

# The Ecological Design of Co-Housing

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# Purpose of Research

The aim of this design study is to propose a specific case of co-housing that expands the term to mean cooperative dwellings of human and non-human residents, creating a greater ecological place.

This design of co-housing should be appropriated to the site as to minimize environmental damage and to enhance what characteristics, qualities and species/beings are present and what could be present (i.e. introducing native species, creating architecture that improves the quality of life of future residents).

# Why this?

- + I see a need to integrate the human environment and nature in development.
- + Far too often nature is seen as stopping development, how can this be changed?
- + Concepts of housing like Co-housing are more sustainable and can give residents more control in their built environment.

# My Background

- + Ball State good design foundation.
- + Denmark studied CoHousing and traveled Europe.
- + Malaysia Internship with Ken Yeang.
- + UT ecological/social housing (current)

Where I am at now

# Why Co-Housing?

- Sustainable, shared resources, lifestyle, socialization, consensus, affordable, time management.
- As many decisions as possible should be left in the individual's lap, because no one knows your interests better than you do. Most of us have gained from this freedom.
- Co-Housing is where residents participate in the design and operations of a community.



Welcome!

The Cohousing Association of the United States

# What's the “So What”?

- Appreciate what we have in terms of “everyday nature”
- Create more sustainable housing, reflecting and embracing nature can bring inspiration and more livelihood.
- Benefits of intertwining nature and human development can be better understood.
- Take ecological design of housing farther than LEED.
- Expanding sustainability past the human condition will create a more sustainable condition

# Previous Research

My investigation is influenced by several related discourses:

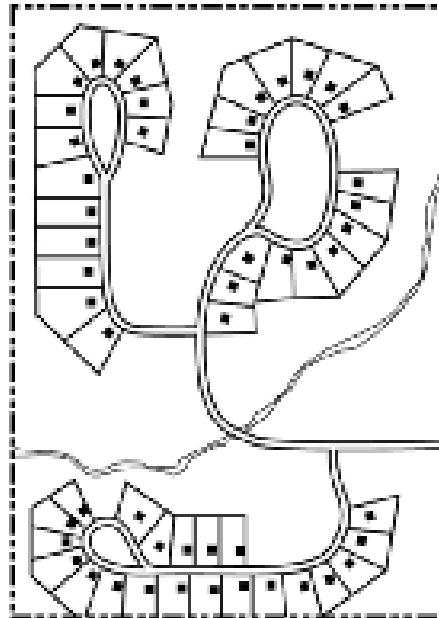
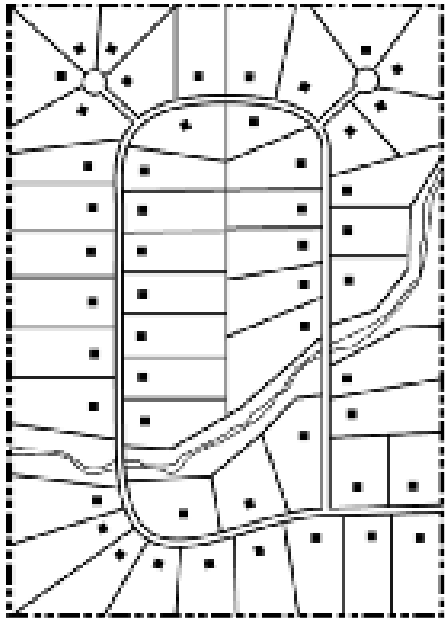
- Green building (LEED)
- Sustainable Architecture (Zeihner, Abalos + Herreros, Yeang)
- Civic Environmentalism (Light, Shutkin, Shannin)
- Co-Housing (Fromm, McCamant and Durrett)

# Methods

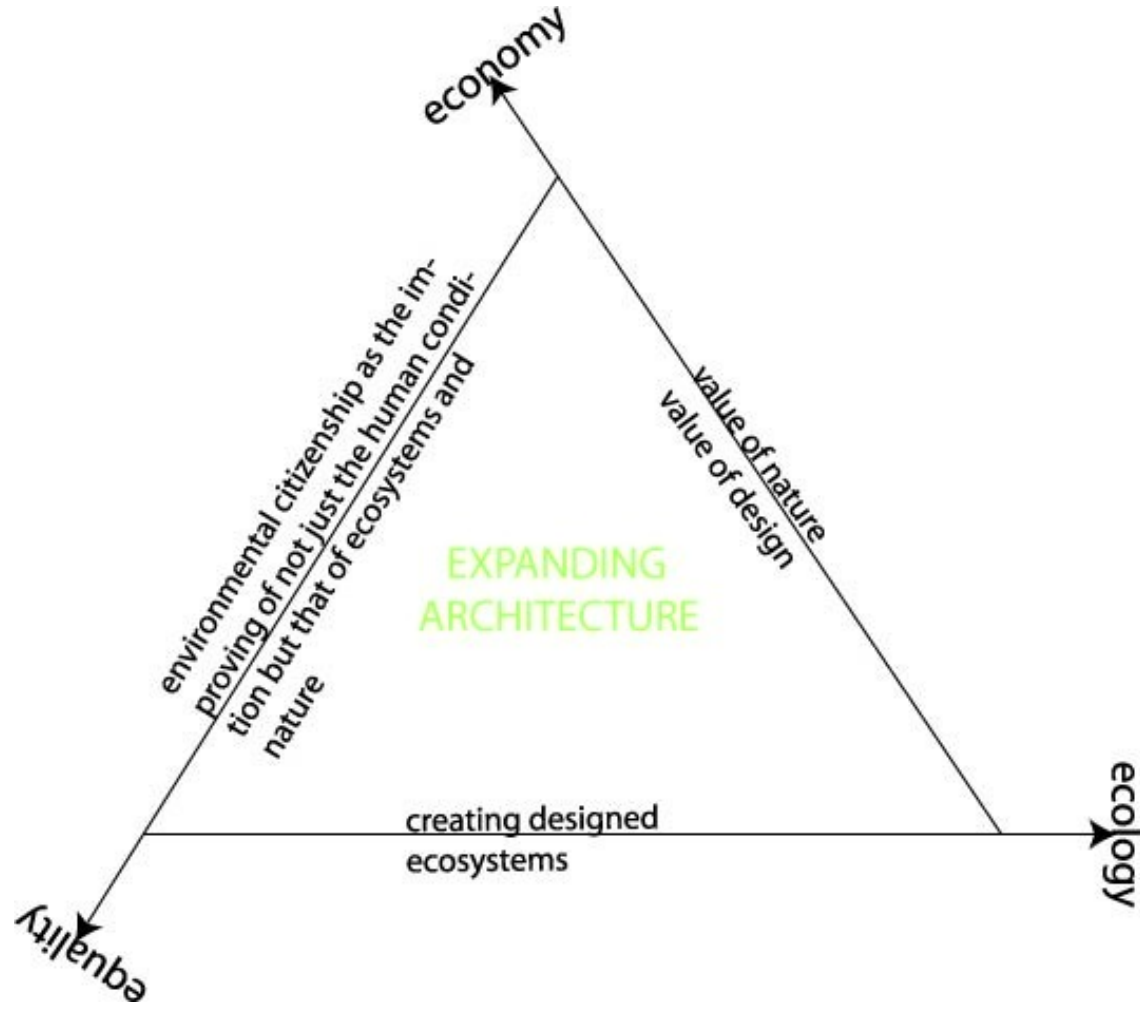
- Review of Literature
- Case Study Analysis (Correlational)
- Ecological Footprint (Quantitative)
- Input from Co-Houser's (Qualitative)
- Graphic Analysis (Critical)

# What will this contribute?

1. To affect building culture in Austin Area.
2. Research has primarily been based on large scales of ecological design and not directly applied to housing, or if done so not in effective scope to include “ecosystem-like structures and systems” that actually increase biodiversity of a locality.



# Triangulate



# Economics

- Low-impact developments reduce infrastructure construction costs by 10 to 33% because of the need to build and maintain conventional storm water structures such as catch basins, gutters, curbs, pipes, and pavement are reduced.
- In Loudon County, Virginia, an American Farmland Trust study found that a residential density of one unit per five acres was approximately three times higher in net **public costs** (water, sewer, fire, police, school, etc.) when compared to a density of 4.5 units per acre

-from: **Greenscaping Residential Communities**

# Ecology

- It takes advantage of the land's contours, natural hydrology, and established environs to create a community with minimal impact during development and more permanent, natural open space at completion.
- Trees also offer shade during the hot summer months, allow warm sunlight during the cold winter months, and provide a sound barrier against noise pollution. Creating a tree windbreak, for example, can lead up to a 10 to 15% reduction in home heating and cooling costs.
- According to the National Association of Home Builders, 15 to 20% of a **property's value** is directly related to its closeness to urban park areas (from: **Greenscaping Residential Communities**)

# Equality

- The endless complexity of intricate connections and conflicts between human and earth economics makes many feel insignificant and powerless. Therefore, it is reasonable to suggest that any participation at the local level is a more productive way of getting involved in environmental action. At this immediate level, individual awareness and will contribute to the power of collective action of a community (Shannin).
- Avoid exclusive focus on idealized notions of preserving the distant wilderness (Shannin).

# Civic Environmentalism

- Civic environmentalism denounces technocratic approaches toward environmental problems which have produced a dichotomy of nature – “*worthy*” wilderness vs. “*unworthy*” urban environment. This is a strong tradition in western intellectualism that takes its roots in Greek philosophy, which affirmed a dualism of mortal body and eternal soul. (Shannin).
- Such dualism has become quite commonplace and it has permeated the world of politics, science and culture. Western society, in general, became trapped in these notions of **polarity**, which have been used to justify inequality, domination, neglect and oppression. For many centuries humankind has seen its destiny shaped by a system of socially constructed relationships – humans vs. nature; (Shannin).
- “the utilization of local institutions over which we (people) have some control, our homes, schools, churches, farms, and locally controlled businesses, as pilot projects of ecological living”. (Shannin).

# Designed Ecosystems

- Native vegetation should be cleared only when necessary and removal should be limited to lot construction, equipment access, and fire protection.
- Green space, such as forests, meadows, wetlands, and riparian corridors, should be preserved to reduce soil erosion, manage runoff, and remove pollutants.
- And because the concept itself is inherently synthetic—linking ecosystem processes with human well being—we have observed in our own research efforts that both physical and social scientists express a willingness to champion ecosystem service related research projects that could support and sustain the ‘decade of synthesis’ vision now being espoused by the network office—from Understanding and Accounting for Ecosystem Goods and Services: Synthesizing Research across the Long-Term Ecological Research Network.
- **Who is designing ecosystems?**

# Precedent 1

The landscape and the building are one and the same, integration of existing site and the new building create a rich architecture and nature.

SeArch Architects



# AESTHETICS

# Precedent 2

## Arcosanti



Arcology is Paolo Soleri's concept of cities which embody the fusion of architecture with ecology. The arcology concept proposes a highly integrated and compact three-dimensional urban form that is the opposite of urban sprawl with its inherently wasteful consumption of land, energy and time, tending to isolate people from each other and the community. The complexification and miniaturization of the city enables radical conservation of land, energy and resources.

An arcology's direct proximity to uninhabited wilderness would provide the city dweller with constant immediate and low-impact access to rural space as well as allowing

COMMUNITY

# Precedent 3

bioclimatic techniques, including daring "vertical landscaping", external louvers to reduce solar heat gain, extensive natural ventilation and lighting.

## Ken Yeang

Yeang's concentration on energy conservation and environmental impact is a radical departure from mainstream architecture's view of the profession as an art form.

Yeang has written, "In practice, architectural design is a craft, and a variable one at that. Post modernism has successfully shown up the volatile nature of this craft by its unrestrained use of architectural symbolisms, its frivolous multiplication of the surface area of the built envelope, its prodigious use of unnecessary building materials, its indifference to engineering economy, its extravagant use of land, and its irrational subservience to whim and history instead of the allocation and restriction of excessive consumption of energy

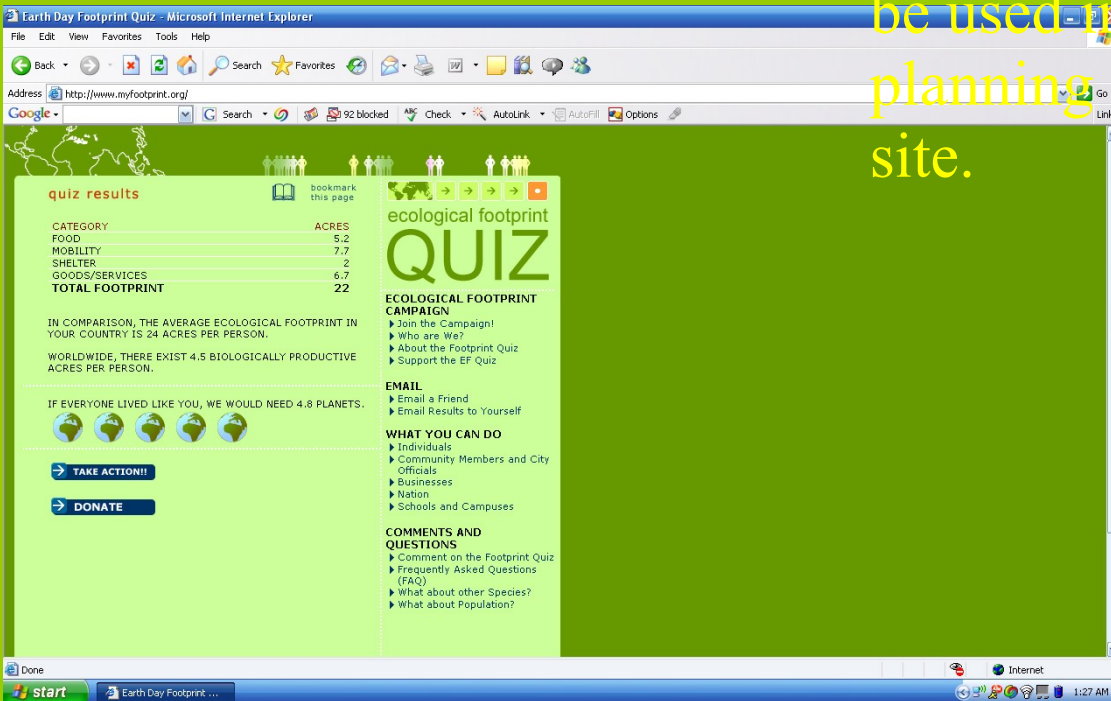
resources."



# INTEGRATION

# Precedent 4

## Ecological Footprint



The measurement of a household's "ecological garden" can account for the bio-productive space needed to sustain the household, this can be used in land and site planning decisions about the site.

The Ecological Footprint is a measure of the amount of nature it takes to sustain a given population over the course of a year. Ecological Footprint analysis suggests whether or not that population is living within its ecological means.

# IMPACT

# Precedent 5

## Abalos & Herreros



- Light, simple, and intense
- Hybrid minimalist and fluid geometries
- How can an architecture that considers this dual approach that is the product of the past be?

NATURALARTIFICIA

I

# HABITAT

- How do I create spaces for non-human residents? What would that look like?
- How does incorporating natural processes help the human development.
- Why should we care about this?
- Combining natural processes and Human Development can be beneficial.

# My world view.

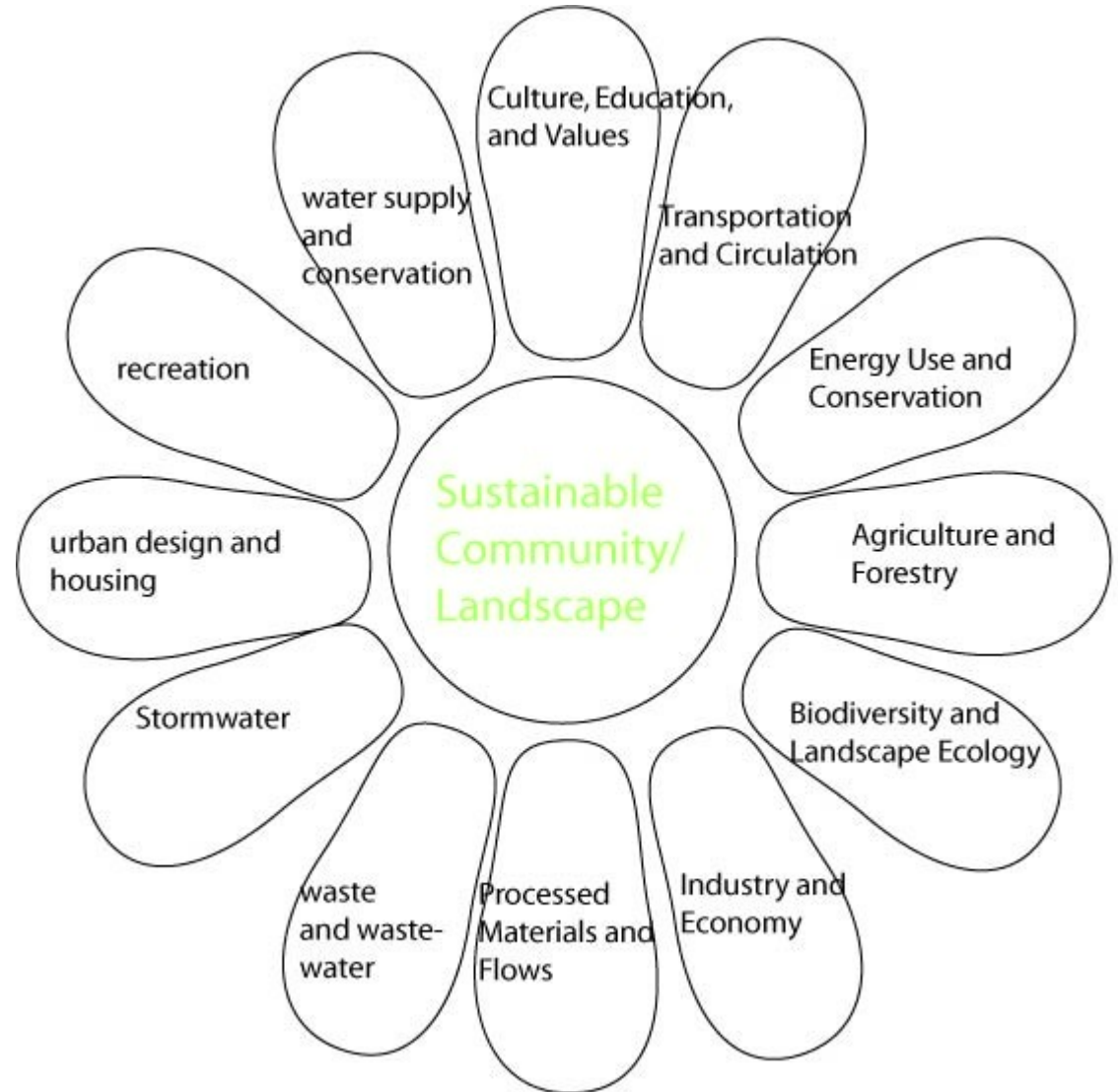
- Within a certain site of existing or proposed human activity, what are the overarching structure, function, and dynamics of the ecosystem enveloping the site?
- Human activity alters what might be considered a “natural” baseline. Although the ecological conditions may change under human influence, knowledge of the baseline is essential to properly design human modifications and adaptations to that ecosystem (from green heart, grey world)

# Anticipated Findings

To create a more sustainable condition you must look at all of these systems.

Each system has potential for disorder and chaos, but design can offer a balanced symbiosis between all these factors.

To be more inclusive than exclusive, by



# Anticipated Critiques

- What do you mean by non-humans?
- You want me to live with the squirrels?
- How do you intend to design for all these aspects/occupiers of the site?
- Other questions?
- What about spirituality?
- Who is designing ecosystems?