



## Naviva®, A Four Seasons Resort Methods

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This investigation was conducted as part of the Landscape Architecture Foundation's 2024 *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/Naviva>

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## Table of Contents

|                                                 |    |
|-------------------------------------------------|----|
| 1. Environmental Benefits.....                  | 01 |
| 2. Social Benefits.....                         | 33 |
| 3. Economic Benefits.....                       | 41 |
| 4. Inconclusive Benefits .....                  | XX |
| 5. Appendix 1: Tree and Palm Planting List..... | 46 |
| 6. Appendix 2: Surveys.....                     |    |

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## Acknowledgements

As we embark on this journey of sustainability, we pause to acknowledge the land upon which we stand, honoring its indigenous stewards, past and present.

We extend our gratitude to those who have contributed to the development of our Case Study Investigation (CSI). Special thanks to Ivan Donoso, PLA, ASLA, Vice President at EDSA, and Joanna Ibarra, PLA, Senior Associate at EDSA, for their invaluable expertise and dedication. We also express our appreciation to the Four Seasons Resort for their collaboration and support.

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## Environmental Benefits

### Benefit 1

***Preserved 97% of the surrounding ecosystem, or 41 acres, during resort construction.***

#### ***Background:***

Punta Mita is 1,500-acre private (gated) peninsula in Mexico that offers beautiful beaches and luxury resorts. The area is a favorite vacation destination of Silicon Valley entrepreneurs.



Figure 1. Context and Location of Punta Mita, Mexico

Investors wanting to capitalize on the prime location sought to build a golf course community and resort on the Punta Mita peninsula in the early 2000s. The project was abandoned due to bankruptcy. It left the peninsula scarred with the initial clearing, access roads, and a cistern.



Figure 2. Punta Mita, Mexico built area and proposed early 2000s development.

Cascade Investment LLC purchased 42.7 acres of land within the Punta Mita Peninsula and adjacent to an existing Four Seasons hotel in 2014. Wanting to protect the remaining natural habitat of the Punta Mita peninsula but seeing an opportunity to create a unique hospitality venue that featured both jungle and ocean views, the investor made use of only previously disturbed land for the future development of the Naviva® resort.



Four Seasons Naviva Map

Punta Mita is located on the Western edge of Mexico. It shares the same latitude and mild temperatures as Hawaii. The peninsula is a popular travel destination for Silicon Valley entrepreneurs. A development project in the early 2000s went bankrupt. An investment firm purchased 42.7 acres with the vision of creating a resort within the natural surroundings.

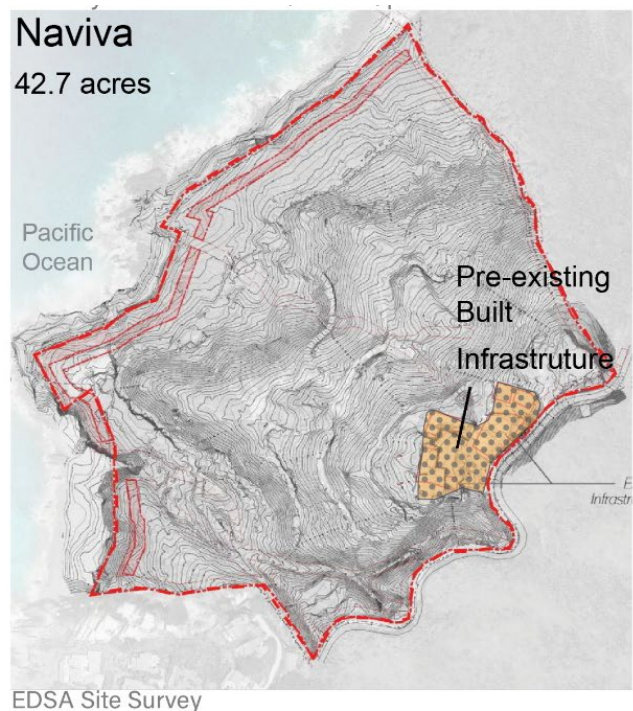


Figure 3. Naviva®

Location within Punta Mita and site survey showing pre-existing infrastructure.



### **Method:**

The research team referenced 3 land use scenarios for the Punta Mita peninsula: proposed '2000s construction' boundaries, pre-Naviva® and post-Naviva® build boundaries. The team reviewed archived Google Earth images and Master Plans. The team plotted disturbed areas in AutoCAD to determine total area in acres and compared the surrounding habitat in acres.

### **Calculations:**

Total project site = 17.30 HA or approx. 42.7 acres

The research team used the conversion factor of 1 hectare is equal to approximately 2.47105 acres.

17.3 hectares x 2.47105 acres/hectare ≈ 42.7 acres

So, 17.3 hectares is approximately 42.7 acres.

Built areas = 1.45 acres

**(42.7acres-1.45 acres) / 42.7 acres = 9.6 x100 = 96.6%**

|                    |   |
|--------------------|---|
| Jungle pool        | 1 |
| Existing structure | 2 |
| Oceanfront venue   | 3 |
| Spa treatment      | 4 |
| Bungalow           | 5 |
| Main arrival plaza | 6 |

|                           |            |
|---------------------------|------------|
| Area (total)              | 98.84 acre |
| Project site              | 42.70 acre |
| Area built                | 1.45 acre  |
| Area preserved            | 97.39 acre |
| Preserved area            | 96.60%*    |
| *Considering project site |            |



Figure 4. Naviva® area totals.

**Sources:**

EDSA, Inc. *Naviva®*, *A Four Seasons Resort, Punta Mita, Mexico-Master Plan 2022*. 130 pages

<https://www.myfavoritevillas.com/mexico/punta-mita/villas>

"Punta Mita, Mexico." *Google Maps*, Google, 2024, <https://www.google.com/maps>.

**Limitations:**

- Survey of site prior original the early 2000s resort construction not available for landscape performance evaluation.
- Master Plan of original 2000s resort not available for landscape performance evaluation.

**Benefit 2**

- ***Reduces surface runoff by 15% through utilization of permeable pavement instead of traditional concrete pavement.***

**Background:**

The urbanization of landscapes significantly increases the volume and quality of runoff water flowing into lakes and streams, as highlighted by research (Davis, 2005; Wang et al., 2001; Williamson, 1993). When natural landcovers like grasslands and forests are replaced by impermeable surfaces such as roads and parking lots, the soil and vegetation lose their ability to retain water. Consequently, runoff from these impermeable surfaces intensifies, leading to hazardous flooding, severe erosion of stream channels, reduced replenishment of groundwater, and habitat degradation for aquatic life.

Permeable pavements can reduce runoff from the rain that falls on the ground and help filter out pollutants that contribute to water pollution. Permeable pavements can also reduce the costs for residential and commercial development by reducing the need for some conventional drainage features.

**Method:**

The research team compared the runoff coefficient of permeable pavers to the runoff coefficient of traditional concrete pavement.

## CIRCULATION | DESIGN DETAIL

Arrival Roadway  
Permeable Concrete

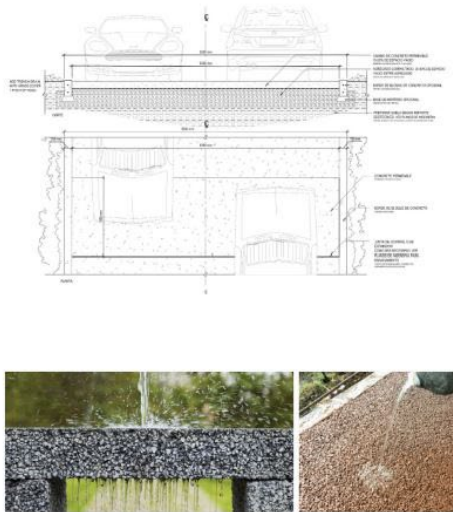


Figure 31. Design detail of permeable concrete. Source: EDSA

## CIRCULATION | DESIGN DETAIL

Pedestrian and Bicycle Trails  
Stabilized Soil/ Aggregate with Polypavement

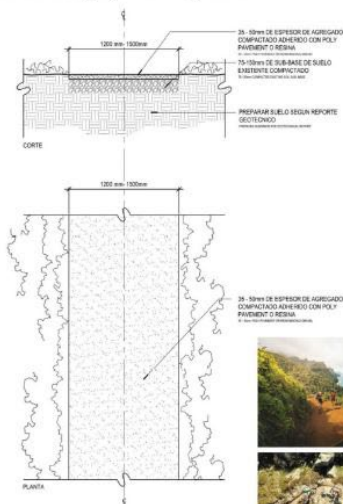


Figure 32. Design detail of walking path. Source: EDSA





Figure 33. Image showing Terramesh installation and permeable paving. Source: EDSA

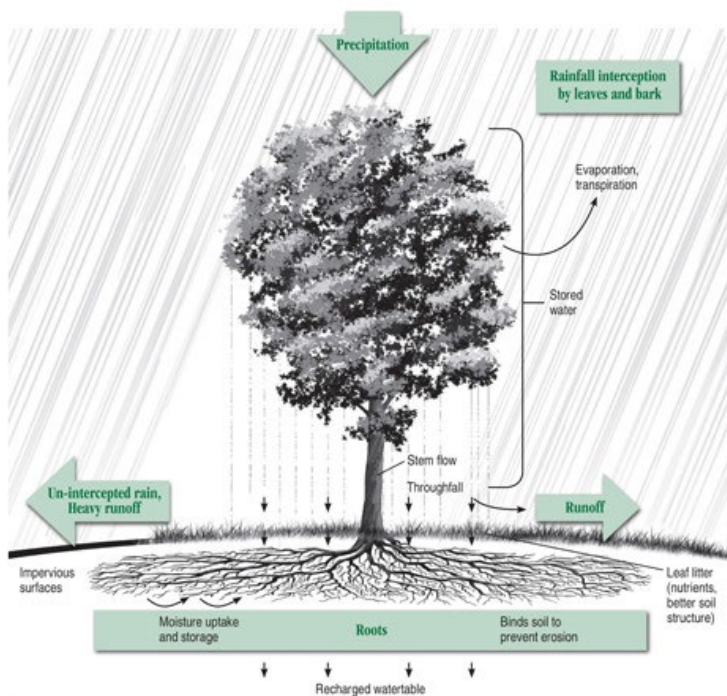


Figure 34. Illustration of how trees assist with precipitation interception and absorption. Source: Tree Canopy BMPS.

| COEFFICIENT OF RUNOFF =<br>RUNOFF / RAINFALL |                       |
|----------------------------------------------|-----------------------|
| SOIL TEXTURE                                 | COEFFICIENT OF RUNOFF |
| Concrete, Roof, or Asphalt                   | 1.00                  |
| Clay – Bare                                  | 0.70                  |
| Clay – Light Vegetation                      | 0.60                  |
| Clay – Dense Vegetation                      | 0.50                  |
| Gravel – Bare                                | 0.65                  |
| Gravel – Light Vegetation                    | 0.50                  |
| Gravel – Dense Vegetation                    | 0.40                  |
| Loam – Bare                                  | 0.60                  |
| Loam – Light Vegetation                      | 0.45                  |
| Loam – Dense Vegetation                      | 0.35                  |
| Sand – Bare                                  | 0.50                  |
| Sand – Light Vegetation                      | 0.40                  |
| Sand – Dense Vegetation                      | 0.30                  |
| Grass Areas                                  | 0.35                  |

Figure 35. Illustration listing coefficient of rainfall for different soil textures. Source: Tree Canopy BMPS.

### **Calculations:**

1 in of rain falling on 1 acre of hardened surface = 27,000 gallons of stormwater runoff.

Polypavement runoff coefficient (provided by manufacturer)= 0.85

Reduction:  $1.0 - 0.85 = 0.15 \sim 15\%$

$27,000 \times 0.15 = 4,050$  gallons of stormwater runoff reduction per 1 acre using Polypavement

### **Sources:**

“Polypavement, More Information.” Polypavement. 2024. <https://www.polypavement.com/more-information/>

Davis, A.P., 2005, Green engineering principles promote low-impact development: Environmental Science and Technology.

Wang, L., Lyons, J., Kanehl, P., and Bannerman, R., 2001, Impacts of urbanization on stream habitat and fish across multiple spatial scales: Environmental Management.

Williamson, R. B., 1993, Urban runoff data book: a manual for the preliminary evaluation of urban stormwater impacts on water quality.

Buchheister, Bevin. Rackley, Jessica. Schoonhoven, Timothy. “Balancing Stormwater Infrastructure Costs.” National Governors Association. January 18, 2022. <https://www.nga.org/publications/balancing-stormwater-infrastructure-costs/>

“Stormwater Benefit of Trees.” Tree Canopy BMPS. 2024. <https://treecanopybmp.org/tree-canopy-bmps/stormwater-benefits-of-trees>



### **Limitations:**

- The research team was unable to perform comparison studies with the pre-construction condition.

### **Benefit 3**

- ***Captures 62 gallons of drinking water daily using a solar-powered water collection system, eliminating use of local groundwater resources for drinking water. This saves an estimated \$47,000 annually in bottled water and eliminates single-use plastic bottle use.***

### **Background:**

The scarcity of water in both Punta Mita and the world has become a reality as expressed by the Mexico National Water Commission. Naviva® was designed to help conserve this resource by creating a renewable water supply that does not tap into or strain existing systems and adopting new water-saving technology. With the help of 39 onsite Hydropanels – each of which eliminates 54,000 plastic bottles over its lifetime (15 years) according to the manufacturer Source – no groundwater is extracted from the earth.

The Hydropanels absorb water vapor from the air with hygroscopic materials, like rice in a saltshaker. The gas then goes through a psychrometric cycle that extracts heat from the sun, turning the vapor back into liquid water. The water is then pumped from a reservoir at the base of the panel through a polishing cartridge to a tap or water dispenser.



Figure 25. Overview of the Hydropanel system. Source: EDSA

**Method:** The research team performed calculations to determine the maximum absorption for each Hydropanel based on the site's average humidity level or dew point. The volume was multiplied by 12 to find the annual capture capacity. Additionally, the team evaluated the performance of the Hydropanels specifically installed on this site by counting the number of panels and assessing their actual contribution to water capture based on local conditions.



Figure 26. Hydropanel water and refill station.



Figure 27. The field research team evaluating solar panels at Naviva®





Figure 28. Hydropanel filtration and bottle area.

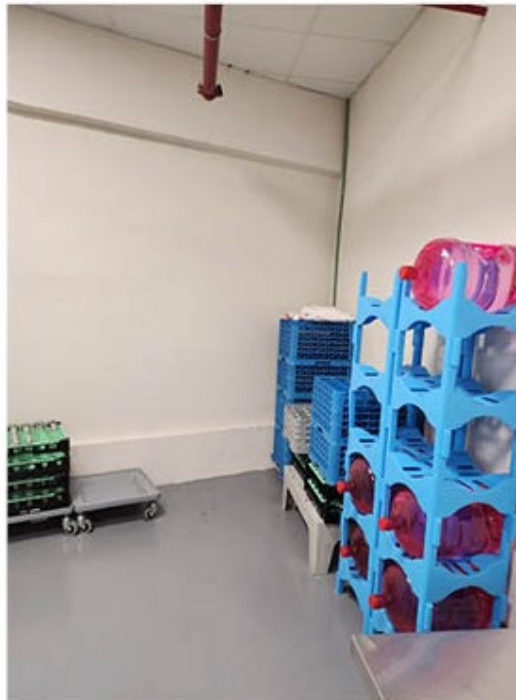


Figure 29. Bottling of Hydropanel-produced water.

**Calculations:**

39 Hydropanels x (12x16.9fl oz)= 7,909.20 daily fl oz produced on site.

1 gallon = 128 fl oz



**7,909.02/128= 61.79 gallons daily produced on site.**

According to the manufacturer, each panel can hold 7.9 gallons of water and produce between 132-330 fluid ounces a day. At the very minimum end of its potential output, each panel can produce the amount of water found in a 12-pack of bottled water per day.

|                                                  |             |
|--------------------------------------------------|-------------|
| 12- pack water (16.9 fl oz) /day -( +- 6 liters) | \$ 3.38     |
| 12-pack * 30/month                               | \$ 101.4    |
| 12-pack * 356/year                               | \$ 1,203.28 |

Figure 30. Bottled water pricing. Source: [www.walmart.com](http://www.walmart.com)

39 panels x \$1203.28 = 46,927.92

This is an estimated cost savings of **\$46,927.92 annually** on 12-pack bottled water.

**Sources:**

“Water supply in Punta de Mita affected by droughts and deficient facilities” Asociación de Empresarios de Punta de Mita y Riviera Nayarit. 2018. <https://adepm.org.mx/en/water-supply-punta-de-mita>

“How It Works.” Source. 2024. <https://www.source.co/how-hydropanels-work/>

“Honouring Nature Through Sustainability.” Four Seasons Hotels and Resorts. 2024. <https://press.fourseasons.com/naviva/trending-now/sustainability-initiatives/>

**Limitations:**

- The research team was not able to compare water demands on the cistern prior to Hydropanel installation.
- Maintenance costs for the Hydropanels is not accounted for in cost savings estimate, but it is minimal.
- Calculating based on manufacturer specifications.
- Bottled water costs are based on United States pricing but are comparable to Nayarit pricing.

**Benefit 4**

- ***Lowens temperatures within the resort’s circulation paths on average by 0.3% compared to surrounding access road. [NOTE TO REVIEWERS FROM MB: CANDIDATE FOR MOVING TO “INCONCLUSIVE BENEFITS”]***

**Background:**

Traditional resorts are a matrix of buildings connected by climate-controlled hallways. Naviva® was

designed as an open-air facility. Guest units and resort spaces were positioned, oriented, and designed to maximize air flow and take advantage of the cooling effect of the existing tree canopy. This supports guests' thermal comfort throughout the resort. Guest bedroom quarters and guest bathrooms are climate controlled.

Tree canopies play a significant role in moderating ground temperatures, providing shade and insulation that can help mitigate temperature extremes and create microclimates beneficial for various organisms and ecosystems. The temperature of the ground under a tree canopy can vary depending on factors like the density of the canopy, the time of day, the season, and the local climate. Generally, tree canopies provide shade, reducing the amount of direct sunlight reaching the ground and thus lowering ground temperatures compared to areas without tree cover.

The mitigation potential of vegetation-driven biophysical effects is strongly influenced by the background climate and will therefore be influenced by global warming. Under high-emission scenario, greening will likely mitigate land warming by  $0.71 \pm 0.40$  °C, and 83% of such effect ( $0.59 \pm 0.41$  °C) is driven by the increase in plant carbon sequestration, while the remaining cooling ( $0.12 \pm 0.05$  °C) is due to biophysical land-atmosphere interactions. (Alkama, R., Forzieri, G., Duveiller, G. *et al.*).

#### Climate and Average Weather Year-Round in Punta Mita

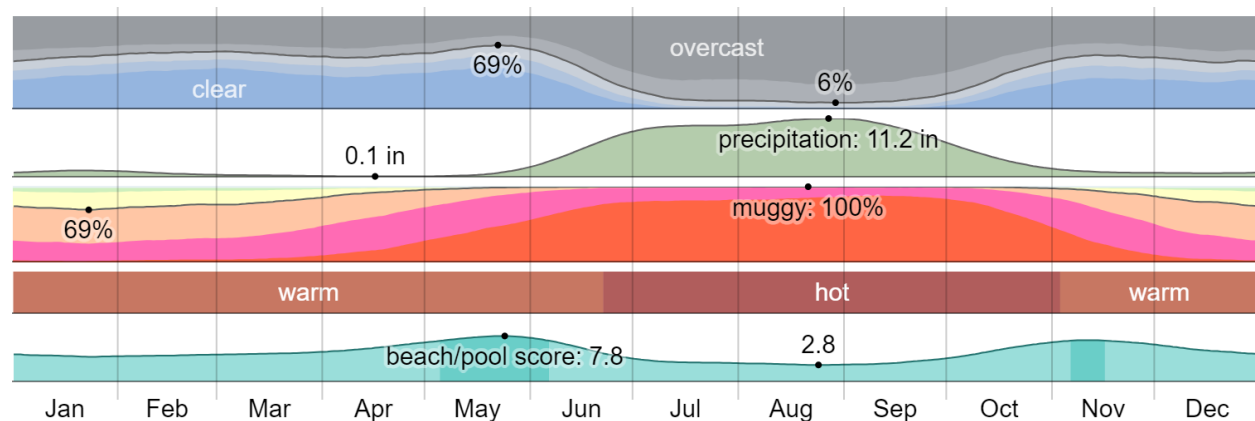


Figure 5. Punta Mita, MX average weather. Image provided by Weather Spark

### Average Wind Speed in Punta Mita

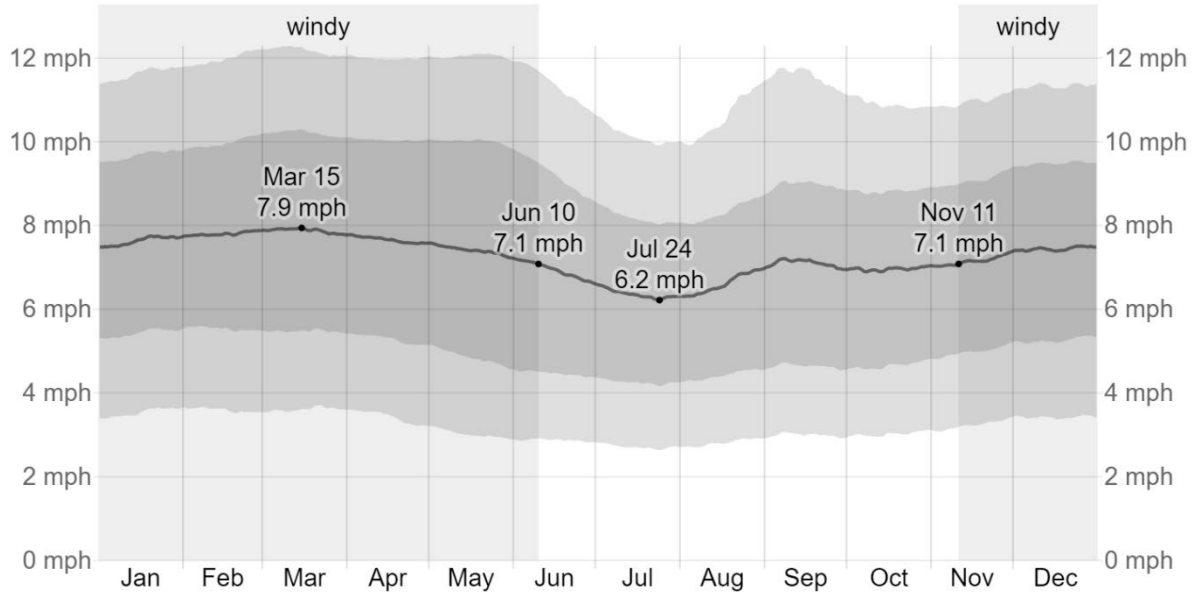


Figure 6. Average wind speed in Punta Mita, MX. Image provided by Weather Spark

#### **Method:**

The research team evaluated three Focus Areas for the climate comparison. These Focus Areas represent guests' circulation and programming experience within the resort. These areas would be climate controlled in traditional resorts. Focus Area 1 is the resort's surrounding access road. This served as the control and representation for the 'built conditions' of a traditional resort. Focus Area 1 is disturbed land due to construction and lacks heavy tree canopy. Focus Area 1 is considered the constant when compared to Focus Area 2 (Golf Cart Path) and Focus Area 3 (Nature Trail) within the resort.



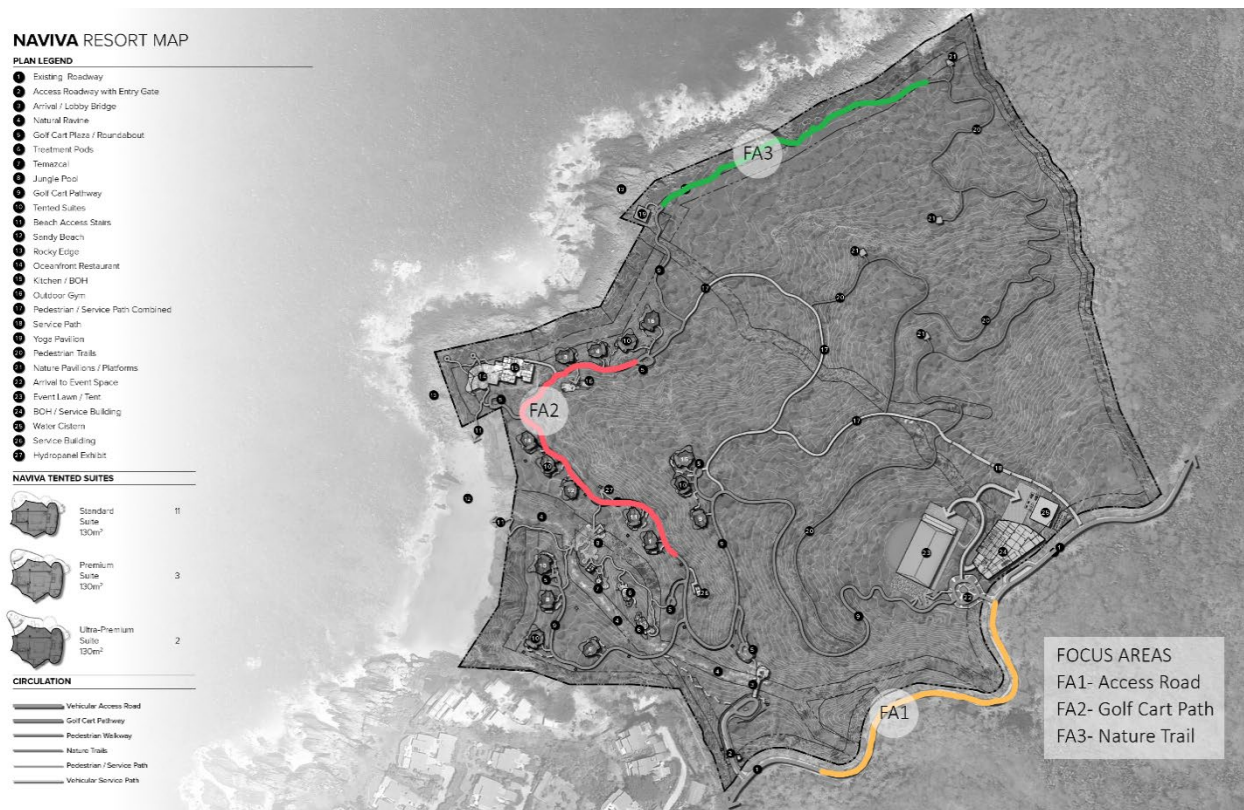


Figure 7. EDSA resort map with the focus area locations added by the research team.

The research field team traveled to the site and recorded temperature and wind measurements over two consecutive days, Sept 27-28, 2024.

#### Summary of Punta Mita Weather Station Data for the day field measurements were taken.

| Accuweather Weather Station Sept 28,2024 Punta Mita, MX |          |           |            |          |
|---------------------------------------------------------|----------|-----------|------------|----------|
| Time                                                    | Air Temp | Real Feel | Wind Gusts | Humidity |
| 3pm                                                     | 88F      | 101F      | 7mph       | 83%      |
| 5pm                                                     | 88F      | 103F      | 0          | 83%      |
| 7pm                                                     | 88F      | 100F      | 9mph       | 78%      |

Figure 8. Field team data from Accuweather during onsite visit Sept. 28, 2024.

Weather station data during the team's visit to Naviva® reported air temperature readings of 88 degrees Fahrenheit, dangerously high humidity (78-83%), with little to no wind. Wind speed was measured by the research team, but the recorded wind speed measurements within the Focus Areas were nominal with rare gusts over 3mph. Consistent wind speeds greater than 3mph have a cooling effect. The wind speeds that the research team recorded are displayed in the Focus Area Measurement charts. During the team's site visit and data collection, the wind gusts were not sustained and were nominal at less than 3mph. Unfortunately, due to lack of wind and sustained gusts over 3mph, the data did not support a 'cooling effect' calculation.

Temperature (in degrees Fahrenheit), humidity and wind speed data were collected from the three Focus Areas. The team selected the Milwaukee 10:1 Infrared Temp-Gun, and HoldPeak 866B Digital Anemometer Handheld Wind Speed Meter. The published accuracies of these devices are  $\pm 1.0$  degree Fahrenheit and  $\pm 5.0\%$  for wind speeds.



Figure 9. Measurement devices for temperature and wind.

The team took air temperature and wind measurements at 12pm, 3pm, 5pm and 7pm on all three Focus Areas. All measurements were taken at 50 steps along the path, eight measurements within each Focus Area.

The devices were held 3ft off the ground (about shoulder height) for 5 seconds to record data in a shaded or semi-shaded location. No data was collected in the full sun. The data was collected and recorded 4x at 12-noon, 3pm, 5pm and 7pm.



Figure 10. Field measurements of temperature and wind at various focus areas.



### **Focus Area 1- Surrounding Access Road**



Figure 11. Photos of Focus Area 1: the surrounding access road.  
The Access Road construction material is permeable concrete.

### **Focus Area 2- Golf Cart Path**



Figure 12. Photos of Focus Area 2: the golf cart path.  
Golf Cart Path construction material is permeable poly pavement.



### Focus Area 3- Nature Trail



Figure 13. Photos of Focus Area 3: the nature trail.  
The Nature Trail surface condition is native soil.

## Data for Measurements of Resort Focus Areas (FA1, FA2, FA3)

Noon temperature comparison: Naviva® Nature Trail (FA3), Golf Cart Path (FA2) and Access Road (FA1)

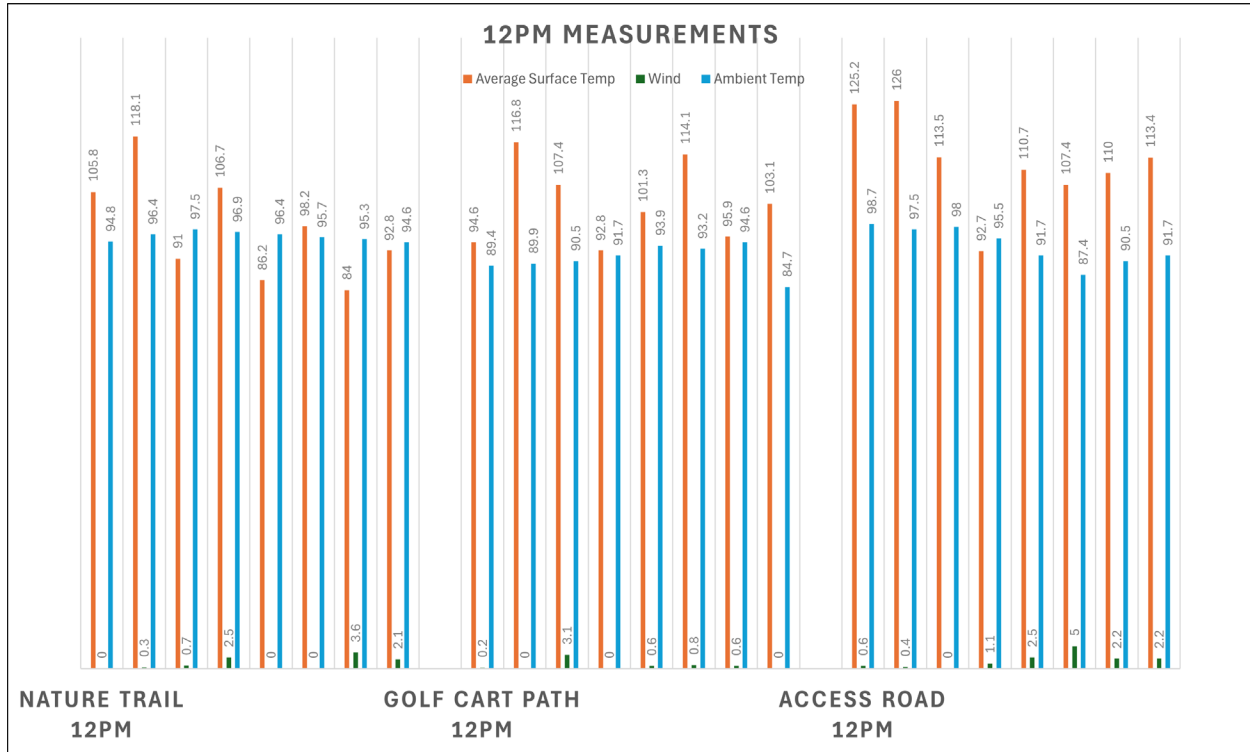


Figure 14. Bar graph showing ambient temperature, surface temperature and wind at 12pm.

### 12pm Measurement Calculations:

12pm Nature Trail (FA3) Average Surface Temperature

$$(105.8 + 118.1 + 91 + 106.7 + 86.2 + 98.2 + 84 + 92.8) / 8 = 97.8$$

12pm Nature Trail (FA3) Average Ambient Temperature

$$(94.8 + 96.4 + 97.5 + 96.9 + 96.4 + 95.7 + 95.3 + 94.6) / 8 = 95.9$$

12pm Nature Trail (FA3) Wind Readings

One reading measured over 3mph was recorded along the Nature Trail (FA3) at 12pm. Wind readings over 3mph have a cooling effect on the body.

12pm Golf Cart Path (FA2) Average Surface Temperature

$$(94.6 + 116.8 + 107.4 + 92.8 + 101.3 + 114.1 + 95.9) / 8 = 103.2$$

12pm Golf Cart Path (FA2) Average Ambient Temperature

$$(89.4 + 89.9 + 90.5 + 91.7 + 93.9 + 93.2 + 94.6 + 84.7) / 8 = 90.9$$

12pm Golf Cart Path (FA2) Wind Readings

One reading measured over 3mph was recorded along the Golf Cart Path (FA2) at 12pm. Wind readings over 3mph have a cooling effect on the body.

12pm Access Road (FA1) Average Surface Temperature

$$(125.2 + 126 + 113.5 + 92.7 + 110.7 + 107.4 + 110 + 113.4) / 8 = 112.3$$

12pm Access Road (FA1) Average Ambient Temperature

$$(98.7 + 97.5 + 98 + 95.5 + 91.7 + 87.4 + 90.5 + 91.7) / 8 = 93.8$$

12pm Access Road (FA1) Wind Readings

No readings measured over 3mph were recorded along the Access Road (FA1) at 12pm. Wind readings over 3mph have a cooling effect on the body.

Nature Trail (FA3) Ambient Temperature at 12pm was 95.9

Golf Cart Path (FA2) Ambient Temperature at 12pm was 90.9

Access Road (FA1) Ambient Temperature at 12pm was 93.8

Average of Focus Area 2 and Focus Area 3 is 93.4

Focus Area 1 -(Average of Focus Area 2+Average of Focus Area 3) = Temperature Delta

$$93.8-93.4 = .02$$



### 3pm temperature comparison: Naviva® Nature Trail (FA3), Golf Cart Path (FA2) and Access Road (FA1)

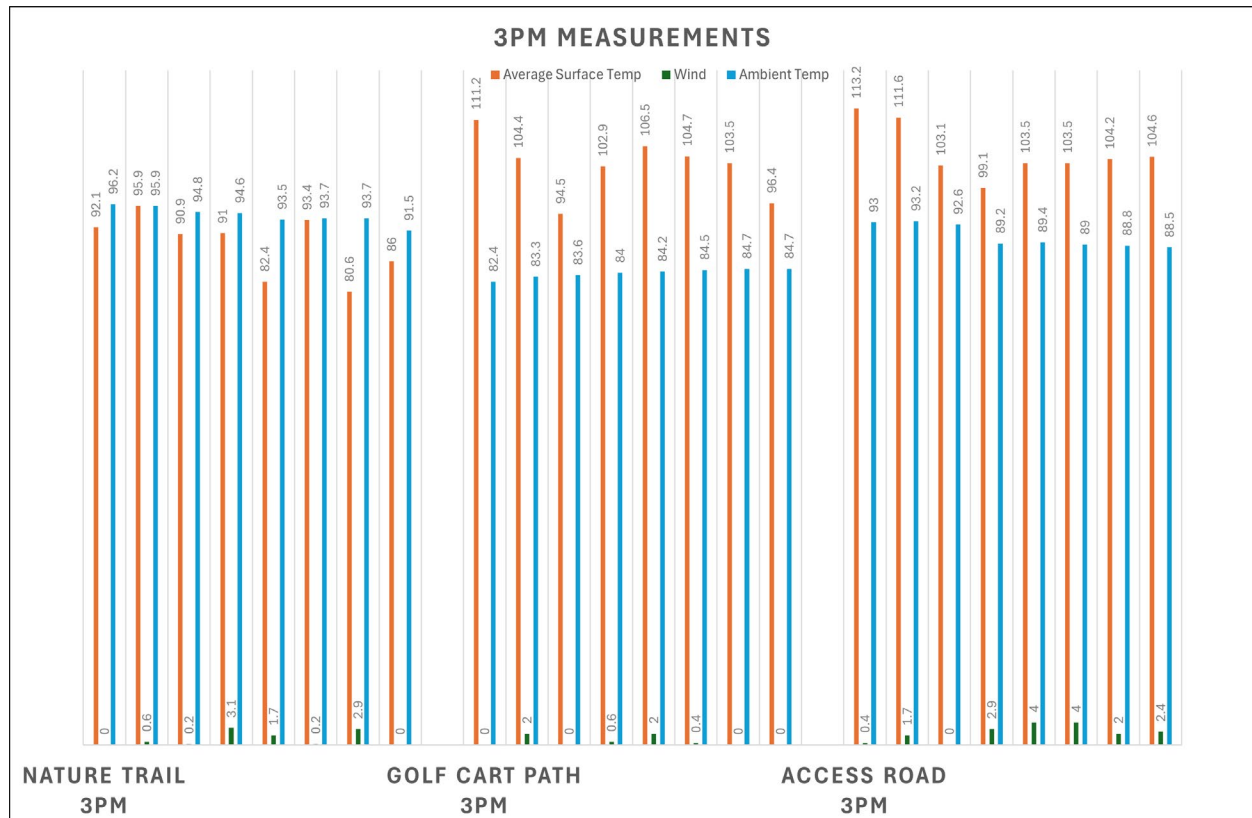


Figure 15. Bar graph showing ambient temperature, surface temperature and wind at 3pm.

#### 3pm Measurement Calculations:

3pm Nature Trail (FA3) Average Surface Temperature

$$(92.1 + 95.9 + 90.9 + 91 + 82.4 + 93.4 + 80.6 + 86) / 8 = 89.0$$

3pm Nature Trail (FA3) Average Ambient Temperature

$$(96.2 + 95.9 + 94.8 + 94.6 + 93.5 + 93.7 + 93.7 + 91.5) / 8 = 94.2$$

3pm Nature Trail (FA3) Wind Readings

One reading measured over 3mph was recorded along the Nature Trail (FA3) at 3pm. Wind readings over 3mph have a cooling effect on the body.

3pm Golf Cart Path (FA2) Path Average Surface Temperature

$$(111.2 + 104.4 + 94.5 + 102.9 + 106.5 + 104.7 + 103.5 + 96.4) / 8 = 103.0$$

3pm Golf Cart Path (FA2) Average Ambient Temperature

$$(82.4 + 83.3 + 83.6 + 84 + 84.2 + 84.5 + 84.7 + 84.7) / 8 = 83.9$$

### 3pm Golf Cart Path (FA2) Wind Readings

No reading measured over 3mph were recorded along the Golf Cart Path (FA2) at 3pm. Wind readings over 3mph have a cooling effect on the body.

### 3pm Access Road (FA1) Average Surface Temperature

$$(113.2 + 111.6 + 103.1 + 99.1 + 103.5 + 103.5 + 104.2 + 104.6) / 8 = 105.3$$

### 3pm Access Road Average (FA1) Ambient Temperature

$$(93 + 93.2 + 92.6 + 89.2 + 89.4 + 89 + 88.8 + 88.5) / 8 = 90.4$$

### 3pm Access Road (FA1) Wind Readings

No readings measured over 3mph were recorded along the Access Road (FA1) at 3pm. Wind readings over 3mph have a cooling effect on the body.

Nature Trail (FA3) Ambient Temperature at 3pm was 94.2

Golf Cart Path (FA2) Ambient Temperature at 3pm was 83.9

Access Road (FA1) Ambient Temperature at 3pm was 90.4

Average of Focus Area 2 and Focus Area 3 is 89

Focus Area 1 -(Average of Focus Area 2+Average of Focus Area 3) = Temperature Delta

$$90.4 - 89 = 1.4$$

## 5pm temperature comparison: Naviva® Nature Trail (FA3), Golf Cart Path (FA2) and Access Road (FA1)



Figure 15. Bar graph showing ambient temperature, surface temperature and wind at 5pm.

### 5pm Measurement Calculations:

5pm Nature Trail (FA3) Average Surface Temperature

$$(99.9 + 102.2 + 93.6 + 98.6 + 96.1 + 90 + 92.1) / 8 = 95.5$$

5pm Nature Trail (FA3) Average Ambient Temperature

$$(82 + 82.7 + 83.4 + 84 + 84.3 + 86.5 + 84.7 + 84.7) / 8 = 84.0$$

5pm Nature Trail (FA3) Wind Readings

Two readings measured over 3mph were recorded along the Nature Trail (FA3) at 3pm. Wind readings over 3mph have a cooling effect on the body.

5pm Golf Cart Path (FA2) Average Surface Temperature

$$(99 + 103.5 + 100.6 + 97 + 100.2 + 100.8 + 95.7 + 97.9) / 8 = 99.3$$

5pm Golf Cart Path (FA2) Average Ambient Temperature

$$(82.4 + 83.3 + 83.6 + 84 + 84.2 + 84.5 + 84.7 + 84.7) / 8 = 83.9$$

5pm Golf Cart Path (FA2) Wind Readings



Three readings measured over 3mph were recorded along the Golf Cart path (FA2) at 12pm. Wind readings over 3mph have a cooling effect on the body.

5pm Access Road (FA1) Average Surface Temperature

$$(107.6 + 106.2 + 100.2 + 96.1 + 103.5 + 103.8 + 102.7) / 8 = 102$$

5pm Access Road Average (FA1) Ambient Temperature

$$(83.9 + 83.8 + 83.8 + 83.8 + 83.6 + 83.7 + 83.7 + 83.8) / 8 = 83.7$$

5pm Access Road Path (FA1) Wind Readings

No readings measured over 3mph were recorded along the Access Road (FA1) at 5pm. Wind readings over 3mph have a cooling effect on the body.

Nature Trail (FA3) Ambient Temperature at 5pm was 84

Golf Cart Path (FA2) Ambient Temperature at 5pm was 83.9

Access Road (FA1) Ambient Temperature at 5pm was 83.7

Average of Focus Area 2 and Focus Area 3 is 83.9

Focus Area 1 -(Average of Focus Area 2+Average of Focus Area 3) = Temperature Delta

$$83.7 - 83.9 = -0.2$$

## 7pm temperature comparison: Naviva® Nature Trail (FA3), Golf Cart Path (FA2) and Access Road (FA1)

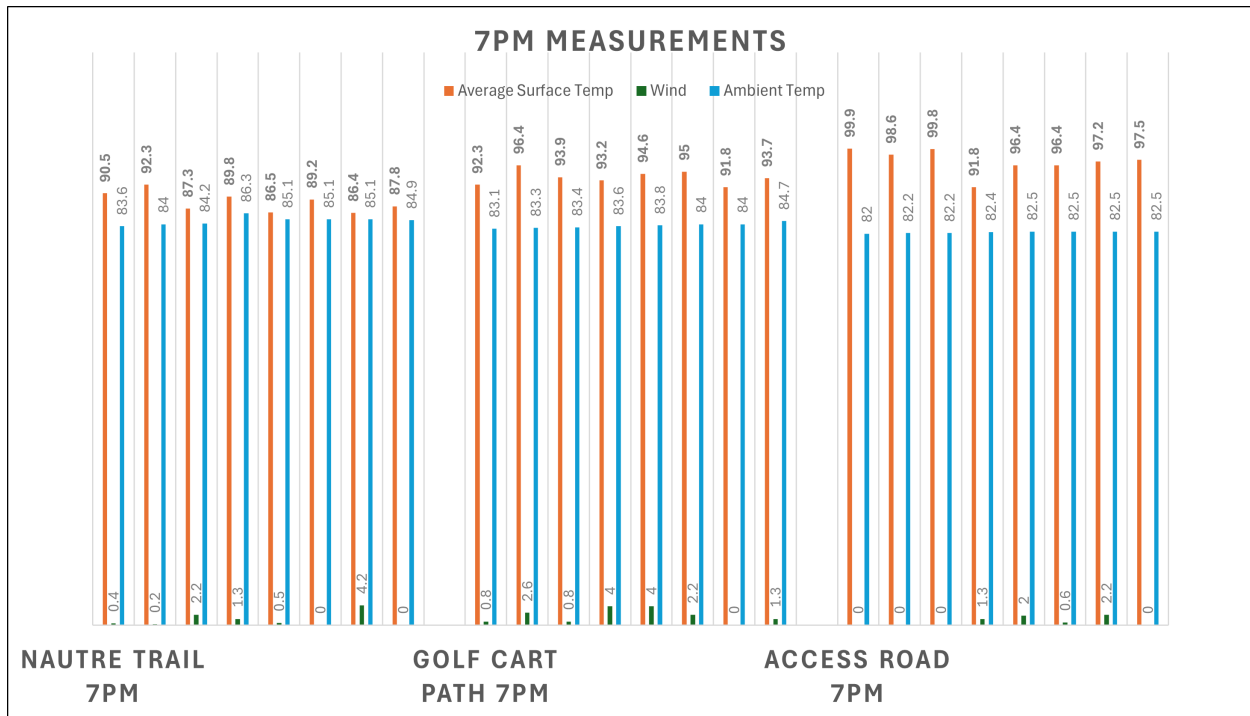


Figure 16. Bar graph showing ambient temperature, surface temperature and wind at 7pm.

### 7pm Measure Calculations:

7pm Nature Trail Path (FA3) Average Surface Temperature

$$(90.5 + 92.3 + 87.3 + 89.8 + 86.5 + 89.2 + 86.4 + 87.8) / 8 = 88.7$$

7pm Nature Trail (FA3) Average Ambient Temperature

$$(83.6 + 84 + 84.2 + 86.3 + 85.1 + 85.1 + 85.1 + 84.9) / 8 = 84.7$$

7pm Nature Trail (FA3) Wind Readings

One reading measured over 3mph was recorded along the nature path at 7pm. Wind readings over 3mph have a cooling effect on the body.

7pm Golf Cart Path (FA2) Average Surface Temperature

$$(92.3 + 96.4 + 93.9 + 93.2 + 94.6 + 95 + 91.8 + 93.7) / 8 = 93.8$$

7pm Golf Cart Path (FA2) Average Ambient Temperature

$$(83.1 + 83.3 + 83.4 + 83.6 + 83.8 + 84 + 84 + 84.7) / 8 = 83.7$$

7pm Golf Cart Path (FA2) Wind Readings

Two readings measured over 3mph were recorded along the Golf Cart Path at 7pm. Wind readings over 3mph have a cooling effect on the body.

7pm Access Road (FA1) Average Surface Temperature

$$(99.9 + 98.6 + 99.8 + 91.8 + 96.4 + 96.4 + 97.2 + 97.5) / 8 = 97.2$$

7pm Access Road (FA1) Average Ambient Temperature

$$(82 + 82.2 + 82.2 + 82.4 + 82.5 + 82.5 + 82.5 + 82.5) / 8 = 82.3$$

7pm Access Road (FA1) Path Wind Readings

No readings measured over 3mph were recorded along the Access Road (FA1) at 7pm. Wind readings over 3mph have a cooling effect on the body.

Focus Area 2: Nature Trail (FA3) Ambient Temperature at 7pm was 84.7

Focus Area 3: Golf Cart Path (FA2) Ambient Temperature at 7pm was 83.7

Focus Area 1: Access Road (FA1) Ambient Temperature at 7pm was 82.7

Average of Focus Area 2 and Focus Area 3 is 84.2

Focus Area 1 -(Average of Focus Area 2+Average of Focus Area 3)= Temperature Delta

$$82.7-84.2= -0.2$$

**Average of measurement deltas (all times)**

$$(.02) + (1.4) + (-0.2) + (-0.2) / 4 = 0.003$$

$$0.003 / 100 = 0.3\%$$

More air movement was recorded within the resort property compared to the access road. However, the wind speed was below a threshold that would be considered a factor contributing to the 'cooling effect'.

#### **Sources:**

Alkama, R., Forzieri, G., Duveiller, G. *et al.* "Vegetation-based climate mitigation in a warmer and greener world". Nat Commun 13, 606 (2022). <https://doi.org/10.1038/s41467-022-28305-9>

"Weather Forecast for Punta Mita, Mexico." Accuweather. September 27, 2024. <https://www.accuweather.com/>.

Foster, Josh et al. "Quantifying the impact of heat on human physical work capacity; part II: the observed interaction of air velocity with temperature, humidity, sweat rate, and clothing is not captured

by most heat stress indices.” International journal of biometeorology vol. 66,3 (2022): 507-520.  
doi:10.1007/s00484-021-02212-y. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8850241/>

“Climate and Average Weather Year Round in Punta Mita.” Weather Spark.  
[https://weatherspark.com/y/3408/Average-Weather-in-Corral-del-Risco-\(Punta-de-Mita\)-Mexico-Year-Round](https://weatherspark.com/y/3408/Average-Weather-in-Corral-del-Risco-(Punta-de-Mita)-Mexico-Year-Round)

#### **Limitations:**

- The site is seasonal with deciduous trees. The research team was unable to perform comparison studies during season with leaves and season without the canopy of tree leaves.
- The research team only had capacity during their site visit to collect surface temperature, ambient temperature and wind speed data over the course of two consecutive days. A multiple day average was not feasible.
- The research team did not have a device to measure humidity levels while on property.
- Data produced by the devices is limited to their published accuracy.
- Wind was minimal during measurement readings and was considered a non-contributing factor for ‘cooling effect’ calculations.

#### **Benefit 5**

- ***Projected to sequester 1,347 tons of atmospheric carbon over the lifespan of 345 newly planted trees.***

#### **Background:**

Excessive emissions of greenhouse gases — of which carbon dioxide is the most significant component — are regarded as the primary reason for increased concentration of atmospheric carbon dioxide and global warming. Terrestrial vegetation sequesters 112–169 PgC (1PgC =  $10^{15}$ g carbon) each year, which plays a vital role in global carbon recycling. Vegetation dominates most terrestrial ecosystems (e.g., forests, grasslands, croplands, shrublands, and savannas) and absorbs 112–169 PgC each year from the atmosphere through a biochemical process called photosynthesis. (Sha, Z., Bai, Y., Li, R. *et al.*, 2022)



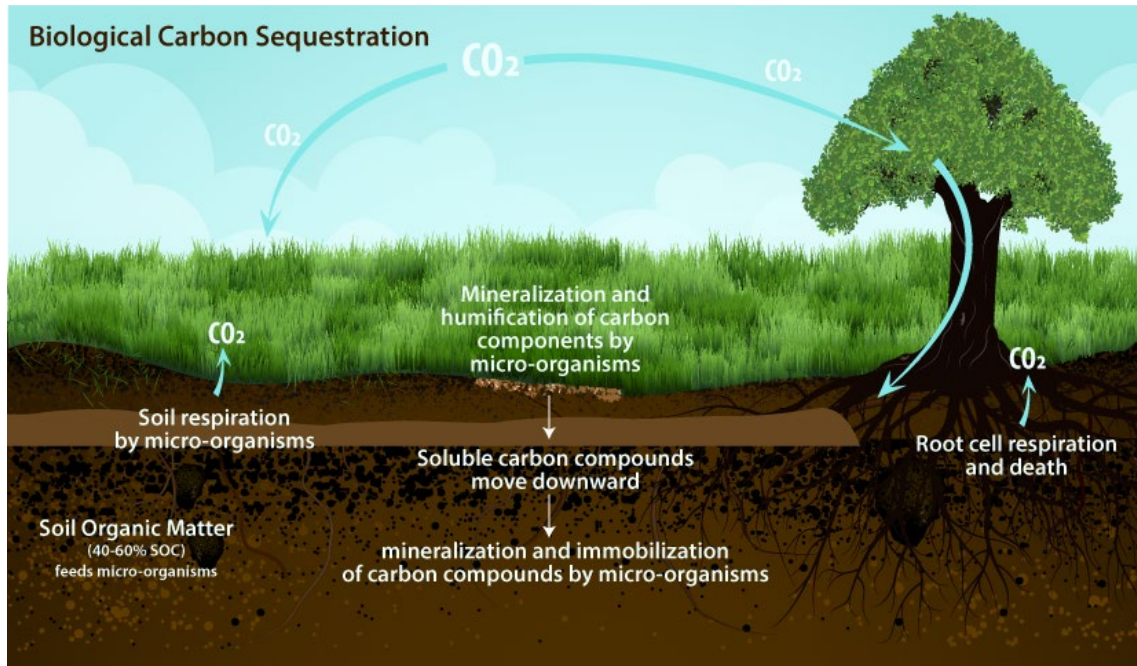


Figure 17. Image of the carbon sequestration process. Source graphic provided by ca.gov.  
<https://www.ca.gov>

**Method:**

The research team used the planting plan (Figure 18) and specified tree and palm list (Figure 19) to identify trees in the field. 345 trees and palms were included in the tree and palm list.

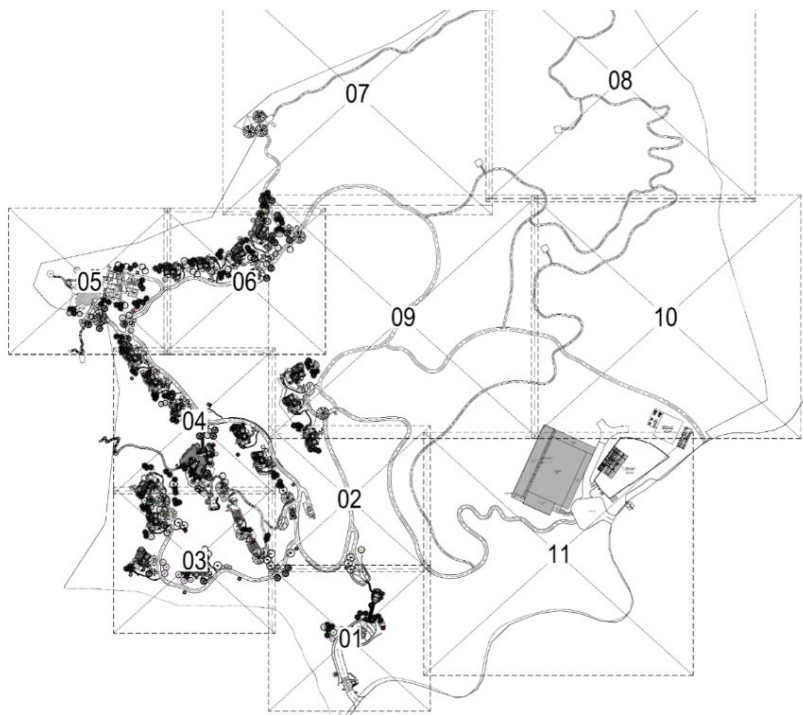


Figure 18. Planting Plan divided into sections. Source: EDSA.

See **Appendix 1** for detailed list of tree and palm species and quantity per section.

Full list of trees used on the planting plan: *Albizia niopoides*, *Bursera simaruba*, *Ceiba nucifera*, *Cocos nucifera*, *Diphyssa americana*, *Enterolobium contortisiliquum*, *Ficus benghalensis*, *Ficus citrifolia*, *Ficus trigonata*, *Lagerstroemia indica*, *Lagerstroemia speciosa*, *Plumeria pudica*, *Plumeria rubra*, *Spondias mombin*, *Tabebuia ochracea*, *Tabebuia rosea*, *Vachellia farnesiana*.

| LISTA DE ARBOLES Y PALMERAS                                                         |      |     |                                      |                      |                                                                      |
|-------------------------------------------------------------------------------------|------|-----|--------------------------------------|----------------------|----------------------------------------------------------------------|
| TREE AND PALM SCHEDULE                                                              |      |     |                                      |                      |                                                                      |
| TREES                                                                               | CODE | QTY | BOTANICAL NAME                       | COMMON NAME          | SIZE                                                                 |
|    | ALB  | 17  | <i>Albizia niopoides</i>             | Caribbean Albizia    | 6m HT x 3.5m SPD                                                     |
|    | BUR  | 26  | <i>Bursera simaruba</i>              | Gumbo Limbo          | 5m-7m GW/single, straight trunk with no scars or bottle necking/full |
|    | CEI  | 15  | <i>Ceiba pentandra</i>               | Kapok Tree           | 7m CT/signle trunk, no scars/trimmed to 7 fronds/full                |
|    | CN   | 136 | <i>Cocos nucifera</i>                | Coconut Palm         | 7m - 8m Overall HT                                                   |
|    | DIA  | 12  | <i>Diphyssa americana</i>            | Guachipilin          | 5m-7m GW/single, straight trunk with no scars or bottle necking/full |
|    | EP   | 2   | <i>Enterolobium contortisiliquum</i> | Pacara Earpod Tree   | 4.5-5m Ht. X 3.5m Spr.                                               |
|    | FB   | 6   | <i>Ficus benghalensis</i>            | Indian Banyan        | 4m-6m O.A.                                                           |
|   | FIC  | 6   | <i>Ficus citrifolia</i>              | Wild Banyan Tree     | 4m-6m O.A.                                                           |
|  | FM   | 13  | <i>Ficus trigonata</i>               | Jaguey Blanco        | 4.5m CT/single trunk/full                                            |
|  | LAG  | 4   | <i>Lagerstroemia indica</i>          | Crape Myrtle         | 3m-3.5m OA/min of 5 stems/full                                       |
|  | LS   | 18  | <i>Lagerstroemia speciosa</i>        | Queen's Crape Myrtle | 3m-3.75m Ht, Full                                                    |
|  | PU   | 43  | <i>Plumeria pudica</i>               | Frangipani           | 3m-3.75m Ht, Full                                                    |
|  | PR   | 13  | <i>Plumeria rubra</i>                | Red Frangipani       | 3m-3.75m Ht, Full                                                    |
|  | SPO  | 5   | <i>Spondias mombin</i>               | Yellow Mombin        | 4m ht/single trunk/full                                              |
|  | TAO  | 20  | <i>Tabebuia ochracea</i>             | Corteza Amarilla     | 5m-7m GW/single, straight trunk with no scars or bottle necking/full |
|  | TAR  | 11  | <i>Tabebuia rosea</i>                | Rosy Trumpet Tree    | 5m-7m GW/single, straight trunk with no scars or bottle necking/full |
|  | VF   | 4   | <i>Vachellia farnesiana</i>          | Sweet Acacia         | 4.5-5m Ht. X 3.5m Spr.                                               |

Figure 19. Tree and Palm List with specifications. Source: EDSA.

For the trees that could be identified and located on site, the diameter at breast height (dbh) was measured using a soft tape measure.



Figure 20. Field research team locating planting plan species and taking dbh measurements.

The field team located 10 species from the planting plan and recorded the dbh (Figure 21).

| Botanical Name                       | Common Name          | Height | dbh  |
|--------------------------------------|----------------------|--------|------|
| <i>Albizia niopoides</i>             | Caribbean Albizia    | 20'    | 4"   |
| <i>Bursera simaruba</i>              | Gumbo Limbo          | 18'    | 6"   |
| <i>Ceiba pentandra</i>               | Kapok Tree           | 40'    | 19"  |
| <i>Cocos nucifera</i>                | Coconut Palm         | 103'   | 11"  |
| <i>Diphyssa americana</i>            | Guachipilin          | 36'    | 9"   |
| <i>Enterolobium contortisiliquum</i> | Pacara Earpod Tree   | 20'    | 3"   |
| <i>Ficus trigonata</i>               | Jaguey Blanco        | 60'    | 40"  |
| <i>Lagerstroemia speciosa</i>        | Queen's Crape Myrtle | 12'    | 1.5" |
| <i>Tabebuia ochracea</i>             | Corteza Amarilla     | 30'    | 5"   |
| <i>Vachellia farnesiana</i>          | Sweet Acacia         | 31.7'  | 17"  |

Figure 21. Field research team's located species and corresponding dbh measurements.

The trees that were included on the specified tree and palm list but not identified or located in the field by the research team were assigned a minimal estimate of 3-inch dbh measurement.

The research team used the i-Tree.com planting calculator to enter tree species, dbh (actual and/or 3-inch minimal estimate), and quantities.



## Calculations:

i-Tree results exported as .csv file and data displayed as a report in Excel showed 345 total trees.

| Tree Group Characteristics                                                         | Initial Number of Trees | Species                                            | Initial DBH (inches) | DBH (inches) | CO2 Sequestered (pounds) |
|------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------|----------------------|--------------|--------------------------|
| 17 Tantakayo albizia (Albizia niopoides) trees of 4 inches initial DBH. Planted 0- | 17                      | Tantakayo albizia (Albizia niopoides)              | 4                    | 42.8         | 227,268.7                |
| 26 Gumbo limbo (Bursera simaruba) trees of 6 inches initial DBH. Planted 0-        | 26                      | Gumbo limbo (Bursera simaruba)                     | 6                    | 35.0         | 388,001.9                |
| 15 Kapok (Ceiba pentandra) trees of 19 inches initial DBH. Planted 0-19 feet       | 15                      | Kapok (Ceiba pentandra)                            | 19                   | 49.9         | 422,301.9                |
| 136 Coconut palm (Cocos nucifera) trees of 11 inches initial DBH. Planted 0-       | 136                     | Coconut palm (Cocos nucifera)                      | 11                   | 41.1         | 287,772.3                |
| 12 Guachiipilin (Diphysa americana) trees of 9 inches initial DBH. Planted 0-      | 12                      | Guachiipilin (Diphysa americana)                   | 9                    | 39.4         | 261,932.1                |
| 2 Pacara earpod tree (Enterolobium contortisiliquum) trees of 3 inches initial     | 2                       | Pacara earpod tree (Enterolobium contortisiliquum) | 3                    | 42.0         | 19,686.4                 |
| 6 Indian banyan (Ficus benghalensis) trees of 3 inches initial DBH. Planted 0-     | 6                       | Indian banyan (Ficus benghalensis)                 | 3                    | 42.0         | 111,687.0                |
| 4 Common crapemyrtle (Lagerstroemia indica) trees of 1.5 inches initial DBH        | 4                       | Common crapemyrtle (Lagerstroemia indica)          | 1.5                  | 18.5         | 12,648.4                 |
| 18 Queen's crapemyrtle (Lagerstroemia speciosa) trees of 3 inches initial DBH      | 18                      | Queen's crapemyrtle (Lagerstroemia speciosa)       | 3                    | 34.4         | 231,339.4                |
| 43 Floron (Plumeria pudica) trees of 1.5 inches initial DBH. Planted 0-19 feet     | 43                      | Floron (Plumeria pudica)                           | 1.5                  | 17.5         | 102,974.2                |
| 13 Plumeria spp (Plumeria) trees of 1.5 inches initial DBH. Planted 0-19 feet      | 13                      | Plumeria spp (Plumeria)                            | 1.5                  | 18.5         | 39,737.1                 |
| 5 Yellow mombim (Spondias mombin) trees of 3 inches initial DBH. Planted 0-        | 5                       | Yellow mombim (Spondias mombin)                    | 3                    | 31.1         | 26,041.5                 |
| 20 Caribbean trumpet-tree (Tabebuia aurea) trees of 5 inches initial DBH. Planted  | 20                      | Caribbean trumpet-tree (Tabebuia aurea)            | 5                    | 32.0         | 168,970.8                |
| 11 Pink Pouli (Tabebuia rosea) trees of 5 inches initial DBH. Planted 0-19 feet    | 11                      | Pink Pouli (Tabebuia rosea)                        | 5                    | 35.7         | 95,881.1                 |
| 4 Vachellia spp (Vachellia) trees of 17 inches initial DBH. Planted 0-19 feet      | 4                       | Vachellia spp (Vachellia)                          | 17                   | 35.3         | 61,434.3                 |
| 13 Jaguey blanco (Ficus trigonata) trees of 40 inches initial DBH. Planted 0-1     | 13                      | Jaguey blanco (Ficus trigonata)                    | 40                   | 54.1         | 237,402.0                |

Figure 22. i-Tree results.

The 345 trees are estimated to have the capacity to sequester 2,695,079.1 lbs of carbon collectively over the course of their lifespan.

1 ton = 2,000 lbs

$2,695,079.1 / 2000 = 1,347$  tons

**Total lifespan capacity of carbon sequestration of 345 new landscape trees planted at the Naviva® resort is 1,347 tons.**

## Sources:

"Welcome to the i-Tree planting calculator". i-Tree. Version 2.7.0. <https://www.itreetools.org/>

"Carbon Sequestration: Carbon Capture, Removal, Utilization, and Storage." Ca.gov. 2024. <https://ww2.arb.ca.gov/our-work/programs/carbon-sequestration-carbon-capture-removal-utilization-and-storage>

"How to calculate the amount of CO2 sequestered in a tree per year." Trees for the Future. [https://www.unm.edu/~jbrink/365/Documents/Calculating\\_tree\\_carbon.pdf](https://www.unm.edu/~jbrink/365/Documents/Calculating_tree_carbon.pdf)

Sha, Z., Bai, Y., Li, R. *et al.* The global carbon sink potential of terrestrial vegetation can be increased substantially by optimal land management. *Commun Earth Environ* 3, 8 (2022). <https://doi.org/10.1038/s43247-021-00333-1>

## Limitations:

- The proposed planting list was not fully implemented/planted due to plant availability at the time of installation.
- The i-Tree calculator did not have exact species matches for all of the EDSA-implemented tree selections.



- Mortality is modeled as a fractional (not whole) tree estimate and may not align year-over-year.
- Sequestration does not account for net differences like decay.
- Tree canopy cover estimate assumes no overlap between crowns.

#### Benefit 6

- ***Sequesters an estimated 43.2 tons of atmospheric carbon dioxide annually through an estimated 1,800 preserved existing trees.***

#### ***Background:***

Nayarit Mexico is a small state but has varying habitats including jungle forest, mangroves, pine oak forest, and the Pacific coast, that offer a wide array of biodiversity. The Naviva® property is primarily a dry tropical forest on the Pacific coast.

#### ***Method:***

The research team referenced the pre-construction tree survey and compared it to the resort's Master Plan. In the field visual observation confirmed protection of existing trees and canopy within the constructed resort area.

Pre-Construction Tree Survey was overlaid on a pre-construction Google Map image. A quadrant overlay was applied to extrapolate an approximate count of existing trees.

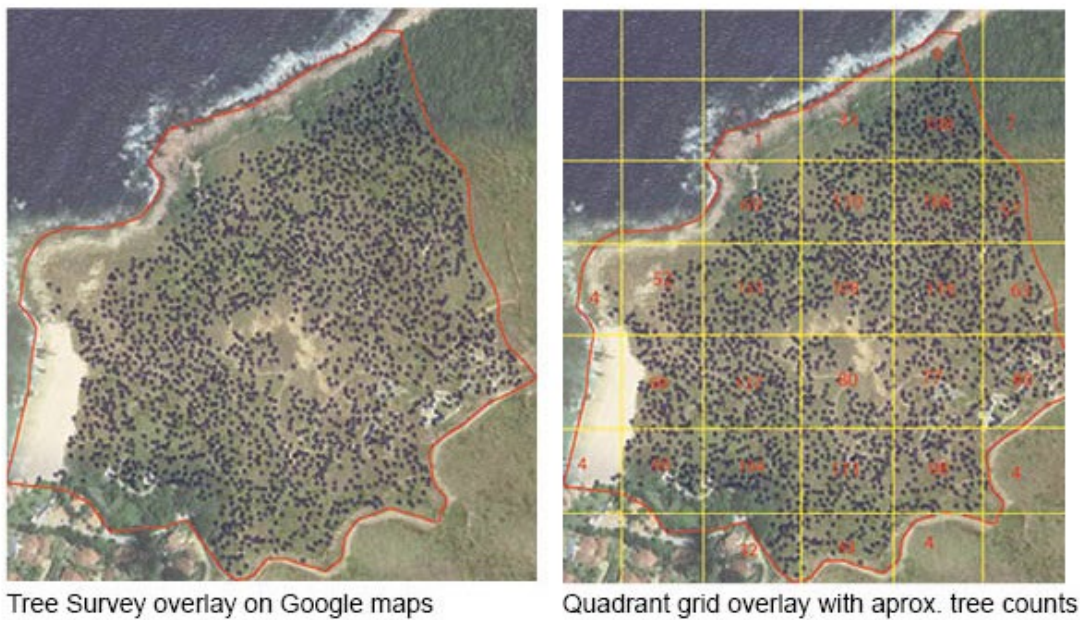


Figure 23. Google map with tree count survey and grid applied for counting.

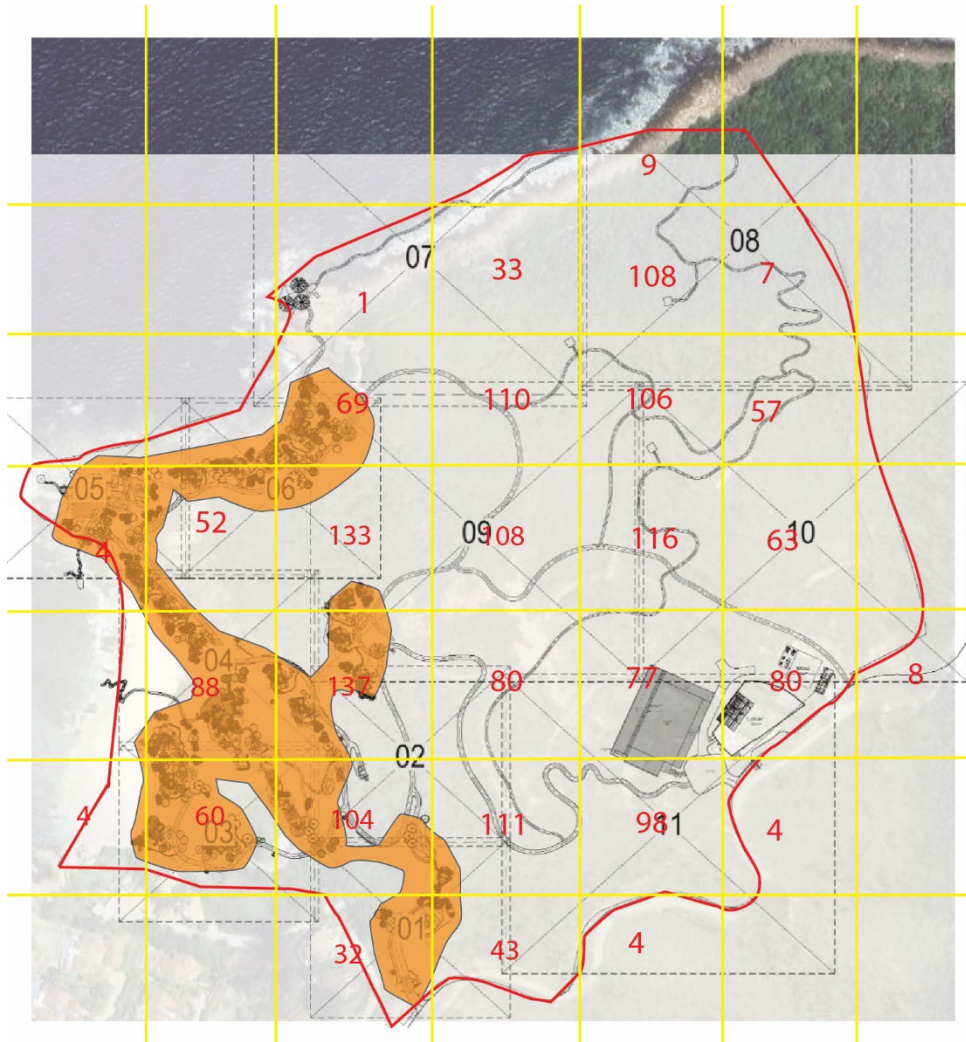


Figure 24. Approximate tree survey counts with resort disturbed area.

EDSA Planting Plan overlaid on Google Map Image and Tree Counts per quadrant.

Orange area is the construction-intensive area. Red numbers are the estimate tree counts prior to construction.

#### **Calculations:**

An estimated 1,800 mature trees of the pre-construction natural habitat were safeguarded during the resort's construction.

A mature tree can absorb more than 48 pounds of carbon dioxide annually.

1800 trees x 48lbs of Co2=86,400 lbs of co2 annually.

2,000lbs = 1 ton

**86,400lbs / 2000lbs = 43.2 tons**

**Sources:**

Androff, Amy. "Trees are Climate Change, Carbon Storage Heros." USDA Forest Service. August 11, 2021. <https://www.fs.usda.gov/about-agency/features/trees-are-climate-change-carbon-storage-heroes>

**Limitations:**

- Did not account for dead or decaying trees after the tree survey was completed.
- Did not enter specific dbh of each tree to determine a more exact carbon sequestration total.
- A post-construction Google Map image did not exist.
- The research team did not have access to a post-construction aerial drone imagery.

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**Social Benefits**

- ***Showcases local culture, with 73% of 29 surveyed resort employees agreeing that working at the resort allows them to share their culture through rituals, cuisine, and artisan craft showcased within the landscape.***

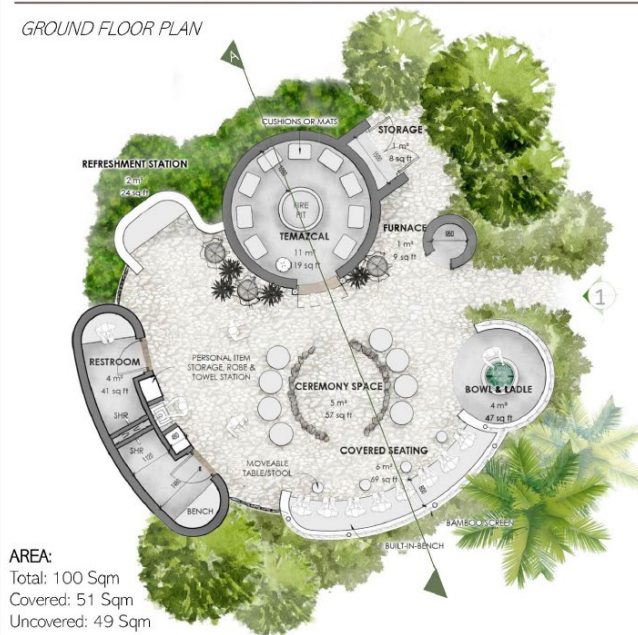
**Background:**

A goal for the development of Naviva® was to showcase the local art and craft of Nayarit, Mexico. The aesthetics and details of the built resort, including the architecture, programming, paving details, and landscape demonstrate the great care that went into creating an environment that celebrates the local culture. It was important for the research team to understand how these details were perceived by locals and quantify the social performance of Naviva®'s landscape.



## TEMAZCAL | SKETCH DESIGN

GROUND FLOOR PLAN



ROOF PLAN

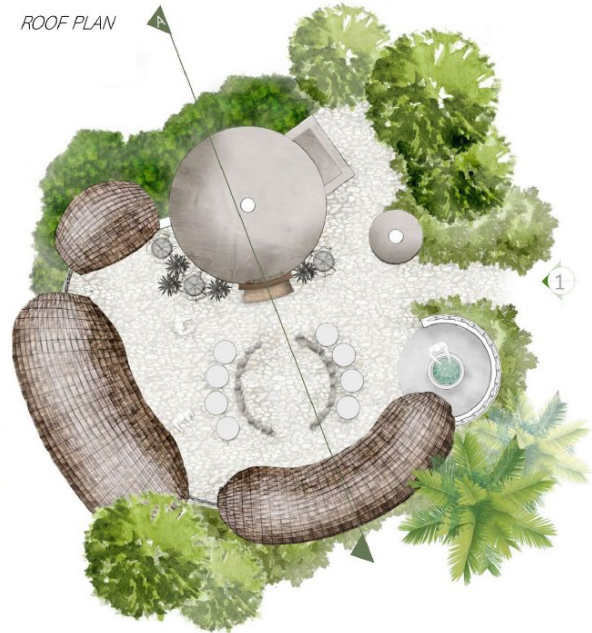


Figure 36. EDSA Sketch Design showing Temazcal ritual/ceremony space



Figure 37. EDSA image showing local artisan at work





Figure 38. EDSA image showing local artisan-detailed bamboo work



Figure 39. EDSA image showing local artisan-detailed bamboo work

**Method:**

To measure social performance benefits, the research team developed a voluntary, digital employee survey. The goal of the survey was to measure employees' perception of Naviva®'s landscape. The research team completed the Collaborative Institutional Training Initiative (CITI) Program Course on Human Subjects Research at Florida International University. The surveys were IRB approved. The approved surveys are available in Appendix 2.

The survey was hosted by Qualtrics and distributed to Naviva® employees with a QR code to take at their convenience. Surveys were available in English and Spanish.

The survey link was available during the research team's visit on September 27, 28 and 29, 2024. A total of 29 adult Naviva® employees participated in the survey. All completed surveys and results were in Spanish. The research team translated the findings.

**Calculations:**

Survey findings

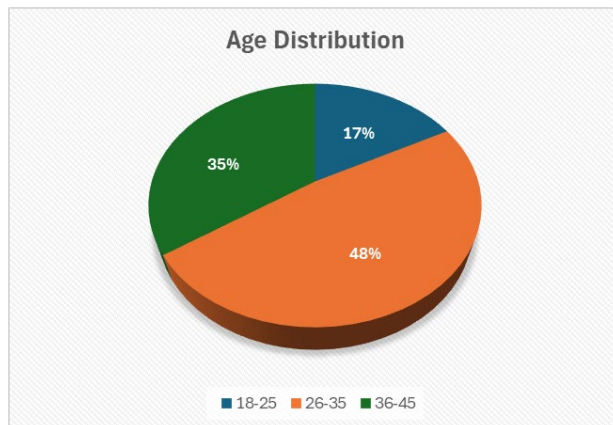


Figure 40. Survey participant age distribution chart.

48% of the survey participants were between 26-35 years old, 35% were 36-45, and 17% were 18-25.

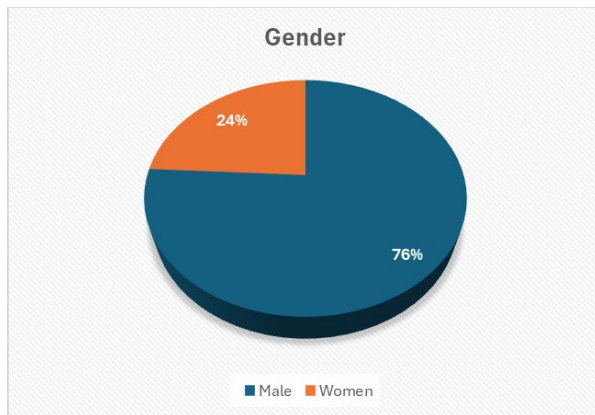


Figure 41. Survey participant gender chart.

76% of the survey participants were males, and 24% were women.

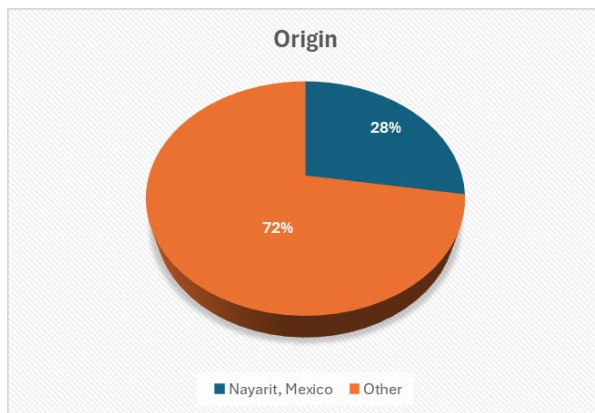


Figure 42. Survey participant origin chart.

72% of the survey participants identified themselves as originally from Nayarit, Mexico, and 28% identified as other/not specified.

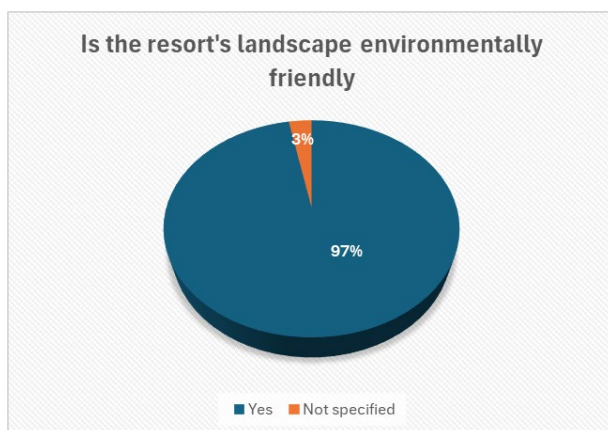


Figure 43. Is the resort's landscape environmentally friendly chart.

97% of the survey participants felt that the resort's landscape is environmentally friendly, while 3% did not respond.



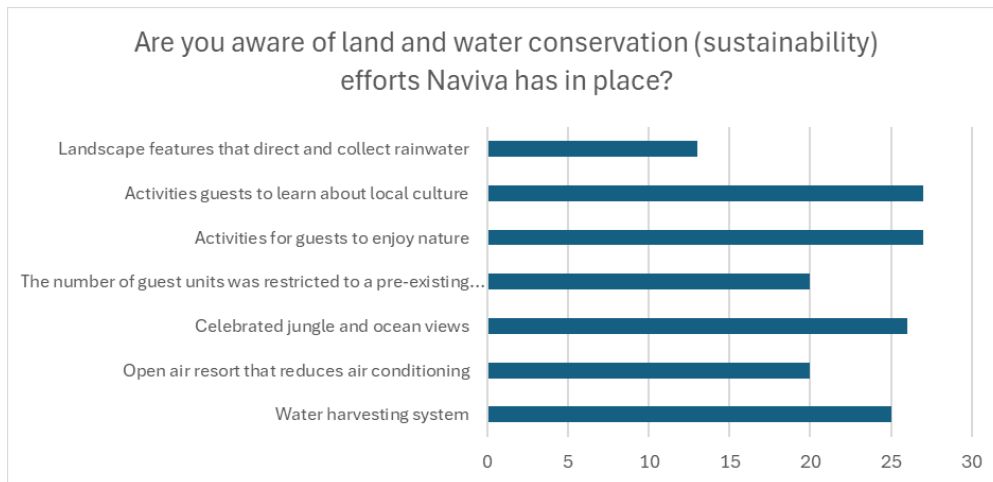


Figure 44. Are you aware of land and water conservation (sustainability) efforts Naviva® has in place chart.

The responses to the question indicate that most employees are aware of Naviva®'s sustainability efforts, especially regarding activities that connect guests with nature (93%) and opportunities to learn about local culture (93%). The water collection system is also widely recognized (86%), as are the resort's jungle and ocean views (90%).

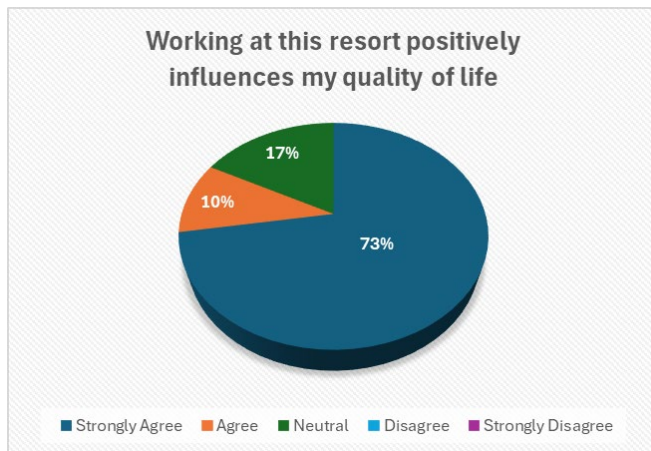


Figure 45. Working at this resort positively influences my quality-of-life chart.

73% of the survey participants strongly agree that the resort positively influences their quality of life, while 17% agrees, and 10% were neutral.



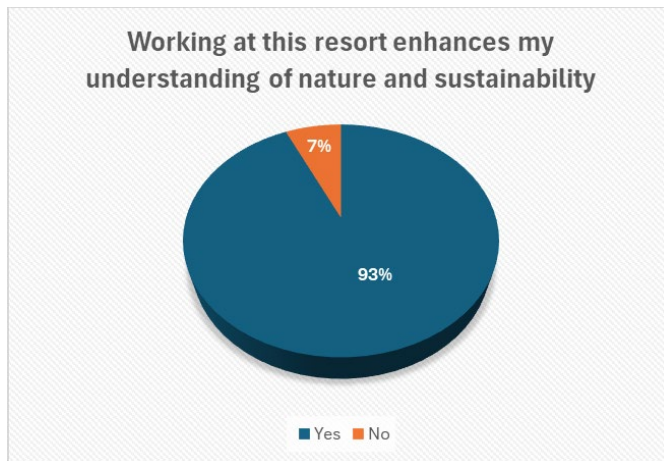


Figure 46. Working at this resort enhances my understanding of nature and sustainability chart.

93% of the survey participants think that working in the resort enhances their understanding of nature and sustainability.

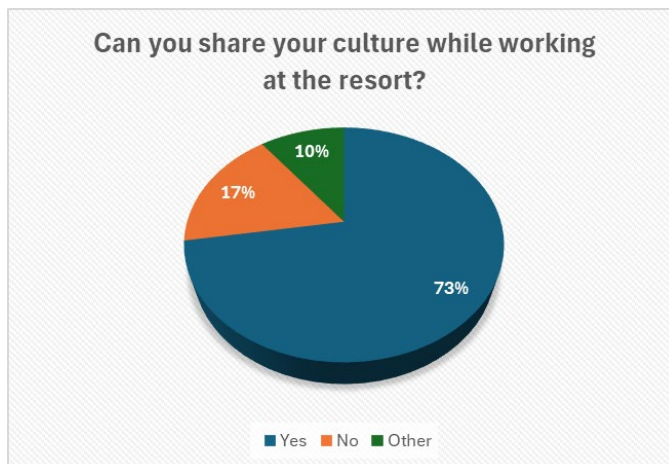


Figure 47. Can you share your culture while working at the resort chart.

**73% of the Naviva® employee survey participants think that working at the resort allows them to share their culture.**

At Naviva®, employees share their culture with guests in various ways, from culinary traditions to personal interactions and local activities. One key method, as described by the staff, is through food, with employees "showing a bit of what we eat, drink, and how we celebrate" important events like Día de Muertos or Independence Day. Cultural practices like the Temazcal and sustainability are also highlighted, as one employee notes, "Sharing our culture by doing activities like the Temazcal and offering our food." Employees frequently engage in conversations with guests about local traditions, fauna, and personal experiences, and they take pride in sharing "the culture of kindness and service." These efforts help guests leave with a deeper connection to Mexican heritage.

Employees at Naviva® feel that the landscape and grounds are generally well-maintained but suggest a few improvements. Several highlight the need for more fruit trees, as one employee mentions, "planting more fruit trees where guests can pick the fruit." Others suggest enhancing vegetation, ensuring areas are "always green," and adding more native plants while avoiding invasive species. Safety improvements, such as reinforcing paths and adding large stones to prevent accidents during landslides, are also recommended. Some propose creating additional attractions, like a treehouse or a zipline, while others believe that "everything is already great" and that Naviva® should focus on preserving its natural beauty.

Employees express a deep sense of pride and fulfillment in working at Naviva®, often describing it as a unique and enriching experience. Many highlight the supportive environment, with one stating, "I feel very happy to work here, with such successful people who always support and guide us." The connection to nature is a recurring theme, with employees appreciating the opportunity to learn about the local flora and fauna while working, and one mentioning how "the sunsets and views of the Pacific Ocean" make them feel at home. The freedom to be oneself and the chance for personal growth, as one employee shared, "It's been a blessing to work here...a place that gives you the opportunity to grow as a person," are also highly valued. Naviva®'s personalized service and cultural experience further enhance their sense of purpose, creating a work atmosphere that fosters creativity and environmental awareness.

Naviva® is widely regarded as a unique and exceptional resort, distinct from others in multiple ways. It stands out for its strong connection with nature, sustainability, and personalized service. Many describe it as "totally different" and "the best I know," with one highlighting that Naviva® is "an incredible place where guests achieve true relaxation in a modern and natural setting." The resort emphasizes sustainability, wellness, and a deep respect for the natural environment. Employees express pride in its commitment to nature, and the staff's harmony contributes to a sense of belonging and teamwork that makes it "a magical place" for both employees and guests.

#### **Sources:**

"The Trusted Standard in Research, Ethics, Compliance, and Safety Training." CITI Program. 2024.

<https://about.citiprogram.org/>

"Understand Customers and Employees. Act When it Counts." Qualtrics. 2024.

<https://www.qualtrics.com/>

#### **Limitations:**

- In-person survey or face-to-face interviews with employees was not feasible due to the limited time of the research team on site.
- Only employee perceptions were collected. It was the research team's desire to capture the guest perception in addition. However, due to the small scale of the resort the team did not receive an adequate number of guest responses to report survey findings.

## Economic Benefits

- ***Contributed \$80,884 USD to the local economy over a 2-year period by purchasing local products such as roasted coffee, distilled spirits, artisan crafts, and spa amenities for exclusive use at the resort.***

### **Background:**

Local goods and artisanal crafts are promoted throughout the resort and given to guests as gifts. The resort does not have a store where items can be purchased. These crafts include roasted coffee, *Raicilla* (a distilled spirit produced with 5 different native agave species), natural fiber hats and bags, and spa amenities. Outside of the resort, Punta Mita, Mexico offers an Art Walk from October to April. This event promotes local artisans through workshops like ceramic, watercolor and manual art.

The local currency is Mexican Peso (MXN). The conversion rate of Mexican Peso to United States Dollar at the time of writing this report (October 19, 2024), is:

1 Mexican Peso (MXN) = .0502 United States Dollar (USD)

100 MXN = \$5.02 USD

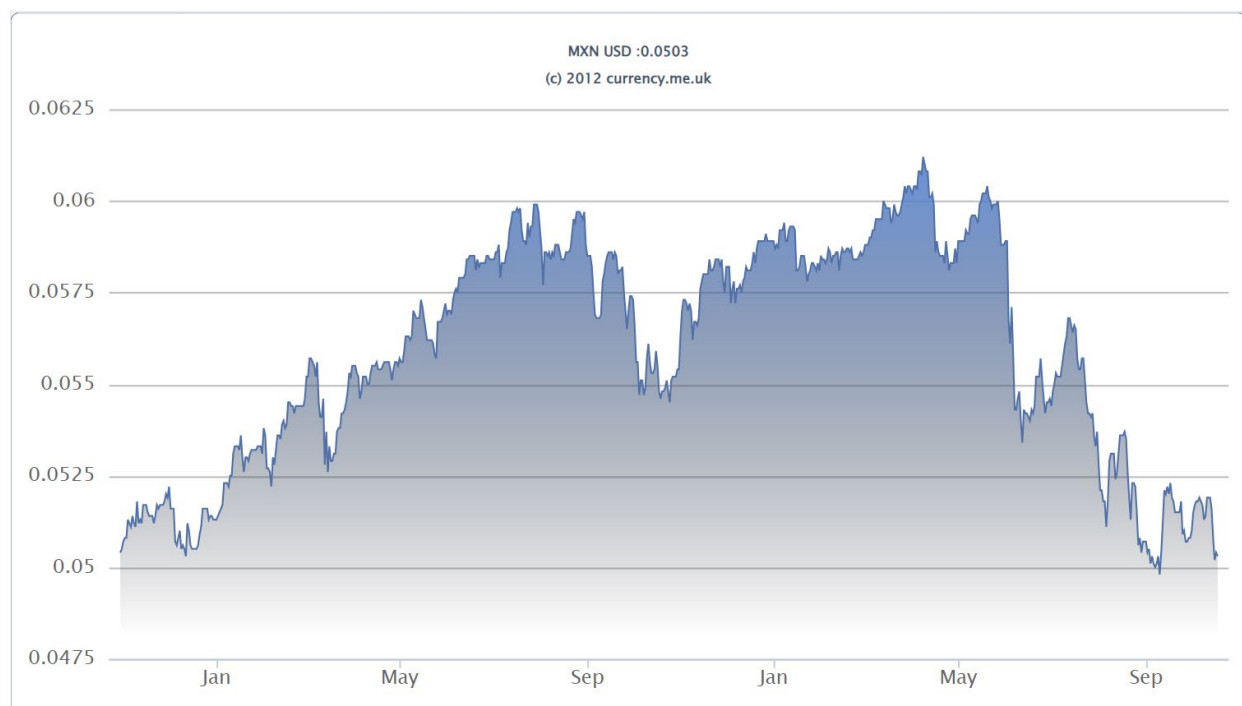


Figure 48. Graph illustrating MXN to USD conversion over 24-month period from 2022-2024.

Source: Currency. <https://www.currency.me.uk/convert/mxn/usd#charts>

The high-water mark occurred April 8, 2024 at 1 Mexican Peso = .0612



Figure 49. Examples of artisan crafts and spa amenities produced locally and available at the resort.



Figure 50. Locally roasted coffee and distilled spirit, *raicilla*, are available at the resort.



**Method:**

The team reviewed the resort's annual expense report for the following items: roasted coffee, *raicilla*, artisan crafts, and spa amenities. An annual estimate expense for local procurement of items for 2023 and 2024 are displayed as a pie chart and bar graph below.

The total expenses for 2023 and 2024 were combined and converted into United States Dollars.

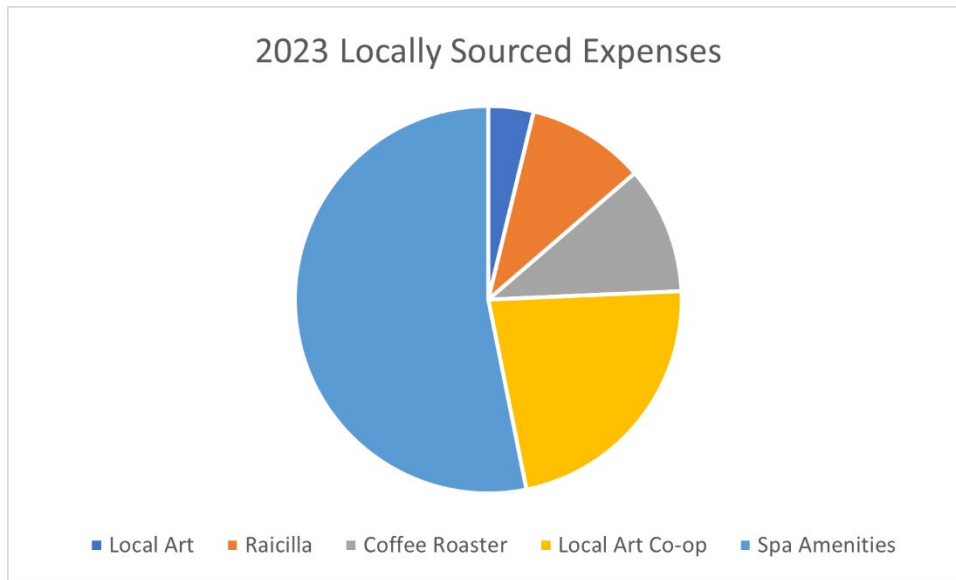


Figure 51. Chart illustrating the distribution of 2023 locally sourced expenses.

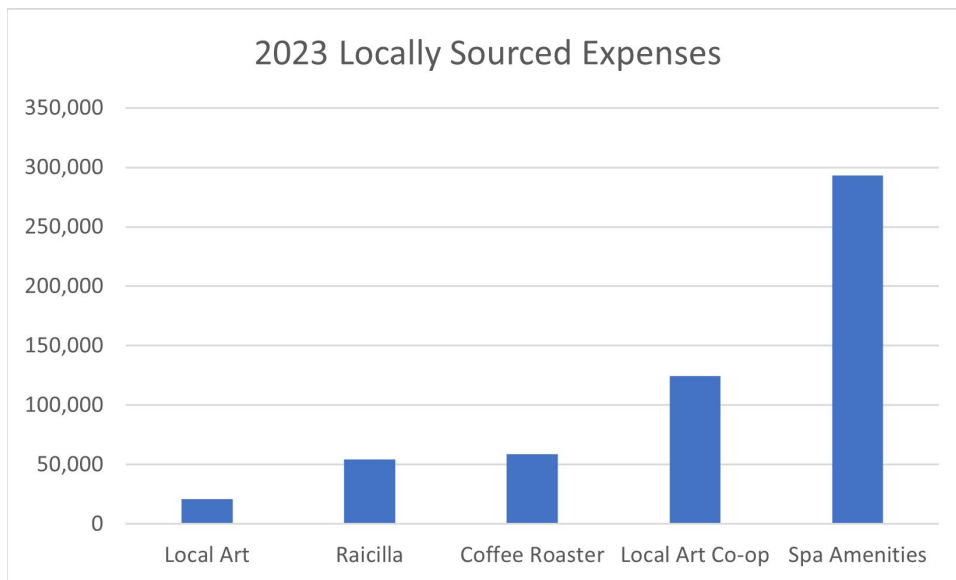


Figure 52. Chart illustrating the distribution of 2023 locally sourced expenses.

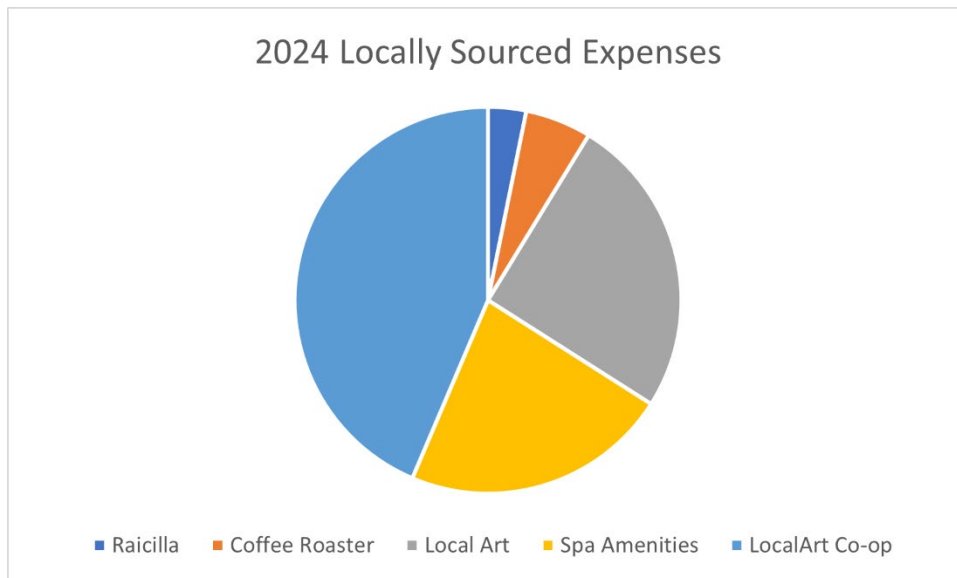


Figure 53. Chart illustrating the distribution of 2024 locally sourced expenses.

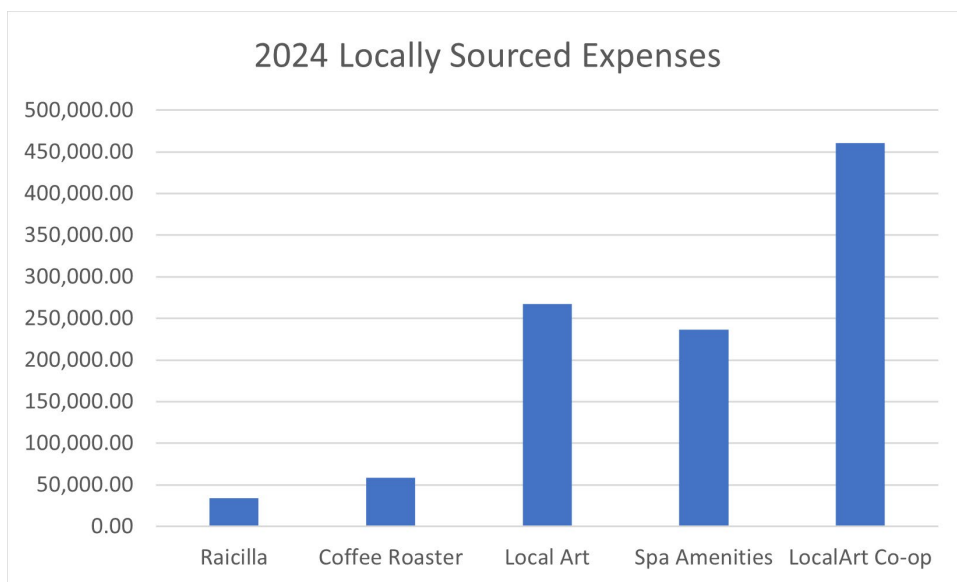


Figure 54. Chart illustrating the distribution of 2024 locally sourced expenses.

**Calculations:**

2023 Local Procurement Expenses for Artisanal Products

$$20,880 + 54,5520 + 58,550 + 124,247 + 293,100 = \$551,298$$

2024 Local Procurement Expenses for Artisanal Products

$$33,706.64 + 58550 + 267,369 + 236,625 + 460,896 = \$1,057,148$$

Total Local Procurement Expenses for Artisanal Products in 2023 and 2024

$551,298 + 1,057,148 = \$1,608,446 \text{ MXN}$

1 Mexican Peso (MXN) = 0.0502 United States Dollar (USD)

Total resort 2023 + 2024 expenses for locally produced artisanal goods and crafts.

$551,298 + 1,507,148 = 1,608,446$

**$1,608,446 / .0502 = \$80,884.15 \text{ USD}$**

***Sources:***

Stalker, Ian. "Raising a Glass to Raicilla: Step aside tequila, its raicilla's time to shine." 2024.

<https://travelcourier.ca/this-mexican-tour-operator-is-raising-a-glass-to-raicilla/>

"Punta de Mita Events." Punta Mita Adventures Inspired by Nature. 2022. <https://www.puntamita-adventures.com/en/events>

"Convert Mexican Pesos to US Dollars." <https://www.currency.me.uk/convert/mxn/usd>

***Limitations:***

- The resort opened in 2022 and did not have local expense data to evaluate trends beyond 2 years.
- 2024 was not complete at the time of evaluation (late October)
- Locally sourced perishable food item expenses, if applicable, were not provided.

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## Appendices:

1. Plant List provided by EDSA
2. Surveys: Guest-English, Guest- Spanish, Employee-English, Employee-Spanish



## Appendix 1: Plant List (Trees) by Section - provided by EDSA

| Section 1 | Genus         | Species          | Type      | Qty |
|-----------|---------------|------------------|-----------|-----|
|           | Albizia       | niopoides        | Tree      | 1   |
|           | Bursea        | simaruba         | Tree      | 2   |
|           | Ceiba         | pentandra        | Tree      | 1   |
|           | Cocos         | nucifera         | Palm Tree | 10  |
|           | Diphysa       | americana        | Tree      | 1   |
|           | Plumeria      | pudica           | Tree      | 1   |
|           | Tabebuia      | ochracea         | Tree      | 3   |
| Section 2 |               |                  |           |     |
|           | Bursea        | simaruba         | Tree      | 1   |
|           | Ceiba         | pentandra        | Tree      | 1   |
|           | Diphysa       | americana        | Tree      | 4   |
|           | Plumeria      | pudica           | Tree      | 1   |
|           | Tabebuia      | ochracea         | Tree      | 1   |
|           | Vachellia     | farnesiana       | Tree      | 2   |
| Section 3 |               |                  |           |     |
|           | Albizia       | niopoides        | Tree      | 5   |
|           | Bursea        | simaruba         | Tree      | 3   |
|           | Ceiba         | pentandra        | Tree      | 3   |
|           | Cocos         | nucifera         | Palm Tree | 26  |
|           | Diphysa       | americana        | Tree      | 6   |
|           | Enterolotium  | contortisiliquum | Tree      | 1   |
|           | Ficus         | benghalensis     | Tree      | 1   |
|           | Ficus         | citrifolia       | Tree      | 5   |
|           | Ficus         | trigonata        | Tree      | 2   |
|           | Lagerstroemia | speciosa         | Tree      | 1   |
|           | Lagerstroemia | indica           | Tree      | 4   |
|           | Plumeria      | pudica           | Tree      | 10  |
|           | Plumeria      | rubra            | Tree      | 3   |
|           | Spondias      | monbin           | Tree      | 2   |
|           | Tabebuia      | ochracea         | Tree      | 5   |
|           | Tabebuia      | rosea            | Tree      | 2   |
| Section 3 |               |                  |           |     |
|           | Albizia       | niopoides        | Tree      | 5   |
|           | Bursea        | simaruba         | Tree      | 3   |
|           | Ceiba         | pentandra        | Tree      | 3   |
|           | Cocos         | nucifera         | Palm Tree | 26  |
|           | Diphysa       | americana        | Tree      | 6   |
|           | Enterolotium  | contortisiliquum | Tree      | 1   |
|           | Ficus         | benghalensis     | Tree      | 1   |
|           | Ficus         | citrifolia       | Tree      | 5   |
|           | Ficus         | trigonata        | Tree      | 2   |

|           |               |                  |           |    |
|-----------|---------------|------------------|-----------|----|
|           | Lagerstroemia | indica           | Tree      | 4  |
|           | Lagerstroemia | speciosa         | Tree      | 1  |
|           | Plumeria      | pudica           | Tree      | 10 |
|           | Plumeria      | rubra            | Tree      | 3  |
|           | Spondias      | mombin           | Tree      | 2  |
|           | Tabebuia      | ochracea         | Tree      | 5  |
|           | Tabebuia      | rosea            | Tree      | 2  |
| Section 4 |               |                  |           |    |
|           | Albizia       | niopoides        | Tree      | 5  |
|           | Bursea        | simaruba         | Tree      | 5  |
|           | Ceiba         | pentandra        | Tree      | 2  |
|           | Cocos         | nucifera         | Palm Tree | 23 |
|           | Diphysa       | americana        | Tree      | 1  |
|           | Ficus         | trigonata        | Tree      | 2  |
|           | Lagerstroemia | speciosa         | Tree      | 4  |
|           | Plumeria      | pudica           | Tree      | 12 |
|           | Plumeria      | rubra            | Tree      | 3  |
|           | Tabebuia      | ochracea         | Tree      | 4  |
|           | Tabebuia      | rosea            | Tree      | 2  |
|           | Vachellia     | farnesiana       | Tree      | 2  |
| Section 5 |               |                  |           |    |
|           | Albizia       | niopoides        | Tree      | 5  |
|           | Bursea        | simaruba         | Tree      | 4  |
|           | Ceiba         | pentandra        | Tree      | 1  |
|           | Cocos         | nucifera         | Palm Tree | 31 |
|           | Ficus         | benghalensis     | Tree      | 3  |
|           | Ficus         | trigonata        | Tree      | 5  |
|           | Lagerstroemia | speciosa         | Tree      | 3  |
|           | Plumeria      | pudica           | Tree      | 9  |
|           | Tabebuia      | ochracea         | Tree      | 2  |
|           | Tabebuia      | rosea            | Tree      | 3  |
| Section 6 |               |                  |           |    |
|           | Albizia       | niopoides        | Tree      | 1  |
|           | Bursea        | simaruba         | Tree      | 9  |
|           | Ceiba         | pentandra        | Tree      | 2  |
|           | Cocos         | nucifera         | Palm Tree | 23 |
|           | Enterolotium  | contortisiliquum | Tree      | 1  |
|           | Ficus         | benghalensis     | Tree      | 2  |
|           | Ficus         | trigonata        | Tree      | 4  |
|           | Lagerstroemia | speciosa         | Tree      | 10 |
|           | Plumeria      | pudica           | Tree      | 10 |
|           | Plumeria      | rubra            | Tree      | 7  |
|           | Spondias      | mombin           | Tree      | 3  |
|           | Tabebuia      | ochracea         | Tree      | 5  |

|            |          |              |           |      |
|------------|----------|--------------|-----------|------|
| Section 7  | Tabebuia | rosea        | Tree      | 4    |
|            | Bursea   | simaruba     | Tree      | 2    |
|            | Ceiba    | pentandra    | Tree      | 3    |
|            | Cocos    | nucifera     | Palm Tree | 6    |
|            | Ficus    | benghalensis | Tree      | 1    |
|            | Plumeria | pudica       | Tree      | 1    |
|            | Plumeria | rubra        | Tree      | 1    |
|            | Tabebuia | ochracea     | Tree      | 1    |
| Section 8  | none     | none         |           | none |
| Section 9  |          |              |           |      |
|            | Shrubs   | shrubs       |           | none |
| Section 10 |          |              |           |      |
|            | none     | none         |           | none |
| Section 11 |          |              |           |      |
|            | none     | none         |           | none |

## Appendix 2: Surveys



### Employee Perception of Naviva Resort



The purpose of this survey is to gather information related to an employee's perception of the landscape and grounds of the Naviva Resort. The information will be used for academic purposes related to the impact of landscape architecture within the hospitality industry.

1. My age range is:
  - a. 18-25
  - b. 26-35
  - c. 36-45
  - d. 46-55
  - e. 56-65
  - f. 66-75
  - g. Above 75
  - h. I do not wish to disclose this information.
2. My gender is: (Please fill in the blank)
3. Are you originally from Nayarit, Mexico?
  - a. Yes
  - b. No
4. What is your perception of Naviva as a resort? Is it different from other resorts you've worked at? (Please fill in the blank)
5. Is the resort's landscape environmentally friendly?
  - a. Yes
  - b. No
  - c. Other (Please Explain)
6. Are you aware of land and water conservation (sustainability) efforts Naviva has in place? Please check all that apply.
  - ☐ Water harvesting system.
  - ☐ Open air resort that reduces air conditioning.
  - ☐ Celebrated jungle and ocean views.
  - ☐ The number of guest units was restricted to a pre-existing footprint to protect the native landscape.
  - ☐ Activities for guests to enjoy nature.
  - ☐ Activities guests to learn about local culture.
  - ☐ Landscape features that direct and collect rainwater.
7. Working at this resort positively influences my quality of life.
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree



8. Working at this resort enhances my understanding of nature and sustainability.
  - a. Yes
  - b. No
  - a. Other (Please Explain)
9. Can you share your culture while working at the resort?
  - b. Yes
  - c. No
  - d. Other (Please Explain)
10. If yes to question 9 above, please explain how you shared your culture with guests. (Please fill in the blank)
11. What can be improved about the landscape and grounds of Naviva? (Please fill in the blank)
12. What else, if anything, would you like to add about your experience working at Naviva? (Please fill in the blank)

Thank you for your time!

### Percepción de los Empleados sobre el Resort Naviva

El propósito de esta encuesta es recopilar información relacionada con la percepción de un empleado sobre el paisaje y los terrenos del Resort Naviva. La información se utilizará con fines académicos relacionados con el impacto de la arquitectura paisajista dentro de la industria hotelera.

1. Mi rango de edad es:
  - a. 18-25
  - b. 26-35
  - c. 36-45
  - d. 46-55
  - e. 56-65
  - f. 66-75
  - g. Más de 75
  - h. No deseo divulgar esta información.
2. Mi género: (Por favor, complete el espacio en blanco)
3. Es originario de Nayarit, Mexico?
  - a. Sí
  - b. No
4. ¿Cuál es su percepción de Naviva como resort? ¿Es diferente de otros resorts en los que ha trabajado? (Por favor, complete el espacio en blanco.)
5. ¿Es el paisaje del resort respetuoso con el medio ambiente?
  - a. Sí
  - b. No
  - c. Otro (Por favor, explique.)
6. ¿Está al tanto de los esfuerzos de conservación de tierra y agua (sostenibilidad) que Naviva tiene en marcha? Por favor, marque todas las opciones que correspondan.
  - ☐ Sistema de captación de agua.
  - ☐ Resort al aire libre que reduce el uso de aire acondicionado.
  - ☐ Vistas destacadas de la jungla y el océano.
  - ☐ El número de unidades para huéspedes se restringió a una huella preexistente para proteger el paisaje nativo.
  - ☐ Actividades para que los huéspedes disfruten de la naturaleza.
  - ☐ Actividades para que los huéspedes aprendan sobre la cultura local.
  - ☐ Elementos del paisaje que dirigen y recogen el agua de lluvia.
7. Trabajar en este resort influye positivamente en mi calidad de vida.
  - a. Totalmente de acuerdo
  - b. De acuerdo
  - c. Neutral
  - d. En desacuerdo
  - e. Totalmente en desacuerdo

8. Trabajar en este resort mejora mi comprensión de la naturaleza y la sostenibilidad.
  - a. Sí
  - b. No
  - a. Otro (Por favor, explique)
9. ¿Puede compartir su cultura mientras trabaja en el resort?
  - b. Sí
  - c. No
  - d. Otro (Por favor, explique)
10. Si respondió sí a la pregunta 9 anterior, por favor explique cómo compartió su cultura con los huéspedes. (Por favor, complete el espacio en blanco)
11. ¿Qué se puede mejorar sobre el paisaje y los terrenos de Naviva? (Por favor, complete el espacio en blanco)
12. ¿Qué más, si hay algo, le gustaría agregar sobre su experiencia trabajando en Naviva? (Por favor, complete el espacio en blanco)

¡Muchas gracias por su tiempo!

The purpose of this survey is to gather information related to a guest's perception of the landscape and grounds of the Naviva Resort. The information will be used for academic purposes related to the impact of landscape architecture within the hospitality industry.

1. What is your perception of Naviva as a resort? Is it different than other resorts you've stayed at?  
(Please fill in the blank)
2. Are you aware of land and water conservation (sustainability) efforts Naviva has in place? Please check all that apply.
  - ☐ Water harvesting system.
  - ☐ Open air resort that reduces air conditioning.
  - ☐ Celebrated jungle and ocean views.
  - ☐ The number of guest units was restricted to a pre-existing footprint to protect the native landscape.
  - ☐ Activities for guests to enjoy nature.
  - ☐ Activities guests to learn about local culture.
  - ☐ Landscape features that direct and collect rainwater.
3. Did you choose to stay at Naviva resort for its land and water conservation (sustainability) efforts?
  - a. Yes
  - b. No
  - c. Other (Please Explain)
4. The design of all built elements within this resort blended into the natural surroundings.
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
5. The design of Naviva's landscape and grounds positively influenced my experience during my stay.
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
6. The design of Naviva's landscape and grounds enhanced my knowledge of sustainability.
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
7. What was the main reason you initially planned your stay at Naviva? (Circle all that apply)



- a. It is a Four Seasons property.
  - b. Recommendation from a family member / colleague / friend / etc.
  - c. Wellness Activities
  - d. Natural Surroundings
  - e. Stand-alone Tent Accommodations
  - f. Small / Intimate Resort Setting
  - g. Resort's Sustainability Efforts
  - h. Other (Please Explain)
8. Did you learn about the local culture, participate in cultural rituals, or purchase locally produced crafts during your stay at Naviva?  
(Please share your comment)
9. Did you visit any surrounding towns / communities during your stay at Naviva?  
(Please share your comment)
10. What did you enjoy most about this resort, and what else, if anything would you like to add about your experience of Naviva? (Please fill in the blank)

Thank you for your time!

El propósito de esta encuesta es recopilar información relacionada con la percepción de los huéspedes sobre el paisaje y los terrenos del Resort Naviva. La información se utilizará con fines académicos relacionados con el impacto de la arquitectura paisajista en la industria hotelera.

1. ¿Cuál es su percepción de Naviva como resort? ¿Es diferente a otros resorts en los que ha estado (Por favor, llenar el espacio en blanco)
2. ¿Está al tanto de los esfuerzos de conservación de tierra y agua (sostenibilidad) que tiene Naviva? Por favor, marque todas las opciones que correspondan.
  - ☐ Sistema de captación de agua.
  - ☐ Resort al aire libre que reduce el uso de aire acondicionado.
  - ☐ Vistas destacadas de la jungla y el océano.
  - ☐ El número de unidades para huéspedes se restringió a una huella preexistente para proteger el paisaje nativo.
  - ☐ Actividades para que los huéspedes disfruten de la naturaleza.
  - ☐ Actividades para que los huéspedes aprendan sobre la cultura local.
  - ☐ Elementos del paisaje que dirigen y recogen el agua de lluvia.
3. ¿Elegió hospedarse en el Resort Naviva por sus esfuerzos de conservación de tierra y agua (sostenibilidad)?
  - a. Sí
  - b. No
  - c. Otro (Por favor, explique)
4. El diseño de todos los elementos construidos dentro de este resort se integra perfectamente con el entorno natural.
  - a. Totalmente de acuerdo
  - b. De acuerdo
  - c. Neutral
  - d. En desacuerdo
  - e. Totalmente en desacuerdo
5. El diseño del paisaje y los terrenos de Naviva influyeron positivamente en mi experiencia durante mi estadía.
  - a. Totalmente de acuerdo
  - b. De acuerdo
  - c. Neutral
  - d. En desacuerdo
  - e. Totalmente en desacuerdo
6. El diseño del paisaje y los terrenos de Naviva mejoró mi conocimiento de la sostenibilidad.
  - a. Totalmente de acuerdo
  - b. De acuerdo
  - c. Neutral

- d. En desacuerdo
- e. Totalmente en desacuerdo

7. ¿Cuál fue la razón principal por la que inicialmente planeó su estadía en Naviva? (Circule todas las que correspondan)
- a. Es una propiedad de Four Seasons.
  - b. Recomendación de un familiar / colega / amigo / etc.
  - c. Actividades de bienestar.
  - d. Entorno natural.
  - e. Alojamientos en tiendas independientes.
  - f. Ambiente pequeño / íntimo del resort.
  - g. Esfuerzos de sostenibilidad del resort.
  - h. Otro (Por favor, explique)
8. ¿Aprendió sobre la cultura local, participó en rituales culturales o compró artesanías producidas localmente durante su estadía en Naviva?  
(Por favor, comparta su comentario)
9. ¿Visitó alguna ciudad o comunidad cercana durante su estadía en Naviva?  
(Por favor, comparta su comentario)
10. ¿Qué fue lo que más disfrutó de este resort y qué más, si hay algo, le gustaría agregar sobre su experiencia en Naviva?  
(Por favor, complete el espacio en blanco)

¡Muchas gracias por su tiempo!