Guaya Symbiosis

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Guaya Symbiosis
An Integration of Ecology into the Urban Built Environment and Infrastructure
GUAYA SYMBIOSIS: An Integration of Ecology into the Urban Built Environment and Infrastructure

Request for Approval of Thesis Research Project Book Presented to:

Pegah Zamani

and to the Faculty of the Department of Architecture College of Architecture and Construction Management

By:
Diana Carolina Gil

In partial fulfillment of the requirements for the Degree

Bachelor of Architecture

Kennesaw State University Marietta Campus, Georgia
May 1, 2020
Dedication:

This thesis book is dedicated to my family and the one that found me. There are no words to express how grateful I am for their unyielding love and support. Every single day, without fail, they have been there for me. Without their love, support, and encouragement, I would not have made it this far.

My parents, Alvaro and Ruth Gil, have always been my inspiration. Their passion for life, their never-give-up attitude, and always holding out hope for a better future are lessons I will always carry with me. I will never be able to repay the countless sacrifices they made to make sure I could achieve my dream. Our love, our support, and their belief in me made all the difference.

Thankful for all the amazing friends who have motivated, pushed me to be better, and never let me give up. I am incredibly fortunate to have met the friends I have today because they have gotten me through some of the darkest times in my life. Many of them have become family; they are the ones that kept me going every day. To my girls that always provided relaxing weekends to distress. Mariana, Maria, and Cami, thank you for always being there when I need you the most.

Finally, to my architecture family, we have been through the toughest times together. We have laughed until it hurt, stayed up countless nights together, and learned about each other’s weird sides. Not to mention all the shenanigans we got into. Without you, these past five years would not have become the funny and laughter-filled moments that they did. Even when everything was going wrong, together we pushed through. I truly would not have survived this without you guys. We made sure no one got left behind and we stayed together. Also, thank you for always helping me finish, pin up, or print whatever it was you were always there for me. You guys are always there for me and I’ll always be there for you because there is always a point.

Acknowledgments:

This project would not be where it is without the advice and guidance of my advisor Pegah Zamani. She helped me get through many bumps along the way and throughout this whole process, she remained a constant source of support and honesty. Without her, I would have never stayed on track. She always focused and determined.

Lastly, I would not have accomplished my professional degree without the guidance of the faculty and department at Kennesaw State University. Thank you to all of my professors throughout these five years for challenging me and encouraging me to work hard.
Guayaquil, an Ecuadorian city with a population of nearly 3 million people, located 2 degrees from the equator, west of the Amazon rainforest, and perched between the Guayas River and the Pacific Ocean. Guayaquil is a unique place with the most biodiverse environment in the world. In the 1980s, Guayaquil saw an unprecedented growth, leading to improper city planning. In just 15 years the population went from 300,000 to 3 million. Uncontrollable urban sprawl has caused a drastic divide between city and ecology—the Guayas river acting as a clear axis. Guayaquil is consistently flooded, contaminated, and overrun with pollution. Legal and illegal settlements alike populate over 100 sq.mi of land, disregarding the already existing resiliency measures that should have been preserved. Water in the city is now a health risk to its citizens, requiring them to boil any water used for cooking or drinking. Crime has increased and the infrastructure lacking in areas as it relates to the urban sprawl. Coastal cities are often seen as examples of how not to build and what not to do. In Guayaquil, the city’s growth and success over time, mostly marked by the Guayas River and the built environment, are causing a physical and psychological pressure to the city’s residents. What if we could integrate micro ecosystems to improve the quality of life, reduce health risks, and begin to heal the environment? My thesis will focus on three areas in Guayaquil customizing nodes in which micro ecosystems can arise. Integrating endemic species as catalyst will create a mutually benefitting system, greatly improving the quality of life and revitalize its endangered flora and fauna. This would facilitate the city’s growth and success over time. A Symbiotic city, which grows with its surroundings and is all inclusive.
Guayaquil, the most populated city in Ecuador, has heavily relied on quick expansion and urban development to accommodate its growing population. Quick urban development has led to the disregard of many essential factors such as water sanitation, maintenance of habitats, and creation of natural spaces. The considerable climate factors are creating challenges that were not examined prior to development. With almost a quarter of Ecuador’s population living in poverty, the economic wellbeing of families is prioritized and the desire for green community spaces are not often considered. Therefore, the project’s main objective will be to develop green urban spaces to both rehabilitate the Guaya River’s edge and the quality of life for Guayaquil’s inhabitants. The lack of these spaces has created multiple issues, and most importantly, it has negatively impacted population health. Urban sprawl has severely contaminated or destroyed five of Guayaquil’s surrounding ecosystems including the Guaya’s River, wetlands (humedales), and dry forest (bosque seco) ecosystems.

The thesis places importance on the use of native vegetation (rather than outsourcing from other countries) and utilizing it in a wider spectrum. Currently, around 95% of the plants cultivated in Guayaquil’s parks, flower beds, planters and avenues are introduced species, meaning they originate from another country. New green urban spaces should show off the uniqueness of its biodiversity and become a cultural focal point that generates a sense of pride and awareness.

The map above shows the numerous amount of biodiversity hotspots that exist worldwide. Biodiversity Hotspots are created when a region with a high amount of biodiversity experiences habitat loss by human activity. The region must contain more than 1,500 endemic species and have suffered minimum of 70% loss of its original habitat.

Today, there are 24 Hotspots. The destruction of these habitats is a growing concern because about 50% of all vascular plants are endemic to a hotspot.

**Research Questions:**

- Can the integration of nature in the urban context lead to rehabilitation of lost habitats?
- Can being intentional with vegetation placement create unique spaces to experience?
- Can nature (plants) be used as an architectural form to design?
1.2 Thesis Relevance

The aim of this thesis is to address current climate change and how it impacts vulnerable developing cities. Over half the world’s population lives closer than 3 km to a natural source of water. Our proximity to sources of water has led to severe contamination. Some cities struggle with maintaining drinking water. Exposure to infected water has detrimental health outcomes for communities. Reducing water runoff can limit the amount of contaminants in bodies of water. Factors such as pollution are evident in projects around the world that focus on sustainability and implementation of green walls. Poor city planning can lead to habitat depletion which contributes to the weakening of ecosystems, health of the planet and quality of human life.

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**ECUADOR**

Ecuador is uniquely located two degrees below the equator. The temperature yearly only varies 15 degrees. May to September being its slightly cooler months.

Annual rainfall of up to 268 cm at its highest months and as little as 20 cm during its dry months. May to September is the heaviest rainfall seasons.

45% of the Ecuadorian territory is part of the Amazon, with many diverse habitats. Amazon of Ecuador is but 1.5% of the total area. The Amazon rainforest but that small percentage has the highest amount of species diversity.

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**GLOBAL**

Temperature

Vegetation

Rainfall
The growing coastal economy and banana cultivations attracted many migrants to Guayaquil in the 1950s.

From 1950 to 1974, Guayaquil experienced a significant population boom from people migrating from other regions of Ecuador. By 1982, Guayaquil had become the most populated city of Ecuador, surpassing the capital city of Quito. The large influx of migrants and lack of planning led to squatter settlements (suburbio), residences developed along the Guayas River.

Communities in the squatter settlements faced poor sewage maintenance from city officials which caused regular flooding.

The Churute Mangrove Ecological Reserve was created on July 26, 1979, to protect three important ecosystems: the Laguna El Canclón, the Cordillera de Churute and mangroves.

Since 1987, La Segua management plan has become one of the main working tools for the conservation and administration of both the wetland and the natural resources associated with it.

The Red Book of Endemic Plants in Ecuador was published. It looks into the 78% of endemic plant species in Ecuador that are threatened to some degree, and 32% that are at serious risk of extinction due to deforestation and habitat alteration.

The Green Project Ecological Foundation (Fundación Ecológica Proyecta Verde) aims to promote ecological conservation, mitigation and adaptation to climate change and sustainable management of natural resources in the Ecuador area.
Ecuador Overview

General Information

Ecuador may seem small but what it lacks in size it makes up for in biodiversity. It is split into 3 geographic regions, Litoral (Costal), Interandina (Andes), and Amazonica (Amazon). About 40% of the territory is part of the Amazon region. Part of which remains unexploited to our knowledge because the jungle becomes too dense and even dangerous. Another part was exclusively given to the many indigenous tribes that live there in the Andes region, which acts as a clear divide between the Atlantic and the coast. Quito, the capital of Ecuador is found here and where the equator splits the country between the northern and southern hemispheres. The coastal region is where most of the population is located, specifically Guayaquil. Ecuador is so uniquely located that it is one of the richest when it comes to species diversity. Its endemic species are even more important because they can only be found in Ecuador. Its location in regard to the equator means the country gets an average of 12 hours of daylight. The richness this country has in nature it lacks in urban development. 64% of the population lives in an urban area and this number continues to increase because of the lack of employment in the rural areas.

Population Growth in Guayaquil: 1950 - 2010

- Population in 2019: 17 million
- 78% of Ecuador's protected areas are found in the Amazon region.
- 42% of the species found in Ecuador are endemic.
- Aerial plants are not grown in the ground, instead they grow vertically with the help of bees, hummingbirds, and butterflies, another species part of the Bromeliad family are the carnivorous plants known to trap flies and other small insects, which could be beneficial.

Fig. 14

Fig. 15

Fig. 16

Fig. 17

Fig. 18

Fig. 19
1.5 Causes & Impacts

Contaminated Drinking Water

It has become customary to boil any water used for drinking prior to consumption. The reason for this is because many people have gotten sick after drinking from the tap. Water is often unreliable because of the poor sanitation regulations as well as the uncontrollable pollution to large bodies of water such as rivers and lakes.

Poor City Planning

So much can go wrong when a city is not properly planned and so much has gone wrong. Many large metropolitan cities are facing one or all these pollution issues. Due to its large populations it becomes difficult to keep up with the always growing city. People are moving to cities faster than proper development can handle. Often time in third world countries all that matters is what will it cost. Not realizing the true cost will be much greater when trying to fix pollution issues. Poor transportation or road system lead to traffic which leads to air pollution. Cities with out parks, green space, and dense population tend to be hectic and noisy causing noise pollution. Water pollution often the most common because a large number of metropolitan cities are located near rivers, lakes, and oceans. Contaminated drinking water can be a problem leading to large amount of pollution and in some cases to severe that it begins to affect the quality of life of its citizens.

WATER POLLUTION

Water pollution is the contamination of water bodies, usually as a result of human activities. Water bodies include for example lakes, rivers, oceans, aquifers and groundwater. Water pollution results when contaminants are introduced into the environment that cause adverse changes in the environment and health hazards.

Impacts to Human Health

Air pollution occurs when harmful or excessive quantities of substances are introduced into Earth's atmosphere. Sources of air pollution include gases, particulates, and biological molecules.

Noise pollution, also known as environmental noise or sound pollution, is the propagation of noise with harmful impact on the activity of human or animal life. The source of outdoor noise worldwide is mainly caused by machines, transport, and propagation systems.

Thermal pollution, sometimes called “thermal enrichment,” is the degradation of water quality by any process that changes ambient water temperature. A common cause of thermal pollution is the use of water as a coolant by power plants and industrial manufacturers. Other causes of thermal pollution include soil erosion.

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Water Runoff

The largest cities in Ecuador are severely lacking proper drainage networks. Whenever there is large enough down pour large urban cities tend to flood. The lack of permeable surfaces forces the water to drain into creeks or streams. As the water moves through the city, it begins to drag with it all kinds of contaminants. Untreated city runoff can be considerably dangerous to local ecosystems.

Poor Sewage System

Lack of proper development of sewage system throughout the city has lead to one of the main source of pollution to the ground water. In the lower income or illegally settled areas there is no sewage system and most of the waste goes into dug out canals that run directly to the river.

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Green Infrastructure

The benefits of green infrastructure have helped rejuvenate areas in a city otherwise abandoned. The benefits have been so evident that cities around the world have begun incorporating this type of infrastructure. The perks to green infrastructure apply to both the city and the natural environments. This is the end goal of this thesis. A design that incorporates nature within the urban context to heal and rejuvenate key areas that lead to a new way of life. Further analysis will help identify these areas, as well as, figure out the scale required for each. An urban park for example would bring in the involvement of an entire community. This community will then set a new standard for surrounding areas.
1.6

**Vertical Gardens**
Gardens that are often supported with posts, fences, trellises, and walls allowing for vertical growth.

**Green Roofs**
A roof covered with vegetation, often used to optimize energy conservation for a building.

**Parks/Gardens**
A space with ornamental plants, trees, and shrubs to create public recreational areas.

**Tree Canopy**
A natural covering created by leafy upper branches of trees.

**Bioswales**
A channelled trench that receives rainwater runoff and uses vegetation to filter out pollutants.

**Permeable Pavement**
A type of pavement with high porosity that allows water to pass through it into the ground below.

**Rain Gardens**
A garden formed on a natural slope to temporarily hold and soak in rainwater runoff from a site.

**Green Streets**
A stormwater management design created to slow, filter, and cleanse runoff from impervious surfaces.
2.1 Precedent Analysis

**Parques del Rio**

Parques del Rio or Medellin River Park was developed by Corkery Consulting, Diana Wiesner Arquitectura y Paisaje, and Gustavo Restrepo in 2016. The project's focus is to create a sustainable urban drainage system that allows retention and mitigation of floodwaters, mainly in the areas with extensive paved surfaces and buildings. The hydrological mesh is integrated with the public open space to increase connectivity and enhance the experience of socializing, exercise, and learning.

**Cheonggyecheon River Park**

The Cheonggyecheon Stream Restoration Project was developed in 2005 by SeoAhn Total Landscape in Seoul, South Korea. This project was created in response to improve the connectedness between the city's north and south sides. Its construction provides flood protection and improves overall biodiversity for plant, bird, and fish species. It also reduced small-particle air pollution by 35%. Before the restoration, residents close to the stream were more than twice as likely to experience respiratory diseases than residents in other parts of the city.

**BIODIVERSITY**

1 2 3 4 5

**MATERIALS**

1 2 3 4 5

**SOCIAL**

1 2 3 4 5

**ENERGY**

1 2 3 4 5

**WATER**

1 2 3 4 5
In 2012, Grant Associates developed Gardens by the Bay in Bedok South, Singapore. The Gardens extend into three garden districts and draw inspiration from the country’s horticulture. The plan uses an intelligent environmental infrastructure which allows endangered plants, which could not normally grow in Singapore to flourish. Sustainable energy and water technologies are embedded within the Supertrees and are integral to the temperature control of the Cooled Conservatories.

**Cloud Forest**
Singapore, Singapore

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2.1

Orquideorama
Medellín, Colombia

In 2006, architects Felipe Mesa, Alejandro Bernal, Camilo Restrepo and J. Paul Restrepo developed Orquideorama in Medellín, Colombia in homage to Colombian botanist José Jerónimo Triana. This installation shows the harmonious cohesion between artificial and organic materials. Each “flor-árboles” (flower-trees) is composed of a steel trunk and pine wood woven petals. The plants beneath each trunk are sustained by funneled rainwater collected by the petals.

Biodiversity
Materials
Social
Energy
Water

Fig.49
Fig.50
Fig.51
Fig.52
Fig.53
Fig.54
Fig.55
Fig.56
Fig.57

Bamboo Theater
Lishui, China

The Bamboo Theater in Lishui, China was developed by DnA Architects in 2015. In China, bamboo can be found in many hilly regions of the country. Bamboo is fast growing and low maintenance which facilitates the upkeep of this structure. On a yearly basis, young bamboo sprouts are woven into the dome and the old poles are removed.

Biodiversity
Materials
Social
Energy
Water

Fig.58
Fig.59
Fig.60
Fig.61
Fig.62
Fig.63
Fig.64
Fig.65
Fig.66
Fig.67
2.2 Guayaquil Overview

Currently, Guayaquil is the most populated city in Ecuador. The city's population is just over 2 million people. It is located in the Guayas province within the coastal region of the country, just two degrees from the equator, west of the Amazon Rain Forest, and perched between the Guayas river and the Pacific Ocean. In the late 1980s, Guayaquil saw unprecedented growth that led to improper planning of the city. In 15 years, the population went from about 200,000 to 2 million, which is 10 times more people in less than 2 decades. Unfortunately, the uncontrolled urban sprawl has caused a drastic divide between the rich and the poor—traditionally the Guayaquil poor live in close proximity to the poor and often with pollution, legalized and illegal settlements alike populating over 100 square miles of land, disregarding the already existing resiliency measures that should have been preserved.

Guayas River

Guayas River is the largest port in the country. The river is born with the merging of the Daule River and the Babahoyo River. The Guayas then leads to the estuary where the river meets the salt water of the Guayaquil Gulf.

Mangroves

A portion of the mangroves are protected in the southern region of the city, but not west of the city where smaller streams flow in and out of the Guayas River. The area mainly contains the mangrove tips, mangrove edges, and mangrove edges, which are the boundaries between the land and the water, making it a rich and diverse ecosystem.
2.3 Catalyst Sites

AQUARELA DEL RIO

LA BAHIA

XIMENA

POLLUTION

WATER

AIR

NOISE

STRUCTURES

WOOD

CONCRETE

STEEL

BAMBOO

OTHER

TYPOLOGY

COMMERCIAL

RESIDENTIAL

INSTITUTIONAL

PARKS

CLIMATE

FLOODING

LANDSLIDES

EARTHQUAKE

ISLAND HEAT
Site Selection

Ximena

This Parroquia (neighborhood) was selected because it is the most likely to benefit from final proposal. This community is located near the water but is not as trafficked as the Guayas river. This connects to the protected wetlands towards the southwest side of the city. Far enough to not be constantly disturbed by everyday city activities but close enough to draw attention. It also sits on a four way river cross so the other neighborhoods will also be viewable. The site lies on the outskirts of the city. There is a clear path through the road network extending the site to a main highway allowing easy access from other parts of the city. The site is heavily residential and could use an open space to relax close to home. It could potential create more commercial businesses and have the most economic impact. Most of the residences here do not use air conditioning so rely on passive cooling and other methods.

Water Levels

The amount of rain the city receives varies but it usually rains often. July to September being its driest months of the year. March is the highest with an average of 1.9 inches. 9 months out of the year the area receives a vast amount of rain causing flooding in multiple parts of the city. A city that is only 8m above sea level.

Circulation

All the roads are in poor conditions. Most barley have 3ft of sidewalk. The are no bike paths and no public transit in this area. Taxi is the most likely alternative to getting around. This site is not pedestrian friendly at all. No street lights. Many of the streets are not continuous and drivers likely have to make multiple turns back to back. There is no clear road grid.

Typology

About 85% residential, 10% commercial, and 5% institutional. In the city it is common to turn the first floor into an informal business area because family do not have enough to rent spaces and most are in downtown. This would require travel in car or public transit. Here the common household would not be able to afford a car and public transit does not reach every part of the city.
3.1 Design Fundamentals

This area of development will first need to develop and identify key elements that will be used for the final design proposal. To the right a few ideas came to mind on how certain areas might look. The diagram shows all the elements that if possible need to be incorporated into the design.

**DESIGN ELEMENTS:**
- Low
- Medium
- High

**PROGRAM:**
- Boardwalks
- Event Space
- Commercial

**WATER:**
- Control Flooding
- Water Collection
- Permeable Surface

**ECOLOGY:**
- Urban Reclamation
- Urban Agriculture
- Natural Restoration

**EARTHWORK:**
- Balanced Cut & Fill
- Bank Stabilization
- Terraces

**EDUCATION:**
- Culture & History
- Sustainability
- Preservation

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**Low**
- Land Fill/ Removal
- Heavy Vegetation
- Low Human Contact

**Medium**
- Bridge/ Crossings
- Paved Pedestrian Paths
- Mixed Vegetation

**High**
- Permanent Structures
- Ornamental Vegetation
- Constant Human Contact
### Bamboo

Bamboo is strong, flexible, easily renewable and cheap. Its elastic structure make it a better choice for regions that suffer from earthquakes. Bamboo grows very fast which make it easily renewable. It is commonly found in Ecuador and often use in construction.

### Wood

Wood is not often used in Ecuador other than for doors, windows, detail framing and such. It is a sustainable material because it can be reused or recycled for other purposes. So it could be used as temporary structures within the site.

### Natural Materiality for Site

- **Wood**
- **Bamboo**
- **Clay**

This is the most commonly and widely used material. Brick is highly energy efficient and has a long life span in comparison to other materials. It could be implemented anywhere hard surfaces are required for the design.
Flora

Home of over 25,000 species of plants. 42% of them endemic to Ecuador. Aerial Plants are not grown in the ground, instead they grow on tree branches high above the ground. Many of these types of plants rely on pollinators to survive. For example, orchids are known for attracting bees, humming birds, and butterflies. Another unique bromeliad species is the carnivorous plant. These plants feed off of flies, mosquitoes, and other small insects.

Along with its widely diverse ecosystems, Ecuador is in fifth place with the most amount of endangered species of birds. Even with conservation attempts species decline is evident with 108 endangered and 7 critical. Ecuador registers 1,619 species of birds, a high quantity for the size of the territory. The country is so uniquely located that it has one of the highest number of endemic species in the world.

Fauna

Emergents

Canopy

Below Canopy

Ground

Below Surface

3.3 Flora and Fauna
Program Development

Urban Eco Park

The program begins to set the limits on which the design will behave. The kind of activities that will successfully drive the community’s engagement. While keeping in mind the main elements. In this case is to give a community a natural sanctuary. To create a place that feels like an escape to nature. Design specific zones in which the community can engage in without harm to the new ecosystems. Design areas that will limit large gatherings and only allow for nature to occur and be observed and experienced. By one at a time. This process will help identify prominent visual spots and likely interactions. These interactions are likely to be at a further distance. This way preserving the natural experience and the site.

**Urban Eco Park**

**GATHERING SPACE**

**PLAY**

**EDUCATION**

**COMMERCE**

**WATER FEATURES**

**NATURAL ZONES**

**Biodiversity**

**Social**

**Energy**

**Materials**

**Water**

**URBAN ECO-PARK**

**DESIGN EVOLUTION**

**GATHERING SPACE**

**Public Gardening**

**PLAY**

**Open Theater**

**Family Playground**

**Children Playground**

**Open Field**

**NATURAL TRAIL**

**Temporary Commercial Collection Areas**

**Filtering Areas**

**Picnic Areas**

**WATER FEATURES**

**Temporary Flood Areas**

**Irrigation**

**Mangroves**

**Forest**

**URBAN ECO-PARK**

**COMMERCE**

**GATHERING SPACE**

**Public Gardening**

**PLAY**

**Open Theater**

**Family Playground**

**Children Playground**

**Open Field**

**NATURAL TRAIL**

**Temporary Commercial Collection Areas**

**Filtering Areas**

**Picnic Areas**

**WATER FEATURES**

**Temporary Flood Areas**

**Irrigation**

**Mangroves**

**Forest**
Initial Ideas

GATHERING SPACE

1. Natural Theater

2. Nature Pit

3. Nature Pit Temporary Flooded Pit

4. Open Theater

5. Family Playground

6. Children Playground

NATURAL TRAIL

1. Open Field

2. Permanent Pathway

3. Temporary Commercial Pathway

4. Permanent Pathway Through Park

5. Nature Path

WATER FEATURES

1. Temporary Flood Areas

2. Picnic Areas

3. Inclined Benches

4. Picnic Area

5. Bamboo Pathway

6. Natural Theater

OBSERVATION PATHS

1. Covered Path

2. Covered Path

3. Covered Path

4. Covered Path

5. Covered Path

GATHERING SPACES

1. Covered Pathway

2. Covered Pathway

3. Covered Pathway

4. Covered Pathway

5. Covered Pathway

6. Covered Pathway
The Scope will begin to determine how much of the new environment created should be built versus left natural or a combination of both. It’s important to find a balance in which both sides can further grow and support each other. The vegetation could start by connect diverse points of the city to one another. Create a city the values nature, instead of social standing. The culture once valued nature and could do so again if the city remember the beauty of it.

A: Urban Park  
B: Street Reconditioning
4.3 Urban Ecu Park

- Open Field
- Nature Outlook
- Bamboo Pathway
- Terraced Bank
- Faux Canopy
- Fountain
- Home Relocation
- Mangrove Edge
- Enclosed Bamboo Pathway
- Nature Pit
- Nature Theater
- Playground Area
- Picnic Area
- Temporary Pop-up Shops
4.3

- Elevated Walkway
- Terraced Bank
- Faux Canopy
CONCLUSION
El Malecon de Guayaquil and El Paque de las Iguanas are examples if the few urban parks within the city. Today both these parks are the most popular as well as a tourist hotspot. The iguana park is exactly that: a park filled with iguanas. Perfect example that parks that include nature tend to thrive. At least in this city they do, so if more parks like those were developed the city would soon discover nature’s true value. Soon enough there could be a park in a mile in any direction.

Avenida 9 de Octubre is the singular most popular road in Guayaquil. It is impossible to visit and not drive through there. Usually highly trafficked but also used during festival season. With huge parades proudly displaying the city’s culture. If this avenue is popular, one with a beautiful tree canopy that blooms every year could be spectacular. Jose de Cuerda could be one of the most popular avenues connecting one side of the city to the other.

SoHo 360 is the first multipurpose building in the city. It is important that the city stop sprawling outwards. The next steps is to densify parts of the city to allow more people but in less space. Work on the elimination and relocation of illegal settlements. This would allow ecosystems like the wetlands to thrive again and reduce pollution. Not all residence will look like this but individual homes could become complexes of 3-4 stories, the incorporate sustainable design.
5.2 Reflection

In 50+ years I wish to find a new city. A city culture redefined to value and nourish its natural environments. Every building showing off its unique facades with thousand of plants covering every inch. Every street an array of colors with equally vibrantly colored birds flying from one flower to the next. Parks that feel more like a forest or jungle rather than a city. Thousands of trees shading from the intense heat and the water collected evaporating to cool the air. Thousand flying to see the tropical city and its one of a kind beauty. New generations getting educated on the thousands of endemic species and their significance. A respect for each other that with the passing of time is only strengthened. A city that grows with nature and not apart from it.

It is important to remember cities are very harsh environment the destroy as it grows. We have learned that there are ways to grow as a city and to grow along side to nature. It has become increasingly important to design sustainable because our environments are on the brink of collapse. We can easily be blinded by the chaos in our lives and forget that every choice and every action we make could make the difference to create change. Cities are chaotic and stressful enough. You can see it on the personas face racing by you. Hear it in the voice of the person taking your order feel it as your own heart paces. A day in any city is filled with stressors and you can even unconsciously pick up on others anxiety. There needs to be a relief. A counter stressor so to speak. Imagine a city where you could walk 2 blocks and finds an oasis to escape and relax in. It is about starting small like a seed and letting it grow with time.
LÍNEAS NATIVAS FLORES DE ECUADOR: ¿ESTÁS RÍTICULO? ¿CÓMO MANTEN NÁTIVAS FLORES DE ECUADOR? A.1


Cajal, Alberto, and Alberto CajalLicenciado en Magisterio. “Flora y Fauna De Ecuador: MOLUSCOS+Y.pdf/faffe57e-86cf-4eb4-ab56-1364e8673bf0


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Figure 1: "Chapter -2- Biodiversity; Environment and Disaster Management - IAS/UPSC UPSC Notes: Edurev." Edurev.In. https://edurev.in/studytube/Chapter--2--Biodiversity--Environment-and-Disaster-Management.


Figure 4: "Water Pollution Detector". Skyfilabs.com. https://www.skyfilabs.com/project-ideas/water-pollution-sensor.


Figure 16: "Water Pollution Detector". Skyfilabs.com. https://www.skyfilabs.com/project-ideas/water-pollution-sensor.


“People often forget that life begins with plants”

“Las personas se olvidan que la vida empieza con las plantas”