



## University of Miami Lakeside Village Methods

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This investigation was conducted as part of the Landscape Architecture Foundation's 2021 *Case Study Investigation (CSI)* program. CSI matches faculty-student research teams with design practitioners to document the benefits of exemplary high-performing landscape projects. Teams develop methods to quantify environmental, social, and economic benefits and produce Case Study Briefs for LAF's *Landscape Performance Series*.

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The full case study can be found at: <https://landscapeperformance.org/case-study-briefs/miami-lakeside-village>

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## Environmental Benefits

- ***Captures, infiltrates, and evaporates an estimated 59% of average annual rainfall with green roofs and rain gardens.***

**Method:** In order to quantify how rainfall is captured, infiltrated, and/or evaporated, a hydrological model was created using construction documents and the EPA’s National Stormwater Calculator (SWC) software. To utilize the model, estimates are based on local soil conditions, land cover, historic rainfall records, in addition to user-supplied data for land cover and low impact development (LID) controls employed. The 12.4-acre site was designated as pervious or impervious land. The total impervious areas of lawn, desert, forest, and meadow were calculated using the original construction documents. The green roofs and rain gardens were input into LID controls under impervious surfaces.

**Calculations:** The model results from the National Stormwater Calculator were used to determine the percentage of average annual rainfall captured, infiltrated, and evaporated on-site through LID controls: green roofs and rain gardens.

Annual Rainfall: 64.05 in

Runoff: 26.24 in

$(26.24 \text{ in}/64.05 \text{ in}) * 100 = \mathbf{40.97\%}$

Infiltration & Evaporation:

$64.05 \text{ in} - 26.24 \text{ in} = 37.81 \text{ in}$

$(37.81 \text{ in}/64.05 \text{ in}) * 100 = \mathbf{59.03\%}$

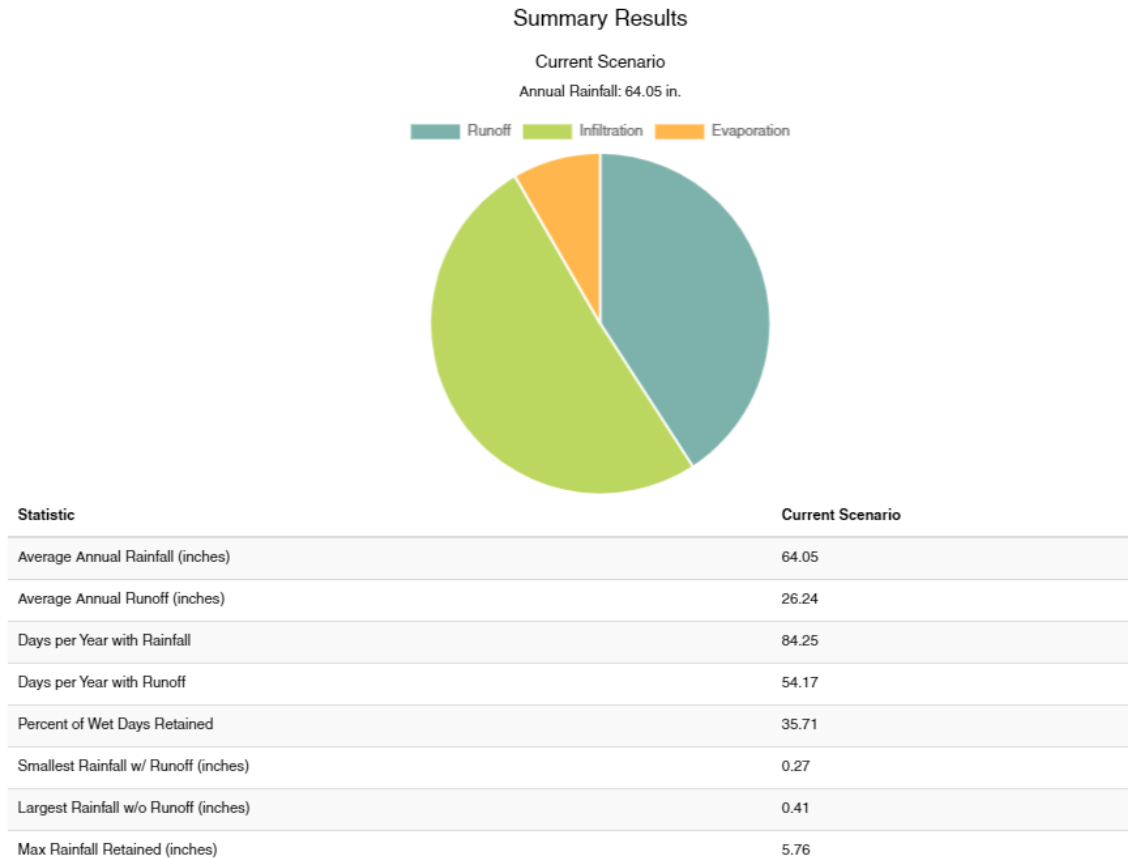


Figure 1: Final results as shown in the National Stormwater Calculator.

For more details about the calculations check **Appendix A**.

**Sources:** "National Stormwater Calculator." EPA. Accessed May 16, 2019.  
<https://swcweb.epa.gov/stormwatercalculator/location>

Construction document data provided by the landscape architect (ArqGEO).

**Limitations:** The National Stormwater Calculator does not take into account tree canopy interception of rainfall for the site.

- **Increased species richness, with a 265% increase in the number of plant species from an estimated 20 species to 73 species.**

**Method:** To calculate the estimated plant species diversity before construction the research team utilized Google Earth imagery and street views from 2017. In addition, the team gathered information from similar parking lots nearby (used to calculate other benefit calculations) to estimate the original species diversity of the site.



Figure 7: Google Earth Pro image of site in 2017 prior to the construction of UM Lakeside Village. The team utilized this image, and others, to compare the areas of lawn and planting to the areas of lawn and planting currently on the site.

The team used construction documents, planting plans, and hardscape plans to calculate the planted and lawn areas after the site was constructed. The plant list, provided by the landscape architecture firm, provided information about plant species and quantities.

Plant List			
Trees			
<i>Scientific Name</i>	<i>Common Name</i>	<i>Quantity</i>	<i>Caliper (inches)</i>
<i>Annona glabra</i>	Pond Apple	1	5"
<i>Bursera simaruba</i>	Gumbo Limbo	13	7"
<i>Cananga odorata</i>	Ylang-Ylang	8	5"
<i>Cassia bakeriana</i>	Pink Cassia	4	2.5"
<i>Ceiba speciosa</i>	Floss Silk Tree	2	4"
<i>Chorisia speciosa</i>	Silk Floss Tree	1	6"
<i>Clusia rosea</i>	Autograph Tree	8	1.5"
<i>Conocarpus erectus`Sericeus`</i>	Silver Buttonwood	13	2"
<i>Guaiacum sanctum</i>	Hollywood	11	3"
<i>Lysiloma latisiliquum</i>	False Tamarind	9	2.5"
<i>Lysiloma sabicu</i>	Horseflesh Mahogany	10	4"
<i>Myrcianthes fragrans</i>	Twinberry	29	3"
<i>Pandanus utilis</i>	Screw Pine	2	4"

Pinus elliotti `Densa`	Slash Pine	33	6"
Pseudophoenix sargentii	Buccaneer Palm	4	4"
Quercus virginiana	Southern Live Oak	5	6"
Swietenia mahagoni	West Indian Mahogany	8	4"
Taxodium distichum	Bald Cypress	8	4"
Clusia rosea Pitch Apple		6	4"
Coccoloba uvifera	Sea Grape	1	5"
Eugenia foetida	Spanish Stopper	24	1.5"
Gymnanthes lucida	Crab Wood	27	2"
<b>Palm Trees</b>			
Acoelorrhaphe wrightii	Paurotis Palm	2	
Caryota mitis	Fishtail Palm	15	
Licuala grandis	Licuala Palm	7	
Sabal palmetto	Cabbage Palmetto	140	
Thrinax radiata	Florida Thatch Palm	134	
Licuala grandis	Licuala Palm	11	
Rhapis excelsa	Lady Palm	8	
Coccothrinax argentata	Florida Silver Palm	4	
Zamia integrifolia Coontie	Coontie	666	
<b>Grasses</b>			
Muhlenbergia capillaris	Pink Muhly	11	
Spartina bakeri	Sand Cord Grass	169	
<b>Ground Covers</b>			
Arachis glabrata	Perennial Peanut	3076	
Ipomoea pes-caprae	Beach Morning Glory	76	
Liriope muscari	`Big Blue` Lily Turf	1,374	
Microsorium scolopendrum	Wart Fern	16,809	
Peperomia obtusifolia	Baby Rubber Plant	2,344	
Spartina bakeri	Sand Cord Grass	457	
Tripsacum floridanum	Fakahatchee Grass	1,106	
<b>SOD/Seeds</b>			

Stenotaphrum secundatum	St. Augustine Grass	48,691 sf	
Zoysia spp	Zoysia Grass	12,443 sf	
<b>Shrubs</b>			
Ficus microcarpa	Green Island Ficus	144	
Acrostichum danaeifolium	Leather Fern	8	
Agave attenuata	Agave	22	
Byrsonima lucida	Locustberry	3	
Chamaedorea cataractarum	Cascade Palm	204	
Clusia fluminensis	Dwarf Pitch Apple	357	
Clusia rosea	`Nana` Dwarf Pitch Apple	223	
Colocasia esculenta	`Black Magic` Black Taro	20	
Crinum asiaticum	Spider lily	33	
Cyperus alternifolius	Umbrella Palm	5	
Dioon edule	Mexican Cycad	147	
Furcraea foetida - not variegated	Mauritius Hemp `GREEN`	6	
Hamelia patens	Fire Bush	15	
Monstera deliciosa	Split-Leaf Philodendron	1033	
Neomarica caerulea	`Regina` Iris	563	
Nephrolepis biserrata	Giant Swordfern	107	
Philodendron burle-marxii		1266	
Philodendron congo rojo		219	
Philodendron wilsonii		22	
Psychotria ligustrifolia	Bahama Coffee	408	
Psychotria nervosa	Wild Coffee	29	
Serenoa repens `Cinerea`	Silver Saw Palmetto	79	
Serenoa repens	`Green` Saw Palmetto	174	
Tripsacum dactyloides	Fakahatchee Grass	205	
Alpinia zerumbet	Shell Ginger `Green`	19	
Byrsonima lucida	Locustberry	14	
Clusia fluminensis	Dwarf Pitch Apple	334	
Furcraea foetida - not variegated	Mauritius Hemp `GREEN`	4	

Hamelia patens Fire Bush		6	
stera deliciosa Split-Leaf Philoden		113	
Neomarica caerulea `Regina` Iris		125	
Zamia integrifolia Coontie	Coontie	221	

Figure 8: Plant list of species and quantities found on site.

**Calculations:**

Before + After	Planting Areas	Lawn
Before Construction	60,517	169,461
After Construction	211,766	14,449

Figure 9: Calculations for total lawn and planting areas compared to previous areas on site.

Estimated 20 plant species in previous design of the site.

Currently there are 73 different species of plants in the new design.

Percentage Increase of Plant Biodiversity:  $73 - 20 = 53$  plant species

$(53/20)*100 = 265\%$  Increase

Percentage Decrease of Lawn Areas:  $169461 - 14449 = 155,012$

$(155,012/169461)*100 = 91.47\%$

Percentage Increase of Planted Areas:  $147,784 - 60,517 = 87,267$

$(87,267/60,517)*100 = 144.20\%$  Increase

**Sources:**

Google Earth Pro: <https://www.google.com/earth/>

Original planting plans provided by the landscape architect (ArqGEO).

Original hardscape plans provided by the landscape architect (ArqGEO).

Plant list provided by the landscape architect (ArqGEO).

**Limitations:** A Floristic Quality Assessment would provide further information on the habitat value of the species. Having access to site plan from before construction could have resulted in a more accurate understanding of plant species present before the project was completed.

- **Reduces overall average temperatures by 4° F on a sunny late afternoon, as compared to an adjacent parking lot with conditions similar to the site before the redesign. The main entry, where a breezeway was created by the elevation of the building, was 8° F cooler than the adjacent parking lot.**

**Method:** To capture the local temperatures on the site we used a tool called AirBeam by HabitatMap. The tool captures temperature and other air quality measurements in real time and

maps them onto a community-based platform for scientific analysis. Data was captured throughout the project site and in a parking lot adjacent to the site. This parking lot resembles the appearance and size of the parking lot located on site before the construction of UM Lakeside Village.

Temperature data was collected on June 10<sup>th</sup>, 2021 on a sunny summer day at 3pm. We started on the project site slowly recording measurements as we walked through each pathway of the site. By 6 pm we began recording the temperature at the parking lot.

The maximum temperature as recorded by the AirBeam in the project's site is of 103°F and the minimum is 91 °F, so the fluctuation in temperatures was 12 °F. The experience of the different temperatures was felt by the research team as the data was collected. The entry area where the buildings are elevated at their highest point and the outdoor gym is located, the AirBeam recorded the lowest temperature of 91 °F.

**Calculations:**

Average Temperature in Project Site: 96 °F

Average Temperature in Parking Lot: 99 °F

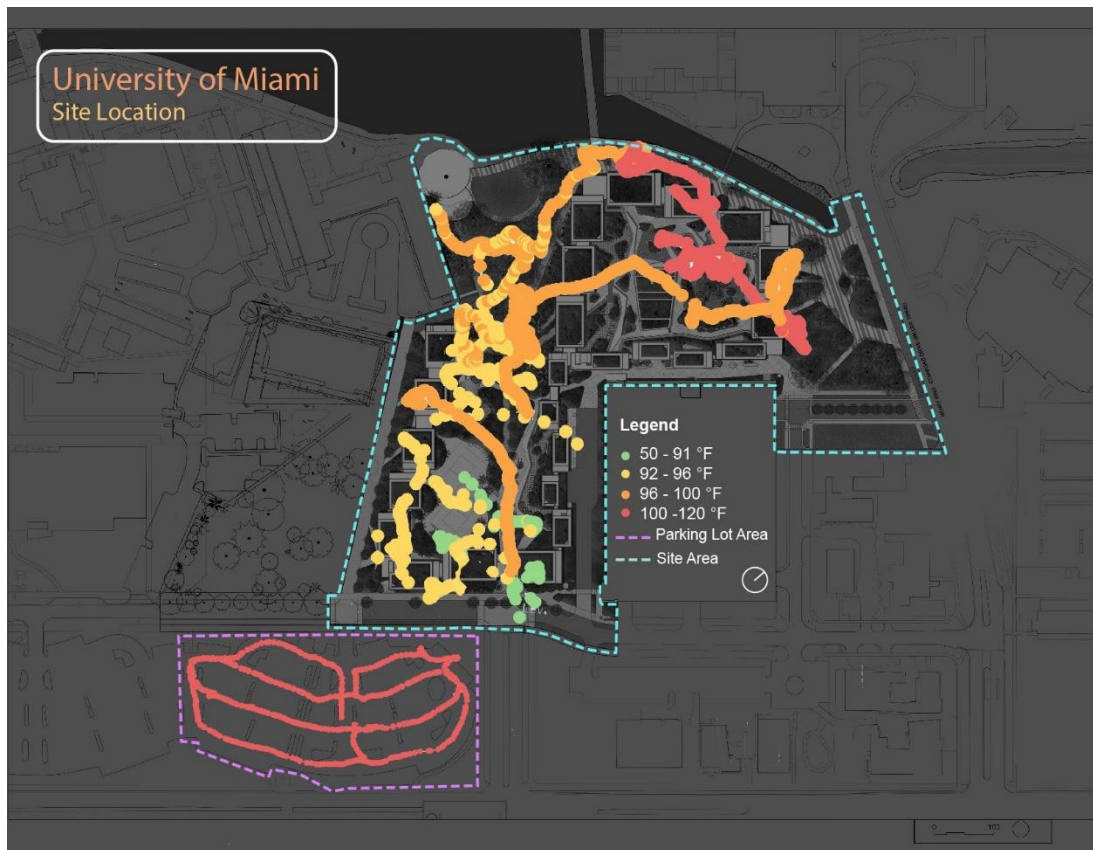
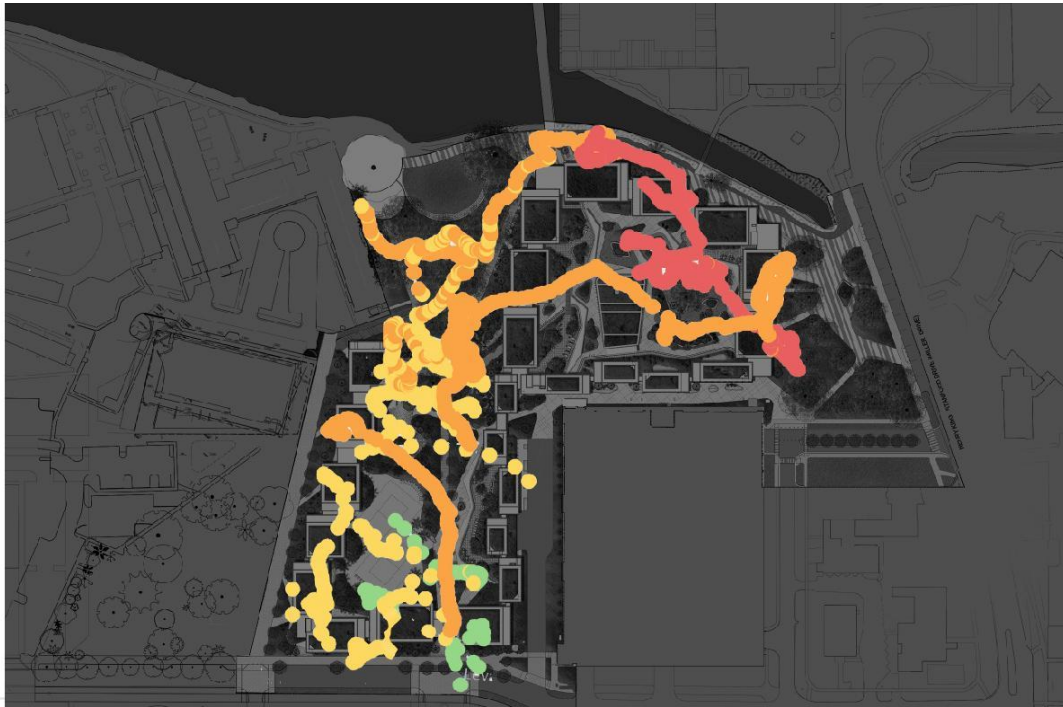


Figure 10: Site and adjacent parking lot location with the corresponding temperature measurements.





um parking lot 2  
 tjmarst  
 AirBeam2-F

● avg. 99 F  
 ● min. 99 ● max. 100  
 06/10/21 17:20-17:36



Figure 11: Detail of site locations with temperatures.

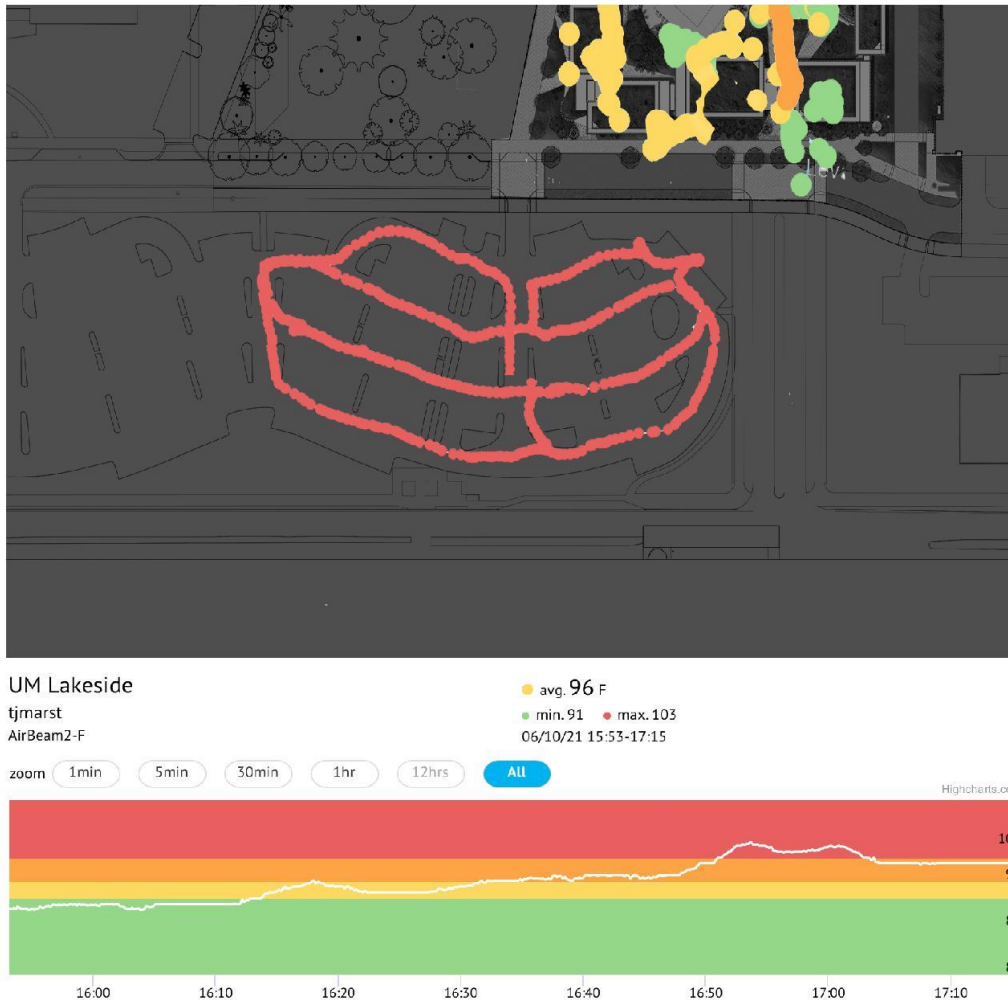


Figure 12: Detail of parking lot locations with temperatures.

**Sources:**

Data recorded with Air Beam: <https://tinyurl.com/3fvbphnw>

**Limitations:**

Data was collected first in the project site at the hottest time of the day (around 3pm) and then in the parking lot at 6pm.

If the recording of the parking lot's temperature had happened first the temperature window might have been much more significant.

- ***Sequesters approximately 12 tons of carbon annually in 73 existing canopy trees preserved on site. The 227 newly-planted trees will sequester approximately 5 tons of atmospheric carbon this year and will sequester a projected 73 tons of atmospheric carbon annually after 10 years.***

**Method:** The calculation of the current atmospheric carbon benefit was made using a list of existing canopy trees (currently on site), dividing these by those that were trees preserved and new trees to the site. The annual carbon sequestration was calculated for each of the 73 trees preserved by using the “iTree My Tree” tool. The future tons of sequestered carbon absorbed by the new trees was based on a 10 year projection. For this calculation iTree Design v6.0 was used.

i-Tree MyTree can assess values of diverse indicators for one to several trees while i-Tree Design analyzes tree benefits at the parcel level. We used i-Tree MyTree to calculate current sequestered carbon dioxide and i-Tree Design to estimate projected sequestered carbon dioxide in 10 years.

Six indicators of tree species: condition, trunk circumference or diameter, sun exposure, distance from a building, adjacent building’s construction date, and orientation of trees relative to adjacent buildings were entered into i-Tree MyTree. The last 3 indicators are only considered when the tree is within 60 ft of a building. Tree conditions are categorized by excellent, good, fair, poor, critical, dying, and dead. Trunk circumference is measured at 4.5 feet above the ground. The diameter at this height is called "diameter at breast height" (dbh), which is the standard measurement of tree trunk width. For more details about the plant list and values for each tree check **Appendix B**.

**Calculations:** As mentioned above calculations were made using iTree tools. The information needed for each tree was collected in a table. Two tables were developed, one for existing trees and one for newly planted trees.

Below is a sample from one tree which was preserved on site using iTree My Tree tool.

## MyTree Benefits

Live oak, (*Quercus virginiana*)

Serving Size: 24.00 in. diameter  
 Condition: Excellent  
 Total benefits for this year: \$65.93

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<b>Carbon Dioxide (CO<sub>2</sub>) Sequestered</b>	<b>\$22.43</b>
Annual CO <sub>2</sub> equivalent of carbon <sup>1</sup>	964.51 lbs
<b>Storm Water Runoff Avoided</b>	<b>\$19.74</b>
Runoff Avoided	2,209.2 gal
Rainfall Intercepted	7,547.67 gal
<b>Air Pollution Removed Each Year</b>	<b>\$23.76</b>
Carbon Monoxide	0.92 oz
Ozone	33.26 oz
Nitrogen Dioxide	5.48 oz
Sulfur Dioxide	< 0.1 oz
PM <sub>2.5</sub>	2.28 oz

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<b>CO<sub>2</sub> Stored To Date<sup>3</sup></b>	<b>\$255.16</b>
Lifetime CO <sub>2</sub> equivalent of carbon <sup>3</sup>	10,971.08 lbs

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Benefits are estimated based on USDA Forest Service Research and are meant for guidance only.

<sup>1</sup> For large trees sequestration is overtaken by CO<sub>2</sub> loss with decay/maintenance.  
<sup>2</sup> Positive energy values indicate savings or reduced emissions. Negative energy values indicate increased usage or emissions.  
<sup>3</sup> Not an annual amount or value.

Visit [www.itreetools.org](http://www.itreetools.org) to learn more.  
 MyTree 2.9.0  
 Powered by the i-Tree Engine



## Tell us about your tree:

*\*These fields are required.*

**Location\*** ?  
 Nearby Address: Rhodes House, 1204 Theo Dickinson Dr, Coral Gables, FL 33146, USA  
 Lat: 25.71739 Lng: -80.27753

**Project or Group Name** ?

**Type of Tree** ?

**Is this part of the Trillion Trees campaign?** ?  
 Yes  No

**Tree Species (type to search)\*** ?  
  
 Common

**Tree Condition\*** ?

**Trunk Size (in.)\*** ?  
  
 Diameter

**Sun Exposure\*** ?  
 Full  Partial  Shade

**Is tree within 60 feet of a building?** ?  
 Yes  No  Skip

**Note or label for this tree** ?

How stressed is your tree? Log data below to discover.  
 Find method details at [The Nature Conservancy's Healthy Trees, Healthy Cities Initiative](#).

Below is a sample calculation of carbon reduction in 2031 using iTree Design for one of the newly planted trees.

## i-Tree Design v7.0

1320 S Dixie Hwy, Coral Gables, FL 33146, USA

Start Over  
Save Progress  
About

Get started with these easy steps:

1. Draw Structures ?
2. Place Trees ?
3. Estimate Benefits ?

**You can calculate the benefits of your tree(s) for current and future years, as well as the total to date.**

- Enter the number of years (2–99) below to track tree growth and benefits.

Years:

**Get your results!** (Save your project BEFORE calculating. Large projects may fail during times of heavy demand. Saving allows you to try again later!)

[Calculate »](#)



Lat: 25.71533  
Lng: -80.28044

## i-Tree Design v7.0

1320 S Dixie Hwy, Coral Gables, FL 33146, USA

Start Over  
Save Progress  
About

Get started with these easy steps:


1. Draw Structures ?
2. Place Trees ?

*Please break large projects into smaller projects of no more than 25 trees at a time.*

**Describe your tree:**

- Tree species:   
[Scientific](#)
- Tree diameter:  Inches   
or circumference:
- Tree condition:
- Tree exposure to sunlight:

**To place a tree:**

- Drag this icon  to the location on the map where you would like to place your tree.
- Repeat to place additional trees.
- Hover over any tree you have placed on the map to display its benefits.

**Model the tree(s) future crown growth over time:**

[Model Crown Growth](#)



Lat: 25.71595  
Lng: -80.28012

### Sources:

i-Tree Tools: <https://www.itreetools.org>

i-Tree MyTree v1.5: <https://mytree.itreetools.org>

i-Tree Design v6.0: <https://design.itreetools.org>

Original tree disposition plan provided by the landscape architect (ArqGEO).  
Original tree schedule plan provided by the landscape architect (ArqGEO).

***Limitations:***

The calculations assumed all proposed trees included in the planting schedule were all planted. The calculations assumed that all trees planned to be relocated or to remain on site survived the transplant.

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## **Social Benefits**

### **Overall Survey Limitations**

- The observational survey was conducted in May and June when school was in summer recess, which cannot capture seasonal variation in user activities and engagement with the space. As the site is located in a University Campus the peak of users would be during the months of August to April.
- Due to the ongoing COVID-19 pandemic we did not engage in interviews.
- ***Provides opportunities for recreation year-round. Of the 153 users observed on the site during an out-of-session summer weekday, 36 were engaged in 6 different recreational activities, spending an average of 18 minutes in the space.***

**Method:** The landscape was designed to create spaces for different social encounters. The site has a volleyball court, an outdoor gym, a berm area with high tree canopy, and a courtyard where people can gather to spend time doing different activities.

According to the observations taken on-site on May 25th, 2021 and June 10th, 2021, 36 users of the 153 observed people participated in 6 different types of activities. Each user spent an average of 18 minutes in the space performing their activities.

The activities varied from strolling with dogs or children around the site to exercising in the outdoor gym or eating lunch by the volleyball court.

The observations were made during the morning on Tuesday May 25th, 2021 and in the afternoon on Thursday June 10th, 2021. From these observations, data was collected to develop the final result of the observational survey.

The method of observation consisted of steadily walking around the site for 3 hours in the morning and 3 hours in the afternoon. Each time we observed a user on the site we took note of the starting and ending time, the number of people, the activity being performed and location of this one. Each loop around the site had also a time of beginning and ending so we knew when the user had left the site if they happened to leave while we were not observing.

**Calculations:**

<b>Users, Activity and Time</b>		
<i>Number of Users</i>	<i>Activities</i>	<i>Time Spent in space (Minutes)</i>
2	Gym	25
1	Gym	40
4	Taking Pictures	15
3	Chatting	10
2	Chatting	14
2	Walking /gym	120
3	Chatting	30
1	Dog Walking	10
2	Walking with baby	15
1	Sitting, using Phone	10
3	Eating lunch	40
1	Eating Lunch	20
1	Using Computer	100
1	Eating Lunch	20
3	Talking	13
2	Eating	45
2	Gym	5
1	Dog Walking	60
1	Using Computer	45
<b>36</b>	<b>6</b>	<b>637</b>

<b>Total</b>
<i>Average time (minutes) spent per person</i>
<b>17.694 = 18 minutes</b>

Figure 13 Table with calculations for the number of users, the number of activities and the time spent.

**Sources:**

Observations done at site by the CSI research team on May 25th, 2021 9.30 AM - 11.50 AM.  
Observations done at site by the CSI research team on June 10th, 2021 3.30 PM - 6.30 PM.

**Limitations:** see above.

- **Promotes social interaction, with 44% of 153 observed users visiting the site in groups of 2 or more.**

**Method:** The design intent was to create spaces which encourage interaction between people. This benefit shows how the design of the project has influenced the interaction between humans in this space. The method applied consisted of observing the users and pedestrians on site and taking note of the number of people encountered. The method of observation consisted of walking around the site in loops for a total of 6 hours divided into two shifts. The site was divided into areas (A through D). Observations were gathered in the morning of May 25th, 2021 and in the afternoon of June 10th, 2021. Each time a visitor was accounted for, the number of people that belong to the same group was also recorded.

**Calculations:**

Visitors in groups	
Location	Two or More
D	2
A	3
B	2
B	2
C	4
D	3
D	3
D	2
D	2
A	2
A	2
A	2
A	2
A	2
A	2
A	2



B	2
B	3
B	3
B	5
B	3
B	2
B	3
C	3
C	2
C	3
C	2
C	2
<b>Total = 68 people</b>	

Figure 14: Number of people who visited the site in groups of 2 or more and the zone where the group was observed.

Total of observed people = 153

Total visiting the site in pairs or more = 68

Percentages:

100% ---- 153 individuals

42.4% ---- 68 individuals

The total number of observed people was 153 individuals. From those, 68 people entered the site in groups of 2 or more people. Some of these individuals were passersby, others were users who sat to eat lunch or use the gym. This benefit shows the effect that the landscape design of the project has regarding the promotion of social gatherings and interconnection.

**Sources:**

Observations done at site on May 25th, 2021 9.30 AM - 11.50 AM.

Observations done at site on June 10th, 2021 3.30 PM - 6.30 PM.

**Limitations:**

See above. Social interaction could have been affected by COVID 19 as people are not meeting with each other in person – or they may be meeting more outdoors.

Observations were recorded during weekdays, the use of the space might have been different during the weekends as people tend to socially gather.

- **Improves connectivity for pedestrians and cyclists, with 78% of 144 observed users utilizing the space as a connector from main buildings, parking lots, or Metrorail station to the larger campus area.**

**Method:** One of the main design objectives of this project was to improve connectivity between certain areas of campus. This benefit shows that 77.8% of the people who enter the site during a weekday utilize this space as a connector to get to a nearby location. It is assumed that before the existence of this project, the connectors had to walk through a parking space or look for a different path to arrive at their location.

The pedestrians on site were quantified by observations. The observations were taken on the morning of May 25th, 2021. The observed people were divided into two categories for this benefit. Those who used the site to walk through and arrive at a destination outside of the site were categorized as 'Connectors'. Those who used a space inside the site as their destination were categorized as 'Users/residents'. The number of people observed was 144 individuals. Of those, 34 people used the site as their destination because they were using the gym or arriving at their residency. The other 112 individuals utilized the space as their connector from main buildings/Metrorail/parking lot to the whole campus area.

The following drawings illustrate the path of travel of the individuals observed. In this drawing only connectors and residents are shown, not users. The observation for these individuals was divided into 8 time frames of 15 minutes where we rotated between 4 locations. Between the first loop and the second the researchers took a 5 minute break; no observations were taken at that moment and this can be seen reflected in the time frame log. Locations are defined by a letter (A, B, C, D) and connectors have their number. In the illustrations below the path of travel of each individual is predicted with an arrow indicating where they are heading, thus the starting point is defined by the leading number.

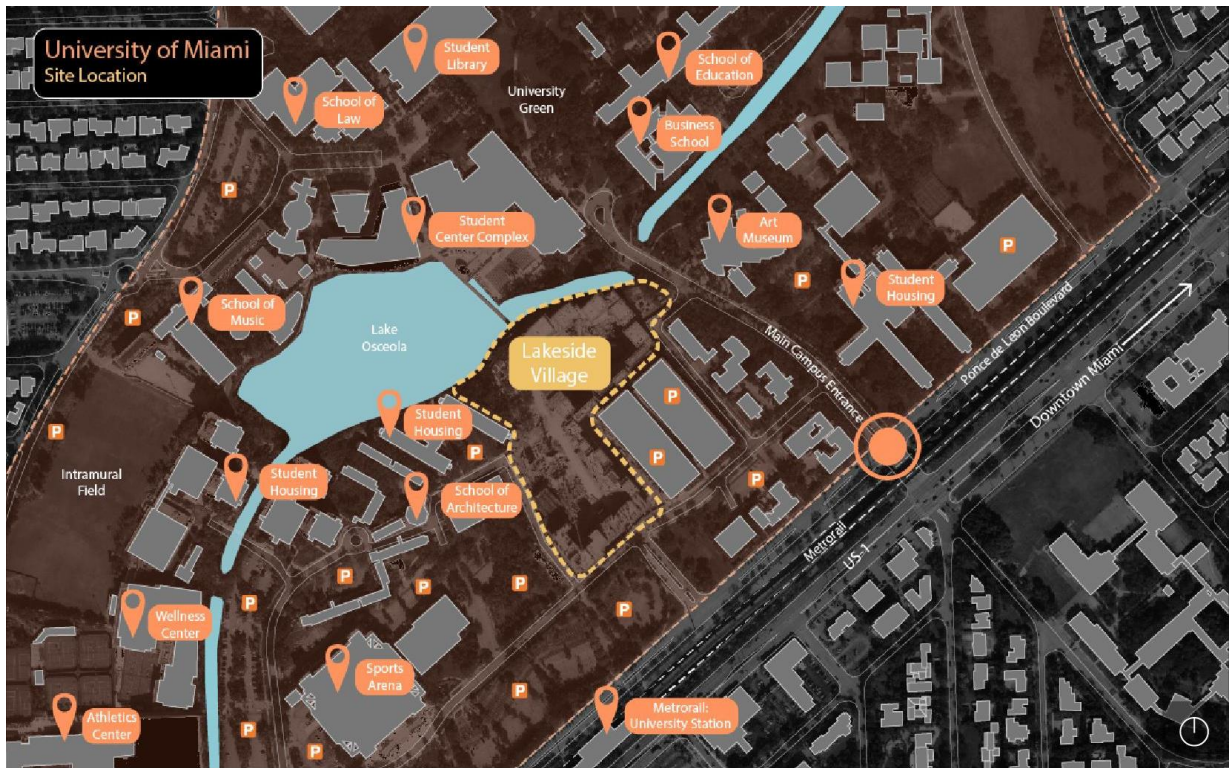
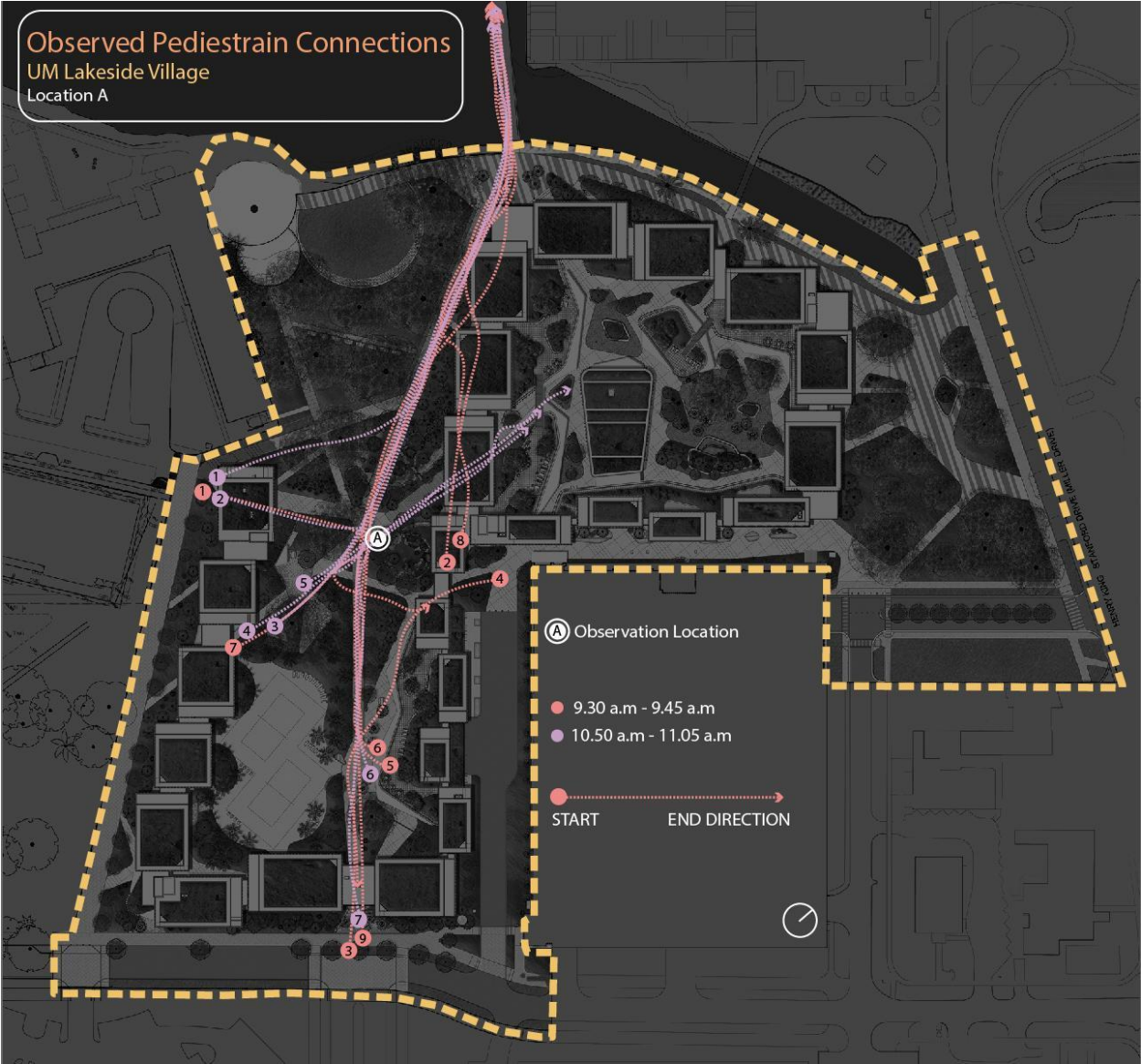
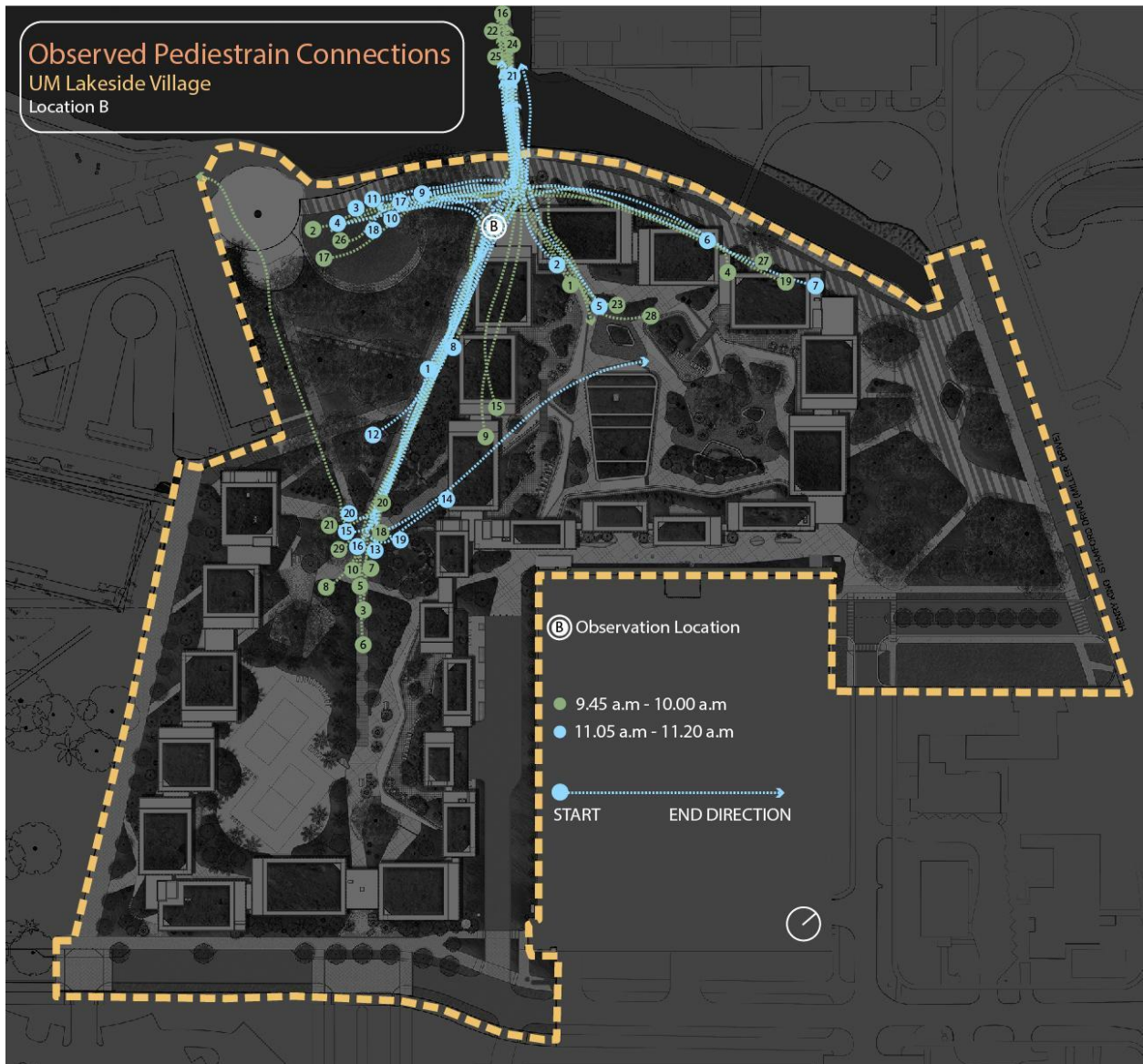
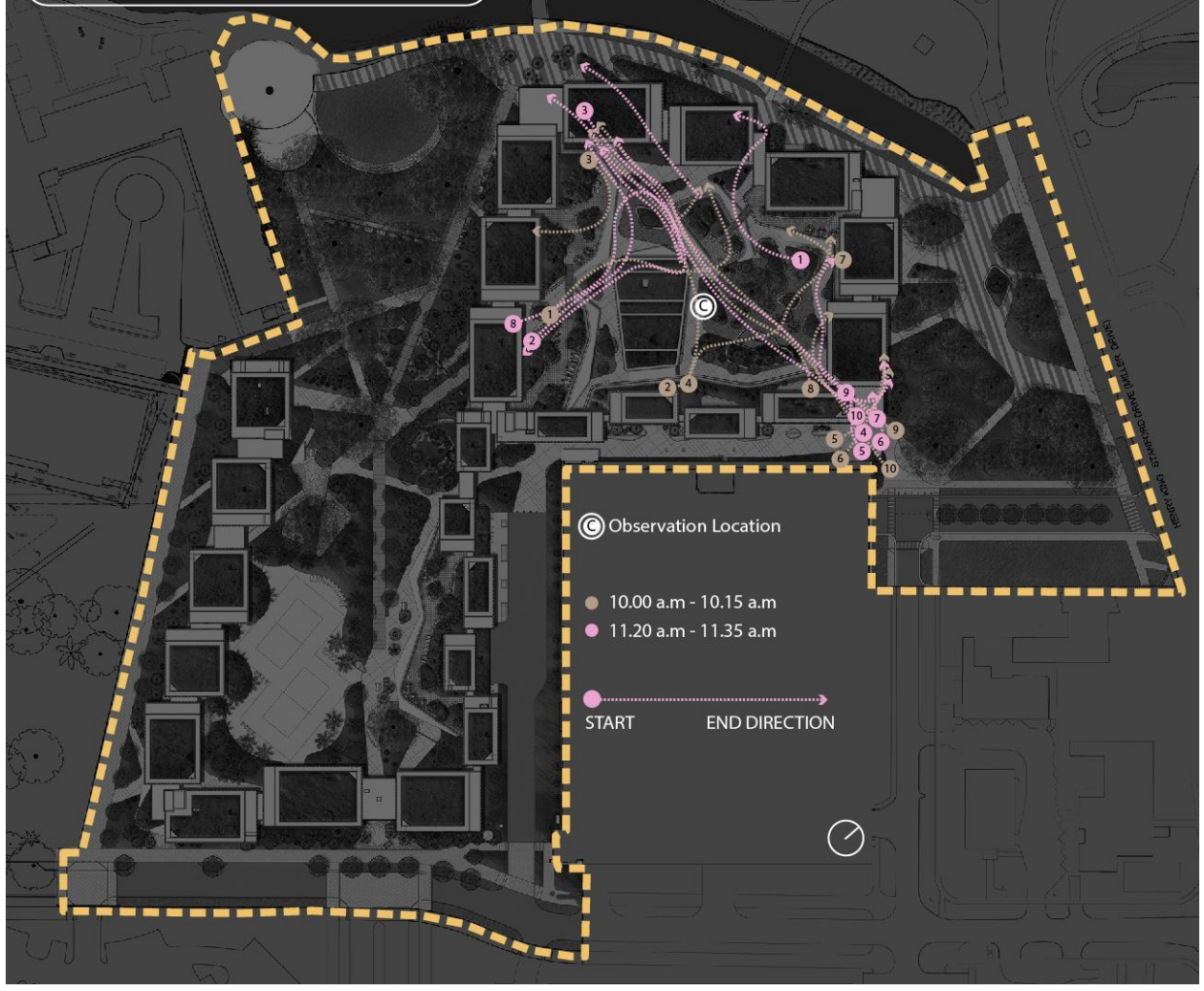


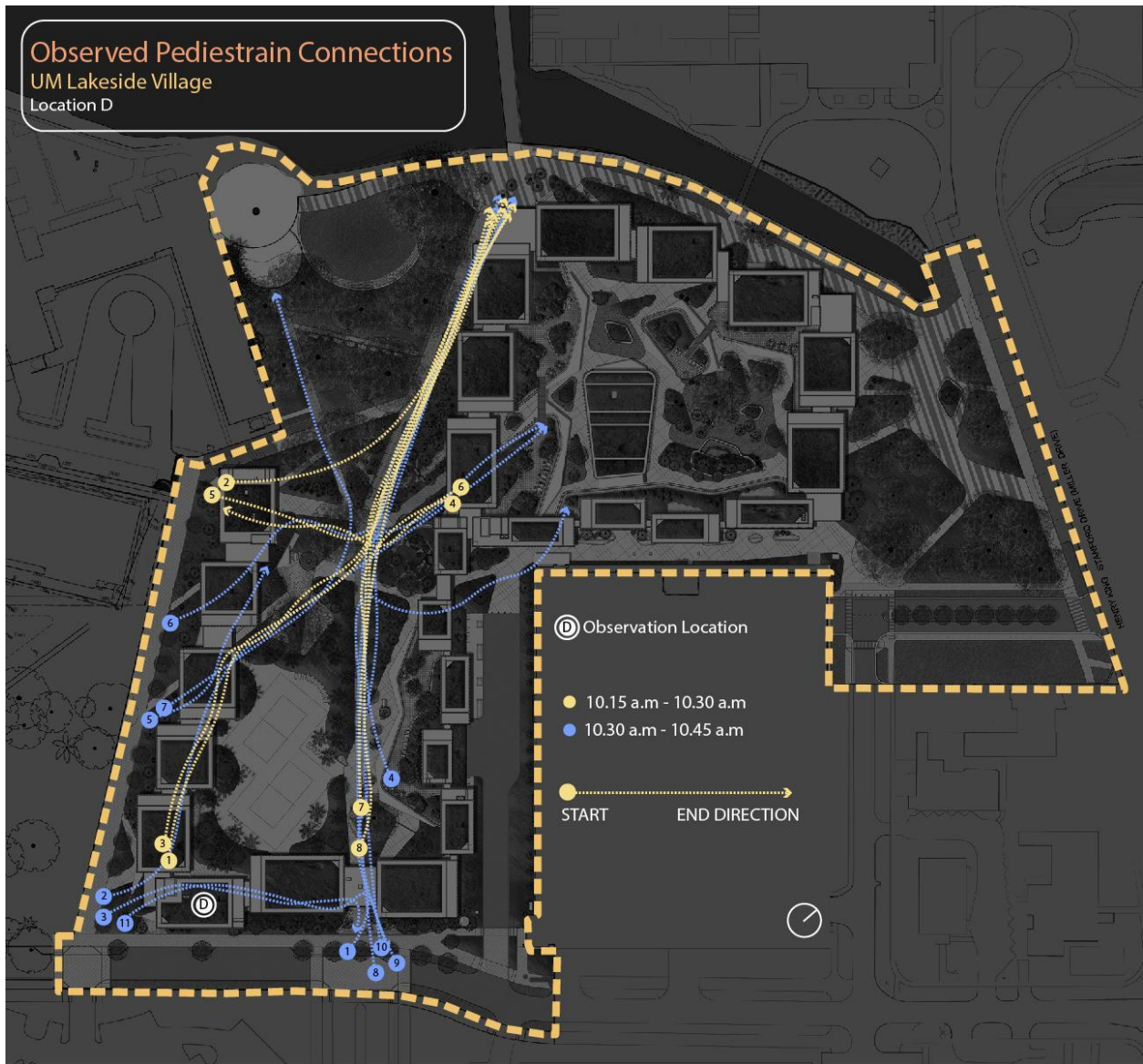
Figure 15: Location of site in context with surroundings for understanding connectivity.





Observed Pediestrain Connections  
UM Lakeside Village  
Location C





**Calculations:**

Circulation				
Time Frame	Location	Connector #	User/Resident/Location in Site	Connector
	D	12	2	
	D	13	1	
9.30 AM - 9.45 AM	A	1	1	
	A	2	1	

	A	3		1
	A	4	3	
	A	5		1
	A	6		1
	A	7		1
	A	8	1	
	A	9	1	
9.45 AM - 10.00 AM	B	1		1
	B	2		1
	B	3		1
	B	4		1
	B	5		1
	B	6		1
	B	7		1
	B	8		1
	B	9	1	
	B	10		1
	B	11		2
	B	12		1
	B	13		1
	B	14	1	
	B	15	1	
	B	16		2
	B	17		1
	B	18	1	
	B	19		1
	B	20		1
	B	21		1
	B	22		1
	B	23		1
	B	24		1



	B	25		1
	B	26		1
	B	27		1
	B	28	1	
	B	29		1
10.00 AM - 10.15 AM	C	1		1
	C	2		1
	C	3		1
	C	4		1
	C	5		1
	C	6		1
	C	7		1
	C	8		1
	C	9		1
	C	10		4
10.15 AM - 10.30 AM	D	1		1
	D	2		3
	D	3		1
	D	4		1
	D	5		3
	D	6		1
	D	7		2
	D	8		1
10.30 AM - 10.45 AM	D	1		2
	D	2		1
	D	3		1
	D	4		1
	D	5		2
	D	6		1
	D	7		2
	D	8		1

	D	9	2	
	D	10	1	
	D	11		1
10.50 AM - 11.05 AM	A	1		1
	A	2		1
	A	3		2
	A	4		1
	A	5		1
	A	6	2	
	A	7		2
11.05 AM - 11.20 AM	B	1	1	
	B	2		1
	B	3		1
	B	4		1
	B	5		2
	B	6		1
	B	7	3	
	B	8		1
	B	9		3
	B	10		1
	B	11		1
	B	12		1
	B	13	5	
	B	14		1
	B	15	3	
	B	16		1
	B	17		1
	B	18		1
	B	19		1
	B	20		1
	B	21		1

11.20 AM - 11.35 AM	C	1		2
	C	2		1
	C	3		1
	C	4		3
	C	5		1
	C	6		1
	C	7		1
	C	8		3
	C	9		1
	C	10		2
<b>Total</b>			<b>32</b>	<b>112</b>

Total Users/residents: 34

Total Connectors: 112

Percentages:

100% ----- 144 individuals

77.8% ----- 112 individuals (connectors)

**Sources:** Observations done at site on May 25th, 2021 9.30 AM - 11.50 AM.

**Limitations:**

See above

This is subject to human error, as the observers could not see where people were coming from nor their final destination from every vantage point.

## Cost Comparison

- ***The cost of keeping the existing trees on-site (preserving or relocating) was \$145,150. Purchasing the same number and species of trees (but not the same size) would have resulted in an estimated cost of \$58,050, not including installation costs. This would not have fulfilled the design intent, nor provided the amount of shade and carbon sequestration benefits that the existing trees provide.***

**Method:** When designing this project the team made the decision to preserve the most existing trees possible. Trees were catalogued into four different categories: to remove, to preserve and to relocate once or to relocate twice. Trees that were relocated once were moved to their final location. Trees which were relocated twice were moved to one of three nurseries created on

site. The nurseries were maintained through the construction of the project.

The intention of this cost comparison is to show the approximate value of retaining the trees that were found in the original site. This value does not include the cost of maintaining the trees during their time at the nurseries. The cost of trees that did not survive the relocation process is also not included in this estimate. The value of keeping the trees on site is compared to the value of buying the same size and same species of trees. The cost of tree installation is not included, which would double or triple the cost of buying new trees.

**Calculations:**

*Value of preserved or relocated trees on site:* \$145,150 (This value was provided by the landscape contractor).

*Cost of buying the existing trees as new trees:* \$58,050

Compared value between maintaining the trees on site and buying the same trees: \$145,150 - \$58,050 = **\$87,100**

<b>Carbon sequestration Trees</b>				
<i>Type of Tree</i>	<i>Status</i>	<i>Tree Species</i>	<i>Annual Carbon Sequestration (lbs)</i>	<i>Price of new tree</i>
Existing	Relocated 2	Lagerstroemia indica – Crape Myrtle	145	\$250.00
Existing	Relocated 2	Lagerstroemia indica Crape Myrtle	124	\$250.00
Existing	Relocated 2	Lagerstroemia indica Crape Myrtle	150	\$250.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	60	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	60	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 1	Bucida buceras – Black Olive Tree	58.92	\$675.00

Existing	Remained	Quercus virginiana – Live Oak Tree	964.51	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	627.18	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	924.32	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	568.72	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	710.83	\$1,250.00
Existing	Remained	Sideroxylon foetidissimum – Wild Mastic	682.49	\$200.00
Existing	Remained	Quercus virginiana – Live Oak Tree	627.18	\$1,250.00
Existing	Remained	Filicium decipiens Japanese Fern Tree	1,111	\$500.00
Existing	Remained	Quercus virginiana – Live Oak Tree	396.13	\$1,250.00
Existing	Remained	Tabebuia heterophylla Pink Tabebuia	178	\$650.00
Existing	Remained	Quercus virginiana – Live Oak Tree	800.39	\$1,250.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 1	Sideroxylon foetidissimum – Wild Mastic	20	\$200.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00

Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Calophyllum brasiliense – Brazilian Beautyleaf	52	\$350.00
Existing	Relocated 2	Quercus virginiana – Live Oak	699.23	\$1,250.00
Existing	Relocated 2	Ficus aurea – Strangler Fig	31	\$600.00
Existing	Relocated 1	Quercus virginiana – Live Oak Tree	396.13	\$1,250.00
Existing	Relocated 1	Quercus virginiana – Live Oak Tree	236.39	\$1,250.00
Existing	Relocated 2	Eugenia foetida – Spanish Stopper	8.48	\$200.00
Existing	Relocated 2	Eugenia foetida – Spanish Stopper	8.48	\$200.00
Existing	Relocated 2	Eugenia foetida – Spanish Stopper	8.48	\$200.00
Existing	Relocated 2	Eugenia foetida – Spanish Stopper	8.48	\$200.00
Existing	Relocated 2	Eugenia foetida – Spanish Stopper	8.48	\$200.00
Existing	Relocated 2	Eugenia foetida – Spanish Stopper	8.48	\$200.00
Existing	Relocated 2	Eugenia foetida – Spanish Stopper	8.48	\$200.00
Existing	Remained	Bucida buceras – Black Olive Tree	352.15	\$675.00
Existing	Remained	Bucida buceras – Black Olive Tree	396.1	\$675.00
Existing	Remained	Bucida buceras – Black Olive Tree	236.39	\$675.00
Existing	Remained	Bucida buceras – Black Olive Tree	92.45	\$675.00
Existing	Relocated 1	Quercus virginiana – Live Oak Tree	614.59	\$350.00
Existing	Remained	Bucida buceras – Black Olive Tree	265.06	\$675.00
Existing	Relocated 1	Quercus virginiana – Live Oak Tree	50	\$1,250.00
Existing	Relocated 1	Quercus virginiana – Live Oak Tree	699.23	\$1,250.00

Existing	Remained	Ficus altissima – Council Tree	472.83	\$3,500.00
Existing	Relocated 2	Quercus virginiana – Live Oak Tree	455.53	\$1,250.00
Existing	Relocated 2	Quercus virginiana – Live Oak Tree	150.21	\$1,250.00
Existing	Relocated 1	Ceiba pentandra – Kapok Tree	2121	\$3,500.00
Existing	Relocated 2	Quercus virginiana – Live Oak Tree	586.46	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	90	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	586.46	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	710.83	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	924.32	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	710.83	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	614.59	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	136	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	129	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	924.32	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	699.23	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	77	\$1,250.00
Existing	Remained	Quercus virginiana – Live Oak Tree	699.23	\$1,250.00
<b>Total</b>			<b>23412.59</b>	<b>\$58,050.00</b>

Figure 16: Species of trees maintained on site and the price for each tree; lbs of carbon that sequesters annually.

**Sources:** To find the estimated price for the trees Plant Finder was utilized <https://www.plantsearch.com>

The approximate cost of keeping the original trees on site was provided by the landscape contractor.

**Limitations:** The approximate cost of keeping the trees on site does not include the cost of maintenance and irrigation during the time the trees were relocated into the nurseries. The cost of buying those same trees does not include the value of installing the trees which is calculated to be equivalent to the value of the tree itself.





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## Features

- **Preserved 59% of the original tree canopy, including palm trees, through tree preservation or relocation.**

**Method:** To calculate the original canopy area of the site, the area of each tree was calculated using the canopy spread listed on the tree disposition plan. The area of each tree canopy was summed by zone using a spreadsheet and then totaled for the entire site. The trees were categorized as relocated, preserved, or removed. To calculate the final percentage, we totaled the tree and palm canopy which remained or was relocated as a percentage of the total original tree and palm canopy. Of the original trees that remained on site, some of them were relocated more than once and some remained in their original place. The number of times relocated did not affect the calculations. Palms were also included in these calculations. To calculate the palm trees the area of each palm was estimated by using its caliper. The final sum was added to the total canopy area totaling 189,263 square feet of canopy and palm trees preserved or relocated on site.

**Calculations:** To calculate the percentage of tree canopy that was preserved the research team developed the following spreadsheets. The tree canopy is divided into four zones for clarity.

The following formula was used to calculate the area of each tree given the spread:  $\text{Area} = \pi r^2$ . The tables below show the calculations made by zone for canopy trees and palm trees. The landscape architecture firm divided the tree schedule and quantity in 4 zones. Zone A is the northern area. Zone B is the area to the west. Zone C is located below and Zone D is the western area. Results show that 53% of the total original tree canopy and 80% of the original palm canopy remained onsite. The total tree and palm canopy preserved was 59%.

Environmental Benefit – Percentages for <b>Tree Canopy</b>		
Location	Total Tree Canopy (sq ft)	Total Relocated + Preserved Tree Canopy (sq ft)
Zone A	87049	47308
Zone B	77465	30814
Zone C	45337	21300
Zone D – Building 37	45955	36858
<b>Total</b>	<b>255807</b>	<b>136280</b>

Figure 2: Calculations made to find the total square feet of Tree Canopy relocated and preserved.

Percentages – Tree Canopy

255807	<b>100</b>
136280	<b>53.27</b>

Figure 3: Calculations made to find the total percentage of Tree Canopy relocated and preserved.

Environmental Benefit – Percentages for <b>Palm Tree Canopy</b>		
Location	Total Tree Canopy (sq ft)	Total Relocated/ Preserved Tree Canopy (sq ft)
Zone A	36489	30346
Zone B	13511	9417
Zone C	11785	10177
Zone D – Building 37	4285	3043
<b>Total</b>	<b>66070</b>	<b>52983</b>

Figure 4: Calculations made to find the total square feet of Palm Tree Canopy relocated and remained.

Percentages – Palm Tree Canopy	
66070	<b>100</b>
52983	<b>80.19222037</b>

Figure 5: Calculations made to find the total percentage of Palm Tree Canopy relocated and remained.

Grand total Tree Canopy + Palm Tree Canopy		Percentage
Total sq ft of original canopy	321877	<b>100</b>
Total sq ft of relocated/preserved canopy	189263	<b>58.79978998</b>

Figure 6: Total percentage of Tree Canopy and Palm Tree Canopy that was relocated and preserved on site.

**Sources:** Original tree disposition plan provided by the landscape architect (ArqGEO).  
Proposed canopy plan provided by the landscape architect (ArqGEO).

**Limitations:** The calculations were based on the original tree disposition plan and proposed canopy plan assuming all trees in those plans survived the construction and relocation process (see “Tree Preservation” in Case Study Brief).

# Appendix A

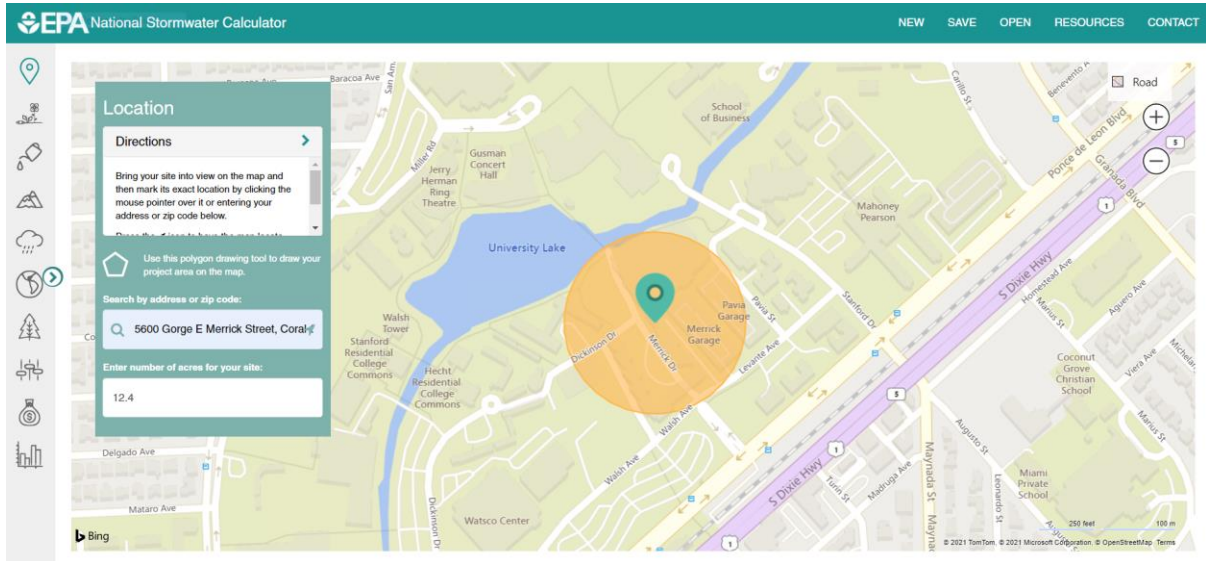


Figure A1: Location of Project (National Stormwater Calculator)

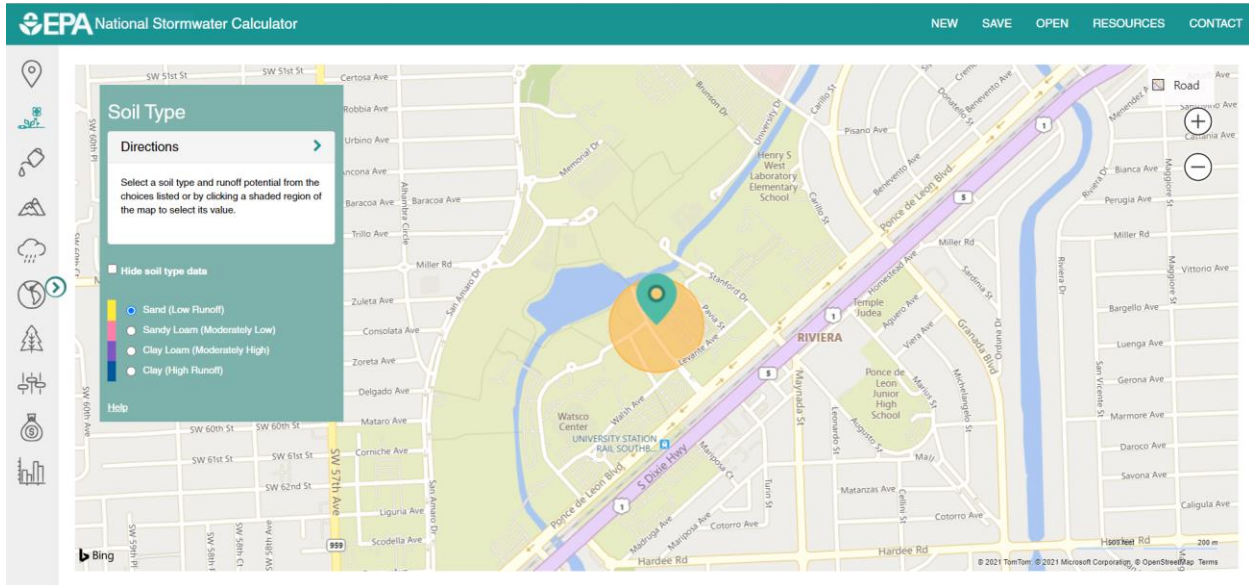


Figure A2: Soil Type (National Stormwater Calculator)

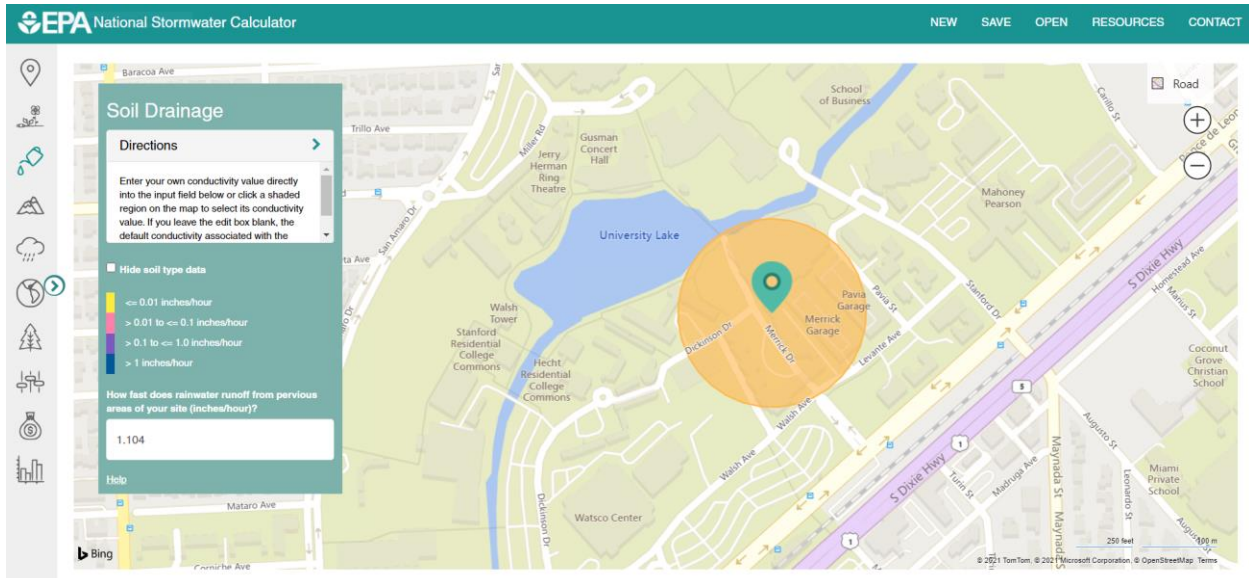


Figure A3: Soil Drainage (National Stormwater Calculator)

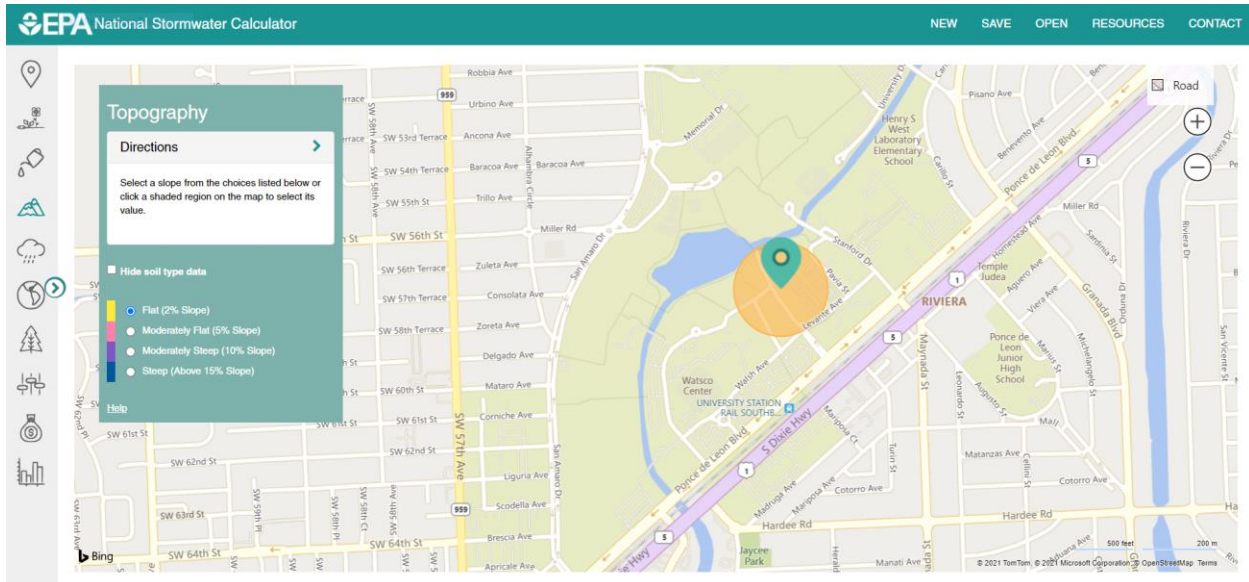


Figure A4: Topography (National Stormwater Calculator)

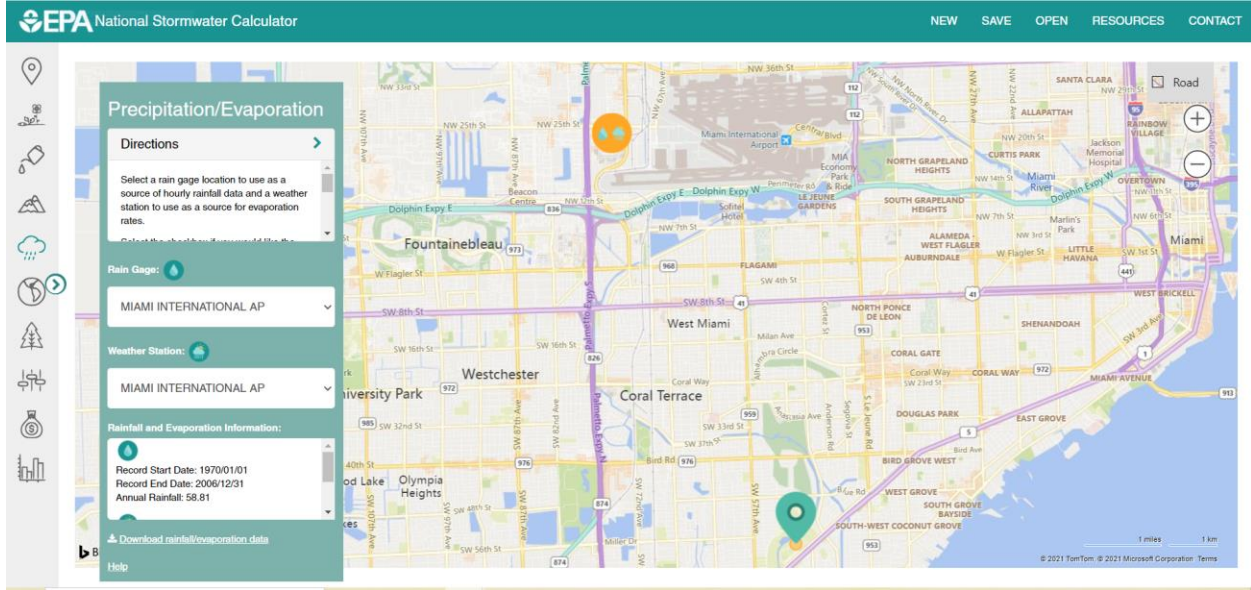


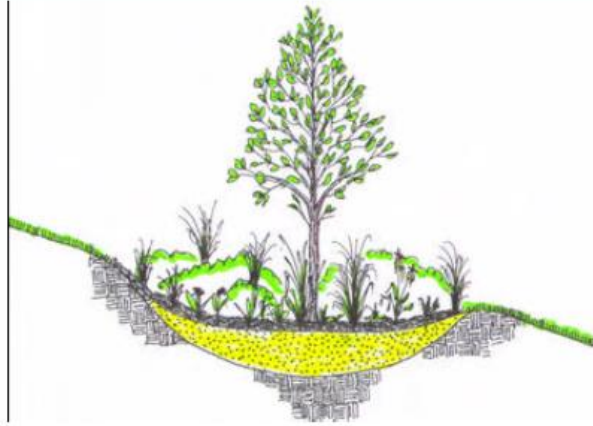
Figure A5: Precipitation/Evaporation (National Stormwater Calculator)



Figure A6: Land Cover (National Stormwater Calculator)



Figure A7: LID Controls (National Stormwater Calculator)



Rain Gardens are shallow depressions filled with an engineered soil mix that supports vegetative growth. They are usually used on individual home lots to capture roof runoff.

Typical soil depths range from 6 to 18 inches

The Capture Ratio is the ratio of the rain garden's area to the impervious area that drains onto it.

[Learn More](#)

**Ponding Height:**  36 in.

**Soil Media Thickness:**  12 in.

**Soil Media Conductivity:**  10 in./hr

**% Capture Ratio:**  32%

Pre-Treatment

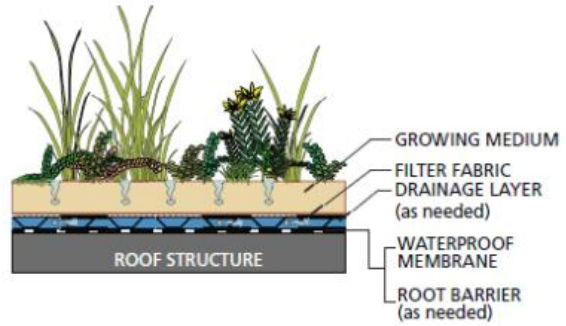
Size for Design Storm

Save and Return

Restore Defaults

Figure A8: LID Controls - Rain Gardens (National Stormwater Calculator)

## Green Roofs



Green Roofs (also known as Vegetated Roofs) are bio-retention systems placed on roof surfaces that capture and temporarily store rainwater in a soil growing medium. They consist of a layered system of roofing designed to support plant growth and retain water for plant uptake while preventing ponding on the roof surface.

The thickness used for the growing medium typically ranges from 3 to 6 inches.

[Learn More](#)

**Soil Media Thickness:**  10 in.

**Soil Media Conductivity:**  15 in./hr

Save and Return

Restore Defaults

Figure A9: LID Controls - Green Roofs (National Stormwater Calculator)



## Appendix B

Carbon sequestration Trees							
Type of tree	Status	Tree Acronym	Tree Species	Condition of tree	Trunk size	Sun exposure	Within 60 ft from building
Existing	Relocated 2	LI	Lagerstroemia indica - Crape Myrtle	Fair	18	partial	yes
Existing	Relocated 2	LI	Lagerstroemia indica Crape Myrtle	Fair	13	partial	yes
Existing	Relocated 2	LI	Lagerstroemia indica Crape Myrtle	Fair	19	partial	yes
Existing	Relocated 2	MG-100	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	partial	yes
Existing	Relocated 2	MG-101	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	4	partial	yes
Existing	Relocated 2	MG-102	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	partial	yes
Existing	Relocated 2	MG-103	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	4	partial	yes
Existing	Relocated 2	MG-104	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	partial	yes
Existing	Relocated 2	MG-105	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	partial	yes
Existing	Relocated 1	HS-135	Bucida buceras - Black Olive Tree	Excellent	43"	Full	No
Existing	Remained	EHN-143	Quercus virginiana - Live Oak Tree	Excellent	24	Full	No
Existing	Remained	EHN-144	Quercus virginiana - Live Oak Tree	Excellent	16	Full	No
Existing	Remained	EHN-145	Quercus virginiana - Live Oak Tree	Excellent	23	Full	No
Existing	Remained	EHN-146	Quercus virginiana - Live Oak Tree	Excellent	14	Full	No

Existing	Remained	EHN-147	Quercus virginiana - Live Oak Tree	Excellent	19	Full	No
Existing	Remained	EHN-148	Sideroxylon foetidissimum - Wild Mastic	Excellent	18	Full	No
Existing	Remained	EHN-149	Quercus virginiana - Live Oak Tree	Excellent	16	Full	No
Existing	Remained	EHN-151	Filicium decipiens Japanese Fern Tree	Excellent	20	Full	No
Existing	Remained	EHN-152	Quercus virginiana - Live Oak Tree	Excellent	18	Full	No
Existing	Remained	EHN-153	Tabebuia heterophylla Pink Tabebuia	Excellent	9	Full	No
Existing	Remained	EHN-154	Quercus virginiana - Live Oak Tree	Excellent	20	Full	No
Existing	Relocated 2	MG-67	Calophyllum brasiliense - Brazilian Beautyleaf	Good	3	Partial	Yes
Existing	Relocated 2	MG-68	Calophyllum brasiliense - Brazilian Beautyleaf	Good	3	Partial	Yes
Existing	Relocated 2	MG-69	Calophyllum brasiliense - Brazilian Beautyleaf	Good	3	Partial	Yes
Existing	Relocated 2	MG-70	Calophyllum brasiliense - Brazilian Beautyleaf	Good	3	Partial	Yes
Existing	Relocated 2	MG-71	Calophyllum brasiliense - Brazilian Beautyleaf	Good	3	Partial	Yes
Existing	Relocated 2	MG-72	Calophyllum brasiliense - Brazilian Beautyleaf	Good	3	Partial	Yes
Existing	Relocated 2	MG-73	Calophyllum brasiliense - Brazilian Beautyleaf	Good	3	Partial	Yes
Existing	Relocated 1	HS-49	Sideroxylon foetidissimum - Wild Mastic	Good	23"	Partial	Yes
Existing	Relocated 2	MG-74	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	Partial	Yes

Existing	Relocated 2	MG-75	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	Partial	Yes
Existing	Relocated 2	MG-76	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	Partial	Yes
Existing	Relocated 2	MG-98A	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	Partial	Yes
Existing	Relocated 2	MG-98B	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	Partial	Yes
Existing	Relocated 2	MG-98C	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	Partial	Yes
Existing	Relocated 2	MG-106	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	Partial	Yes
Existing	Relocated 2	MG-107	Calophyllum brasiliense - Brazilian Beautyleaf	Excellent	3	Partial	Yes
Existing	Relocated 2	MG-50	Quercus virginiana - Live Oak	Fair	25"	Partial	Yes
Existing	Relocated 2	HS-134	Ficus aurea - Strangler Fig	Good	52"	Partial	Yes
Existing	Relocated 1	MG-10	Quercus virginiana - Live Oak Tree	Excellent	18"	Partial	Yes
Existing	Relocated 1	HS-38	Quercus virginiana - Live Oak Tree	Good	28"	Partial	Yes
Existing	Relocated 2	MG-119	Eugenia foetida - Spanish Stopper	Fair	1"	Partial	Yes
Existing	Relocated 2	MG-120	Eugenia foetida - Spanish Stopper	Fair	1"	Partial	Yes
Existing	Relocated 2	MG-121	Eugenia foetida - Spanish Stopper	Fair	1"	Partial	Yes
Existing	Relocated 2	MG-122	Eugenia foetida - Spanish Stopper	Fair	1"	Partial	Yes
Existing	Relocated 2	MG-123	Eugenia foetida - Spanish Stopper	Fair	1"	Partial	Yes
Existing	Relocated 2	MG-124	Eugenia foetida - Spanish Stopper	Fair	1"	Partial	Yes

Existing	Relocated 2	MG-125	Eugenia foetida - Spanish Stopper	Fair	1"	Partial	Yes
Existing	Remained	EH-41	Bucida buceras - Black Olive Tree	Excellent	23"	Partial	Yes
Existing	Remained	EH-42	Bucida buceras - Black Olive Tree	Excellent	19"	Partial	Yes
Existing	Remained	EH-40	Bucida buceras - Black Olive Tree	Excellent	28"	Partial	Yes
Existing	Remained	EH-46	Bucida buceras - Black Olive Tree	Excellent	32	Partial	Yes
Existing	Relocated 1	HS-119	Quercus virginiana - Live Oak Tree	Excellent	22"	Partial	Yes
Existing	Remained	EH-53	Bucida buceras - Black Olive Tree	Excellent	27"	Partial	Yes
Existing	Relocated 1	HS-77	Quercus virginiana - Live Oak Tree	Excellent	33"	Partial	Yes
Existing	Relocated 1	HS-50	Quercus virginiana - Live Oak Tree	Excellent	25	Partial	Yes
Existing	Remained	EH-48	Ficus altissima - Council Tree	Excellent	60"	Full	Yes
Existing	Relocated 2	MG-35	Quercus virginiana - Live Oak Tree	Fair	17	Partial	Yes
Existing	Relocated 2	HS-66	Quercus virginiana - Live Oak Tree	Poor	11"	Shade	Yes
Existing	Relocated 1	EH-73	Ceiba pentandra - Kapok Tree	Excellent	42"	Full	Yes
Existing	Relocated 2	MG-42	Quercus virginiana - Live Oak Tree	Excellent	21"	Full	Yes
Existing	Remained	SD-2	Quercus virginiana - Live Oak Tree	Excellent	40"	Full	No
Existing	Remained	SD-3	Quercus virginiana - Live Oak Tree	Excellent	21"	Full	No
Existing	Remained	SD-4	Quercus virginiana - Live Oak Tree	Excellent	19"	Full	No
Existing	Remained	SD-5	Quercus virginiana - Live Oak Tree	Excellent	23"	Full	No
Existing	Remained	SD-10	Quercus virginiana - Live Oak Tree	Excellent	19"	Full	No
Existing	Remained	SD-11	Quercus virginiana - Live Oak Tree	Excellent	22"	Full	No

Existing	Remained	SD-11A	Quercus virginiana - Live Oak Tree	Excellent	35"	Full	No
Existing	Remained	SD-11B	Quercus virginiana - Live Oak Tree	Excellent	41	Full	No
Existing	Remained	SD-11C	Quercus virginiana - Live Oak Tree	Excellent	23	Partial	Yes
Existing	Remained	SD-11D	Quercus virginiana - Live Oak Tree	Excellent	25	Partial	Yes
Existing	Remained	SD-11E	Quercus virginiana - Live Oak Tree	Excellent	26	Partial	Yes
Existing	Remained	HS-225	Quercus virginiana - Live Oak Tree	Excellent	25	Full	No

<b>Carbon Sequestration - New Trees on Site</b>					
<i>Tree Species</i>	<i>Number of Trees</i>	<i>Tree's condition</i>	<i>Trunk Size (DBH)</i>	<i>Sun Exposure</i>	<i>Total atmospheric carbon reduction in 2021 (lbs)</i>
Annona glabra	1	New	5"	Full	2
Bursera simaruba	13	New	5"	Partial	1183
Cananga odorata	8	New	5"	Partial	329
Cassia bakeriana	4	New	2.5"	Partial	222
Ceiba speciosa	2	New	4"	Partial	132
Chorisia speciosa	1	New	6"	Partial	110
Clusia rosea	8	New	1.5"	Partial	108
Conocarpus erectus `Sericeus`	13	New	2"	Partial	676
Guaiacum sanctum	11	New	3"	Partial	297
Lysiloma latisiliquum	9	New	2.5"	Partial	216
Lysiloma sabicu	10	New	4"	Partial	561
Myrcianthes fragrans	29	New	3"	Partial	232
Pandanus utilis	2	New	4"	Partial	42
Pinus elliotti `Densa`	33	New	6"	Partial	2475
Pseudophoenix sargentii	4	New	4"	Partial	36
Quercus virginiana	5	New	6"	Partial	887

Swietenia mahagoni	8	New	4"	Partial	728
Taxodium distichum	8	New	4"	Partial	320
Clusia rosea Pitch Apple	6	New	4"	Partial	288
Coccoloba uvifera	1	New	5"	Partial	110
Eugenia foetida	24	New	1.5"	Partial	24
Gymnanthes lucida	27	New	2"	Partial	351