The tool is grounded in the theory of urban efficiency, which applies the same logic to urban systems as that which is applied to natural systems. Cities are understood as ecosystems ruled by the laws of physics.

Ecosystemic Urbanism postulates that as urban organization \((nH)\) increases in complexity (measured by the number and diversity of legal entities in the study area), energy consumption \((e)\) will naturally reduce, leading to a more efficient system over time. As this trend towards increased complexity and reduced energy consumption continues, it will eventually reach a regenerative state.

**Urban Complexity**. Urban complexity plays a key role in the theory of Ecosystemic Urbanism. The framework utilizes a series of icons to represent urban diversity (shown left). (Source: BCNecologia)
Ecological Urbanism Certification.
Ecosystemic Urbanism is grounded in the four goals, seven objectives, and fifteen design principles shown above. This conceptual framework comprises the majority of BCNecologica’s public facing process.

**INDICATORS**

01 Housing density
02 Absolute compactness
03 Corrected compactness
04 Staying space per inhabitant
05 Air quality
06 Acoustic comfort
07 Thermal comfort
08 Road accessibility
09 Road space for pedestrians
10 Proportion of the street
11 Visual perception of urban green
12 Habitability index in the public space
13 Proximity to public transport
14 Proximity to cycling network
15 Motorized road space
16 Proximity to bicycle parking
17 Off-road car parking spaces
18 Provision of vehicle parking spaces
19 Provision of bicycle parking spaces
20 Off-road space for the distribution of goods
21 Urban diversity
22 Balance between activity and residence
23 Spatial and functional continuity of street
24 Soil biotic index
25 Green space per inhabitant
26 Simultaneous proximity to green spaces
27 Density of trees
28 Urban green connectors
29 Energy demand in the residential sector
30 Energy demand in the tertiary sector and equipment
31 Energy demand in the public space
32 Consumption
33 Energy self-sufficiency from renewable energies
34 Emissions of greenhouse gases
35 Potable water demand
36 Water sufficiency
37 Proximity to waste collection points
38 Proximity to household waste recycling centre
39 Closing the organic matter cycle
40 Model integration with adjacent waste management
41 Provision of subsidized housing
42 Spatial distribution of subsidized housing
43 Provision of public facilities
44 Proximity to public facilities
Ecosystemic Urbanism is a neighbourhoood-scale sustainability assessment framework that utilizes an indicators approach. The framework is intended to guide the growth and development of cities with an urban population of greater than 50,000 residents. The city being evaluated is broken down into minimum units of action for analysis. The study area is defined by a radius of 300 meters or by a surface area of 16 hectares.

Guiding Principles
A unit of action, or the study area, is analyzed using a series of indicators that are designed to bring a balanced, holistic and ultimately regenerative approach to urban planning projects. The indicators are based on four key principles: Compactness and Functionality, Complexity, Efficiency, and Social Cohesion. The framework can be applied to both new fabrics, new neighbourhoods or development proposals, and existing fabrics, existing neighbourhoods or developments. Each context is assessed using a unique, but related set of indicators, which are based on the same set of principles shown in the diagram.

Differing Contexts
The study of new fabrics has two components - a Pre-existing Context Analysis and an Assessment of the Neighbourhood Proposal. The Pre-existing Context Analysis is performed using 30 indicators in order to gain a thorough understanding of current conditions, and to identify deficiencies. This will be discussed further in Part 4. An Assessment of the Neighbourhood Proposal is then applied to the proposed development, to gain a theoretical understanding of its performance. The existing fabrics indicators are applied to an existing neighbourhood. These indicators are almost identical to the Assessment of the Neighbourhood Proposal indicators, but are applied to built-out areas to assess performance. Together, these indicators are designed to provide a holistic view of neighbourhood performance.
01. Land Occupancy

Description
Land Occupancy prioritizes compact development. This encourages efficient land consumption and efficient use of natural resources in order to decrease pressure on urban support systems. Emphasis is placed on integration, connectivity, building density, and intensity of land uses.

Main Objectives
01. Generate a critical population mass
02. Create a compact urban fabric
03. Develop patterns of walkability

02. Public Space & Habitability

Description
Public Space and Habitability emphasizes high quality public spaces in order to create a city that is both habitable and sustainable. Key features of public spaces are accessibility, safety, and health. Health includes low pollution levels, and high levels of acoustic, lighting, and thermal comfort.

Main Objectives
01. Seek a balance between built and gathering spaces
02. Reserve ample “staying” space for inhabitants
03. Ensure environmental comfort
04. Create safe and accessible streets for people
05. Design well-proportioned, human-scale streets

05. Green Space & Biodiversity

Description
Green Space and Biodiversity should be prioritized in neighbourhood design to support wildlife and maintain permeable surfaces, while creating green spaces for recreation, both at grade and as green walls and roofs. Networks should comprise a green mosaic of parks, gardens, and interior blocks.

Main Objectives
01. Implement a structured green network
02. Promote soil permeability
03. Plant native and drought resistant species
04. Ensure inhabitants are within walking distance to green space

06. Urban Metabolism

Description
Urban Metabolism seeks self-sufficiency in all urban systems. Closed loop systems, for energy, water, waste, materials and food are desired. New urban development projects should incorporate strategic actions to mitigate climate change.

Main Objectives
01. Optimize efficiency and self-sufficiency
02. Apply systems thinking
03. Promote closed loop systems
03. Mobility & Services

Description
Mobility and Services promotes transportation alternatives to private vehicles, where the street is predominantly reserved for pedestrians. This promotes reduced energy consumption, and air and noise pollution while increasing safety and reducing traffic accidents. A safe, accessible, and continuous bicycle and pedestrian network is required.

Main Objectives
01. Reduce automobile dependency
02. Develop a land-use transportation plan
03. Create a multi-modal transit network
04. Guarantee frequent and accessible public transportation

04. Urban Complexity

Description
Urban Complexity aims to create a complex, knowledge-dense fabric of legal entities which ensures access to key goods and services close to home. Diversity of organizations supports a balanced social structure and creates local employment opportunities.

Main Objectives
01. Promote the knowledge/information economy
02. Promote a diverse critical mass of legal entities
03. Create residential areas services by daily needs
04. Promote fine-grained urban fabric
05. Create a mixing of uses

07. Social Cohesion

Description
Social cohesion refers to the level of harmonious co-existence among groups of people with different cultures, ages, incomes and occupations. Housing and social infrastructure, including cultural, sport, education, healthcare and social services, should promote diversity of access and inclusion.

Main Objectives
01. Foster a mixed population
02. Foster mixed and inclusive housing composition
03. Distribute public services, goods and infrastructure equitably

The 7 Objectives of Ecosystemic Urbanism. The 44 indicators used to conduct both an Assessment of Neighbourhood Proposals and Assessment of Existing Neighbourhoods are rooted in the 7 key objectives described here and will be used to analyze the design concept in Part 5.
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In 2015, a group of representatives from BCNecologia came to the UBC campus for a workshop with Campus and Community Planning and other external stakeholders. The goal of the workshop was to describe Ecosystemic Urbanism and its potential applicability within the region. With continued interest in the framework, and the start of the SCARP student team project, C&CP reached out to connect with BCNecologia and Salvador Rueda. Mr. Rueda expressed interest in the project and its goal of testing Ecosystemic Urbanism on campus. This began a relationship that spanned the project and culminated in a workshop with C&CP, external stakeholders, the SCARP team and Salvador Rueda. The sections following further describe the SCARP student team’s analysis, BCNecologia’s assessment and contributions, and the Stadium Gaming Workshop.

**Stadium Gaming Workshop.** (UBC, 2017) As Salvador Rueda gave a lecture on the theory of Ecosystemic Urbanism at the Stadium Gaming Workshop, Andrew Martin captured key concepts through graphic recording.
To gain an understanding of the pre-existing conditions at Stadium Neighbourhood, the SCARP student team conducted a preliminary analysis through the lens of Ecosystemic Urbanism. The 30 indicators for the Pre-existing Context Analysis are organized into 5 categories: Site Vulnerability, Territorial Fitting of the New Fabric, Efficient Land Consumption, Urban Planning Demands, and Resource Availability. Each category is further divided into sub-categories, with the indicators distributed among these sub-categories. Due to limited time, and availability of data, it was not possible to calculate all indicators, so a high level analysis was conducted using the five categories and their sub-categories. The following provides a summary of key features of the site to be considered in the design process.
01. SITE VULNERABILITY
1.1 Natural & Anthropic Hazards
- risk of earthquake
- risk of tree fall from high winds
- acoustic pollution from roads and stadium
- stable, flat terrain

01. SITE VULNERABILITY
1.2 Environmental & Cultural Assets

02. TERRITORIAL FITTING
2.1 Integration & Connectivity
- connected to pedestrian/bike routes
- close to bus stops

02. TERRITORIAL FITTING
2.2 Access to Services
- close to key service hubs

02. TERRITORIAL FITTING
2.3 Urban Complexity
- insufficient diversity of urban facilities

04. PLANNING DEMANDS
4.2 Urban Facilities
- diverse facilities in area

04. PLANNING DEMANDS
4.3 Public Space
- significant access to public/green space

05. LOCAL RESOURCES
5.1 Water
- high potential for blue infrastructure

05. LOCAL RESOURCES
5.2 Energy
- low potential for solar, moderate for wind
01. SITE VULNERABILITY
1.2 Environmental & Cultural Assets
- regional parks, forested areas
- UBC farm, botanical gardens,
- Musqueam lands

1.3 Social Vulnerability
- access to housing,
- social isolation, mental health

02. TERRITORIAL FITTING
2.1 Integration & Connectivity
- limited urban edge connections

2.4 Compactness
- surroundings are not compact

03. LAND CONSUMPTION
3.1 Urban Saturation
- small site relative to urban context

3.2 Urban Fix
- potential for site to connect urban areas

04. PLANNING DEMANDS
4.1 Housing
- housing shortages, high costs

05. LOCAL RESOURCES
5.3 Food
- close to farm & on-site potential

5.4 Waste Management
- high potential for closed loop mgmt

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## Ecosystemic Urbanism Certification

### Preexisting Context Indicators
- Site vulnerability
- CTX.01.01 Forest fire hazard
- CTX.01.02 Flooding hazard
- CTX.01.03 Other natural hazards
- CTX.01.04 Chemical atmosphere hazard
- CTX.01.05 Chemical soil hazard
- CTX.01.06 Acoustic hazard
- CTX.01.07 Electromagnetic hazard
- CTX.01.08 Radioactive hazard
- CTX.01.09 Geotechnical and geomorphological conditions
- CTX.01.10 Protection of sites and habitats of natural and / or agrological interest
- CTX.01.11 Protection of elements of cultural interest
- CTX.01.12 Social vulnerability of the population

### Territorial Fitting of the Urban Planning Action
- CTX.02.13 Spatial location of the urban planning action
- CTX.02.14 Urban action connectivity
- CTX.02.15 Proximity to public transport and bicycle network
- CTX.02.16 Proximity to basic services networks
- CTX.02.17 Urban complexity
- CTX.02.18 Absolute compactness

### Land Consumption
- CTX.03.19 Increase of the urbanised area
- CTX.03.20 Type of urban planning action

### Planning Demands
- CTX.04.21 Housing deficit
- CTX.04.22 Basic urban facilities deficit
- CTX.04.23 Green space deficit
- CTX.04.24 Public space deficit

## Existing Fabric Indicators
- 01 Residential density
- 02 Absolute Compactness
- 03 Corrected compactness
- 04 Staying space per inhabitant
- 05 Air Quality
- 06 Acoustic comfort
- 07 Road accessibility
- 08 Road space for pedestrians
- 09 Proportion of the street
- 10 Visual perception of urban green
- 11 Habitability index in the public space
- 12 Proximity to public transport
- 14 Proximity to cycling networks
- 15 Motorized road space
- 16 Proximity to bicycle parking
- 17 Off-road car parking spaces
- 18 Provision of vehicle parking spaces
- 19 Provision of bicycle parking spaces
- 20 Off-road space for the distribution urban freight platforms
- 21 Urban diversity
- 22 Balance between activity and residence
- 23 Spatial and functional continuity of street
- 24 Soil biotic index
- 25 Green space per inhabitant
- 26 Simultaneous proximity to green spaces
- 27 Density of trees
- 28 Urban green connectors
- 29 Energy demand in the residential sector
- 30 Energy demand in the tertiary sector and equipment
- 31 Energy demand in the public space
- 32 Power consumption
- 33 Energy self-sufficiency from renewable energies
- 34 Emissions of Greenhouse gases
- 35 Potable water demand
- 36 Water sufficiency
- 37 Proximity to waste collection points
- 38 Proximity to household waste recycling centre
- 39 Closing the organic matter cycle
- 40 Model integration with adjacent waste management
- 41 Provision of subsidized housing
- 42 Spatial distribution of subsidized housing
- 43 Provision of equipment
- 44 Proximity to equipment

## UBC Ecosystemic Assessment

### Pre-existing Indicators
- CTX 01 Forest fire hazard
- CTX 02 Flood hazard
- CTX 03 Spatial location of the urban planning action
- CTX 04 Urban action connectivity
- CTX 05 Housing deficit

### Current Urban Fabric Indicators
- 01 Residential density
- 02 Absolute Compactness
- 03 Corrected compactness
- 04 Staying space per inhabitant
- 05 Proximity to transportation networks alternative to car
- 06 Motorized road space
- 07 Proximity to bicycle parking
- 08 Off-road car parking spaces
- 09 Provision of vehicle parking spaces
- 10 Provision of bicycle parking spaces
- 11 Urban diversity
- 12 Balance between activity and residence
- 13 Soil biotic index
- 14 Green space per inhabitant
- 15 Simultaneous proximity to green spaces
- 16 Provision of subsidized housing
- 17 Provision of public facilities
- 18 Proximity to public facilities
BCNecologia conducted a preliminary analysis of the UBC Campus using the Ecosystemic Urbanism assessment framework and two contexts: Pre-existing Context Analysis, and Existing Fabrics. The analysis was conducted from December, 2016 to January, 2017, in approximately six weeks. This is a significantly condensed period in comparison to a typical analysis by the agency. Additionally, there were substantial gaps in the data, which limited the scope of the analysis.

In order to conduct the Pre-existing Context Analysis, data was collected at a campus-wide scale and was considered with respect to the Stadium Neighbourhood site. While a complete analysis in this context would include results for 30 indicators, only 5 indicators could be calculated given the time and data constraints. The analysis identified three key areas for consideration. First was site vulnerability to forest fire and flooding. Second was the need to increase access to affordable housing. And finally, the tool suggested a need to increase urban complexity across the campus. No indicators were calculated in the categories of Efficient Land Consumption or Local Resources.

It was also of interest to Campus and Community Planning to understand how an existing neighbourhood at UBC was performing according to the Ecosystemic Urbanism framework. To achieve this, data was collected for a sample area in Wesbrook Village to be analyzed by BCNecologia. Of the 44 Existing Fabrics indicators, results were provided for 18. The results suggested the development was excelling in terms of urban morphology, transportation networks, and public space, but did not achieve ideal levels of urban diversity, access to public facilities, and access to affordable housing. It is important to note that only a portion of Wesbrook Village was analyzed, and therefore these results do not provide a complete picture of the neighbourhood.
At the Stadium Gaming Workshop, participants began by discussing the neighbourhood’s fit into the broader campus context.
Stadium Gaming Workshop

In February 2017, a gaming workshop was hosted to give interested professionals a hands-on introduction to Ecosystemic Urbanism at UBC. A group of 30 academics and professionals from C&CP, SCARP, the University of Montreal, the UBC School of Architecture and Landscape Architecture, the City of Vancouver, DIALOG, and Perkins + Will worked to create two bold plans for Stadium Neighbourhood, while assessing the merits of Ecosystemic Urbanism at UBC. The workshop featured Salvador Rueda, founder of BCNecologia and Ecosystemic Urbanism, who gave a lecture to the participants on the theory and use of the tool.

Day 01
The SCARP student team and partners at C&CP conducted a walking tour of the Wesbrook neighbourhood to introduce Salvador Reuda and his associates, Professor Danny Pearl of the University of Montreal and Suzanne Deschamps to the UBC campus. The afternoon convened all workshop participants for a lecture from Mr. Rueda on the theory of Ecosystemic Urbanism, its indicators, and its data driven approach.

Day 02
Participants were divided in two groups and asked to plan Stadium Neighbourhood based on the principles of Ecosystemic Urbanism. Both teams were provided with minimum targets for land use types and built areas, which were grounded in the theory of the framework and adjusted with respect to the local planning context. Teams were provided with base maps, and a series of gaming pieces, to represent various building typologies, and open and green space typologies.
Team A’s overall vision was to diversify and energize the campus to increase complexity and energy on Main Mall through the addition of commercial services. The design took inspiration from Superblocks being implemented in Barcelona, and proposed a similar built form with mixed-uses at the periphery of campus. The stadium was placed along the eastern edge of the site, with commercial space under the stands to animate East Mall.

### Key Design Features
- One way road access to serve residents
- Main Mall as a greenway connecting the site to campus and Wesbrook Village
- Commons areas on the FP Innovations site with residential and commercial uses included
- Re-design East Mall to reduce street width and provide low rise housing at grade
- Create connections to the Botanical Garden with green linkages
- Create forest “fingers” through the site to foster biodiversity

### Team A Outputs

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Ecosystemic Target</th>
<th>Site Specific Target</th>
<th>Team A Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity and compactness</td>
<td>&gt;100 residential units/ha</td>
<td>140 units/ha or 130,000 m²</td>
<td>1,847 dwelling units</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>168,350 residential m²</td>
</tr>
<tr>
<td>Critical mass of population, activities and facilities</td>
<td>15 to 20% of total built area is non-residential</td>
<td>9,500 m²</td>
<td>24,800 commercial m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>85,600 academic m² = 1,080 jobs</td>
</tr>
<tr>
<td>Proximity to staying space (green or open space)</td>
<td>10 to 15 m² of staying space per inhabitant</td>
<td>54,500 m²</td>
<td>22,500 m² of green space</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16,300 m² of open space = 38,800 m²</td>
</tr>
<tr>
<td>Proximity between housing, work and leisure</td>
<td>15 to 20% of built area is non-residential</td>
<td>62,000 m² of academic and 9,500 m² of other non-residential</td>
<td>24,800 commercial m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>85,600 academic m² = 110,400 m²</td>
</tr>
<tr>
<td>Proximity to green spaces</td>
<td>10 to 15 m² of green space per inhabitant</td>
<td>54,500 m² (includes green and open space)</td>
<td>22,500 green space m²</td>
</tr>
</tbody>
</table>
Team B's overall vision was to increase connectivity across campus by strengthening pedestrian and bicycle linkages through the site to Wesbrook, the UBC Farm, the Botanical Garden and athletic fields. The design proposed an off-site stadium to allow for development of a complete and sustainable community. The design also utilized the sunken site of the existing stadium for underground parking, with underground road connection to 16th Avenue.

Key Design Features
- Towers in close proximity to the transit station (located at East Mall and Stadium Road)
- Sloped topography utilized for a park space with commercial activity at the edge
- Main Mall as a greenway connecting campus to the park, and continuing to Wesbrook Village
- Mid-rise buildings adjacent to green space to maintain views
- Academic uses at key “gateways” to the site

### Team B Outputs

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Ecosystemic Target</th>
<th>Site Specific Target</th>
<th>Team B Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity and compactness</td>
<td>&gt;100 residential units/ha</td>
<td>140 units/ha or 130,000 m²</td>
<td>2,975 dwelling units 270,990 residential m²</td>
</tr>
<tr>
<td>Critical mass of population, activities and facilities</td>
<td>15 to 20% of total built area is non-residential</td>
<td>9,500 m²</td>
<td>9,900 commercial m² 78,330 academic m² = 395 jobs</td>
</tr>
<tr>
<td>Proximity to staying space (green or open space)</td>
<td>10 to 15 m² of staying space per inhabitant</td>
<td>54,500 m²</td>
<td>6,860 m² of green space open space not completed</td>
</tr>
<tr>
<td>Proximity between housing, work and leisure</td>
<td>15 to 20% of built area is non-residential</td>
<td>62,000 m² of academic and 9,500 m² of other non-residential</td>
<td>9,900 commercial m² 78,330 academic m² = 88,230 m²</td>
</tr>
<tr>
<td>Proximity to green spaces</td>
<td>10 to 15 m² of green space per inhabitant</td>
<td>54,500 m² (includes green and/or open space)</td>
<td>6,860 green space m²</td>
</tr>
</tbody>
</table>
designing stadium neighbourhood.
Stadium Design Vision

Stadium Neighbourhood is a truly regenerative community. The neighbourhood enhances connectivity and urban complexity at UBC. It bridges Wesbrook Village, the UBC Farm, the Botanical Gardens and Hawthorne Place into a cohesive fabric. The UBC Thunderbird Stadium has been placed along East Mall to take advantage of the forest edge and the planned rapid transit station.

The neighbourhood has vehicular access only for residents who require it and for commercial service vehicles. The main corridors of the community are all mixed-use with programming that activates and excites the space. Academic, commercial and residential uses are intermingled to foster social connections and knowledge transfer. The community itself is diverse, both economically and culturally, with many gathering spaces. Public spaces take advantage of the natural site elevations and sun exposure.

Key Characteristics

| Site Area | 12.28 ha |
| No. Residents | 3,750 |
| Residential Units | 1,800 |

| Total Built Area | 238,000 m² |
| Residential | 134,000 m² |
| Commercial | 27,000 m² |
| Academic | 62,000 m² |
| Stadium Field | 15,000 m² |
Stadium Neighbourhood is a compact community made up of ground-oriented buildings proportioned to a human scale. The facades of the buildings frame the open space, creating a network of outdoor rooms. This configuration produces a tight-knit urban fabric that mimics pre-automobile development. The clustering of mid-rise buildings creates an intimate environment that maintains visual interest across the entire site.

Key Features
01. The compact urban fabric and associated population mass support a mixed-use, vibrant community
02. Compactness yields proximity, which encourages travel by foot
03. The labyrinthine style of the forms and spaces was inspired by the historic walled city of Lucca, but with improved sight lines
04. Buildings of 4 to 6 storeys enable density while maintaining connectivity between upper storeys and the ground, so that all residents can feel connected to their surrounding spaces
05. All buildings built in wood frame, which sequesters carbon and is less expensive than concrete construction

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Ecosystemic Target</th>
<th>Proposed Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity and compactness</td>
<td>&gt;100 residential units/ha</td>
<td>145 units/ha</td>
</tr>
<tr>
<td>Critical mass of population, activities</td>
<td>15 to 20% of total built area is non-</td>
<td>36% (due to inclusion of academic use)</td>
</tr>
<tr>
<td>and facilities</td>
<td>residential</td>
<td></td>
</tr>
</tbody>
</table>

Building Heights
- 6-storey
- 5-storey
- 4-storey
designing stadium neighbourhood

5-minute walk range
02. Public Space & Habitability

Stadium Neighbourhood emphasizes high quality public spaces at multiples scales. The car-free neighbourhood features accessible and comfortable pedestrian-only streets that link to open, active public gathering places. A large plaza and main retail avenue hug the sports venue to allow for large public gatherings during events and an active commercial atmosphere. Other gathering places are linked with intimate pedestrian paths of varying widths. There is a mix of private and public courtyards, allowing for a mix of quiet, contemplative spaces and open, lively spaces.

Key Features
01. A pedestrian mall modeled after the Pearl Street Mall in Boulder
02. A large plaza provides space for outdoor concerts and public art
03. A mix of courtyard types create calm and intimate spaces
04. Ample parks for playgrounds and community food gardens
05. Narrow streets and local plazas create finer-grain environments
06. Strong sight lines and active uses improve safety

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<tr>
<td>Proximity to staying space</td>
<td>10-15 m² of staying space per inhabitant</td>
<td>16.6 m² per inhabitant</td>
</tr>
<tr>
<td>Habitability in the public space</td>
<td>Maximize: air quality, acoustics and climactic comfort</td>
<td>- Limit vehicle access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Utilize solar gain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Activate frontages</td>
</tr>
</tbody>
</table>

Public Space
- High intensity
- Medium intensity
- Low intensity
Stadium Neighbourhood prioritizes active transportation modes with a continuous network of greenways and active commercial corridors, connected to rapid transit. The streets have restricted access for private vehicles, resulting in reduced air and noise pollution, as well as increased safety. Vehicles are kept to the perimeter with a single underground parking lot, making this the first car-free neighbourhood in the region.

Key Features
01. “Thunderbird” Skytrain Station connects directly to the new stadium
02. A double axis of greenways link Main Mall to skytrain to Wesbrook Village, with all-ages-and-abilities cycling infrastructure
03. Through-traffic and anticipated Autonomous Vehicle drop zones are kept to the periphery of the site, but minimum road widths of 5m within the neighbourhood allow access for emergency vehicles, deliveries, and people with disabilities
04. A single underground parking lot services the community, taking advantage of a topographical depression left by the old stadium

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<tbody>
<tr>
<td>Accessibility</td>
<td>100% of population is within 800 m of rapid transit</td>
<td>All buildings are within 450 m of rapid transit</td>
</tr>
<tr>
<td>Proximity to non-car transportation networks</td>
<td>Create pedestrian- and bike-friendly streets</td>
<td>- All buildings are within 60 m of a AAA cycling route</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The neighbourhood prioritizes pedestrians</td>
</tr>
</tbody>
</table>

Routes
- Primary
- Secondary
- Tertiary
- Car road

King Edward Station
Vancouver, BC

A mixed-use greenway

LSE Central
London Campus
designing stadium neighbourhood

underground parking lot

greenway

< Main Mall

T

^ car road and Autonomous Vehicle drop zone

Wesbrook >
Stadium Neighbourhood features a diverse array of shops, services, businesses and community organizations that create proximity patterns between home, work, leisure and services. This urban complexity reduces the need for off-campus travel and satisfies some of the local demand for jobs. Due to the integrated nature of academic facilities, knowledge transfer between organizations and within the community are increased.

**Key Features**

01. A knowledge and information economy is promoted through the integration of academic uses, concentrated in two sub-areas
02. A diverse critical mass of businesses, organizations, and academia create lively streets and encourage interdisciplinary cross-pollination
03. The daily needs of residents are met within the neighbourhood
04. Retail and service facilities vary in scale across the neighbourhood, in relation to the scale of the streets they front onto

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<tbody>
<tr>
<td>A diversity of land uses and functions</td>
<td>Diversity in types of legal entities (uses)</td>
<td>Encourages development of all necessary facilities</td>
</tr>
<tr>
<td>Proximity between housing, work and leisure</td>
<td>15-20% of built area is non-residential</td>
<td>25% of built area is academic and 11% is other non-residential</td>
</tr>
</tbody>
</table>

**Legal Entities**

- Culture & Services
- Retail & Restaurants
- Transportation
- Academic
- Municipal Services

A student-run cafe at the University of Copenhagen

A small cafe in Copenhagen

The New Lawn timber-built stadium in Nailsworth, England
Stadium Neighbourhood preserves and links the forests that bound the site, ensuring the ecological integrity of these stepping stones are kept intact. This green corridor features native plantings to promote biodiversity and healthy ecosystems. Parks, gardens and other green spaces are connected through a green network. Green spaces are found above ground with community gardens and urban farms on the roofs of most buildings.

Key Features
01. A structured green network connects forests that edge the site
02. Soil permeability is promoted through the use of permeable pathways and surfaces
03. Native plants are used for the benefit of local species
04. All inhabitants are within easy walking distance of green space

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<tr>
<td>Proximity to green spaces</td>
<td>10-15 m² open space per inhabitant</td>
<td>16.6 m² open space per inhabitant, excluding preserved forest</td>
</tr>
</tbody>
</table>
| Biological connectivity    | >15% of roofs are green, with tree-lined biodiverse streets | - All roofs are green  
- All streets include greenery and trees |

Green Spaces
- Ecological corridor
<linkage between existing forests>
Stadium Neighbourhood seeks self-sufficiency in urban ecosystems. This includes green and blue infrastructure such as a bioswale with native species and a stormwater retention pond area. Other features include passive house design, connection to the UBC district energy system and solar panels. Food production is promoted through community gardens and urban farming, and space is allocated for on-site composting and greywater recycling.

Key Features
01. Recycling and composting facilities on-site
02. A bioswale runs the length of the site, collecting storm water and connecting to a park that contains a depressed area for flood retention in cases of severe weather events
03. Solar panels on the tops of some buildings support local power generation
04. Green roofs everywhere improve local food self-sufficiency

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<tbody>
<tr>
<td>Maximize energy, water, material self-sufficiency</td>
<td>Decrease external inputs by increasing on-site capacity</td>
<td>Incorporate best practice technology in all areas</td>
</tr>
<tr>
<td>Mitigation of climate change impacts</td>
<td>Create strategic actions</td>
<td>Daylight bioswale with floor retention pond</td>
</tr>
</tbody>
</table>

Systems Features
- **Bioswale**
- **Flood retention**
- **Food production**
- **Solar array**
- **Waste processing**

A water feature integrated into public space

A park that doubles as flood retention

A roof-top food garden
07. Social Cohesion

Stadium Neighbourhood is a socially cohesive community with people of different cultures, ages, incomes and occupations. There will be a mix of affordable student, staff, faculty and workforce housing constituting 50% of residential units, including a mix of housing models such as co-housing and co-operatives. Stadium Neighbourhood residents have access to community services across the UBC campus, as well as on-site services including two forest kindergartens and a community centre with a public library, recreational space and multi-purpose hall.

Key Features
01. The Stadium Neighbourhood community is diverse and inclusive
02. Stadium Neighbourhood has a mixed and inclusive housing composition with 50% of housing as affordable
03. Key community and cultural services are easily accessible

<table>
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</tr>
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<tbody>
<tr>
<td>Access to housing</td>
<td>&gt;40% of total residential floor area is social housing</td>
<td>50% of residential units are subsidized or co-operatively operated student, staff, and faculty housing</td>
</tr>
<tr>
<td>Citizen participation in urban processes</td>
<td>Ensure influence of citizens in planning</td>
<td>Inclusive planning process begins soon</td>
</tr>
</tbody>
</table>

Social Entities
- Public facilities
- Housing

Services and activities to build community
Spaces for student mingling
A forest kindergarten
reflections.
The application of Ecosystemic Urbanism in the UBC context presents a number of unique opportunities, as well as several limitations. Both opportunities and threats have been organized into key themes, to aid Campus and Community Planning in determining whether to pursue a complete application of Ecosystemic Urbanism in the UBC context.

The Applicability of Ecosystemic Urbanism at UBC

Opportunities

Pedestrians as Citizens
Ecosystemic Urbanism provides a comprehensive, innovative framework for analyzing neighbourhood sustainability. Particularly, there is a strong emphasis on urban complexity and social cohesion with an aim of creating high quality public spaces. This notion of pedestrians as citizens who have a right to the city is a powerful, and unique feature of the tool.

Supporting a Cultural Shift
Ecosystemic Urbanism supports a shift in the way we view and understand urban places. It promotes growth in the knowledge sector over growth in resource consumption and acts to inspire new ways of thinking. This core narrative helps to promote the long-range, systems approach to planning that C&CP is striving for.

Early Adopter
UBC has an opportunity to be an early adopter of Ecosystemic Urbanism in adapting the tool to the North American, and university context for the first time. This both provides a new planning lens with which to develop Stadium Neighbourhood and fulfills UBC’s mandate of “campus as a living lab”.

Limitations

Proprietary and Complex
The proprietary nature of Ecosystemic Urbanism is a significant limitation. The tool is highly complex, and knowledge is closely held by BCNecologia, which means the tool is only usable with the agency’s direct involvement.
Data Limitations
The breadth and complexity of the data required to run the Ecosystemic Urbanism assessment may be prohibitive to UBC’s implementation of the tool as well as other municipalities interested in its use. The tool requires specific, geolocated information that does not currently exist for the campus. The cost and time investment required to collect the necessary data should be carefully considered.

Contextual Considerations
Ecosystemic Urbanism was developed in Barcelona, Spain and is therefore grounded in the region’s geographic, cultural, and political context. To effectively apply the tool at UBC the targets for each indicator would need to be reconsidered to ensure alignment with local policies. Particular consideration must be given to indigenous culture.

Urban Bias
Ecosystemic Urbanism has an urban bias which presents a significant challenge. The tool was developed for a stable, urban population of greater than 50,000 inhabitants, living within a single political jurisdiction. When applied at UBC, the analysis crosses political boundaries which complicates data collection and analysis. Additionally, UBC has a predominantly academic land use, and a population that fluctuates with time of day and season. These factors need to be fully considered for the tool to be adapted to the context.

Longevity and Adaptability
Longevity, adaptability and responsiveness of the framework over time should be considered. Based on available literature, it is unclear how to the tool is adapted to new contexts, or responds to new innovations in technology over time.
Conclusion

UBC Campus and Community Planning has an opportunity to design one of the region’s first truly regenerative communities at Stadium Neighbourhood. By designing a compact, complex, and efficient neighbourhood, the site can be leveraged to connect the campus in its entirety, fostering new partnerships, supporting innovation, and improving human and environmental wellbeing. Ecosystemic Urbanism provides a comprehensive set of principles that can inspire new ways of planning, and can help to support the campus vision of UBC as a living laboratory, where knowledge is currency. Through ambitious and creative planning, UBC can push beyond the dominant narrative of sustainability, and create communities that are truly regenerative, thus playing a key role improving the health of both the campus, and the world.


