



I'x Tower  
Valorization of Tulum's  
Archeological Zone





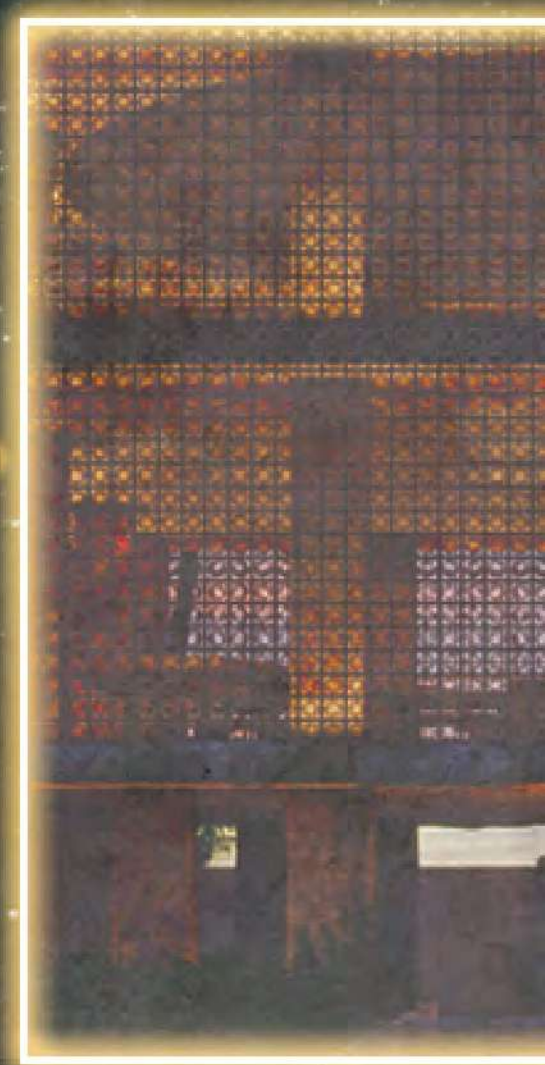
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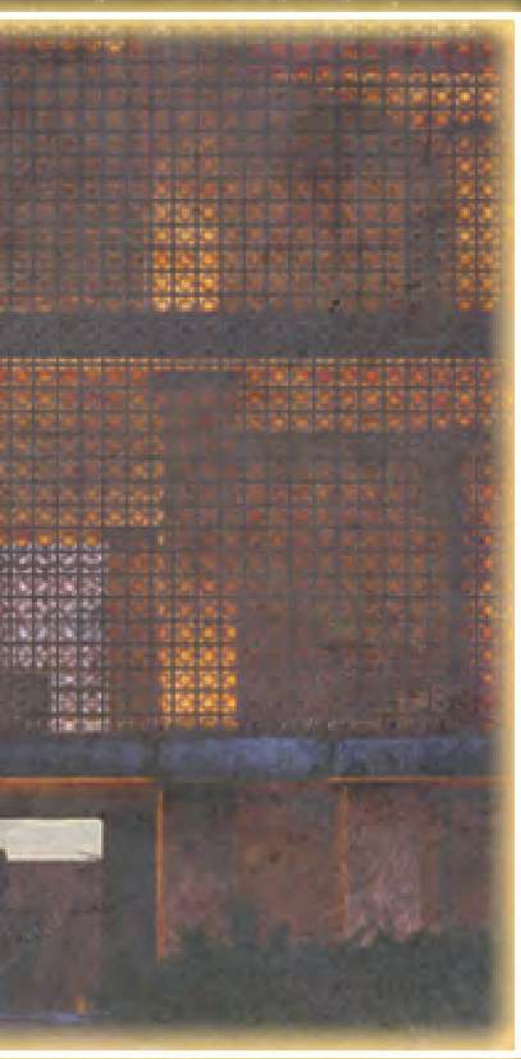
Scuola di Architettura Urbanistica  
Laurea Magistrale Architecture Built Environment - Interiors

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# Dedications

*Sometimes our dreams make us travel far, far away from everything.  
To my parents, who took care of my wings and taught me how to fly.  
To my brother, who has been my flying partner.*

*Actually, they are all medics so they probably won't understand the project, they'll go ahead saying "its nice", as always.*

*Algunas veces nuestros sueños nos hacen viajar lejos, muy lejos de todo.  
A mi papá y a mi mamá, quienes cuidaron mis alas y me enseñaron a volar.  
A mi hermano, quien ha sido mi compañero de vuelo.*

*De hecho, todos son médicos así que probablemente no entiendan el proyecto y solamente digan "está bonito", como siempre.*





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Life is this constant journey where sometimes you know where it'll take you, on occasions you won't and you'll just go with the flow and, in some others, you'll be the one tracing the path.  
Thank you Milan, for being the beginning of one of the best experiences in my life.

Along the ride, you'll learn to keep near to you the people that truly matter, you'll cross paths with new persons and you'll learn that not everyone is meant to stay.  
Thanks to all of you who have been there with and for me since the beginning: my parents, my brother, my whole family and friends, especially Katia Ochoa and Roberto Dueñas.  
My four legged and furry friends: Pelusa, Sir Qua Qua, Fufú, Castañita, Vainilla, Negrita, Negrito, Tabacco, Beethoven, Bernardo, Piaf, Jackie, Carmina, Burana and Mika.

Being far away from everything and everyone you know, will make you understand that true friends become your family.  
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April 6th 2021, Madrid, Spain

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La vida es este viaje constante donde algunas veces sabes a dónde te llevará, muchas otras no lo sabrás y solamente te dejarás fluir y en otras tantas serás tú quien empiece a trazar el camino.  
Gracias Milán por ser el comienzo de unas de las mejores experiencias de mi vida.

A lo largo del viaje aprenderás a mantener cerca de ti a las personas que realmente importan, cruzarás caminos con gente nueva y entenderás que no todos llegan para quedarse.  
Gracias a todos ustedes que han estado por y para mí desde el comienzo: mi papá, mi mamá, mi hermano, toda mi familia y amigos; especialmente Katia Ochoa y Roberto Dueñas.  
A mis amigos peludos y de cuatro patas: Pelusa, Sir Qua Qua, Fufú, Castañita, Vainilla, Negrita, Negrito, Tabacco, Beethoven, Bernardo, Piaf, Jackie, Carmina, Burana and Mika.

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6 de abril del 2021, Madrid, España



***Ix or I'x (Mayan: [if' ])***  
***Sun of the night, jaguar***

“...[the god of the Sun transformed himself into a jaguar to be able to travel during the night through the world of the dead; at nightfall and throughout the night, he fought against Xilbalba, the god of the underworld, defeating him and leaving once again at dawn.

The end of the Earth will come when the jaguars ascend from the underworld to devour the Sun, the Moon and the universe. An eclipse will be a sign of the final event.”

—Popol Vuh



This project seeks the revitalization of Tulum's archeological zone at Mexico. Currently, the sites lack of additional design in the urban layer, and a proper care and delimitation of the ruins, situation that can lead to further deterioration.

So, the aim is to redesign the existing paths, delimitate and revitalize the ruins, restore those who are not in danger of losing their identity through this intervention. Since the site is already being intervened, it was decided to place an astronomical observatory. A building that will connect the site with the contemporary world.

*Keywords: revitalization, heritage, astronomical observatory, relationship*

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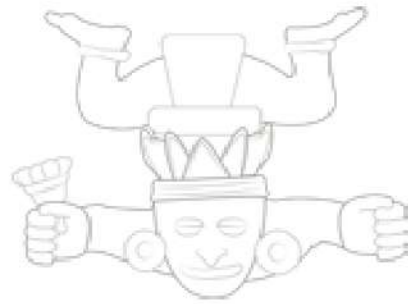
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# Chapter I: Area analysis

Maya History  
Maya Architecture  
Materials  
Constructive systems



# Maya History



Maya territory

The Mayas are probably the best-known culture of the Mesoamerican civilizations. Their origin dates back to 2600 B.C. in the Peninsula of Yucatan, Mexico; later they expanded throughout southern Mexico, Guatemala and northern Belize, reaching their peak approximately in 250 A.D. and beginning to decline with the arrival of the Spanish, to later see their end in 1521 A.D.

This culture was one of the most advanced in its time as they had great advances in various sectors such as astronomy, agriculture, sociology, mathematics and architecture. The history of this civilization is divided into three periods: pre-classical, classical and post-classical.

### **Preclassic (1500 B.C - 250 A.D)**

Period of establishment and expansion. The Mayas of this period were strongly influenced by other cultures such as the Olmec and the Mixe-Zoque. A period characterized by the advance in agriculture, commerce and artistic activities. The first formal cities appeared, formed by religious centers, palaces, acropolis and ball games; the most important were Edzna and Dzibilchaltun. During this era, a more sophisticated social structure and hierarchy is also characterized, with the nobility

and priests at the top.

Also, the first urban records and labor diversification are found such as hunting, fishing, gathering of forest fruits, pottery, textiles and an increasingly assiduous commerce with neighboring populations.

### **Classic (250 A.D - 950 A.D)**

Period of consolidation and splendor. It is considered the most important stage in the history of the Mayas, since they perfected various sciences such as mathematics, astronomy,

architecture and visual arts, in addition to refining and perfecting their writing and calendar. The first city-states were founded where the sociopolitical structure was already fully consolidated, consisting of small independent states, each governed by kings and priests. One of its most important locations was Chichen-Itzá.

Architecturally speaking, it represents a peculiar mix of styles, the Mayans combined these influences to create a characteristically unique style seen now among all its art and architecture.

### **Postclassic (950 A.D - 1524 A.D)**

Period of decline and unknowns. During this stage, the Mayas began to abandon the cities and their surroundings completely, except for small rural villages nearby. To this day the cause remains a mystery, but the theories of overpopulation and climate change

are the most accepted. The Toltec tribe was the one who occupied the deserted Mayan cities and brought them back to life, being Tula and Chichen Itzá the most powerful and important cities of this era. It is considered the end of the ancient Maya culture around 1521 A.D. when the Spanish won the war against the resistance of the last Maya.



01. Detail of "El Castillo", Tulum, lithograph on stone by A. Picken

Mayan  
entrance  
to Xcaret's  
cave





03. Chichen Itzá, Yucatán, Mexico. Photo by: Ttext

The Mayas occupied nearly 400.000 square kilometers, in which different constructive methods were created through the years. There are several impressive characteristics about their architecture, but some of the most significant are: constructing without any aid of metal cutting tools and the careful placement method of their buildings according to the surroundings.

First of all, the urban and topography conditions were the setting rules for the Mayans to place their buildings, all of them follow a careful and methodic urbanistic line, having as a result a city with a close link and connection

with their surroundings. The Mayas believed that the most they respected the nature around them, the closest they will be to build something worth for the gods. "The link with the landscape is precisely the architecture. The abstract lines generated by the buildings do not compete with the profile of the natural environment. There is a respectful relationship between the building and its context, because the resulting living space was handled with great agility." (Cejudo, M. 2012, 45-46)

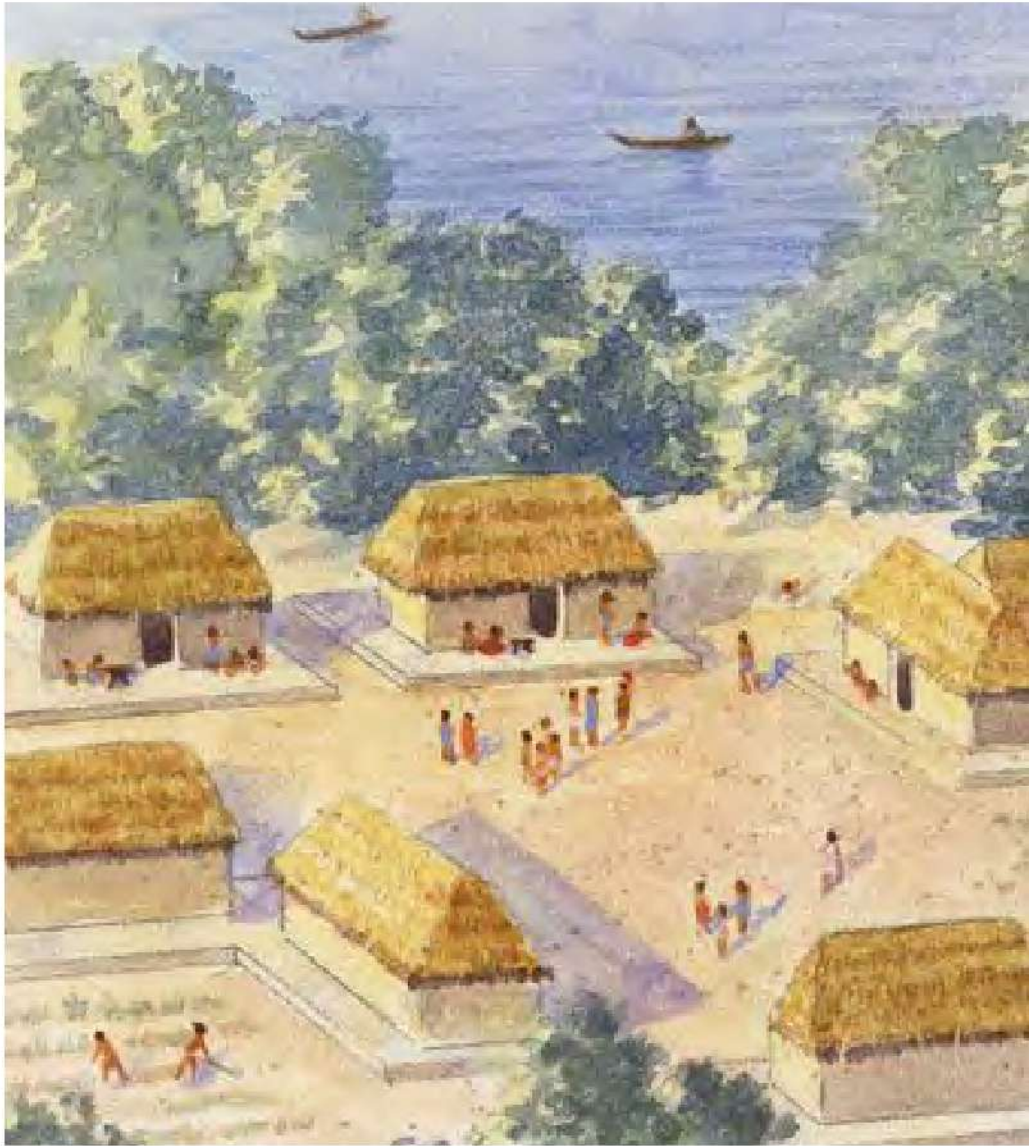
The ceremonial buildings were the center points of the cities, which were characterized by its openly public space conformed by huge esplanades, all these elements were erected on elevated horizontal surfaces. At the beginning, these podiums were meant to avoid flooding and to proportionate a better visual to keep away from other tribe's attacks. These elevations kept increasing their dimensions and ornamentations, they kept evolving until becoming one of the most emblematic Maya's architecture elements: the platforms, which had different shapes. It appears to be that their buildings were meant to be lived

and admired from the outside since the facades, by comparison, were exceptionally decorated and, in some cases, a crenellation was used to elevate its height in order to stand out from its surroundings<sup>1</sup>. These characteristics from the public spaces contrast with the design of the inner and private ones which were from reduced dimensions and lacking natural light, especially during the first periods.

<sup>1</sup> Cejudo, M. (2019). *Materiales y sistemas constructivos de la arquitectura maya*. Soria, 209.



Palenque  
Chiapas,  
Mexico



01. Pre-classic architecture style. Photo by: Kids discover

Among the Mayas, their architecture evolved as well. They kept improving the construction techniques and experimenting with different materials, from twig and thatch in the earliest period to wood and stones in the most advanced time of their civilization.

The architecture of Maya can be placed into four logical classifications<sup>2</sup>:

- Early Development (Pre-masonry) – up to 500 B.C.
- Late Development (Pre-vault) – 500 B.C to 300 A.D
- Early Classic (Vault I) – 300

- A.D to 950 A.D
- Late Classic (Vault II) – 950 A.D to 1521 A.D

Vault I and II refer to refinement of construction and building detail rather than one and two rows of vaults.

The Early Development period is the simplest of them all. The architecture consisted just of posts, thatch and a roof system covered either by twigs or thatch, therefore the construction method had no difficulty.

During the Late Development period this method slightly evolved, it was used as main core, but it was starting to be covered by

large cut stones. The first glances of Maya masonry can be found inside the religious buildings, which were erected upon a low masonry platform. “During this period the first truncated pyramids were erected. The core material consisted of earth, rubble, and general fill material. The outer core was covered with large cut stones with header courses tailed into the fill. The entire surface was then stuccoed.” (Jordan, D. 1951, 29).

The Classic is known to be the high peak of Maya civilization and the development of architecture was no exception. As seen before, architecture before this period was rather simple and modest, with no further ornamentation but during the Classic, Mayan architecture can

be described as massive, illustrative, artistic and monumental. During the Classic in comparison to the first periods, the materials were from a higher quality, they passed from using block masonry to concrete cores with stone covers where limestone was the most frequented building material, as an interesting fact, the pyramids and temples that were built during the Early and Late Development period, were completely covered by a new structure, where the old became the core of the new<sup>3</sup>.

<sup>3</sup> Jordan, D. (1951). Mayan architecture. Master's thesis. Kansas: Kansas State University.



05. Classic architecture style. Chicanna, Campeche, Mexico.

<sup>2</sup> Jordan, D. (1951). Mayan architecture. Master's thesis. Kansas: Kansas State University.



07. Temple of warrior, Chichen Itzá, Yucatán, Mexico. Photo by: Diego Grandi

In terms of construction, the Maya repertoire is not extensive, perhaps due to lack of metal tools and metal as a material itself. They never fully developed a closed system or a solution to properly take advantage of the stone, instead, they used approximation arches and vaults which require more material quantity and therefore the spaces on the inside get reduced.

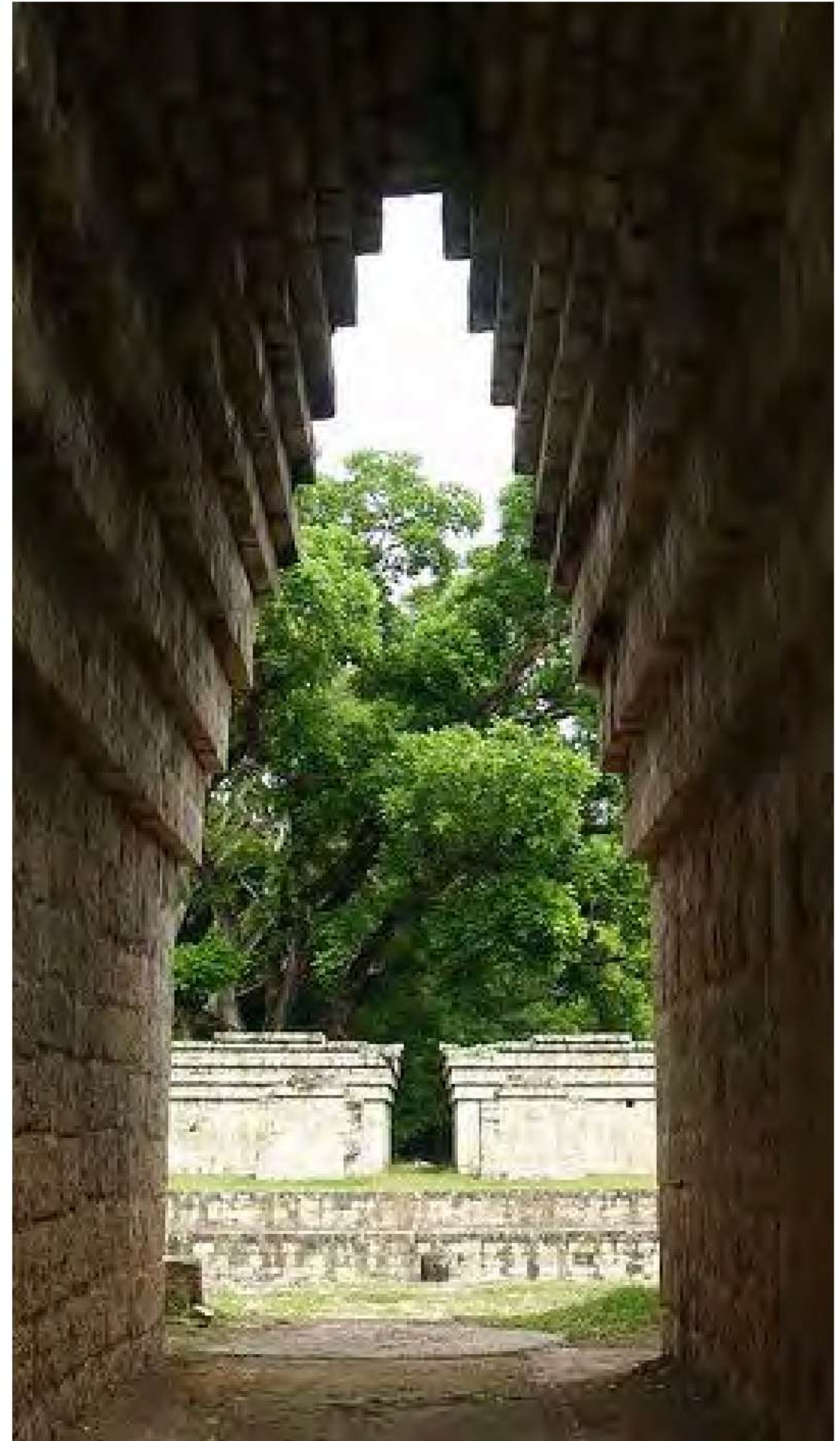
Muñoz and Vidal<sup>4</sup> propose five constructive systems in Maya architecture:

- Load-bearing walls and vegetal cover
- Approximation walls and vaults
- Load-bearing walls and mezzanines
- Lintels and pillars
- Encased or cellular system

<sup>4</sup> Muñoz, C., & Vidal, C. (2004). Análisis comparativo de los diferentes sistemas constructivos en el área Maya. En XVII Simposio de Investigaciones Arqueológicas en Guatemala. Museo Nacional de Arqueología y Etnología, Guatemala.



08. House of Columns, Tulum, Quintana Roo, Mexico. Photo by: Beatriz de Paulis



09. Maya arch, Copán, Honduras. Photo by: Adalberto H. Vega



10. Maya mural found during a private house renovation. The painting features musicians in European clothes on the left and a traditional dancer on a feathered cape on the right. Guatemala. Photo by: R. Slabónski et al.

The wall was the most important element in the Maya constructive system since it was the simplest method to build with stones, besides, it isolated the spaces and protected them from excessive light and the storms of the climate. Not only it made possible the control and distribution of spaces, but it had a more transcendental meaning: it was the connection between the

mortal world and the gods. The Mayas used the walls as painting canvas to represent their daily life, beliefs and culture; these representations are called graffiti.

“Art and religion cannot be separated from Mayan architecture and their architecture was an expression of their culture”.



# Chapter II: The site

Location

History of Tulum

Archeological buildings

Topography

Vegetation



## A sacred walled city for pilgrims

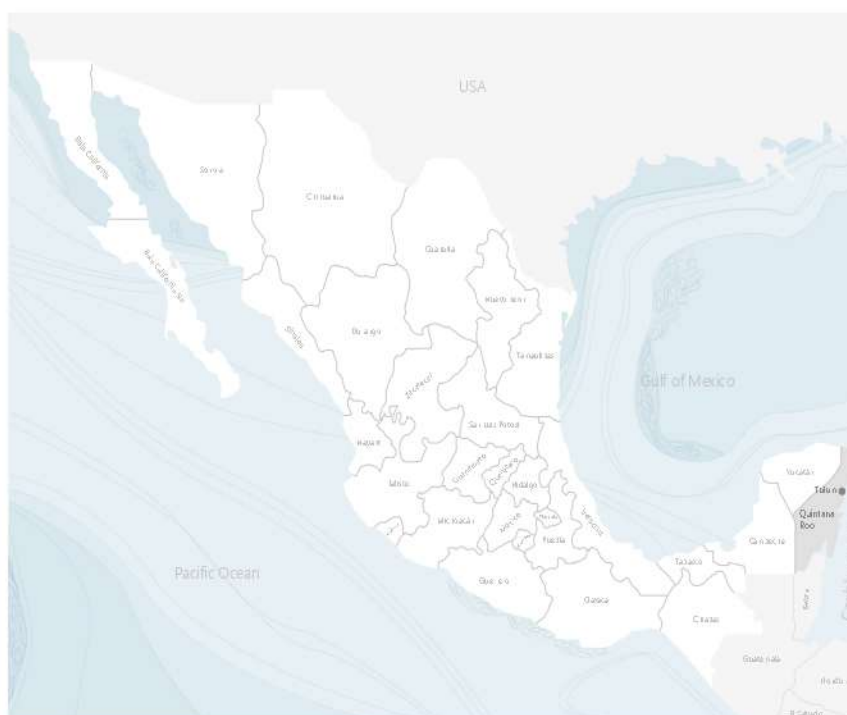


11 Photo by: Antonio Quinzán

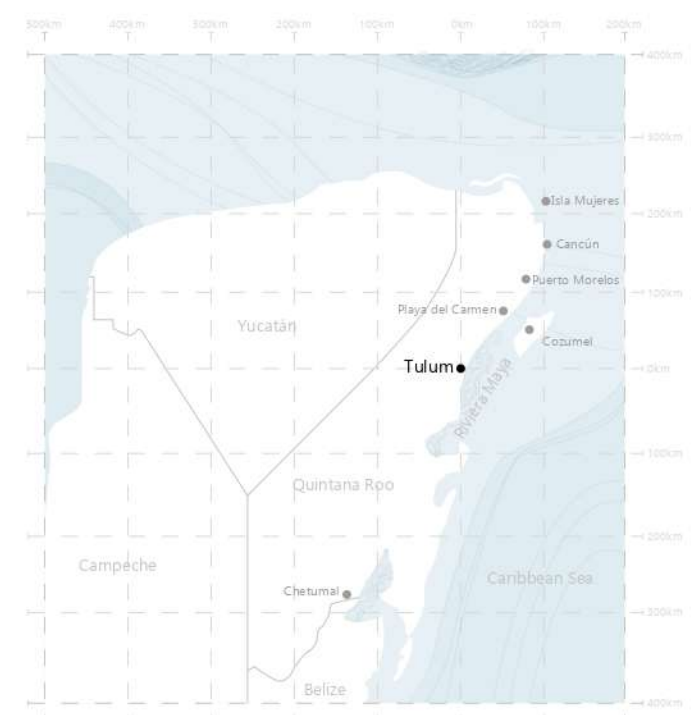
Located on east of the Yucatan peninsula, in the state of Quintana Roo, in southern Mexico, the city of Tulum was founded in what is considered the “late classic” of the Mayan culture, around the year 450 A.D. It was the last city inhabited and built by the Mayas that lasted active even during the Spanish invasion.

Tulum was built atop of a 12-meter cliff that rises from the Caribbean seas and has a 6km length next to the coast. It has a 20°13'N in latitude, 87°28'W in length.


The city has an Aw Tropical Savanna Climate according to Köppen Classification and its characterized by rainy summers and dry winters. Tulum has an annual 26°C in temperature, being June the hottest month with a temperature between 28°C and 30°C and January the coldest one with a temperature around 23°C having as a result a 4.4°C annual variation in temperature. Tulum has 80% in humidity and 1,200mm in rain.



Quintana Roo's location inside Mexico

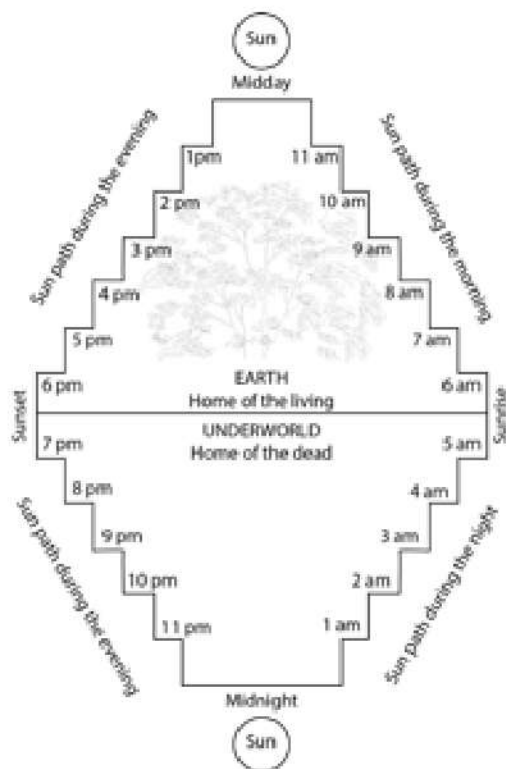


Tulum's location inside Quintana Roo

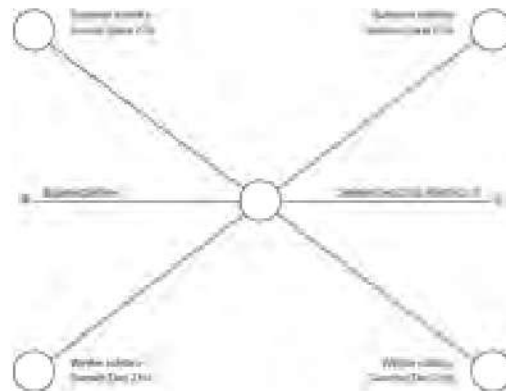
An aerial photograph of a tropical island. The left side of the image shows the turquoise ocean with white waves crashing onto a sandy beach. The island is covered in lush green vegetation, including palm trees and dense foliage. In the center and right, there are several stone ruins, likely remnants of an ancient civilization, surrounded by a network of dirt paths. The overall scene is serene and picturesque.

Sea of  
turquoise  
color,  
symbol of  
rebirth

# History of Tulum



13. Vertical dimension of the world



14. Sky corners related to the solstices

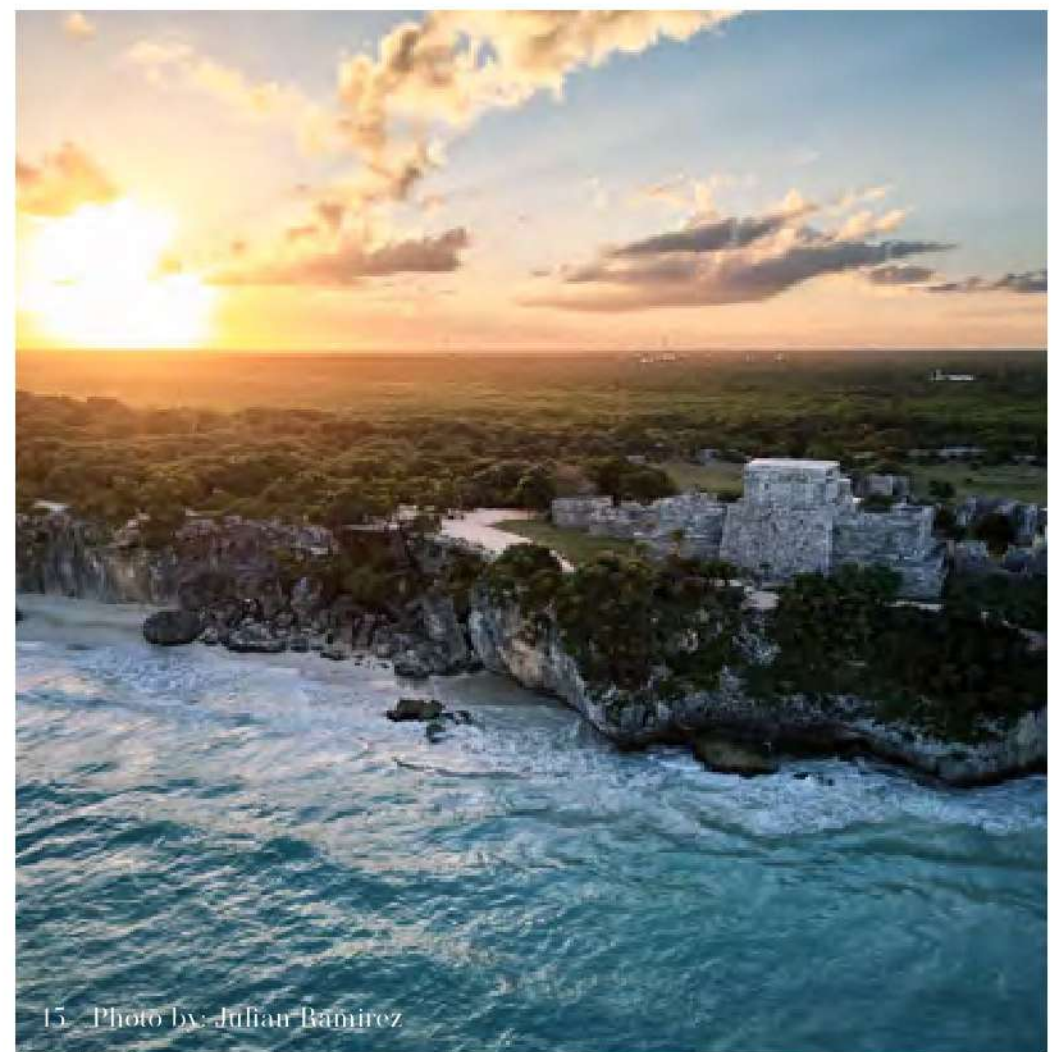
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Immersed in the jungle of Quintana Roo and surrounded by four walls which served as a fortress, the city became to be an important trading and religious center between the years 1100 – 1450 AD. The name of Tulum was given by the Spanish, which translates as palisade<sup>5</sup> referring to the wall but originally, the city’s name was *Zamá* which means *morning* in maya.

For the Mayas, the cardinal points had a closed connection with the divine world, for instance, the West and the South are associated with the Underworld and the East with the Upperworld. Their gods were related to astronomical bodies and the three most important ones, the Sun who was Kin, the moon who was Ix Chel and Venus who was Kukulcan, always follow a path between East and West. “It seems that when an astronomical body disappeared in the western sky it was thought by the Maya to be undergoing passage from one world into another, leaving the world of the living and beginning its journey in the world of the dead.” (Miller, A. 1974, 47)

Thus, Tulum was constructed with a strong spiritual meaning, its location on the extreme east represents birth, rebirth and the winter solstice<sup>6</sup>. Ix Chel, the goddess of the moon, was an important divinity –if not the most– for the East Coast maya as she was as well the deity of child birth, procreation and medicine and because the moon rises out of the eastern sea. It is believed that Tulum and most of the East Coast area of the Yucatan peninsula were important pilgrim centers as the sea and its turquoise color symbolized the concept of rebirth as well.

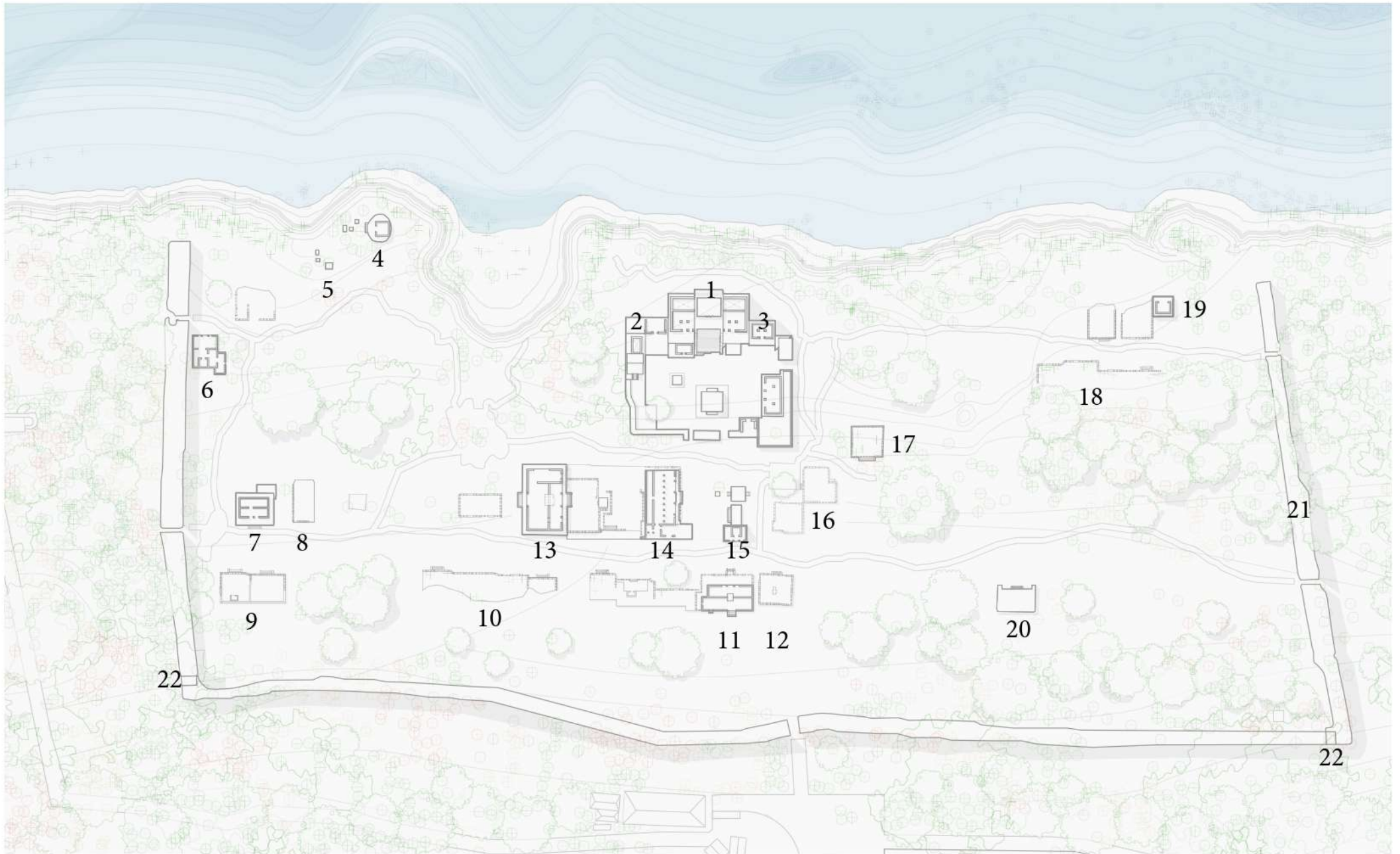
<sup>6</sup> Hajovsky, R. (2012). The Bizarre Events, Weird Connections, Wacky Theories & Offbeat Characters of Tulum. Pan-American.



15. Photo by: Julian Ramirez

<sup>5</sup> Velázquez, A. (2008). The walled city of Tulum pp. 82. Universidad Nacional Autónoma de México, México.

# Archeological buildings



- |   |  |                                       |                         |
|---|--|---------------------------------------|-------------------------|
| 1. El Castillo (Structure 1)                    | 7. House of Northwest                    | 14. House of Columns (Structure 21)   | 22. Surveillance towers |
| 2. Temple of the Descending God (Structure 5)   | 8. The Great Platform                    | 15. Temple of Frescoes (Structure 16) |                         |
| 3. Temple of Initial Series                     | 9. Platform                              | 16. Platform (Structure 13)           |                         |
| 4. Temple of the God of the Wind (Structure 15) | 10. Platform (Structure 29)              | 17. Platform                          |                         |
| 5. Sanctuaries                                  | 11. House of Chultún (Structure 20)      | 18. Group of palaces                  |                         |
| 6. House of the Cenote (Structure 35)           | 12. Platform                             | 19. Temple the Sea                    |                         |
|   | 13. House of Halach Uinic (Structure 25) | 20. Platform                          |                         |
|   |  | 21. The wall                          |                         |



16 Source: Adventure tours

## The portal to a sacred and spiritual place

### **The wall**

Tulum was one of the few Maya cities that were built within a wall, where only the religious, political buildings and some of the dwelling of high status people were inside, the rest of the city was built outside the fortress.

On the east, the city faces the cliff and, on the north, south and east points, the city is protected by a six meters thickness by four meters height wall. There are five access into the city, one is located on the west, two on the north section and

two more on the south one and there was one unique access by the sea, which its believed, it was the port where the merchandise entered and exited the city. These entrances have the characteristic "Maya arch".

Along the wall, there are grades to climb, as well as parapets and observation towers which without doubt had a defensive character.

The wall custodes approximately twelve buildings but the most known and well preserved are eight.



17 Source: Cultural colectiva

## El Castillo (Structure 1)

El Castillo is part of a square which is surrounded by a smaller wall that has entrances just three entrances, two on the West part and one on the South.

It is the site's most important building due to its religious character. It is located on the extreme East part of the site, next to cliff facing the sea. It is 7.5 m height which make it the tallest building in the area. The access to the temple is through a flanked staircase that leads to an entrance with serpentine columns, two zoomorphic masks on the corners and a statue of the "Descending God" in the middle. In front of it, there is a platform that was used for dances and on the sides, other buildings complementing the square. Located to the Southwest, there is the Temple of the Initial Series, where it was found the most ancient documented date of Tulum: 516 AD.<sup>7</sup>

'Since "El Castillo" was used for ritual sacrifices, it was built with a heavily spiritual meaning, it has numerous elements related to the Sun and Venus which were symbols of birth and rebirth.

All the structures that compose the central enclosure dominated by the Castle, exhibit very similar orientations, apparently dictated by that of the Castle, aligned along the same axis east, west, which runs slightly south of the central axis of the Castle.<sup>8</sup>

<sup>7</sup> Instituto Nacional de Antropología e Historia. (2020). INAH. Obtenido de <https://www.inah.gob.mx/zonas/99-zona-arqueologica-de-tulum>

<sup>8</sup> Nava, S., & Sprajc, I. (2015). Orientaciones Astronómicas en la Arquitectura Maya en las Tierras Bajas. Ciudad de Mexico: Instituto Nacional de Antropología e Historia

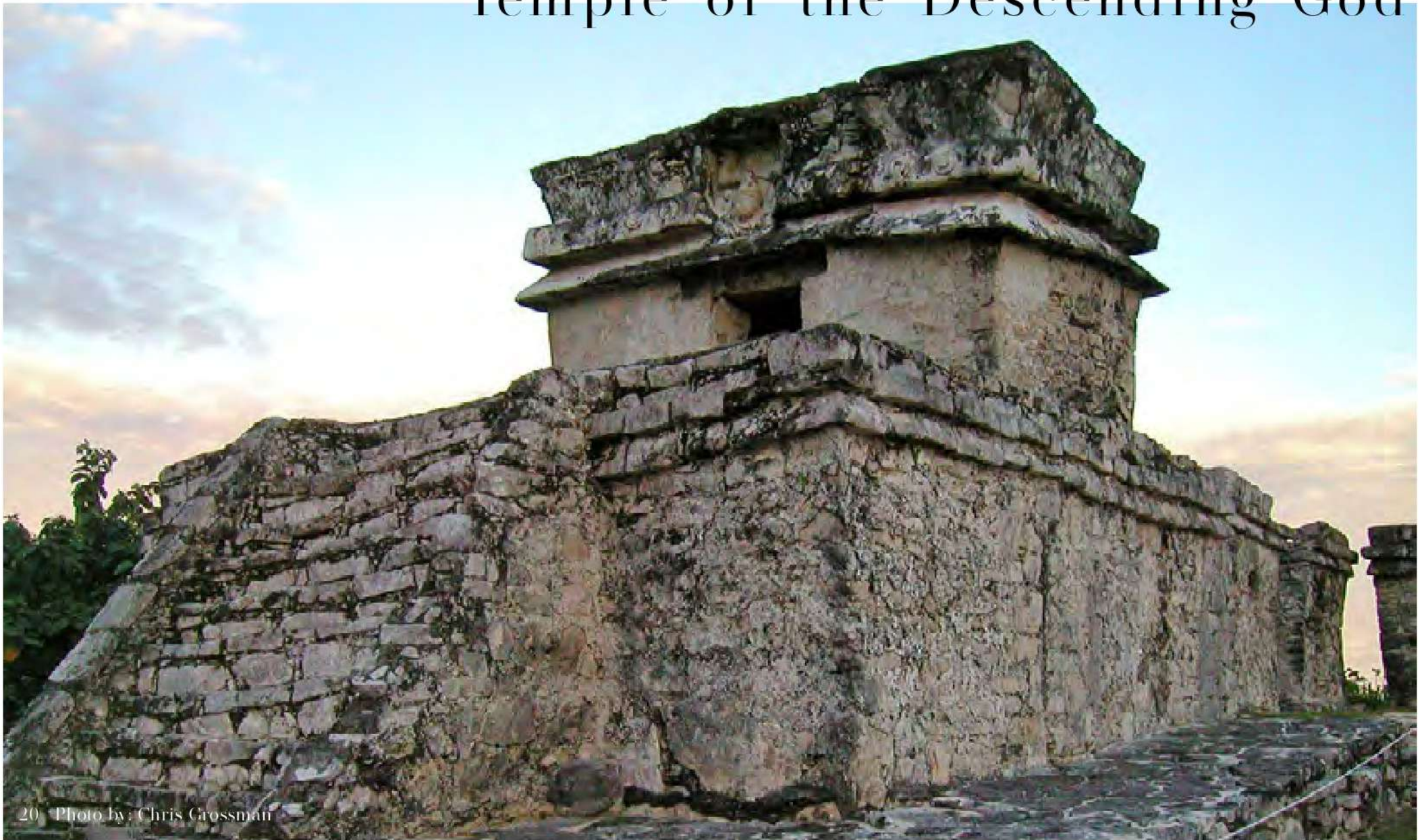


18 Source: La verdad



19. Sunset along the symmetry axis of the upper sanctuary. May 20th 2011. Photo by: Ivan Sprajc

# Temple of the Descending God



20. Photo by: Chris Grossman

## Temple of the Descending God (Structure 5)

Located on the North of the city, on top of the cliff next to the ocean, this temple is related to the Sun, Venus and the celestial and terrestrial cosmic planes<sup>9</sup>. It is characterized by its asymmetrical façade and the stucco character arranged on the lintel niche in a downward position. The meaning of this statue varies, some identify it as the Sun whilst some others claim it is Venus. The main façade, as well as the North-East and South-West ones, were decorated with murals which, according to Miller (1974) are both cosmic planes, the celestial and terrestrial ones that seem to be connected by a navel – this assumption is based on glyph

náhtutal representations – which was believed to be the central axis that connected the mortal plane with the divine one.



21. Stucco character from the Descending God. Photo by: El Comandante

<sup>9</sup> Vargas, E. (1995). *El Espacio Sagrado de Tulum*, pp. 63-66. DialNet



22. Niches, Temple of Frescoes, Photo by: Sergio

## Zamná, god of life and creation



23. Corners, Temple of Frescoes, Photo by Sergio

### Temple of Frescoes (Structure 16)

It is one of the most important buildings in Tulum, along El Castillo and the Temple of the Descending God. It is located on the West side of the site, following the same spiritual references, the location of this building may be related to the dying Sun, the sunset, femininity and old age<sup>10</sup>.

The façade of this temple resembles that of the Temple of the Descending God, on the upper floor of the main façade, there are three niches and in the middle one, there is a representation of the descending god and on the

side ones, there are two standing figures. On the angles, there are large masks that represent the god Itzamná or Zamná, which was one of the most important deities in the Maya culture as it was the god of life and creation and the supreme leader of the Maya pantheon. Inside the temple, the Mayas painted murals in the codex style that show their underworld deities.

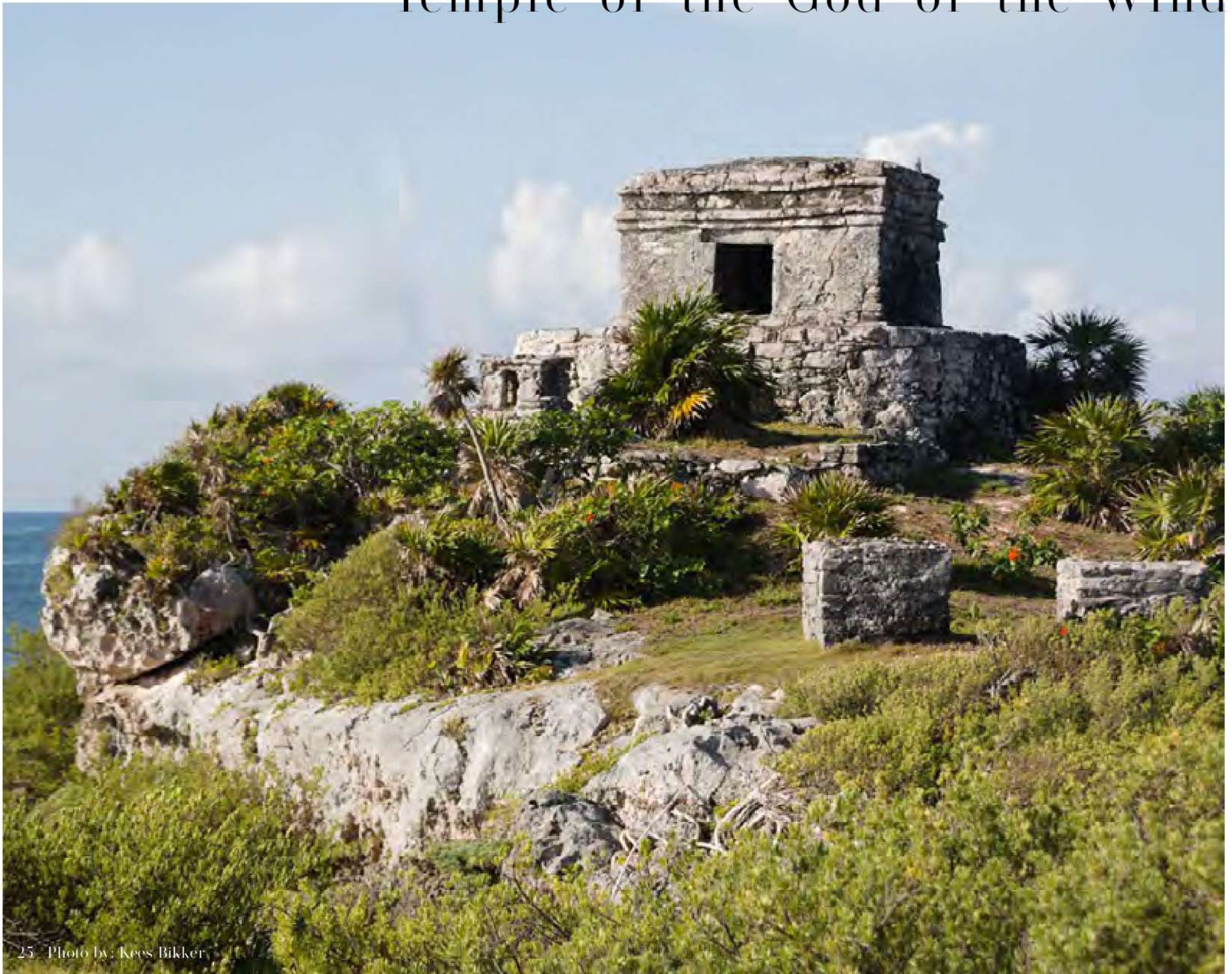
<sup>10</sup> Vargas, E. (1995). El Espacio Sagrado de Tulum, pp. 63-66. DialNet



21 Source: Real Estate



# Temple of the God of the Wind



*Cylindrical base, a representation  
of the wind that blows in all  
directions*

## **Temple of the God of the Wind (Structure 45)**

Located on top of a cliff on the North-East of the site, facing the sea, this building was dedicated to the god Kukulcán or Éhecatl as it was known in Central México. The building has a cylindrical base with no corners, alluding to the God of Wind which was associated to the

four cardinal points since the wind blows in all directions.

The temple has just one room with an altar inside that was used as a sanctuary, some vestiges of sculptures on the roof were found as well<sup>11</sup>.

<sup>11</sup> Instituto Nacional de Antropología e Historia. (1980). INAH. Obtenido de <https://mediateca.inah.gob.mx/repositorio/islandora/object/fotografia:495962>

## A gateway to the Xibalba, the underworld

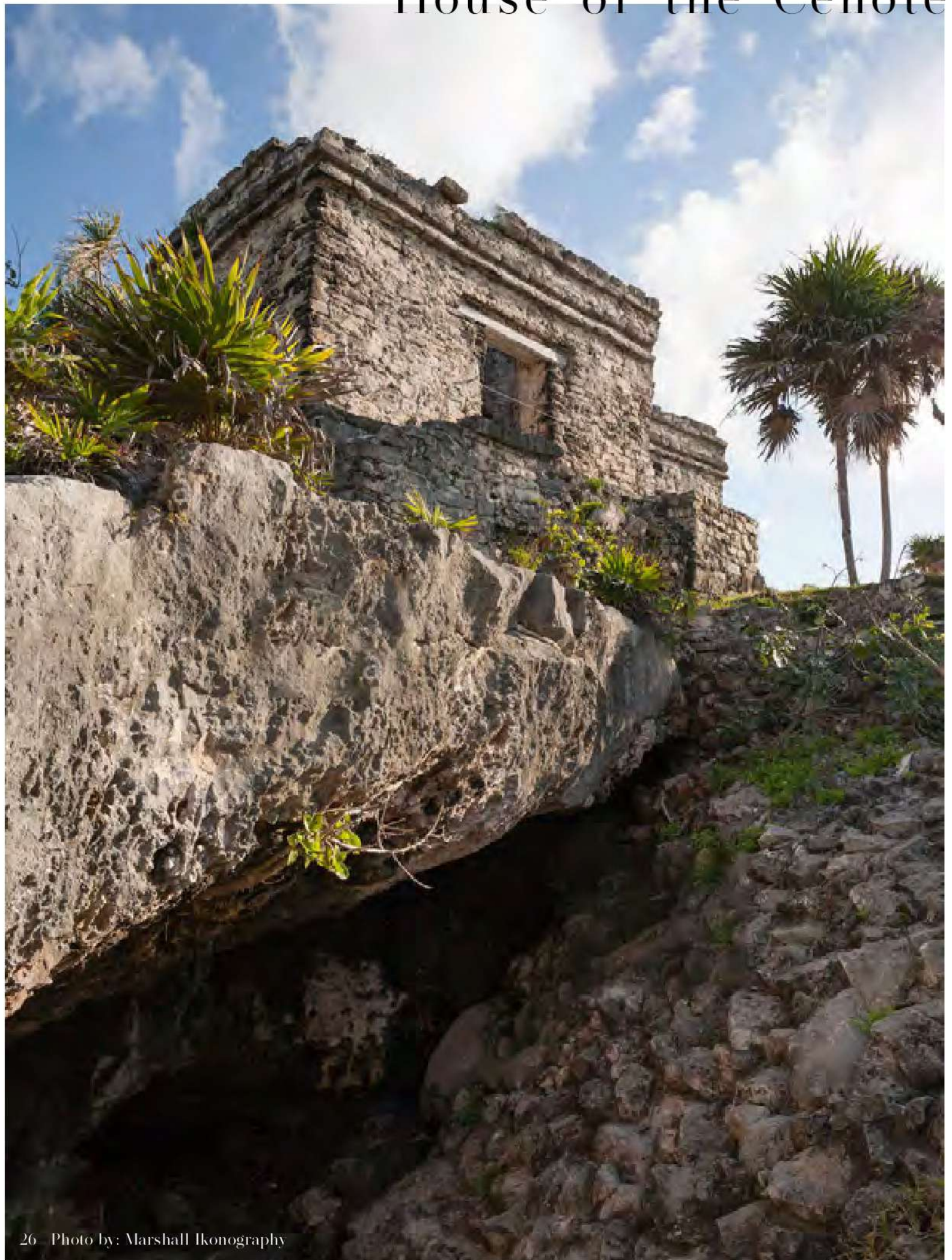
### **House of the Cenote (Structure 35)**

The cenotes are natural freshwater wells that can be found along the Yucatan Peninsula. These sites were sacred for the Mayas since they believed they were gateways to Xibalba, the underworld, therefore, these places were used as graveyards for the leader of each home of the community.

The house of the Cenote is located near the wall, on the North-East side, the main façade is facing East. The structure was erected on top of the cave, it consisted of three large rooms where the bodies were buried, large walkaways so the family could sit and spend time with their ancestors and a sanctuary to perform rituals. In an essential way, this place allowed people to gather and coexist, this is the reason why it is called "The house of the Cenote".

(Vargas, 1995)<sup>12</sup> has named this and some other structures in Tulum Ahua Na or "Stately homes".

<sup>12</sup> Vargas, E., & Santillán, P. (s.f.). La casa señorial o Ahua Na en Tulum. Estudio del patrón de asentamiento en Tabasco, Campeche, Yucatán y Quintana Roo. IIA, UNAM, México.





27 Photo by: Beatriz de Paulis

## House of Columns (Structure 21)

The House of Columns was once conceived as a palace, the building lies on a big L shape platform. Its main façade was located on the South, the entrance is divided in five spaces, as a result of the emplacement of four columns. The interior was quite vast, the principal building had a living room with an altar in the middle, this space had six columns to support the roof, in addition this wing had two bedrooms plus two more on the West wing, which is believed was added afterwards.

The orientation of Structure 21 corresponds approximately to sunsets on the June solstice. Remembering that the ends of

the full Moon always occur near the solstices, it is perhaps not fortuitous that Structure 25, with the probable lunar orientation, is located immediately north of Structure 21. If in the observation of the full phase of the Moon was important, let's remember that the association with a solstice-oriented building would make sense because of the contrast of the Full Moon and the Sun<sup>14</sup>.

<sup>14</sup> Nava, S., & Sprajc, I. (2015). Orientaciones Astronómicas en la Arquitectura Maya en las Tierras Bajas. Ciudad de Mexico: Instituto Nacional de Antropología e Historia

A building  
oriented to  
the Sun





28 Photo by: Richard F. Ebert

A building  
oriented to  
the Moon



## House of Halach Uinic (Structure 25)

The term Halack Uinik means "real man" or "leader man" which was a title given to the supreme leader, overlord or chief. There was one halack uinik for each kuchkabal which were the states or regions of the Maya empire.

The house of the Halach Uinic is located at the center of the site, in front of the House of Columns (Structure 24), to the North side. These buildings were at the same time separated and connected by a big platform that had four entrances being the most important one that of the West side which communicated to Tulum's principal avenue. This building was the largest in Tulum, it had thirteen accesses, six of them were on the main façade and were composed by a set of four columns and a pilaster.



29. Installation of two vassals in Machaquilá by the king of Cancuén



30. Structure 25 seen to the west through the holes in the east and west walls of the south anteroom: note the height of the western hole with respect to the segment of the wall visible in the background on the left. Photo by: Ivan Sprajc

### House of Halach Uinic (Structure 25)

The orientation of Structure 25: an elongated palace in an east-west direction and with access stairs on the north and south sides, can be related to the major north ends of the moon on the western horizon. On the east and west walls of the south room –a sort of antechamber that can be accessed by passing through a colonnade– there are two holes, the of the east wall at a lower height than the west wall.

The fact that: observing from the eastern hole, the line of sight that crosses the western hole passes just above the western segment of the wall that encloses the nucleus of the site (figures 29 and 30) , suggests the possibility that the two openings were used for astronomical observations.

The line of sight from the east hole through the hole west corresponds to the lunar declination of  $28^{\circ}39'$ , which is equal to the maximum

declination reached by the Moon in the Late Postclassic. The alignment of the two holes could not serve to observe the southern major ends of the moon on the eastern horizon, due to their inclination: looking through the two openings in the opposite direction, one does not see the horizon but the natural terrain about 20 m to the east of the structure<sup>13</sup>.

<sup>13</sup> Nava, S., & Sprajc, I. (2015). Orientaciones Astronómicas en la Arquitectura Maya en las Tierras Bajas. Ciudad de Mexico: Instituto Nacional de Antropología e Historia



31. West façade of structure 25, looking from the stairway of structure 29 to the east. Photo by: Ivan Sprajc



32 Source: Mega Construcciones

## Chultún: device to store water

### **House of Chultún (Structure 20)**

This building is named after the device chultún, it is an excavation made for storing water and it can be found on the southwest corner of the house.

The emplacement is facing the Temple of Frescoes, its size is considerably generous, situation that leads to believe this place was inhabited by an important civil servant. The building consists of a portico with two columns at the entrance and two large corridors that lead to the chamber.



33 Photo by: Julián Ramírez

## Ocean

The most appealing feature of Tulum is its location next to the turquoise ocean, which as a matter of fact, charmed the ancient Mesoamerican cultures as well, as they believed this color was related to birth and rebirth. An advantage of belonging to the Caribbean Sea, is the water's warm temperature through the year, being the average of a 28 C, the maximum of 30 IC and the minimum of 27.5°C.

The site already has two accesses

to the beach, one is through a staircase that is located to the south of El Castillo and the other one is the caleta, which is at the same level of the beach due to the natural topography of the terrain, this one can be found between the Temple of the Descending God and the Temple of Wind.

## Cliff

All the east part of the site, with exception of the caleta is a rising cliff of 12 meters height. El Castillo, the Temple of Wind, Temple of the Ocean and some sanctuaries are distributed along the 6km cliff. This part of the landscape is a captivating place to construct since it offers both an interesting variety of observation points and a deep spiritual concept, according to the Maya culture.

## Terrain

In general, the terrain is a flat surface with small elevations on the east and west part. These irregularities were cleverly used by the Mayas to place their buildings, such as the temples, the dancing platforms or the sanctuaries.



34 Source: Experiencias Nard

## Vegetation

The archeological site itself is not particularly covered by vegetation, the center of the city has sporadic green spots, specially where the buildings are located, however, all the place outside the wall is immersed in a thick jungle.

The vegetation consists of medium semi evergreen and semi-deciduous forest, and low semi-evergreen forest, which are particularly valuable for logging due to the presence of precious

woods such as mahogany and cedar.

The beach, known as costal dune scrub, is covered by bushes, palms, hearty trees, ocean grapes (*cocoloba uvifera*), agave *angustifolia* and *bravisia tubiflora*. Mangroves can be found in the cost of the Caribbean Sea and due to its valuable role within the natural ecosystem, supplying the nutrients for the Caribbean reef, they are illegal to destroy in Mexico.



35 Photo by Julia Alster



36



A magical  
place,  
connected  
to the  
cosmos





# Chapter III: Thesis analysis

Astronomy History  
Maya Archaeoastronomy  
Tulum, a sacred place  
Requirements for an astronomical  
observatory  
Study cases



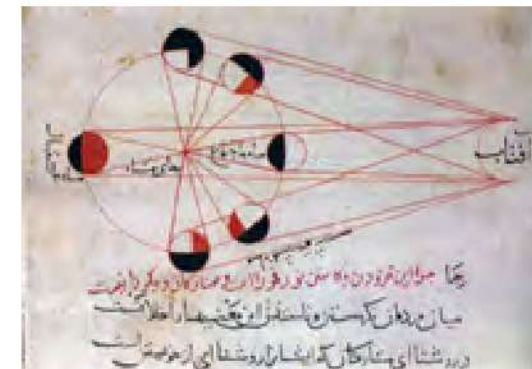
38. Stonehenge, United Kingdom. Photo by: George Rieke



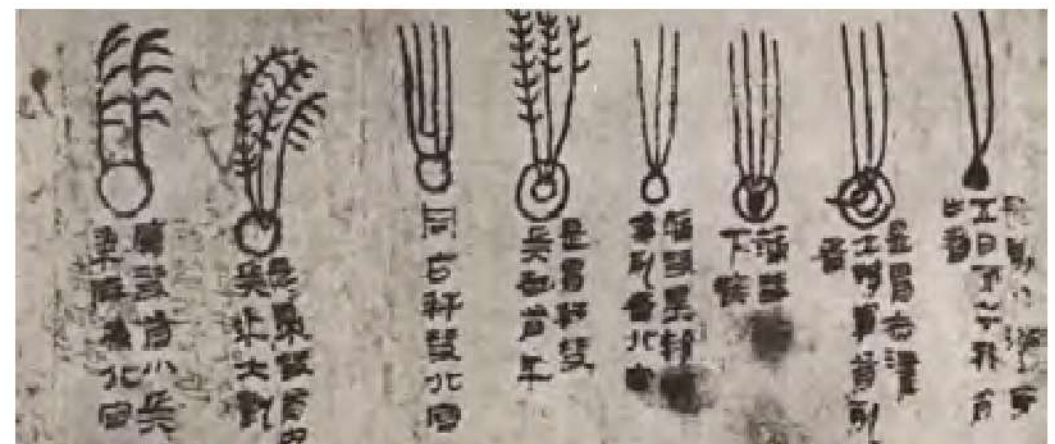
39. Stone circle of Nabta Playa, marks the summer solstice, Egypt. Photo by: Wikimedia commons

Astronomy is one of the oldest and, at the same time, most modern sciences. Its antiquity is almost the same as that of man, however, for a long time it was considered a merely contemplative activity without any relation and relevance to important aspects of daily life; nevertheless, this science had a notable importance in old cultures since it helped them to predict and schedule all kind of activities, from the most spiritual and religious ones until the basic aspects of human survival such as hunting, fishing, agriculture and transportation<sup>14</sup>. Some of the most basic tools we have nowadays were once developed and perfected by Astronomy, for instance maps and the calendar.

What was incredibly impressive about the ancient astronomy is that it was almost entirely carried out with the naked eye, even if some cultures had observatories, there was little use of instruments. Depending on each culture, the closeness of Astronomy to Mathematics varied, for example, the Muslims, the Indians and the Chinese developed an astronomical science highly mathematical and technical, in contrast to the Egyptians whom despite to use very little mathematics, developed a highly accurate observational science<sup>15</sup>. Despite the pragmatic characteristic of this science, Astronomy had an important relevancy in the religious aspect for most of the ancient cultures and, to study both aspects and many others, numerous branches of this science were developed, one among them is archaeoastronomy.



40. Illustration showing the different phases of the moon made by Al Biruni



41. Silk Atlas of Comets from the Hunan Provincial Museum. Photo by: Album of Relics of Ancient Chinese Astronomy. Zhongguo Gudai Tianwen Wenwu Tuji

14 Duque-Escobar, G. (2017). Guía Astronómica. Guía No.1: Historia de la Astronomía. pp. 19. Colombia: Universidad Nacional de Colombia.

15 Selin, H. (2000). Astronomy across cultures. The History of Non-Western Astronomy. pp. XXI. Springer-Science+Business Media.

## Archaeoastronomy?

*“Archaeoastronomy is the interdisciplinary study of the prehistoric astronomy, ancient and traditional all over the world, in the frame of its cultural context. In this study both written and archaeological sources are included, covering the following topics: calendars; practical observation; cults and celestial myths; symbolic representation of events, concepts and astronomical objects; astronomical orientation of graves, temples, sanctuaries and urban centres; traditional cosmology and the ceremonial application of astronomical traditions.” (Lankford, 1997, as cited in Belmonte, J. n.d)<sup>16</sup>*

16 Belmonte, J. A. (n.d). Archaeoastronomy and its educational potential. pp.1 Instituto de Astrofísica de Canarias, Canarias, España: NASE Publications.

### General criteria

Mayan cities have a deep spiritual meaning that is shown both in the general city's emplacement and so as of each building. Their religious and civic constructions were oriented to astronomical phenomena on the horizon, mostly to sunrises and sunsets ; some others had Venus or the moon as standstills.

The explanation of their urban layer and orientations derives from their believes regarding the Earth plane, which they thought it to be flat and of a square surface with four major points located in each corner – the cardinal points – that were surrounding a fifth element in the middle, denominated the center of the world. The cosmic path of their most important astronomic figures, hence the gods, follows in some sort of way, the same direction of that of the four corners of the world, therefore, the cities needed to be in the center as much as possible so they could witnessed the presence of the gods.

their buildings to the Sun's position over the horizon during the solstices, equinoxes and the days of its passage through the zenith.<sup>17</sup>

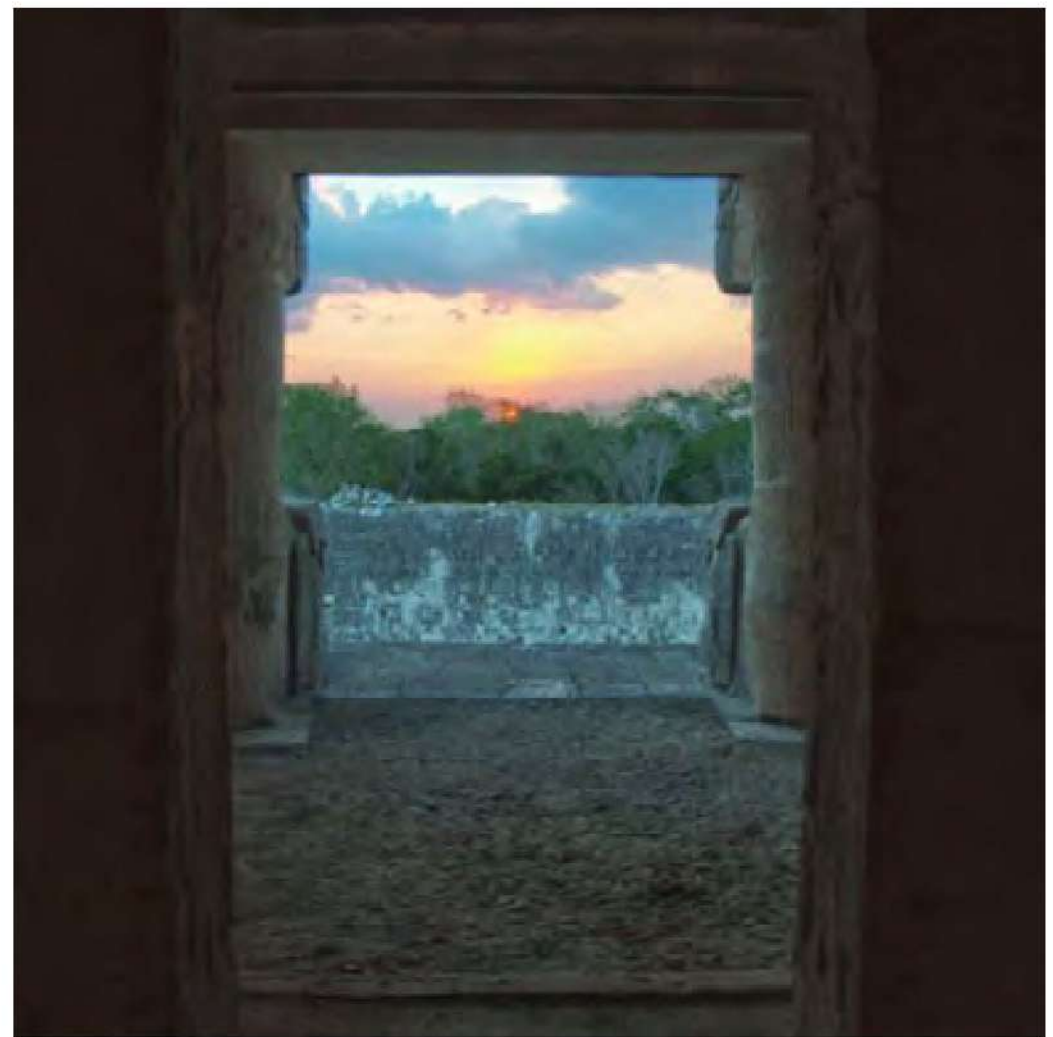
The sacred and important buildings were the ones oriented to the astronomical phenomena, and these were the central points for the symmetry axis that continued designing their cities. The rest of the buildings were aligned to this axis and they never interfered with the horizon's view from one another.

17 Sprajc, I. (2009). Astronomical and Cosmological Aspects of Maya . Architecture and Urbanism. Scientific Research Center of the Slovenian Academy of Sciences and Arts, Ljubljana, Slovenia: Cosmology Across Cultures. ASP Conferences Series, vol. 409.

The most followed belief is that Mesoamerican cultures aligned



12. The orientation of the central part of the Acropolis of Nochicalco, whose east-west axis marks sunrises on February 12 and October 30 (above) and sunsets on April 30 and August 13, belongs to one of the most widespread alignment groups in Mesoamerica. Photo by: Ivan Sprajc

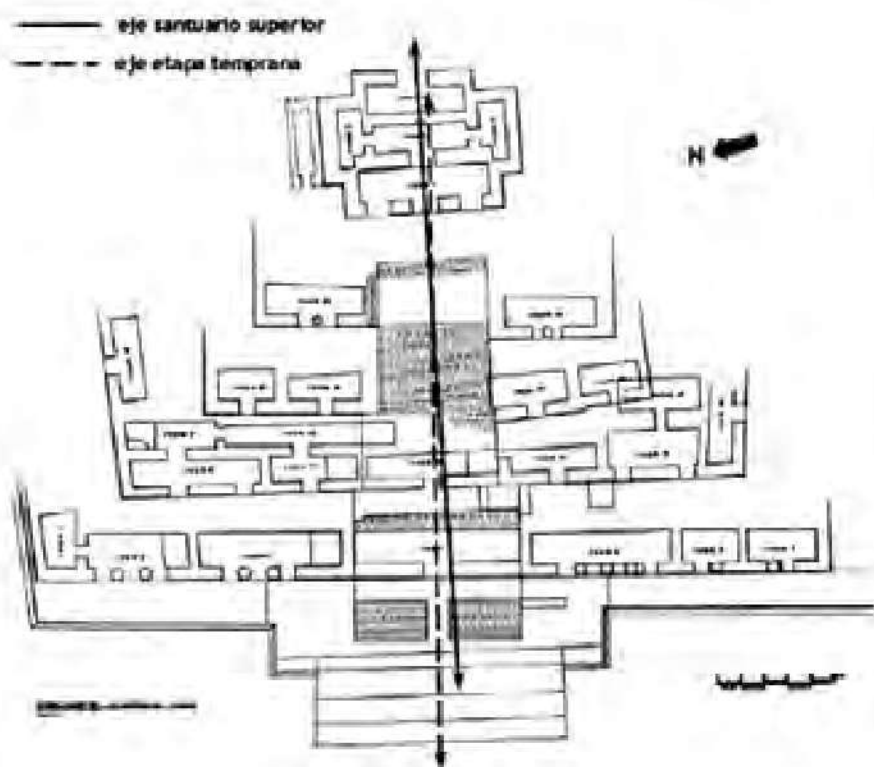


13. The Upper Temple of the Jaguars at Chichén Itzá records sunsets on May 7 and August 6. Photo by: Ivan Sprajc

## Cosmic and natural alignments



14 . Edzná, Edificio de los Cinco Pisos, seen to the east along the symmetry axis of the upper sanctuary, of the upper sanctuary, Yucatán, Mexico Photo: Ivan Sprajc.



15 . Edzná, Edificio de los Cinco Pisos, seen to the east along the symmetry axis of the upper sanctuary, of the upper sanctuary, Yucatán, Mexico Photo: Ivan Sprajc.

### Relations to the Surrounding Landscape

Besides the astronomical bodies' orientations, the Mayas use the site and its surroundings as axis, since they valued nature and wanted to be one with it.

"It is likely that rhomboidal ground plans, relatively common in Mesoamerican structures, at least in some cases, resulted from the builders' attempts to orient the east-west axis to a celestial event and, at the same time, the north-south axis to a prominence on the horizon[...] Obviously, if a building was oriented both astronomically and to a chosen landscape feature, the place of construction must have been carefully selected." (Sprajc, 2009, 722)<sup>18</sup>

Despite the accurate axis system, the Mayas cities weren't formally planned, they tended to grow horizontally outwards from the core, formed by the religious and elite buildings and upwards in the city center, as the existing buildings were normally used as main core to build bigger temples<sup>19</sup>.

### Maya lowlands

The Mayas continued using almost the same general criteria, the city and the building's alignments were mostly motivated by astronomical phenomena and the symmetry axis were mostly oriented to an east-west direction<sup>20</sup>; these inclinations can be better appreciated in religious buildings or those used as dwellings for people with a high hierarchy.

As seen before, most of the orientations refer to sunrises and solstices in particular dates, mostly to winter and summer solstices.

"The solstices acquired a great meaning, symbolic and inspired diverse rituals: in many societies the winter solstice was particularly

important, because it is then when the nights do not continue extending and the Sun stops losing its force, initiating a new cycle of life. The importance the solstices must have had since remote times seems to be reflected not only in the orientations but also in the conception, apparently panmesoamerican, conception that the corners<sup>1</sup> and the carriers of the sky are in the four solstitial points above the horizon." (Nava, Sprajc, 2015, 52)<sup>21</sup>

<sup>18</sup> Sprajc, I. (2009). *Astronomical and Cosmological Aspects of Maya Architecture and Urbanism*. Scientific Research Center of the Slovenian Academy of Sciences and Arts, Ljubljana, Slovenia: *Cosmology Across Cultures*. ASP Conferences Series, vol. 409.

<sup>19</sup> Olmedo Vera, Bertina (1997). A. Arellano Hernández; et al. (eds.). *The Mayas of the Classic Period*. Mexico City, Mexico: Consejo Nacional para la Cultura y las Artes (CONACULTA).

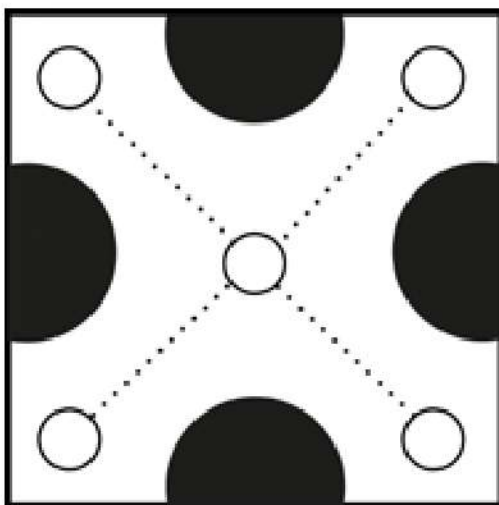
<sup>20,21</sup> Nava, S., & Sprajc, I. (2015). *Orientaciones Astronómicas en la Arquitectura Maya en las Tierras Bajas*. Ciudad de México: Instituto Nacional de Antropología e Historia.

# Tulum

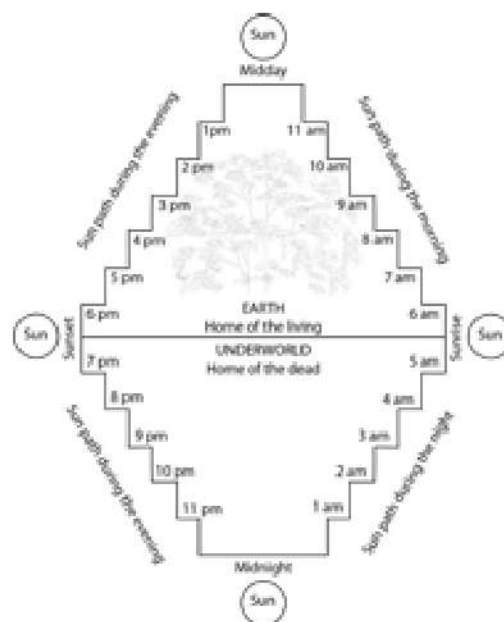
## a sacred place



16. Surveillance tower. Photo by: Kurt Reichardt



17. Cosmogonic square. Four corners



18. Vertical dimension of the world

Tulum was built as a sacred city, a pilgrim place where people could go and clean their body and spirit. The extreme east's emplacement of the city, facing the sea, meant birth and rebirth<sup>22</sup> thus, Tulum's axis were settled by astronomical implications such as the major movements and positions of the Sun, the Moon and Venus; some other alignments were given by the cardinal points.

The city's construction follows the two Maya beliefs regarding the universe: the horizontal and vertical one.

### Horizontal belief (Fig. 46)

The Mayas saw the terrestrial plane as a flat surface with four corners orbiting around a fifth central element, denominated the "*center of the world*", this concept is visible mostly in the urban composition and, in some cases, in the buildings.<sup>23</sup>

This concept is appreciated in Tulum, firstly in its four entrances, located exactly in every single corner, and these, at the same time, follow a north-south axis. Secondly, the fifth element or center of the world, is represented by two elements, Structure 8 and 18, both platforms. The first one is located in the inner enclosure, where El Castillo is located. Structure 18 is located in front of the Temple of Frescoes, which is the physic intrinsic point of some axis in the city's urban layer: the cardinal axis that serve to create the entrances and the one for other buildings alignments.

<sup>22</sup> Miller, A. G. (1974). West and East in Maya Thought: Death and Rebirth at Palenque and Tulum. Yale University

<sup>23</sup> Vargas, E. (1995). El Espacio Sagrado de Tulum. pp. 58. DialNet

The entrances were guarded by surveillance towers, located on top of the wall which has a dual purpose, to protect their people from physic and magic dangers. Since Tulum was a spiritual center, it was believed that the pilgrims were sometimes in danger when they entered the city without precautions as "the sacred is always dangerous." (Vargas, 1995, 61).

### Vertical belief (Fig. 47)

For the Mayas, the cardinal points had a closed connection with the divine world, for instance, the West and the South are associated with the Underworld and the East with the Upperworld.

"It seems that when an astronomical body disappeared in the western sky it was thought by the Maya to be undergoing passage from one world into another, leaving the world of the living and beginning its journey in the world of the dead." (Miller, A. 1974, 47)<sup>24</sup>

Thompson (1954,225) suggests that this verticality is represented as a stair, with six ascendent steps on the west and six descendent steps on the east, the thirteenth step is marked by the zenith and this was the link between worlds.<sup>25</sup>

<sup>24</sup> Miller, A. G. (1974). West and East in Maya Thought: Death and Rebirth at Palenque and Tulum. Yale University.

<sup>25</sup> Vargas, E. (1995). El Espacio Sagrado de Tulum. pp. 58. DialNet



19. Temple of the God of the Wind. Photo by: Jaime Tena

## Winter solstice, synonym of new beginnings

Thus, Tulum was constructed with a strong spiritual meaning, its location on the extreme east represents birth, rebirth and the winter solstice is synonym of a new beginning<sup>26</sup>.

The architectural expression in Tulum is the representation of this beliefs, as the most important buildings of the city are either oriented to astronomical phenomena or have an intangible design following this concept.

The orientation of the House of Columns (Structure 21), corresponds approximately to sunsets on the June solstice.

<sup>26</sup> Hajovsky, R. (2012). The Bizarre Events, Weird Connections, Wacky Theories & Offbeat Characters of Tulum. Pan-American.

Remembering that the ends of the full Moon always occur near the solstices, whilst the House of Halach Uinic (Structure 25) follows the major inclinations of the moon<sup>27</sup>.

The house of the Wind (Structure 15) is the only building in the area with a round base, which are associated to the god Kukulcán and one of its most important manifestations is Venus, the Morning Star.<sup>28</sup>

<sup>27</sup> Nava, S., & Sprajc, I. (2015). Orientaciones Astronómicas en la Arquitectura Maya en las Tierras Bajas. Ciudad de Mexico: Instituto Nacional de Antropología e Historia

<sup>28</sup> Miller, A. G. (1974). West and East in Maya Thought: Death and Rebirth at Palenque and Tulum. Yale University.

Legend



Axis - Four corners of the world



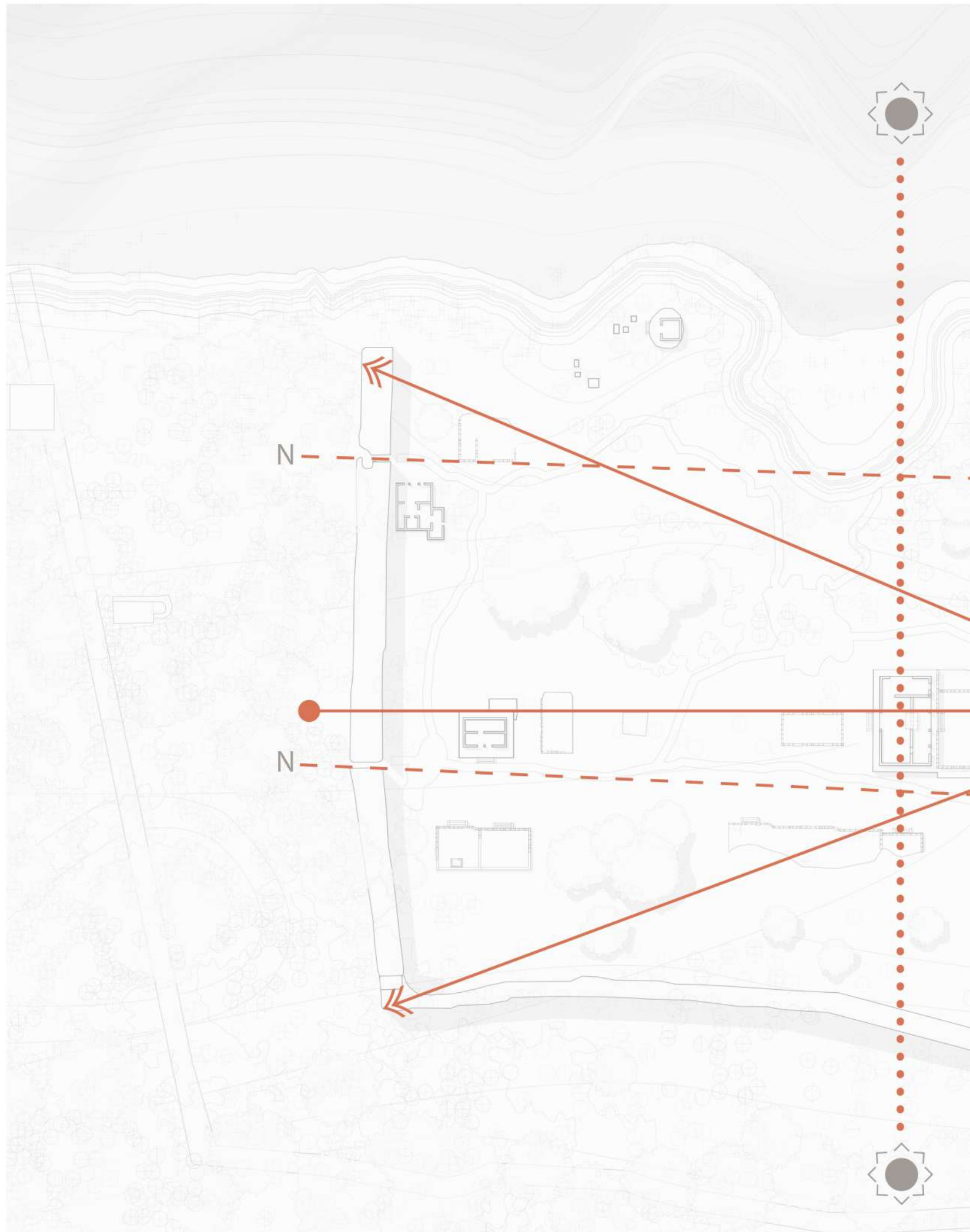
Axis - Cardinal points



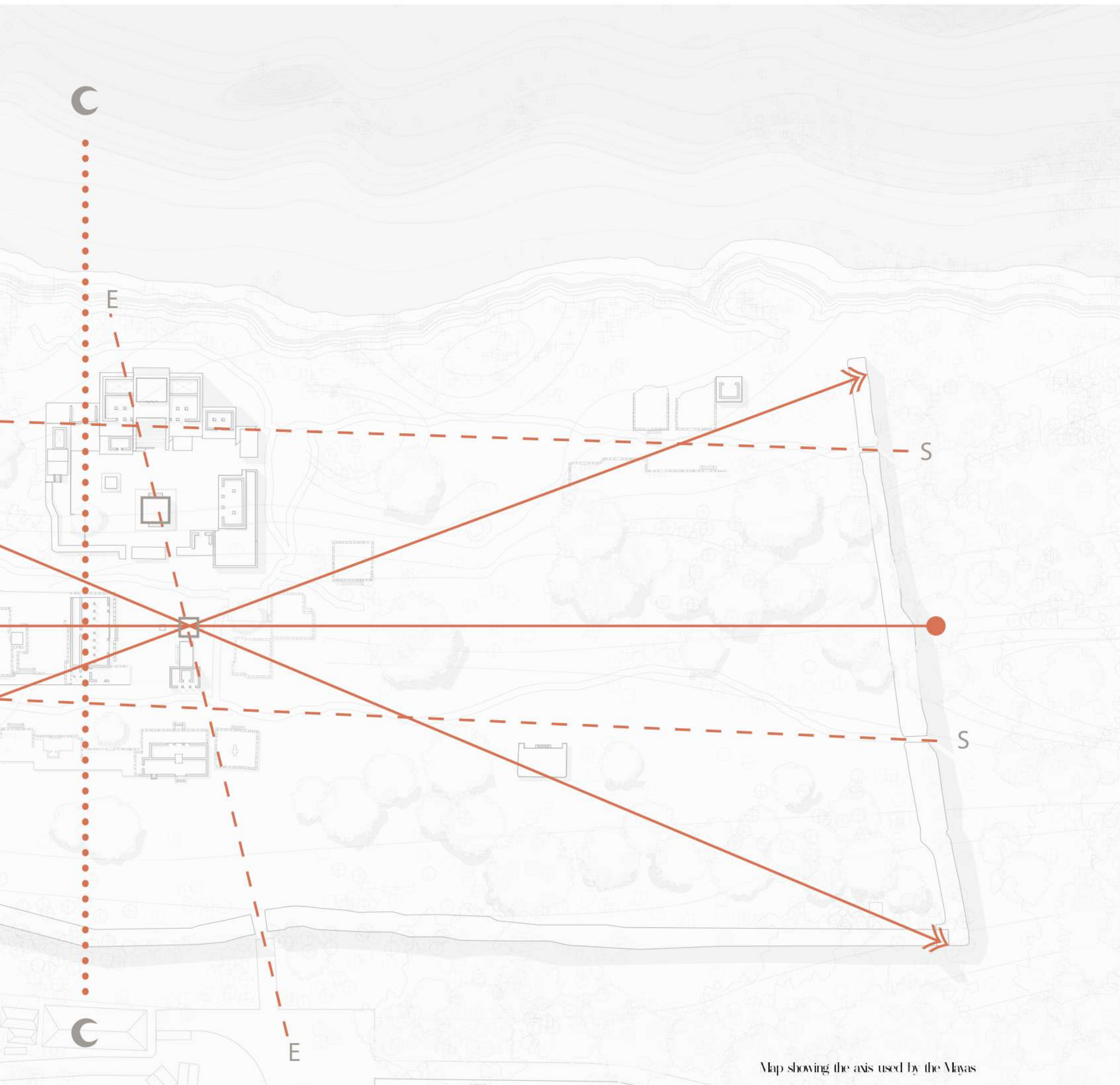
Axis - Alignment of other buildings with the fifth element, Structure 18



Alignments with the Sun or the Moon







Map showing the axis used by the Mayas

# Requirements for an astronomical observatory

## Observatory

/əb'zɜːvə'tɔːr.i, -'tɔːr.i/

Oxford dictionary

noun [ C ]

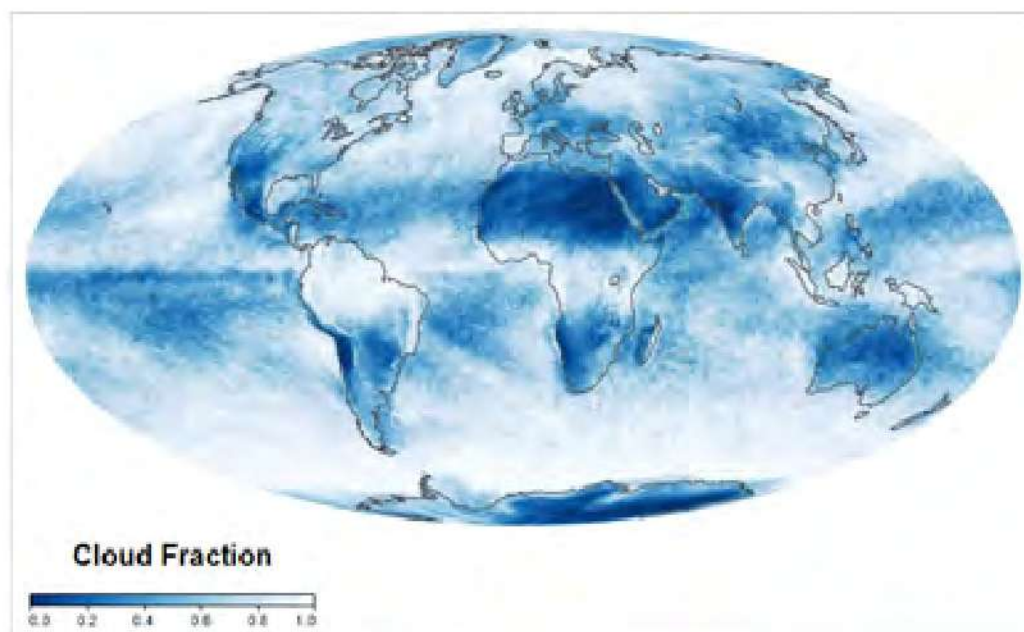
US

A special building with a telescope or other equipment that scientists use to watch the stars, the weather, etc.<sup>29</sup>

<sup>29</sup> Oxford University. (2020). Oxford Learner's Dictionary. Obtenido de <https://www.oxfordlearnersdictionaries.com/definition/english/observatory>

An astronomical observatory does not necessarily require scientific instrument. ancient cultures used monolithic structures to keep track of the Sun, Moon and other celestial bodies for timekeeping or calendrical purposes. being Stonehenge the most famous one; while some other cultures built towers to have a better and closer look of the sky, such as the Babylonians or the Mayas. Nevertheless, an astronomical observatory, being amateur or professional, needs certain conditions to have a proper development.

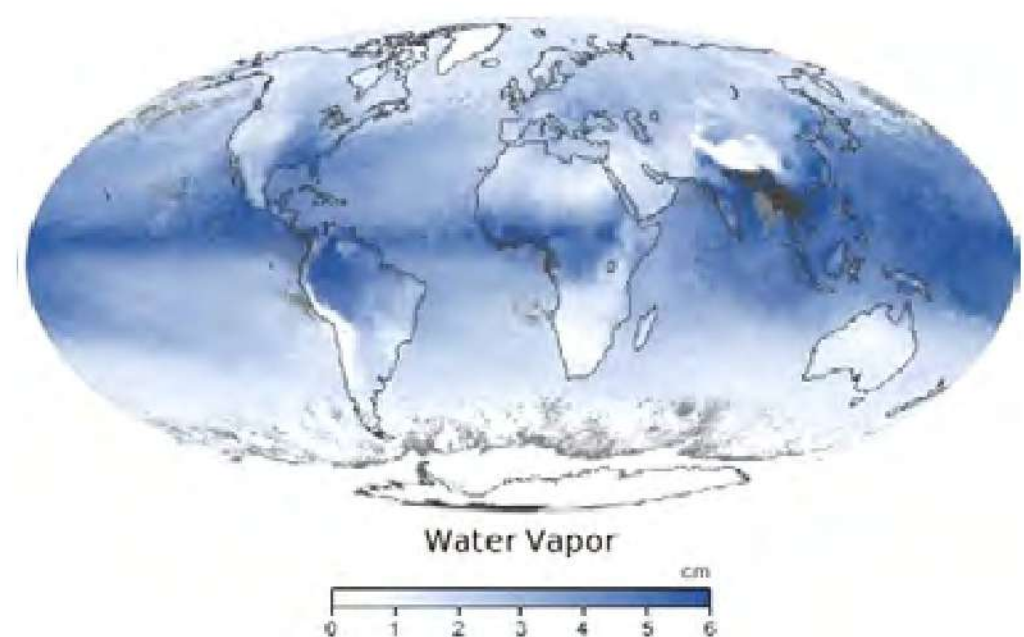




50. Average of cloud coverage a year. Source: NASA



51. Light pollution. Source: Light pollution map



52. Average humidity, water vapor a year. Source: NASA

### Latitude

The first decision to be made is whether to site a telescope in the northern or southern hemisphere. The southern sky is arguably the more interesting, as it contains both the galactic centre and the two nearest galaxies to our own – the Small and Large Magellanic Clouds. Telescopes sited close to the equator can access much of both hemispheres, of course, so this is often a good compromise.

### Cloud cover

Although radio telescopes can peer through cloud, optical telescopes cannot. Hence, finding a site with relatively little cloud cover means that a telescope can be used for a larger number of nights per year, maximising the investment made in the facility.

### Light pollution

Light from terrestrial sources, such as streetlights and industry, increases the amount of background light detected by telescopes. This increases the background noise in astronomical images, making it more difficult to detect faint astronomical sources. Since the faintest astronomical sources often turn out to be the most interesting ones, the world's largest telescopes are sited in regions with low light pollution.

### Seeing

Selecting a site with good seeing is of prime importance, as lower seeing improves both the spatial resolution and the signal to noise ratio of astronomical images, thereby exploiting the apertures of the world's largest telescopes to their maximum. The atmosphere over the sea tends to be much less turbulent than the atmosphere over land, as the sea exhibits an essentially smooth, constant temperature surface compared to the land. Some of the best astronomical sites are therefore

located on small islands in the middle of oceans, such as Hawaii and the Canaries, as these small land masses cause little additional turbulence. For the same reason, coastal regions that receive winds predominantly from the direction of the ocean, such as the western coasts of the Americas and Africa, also exhibit excellent seeing.

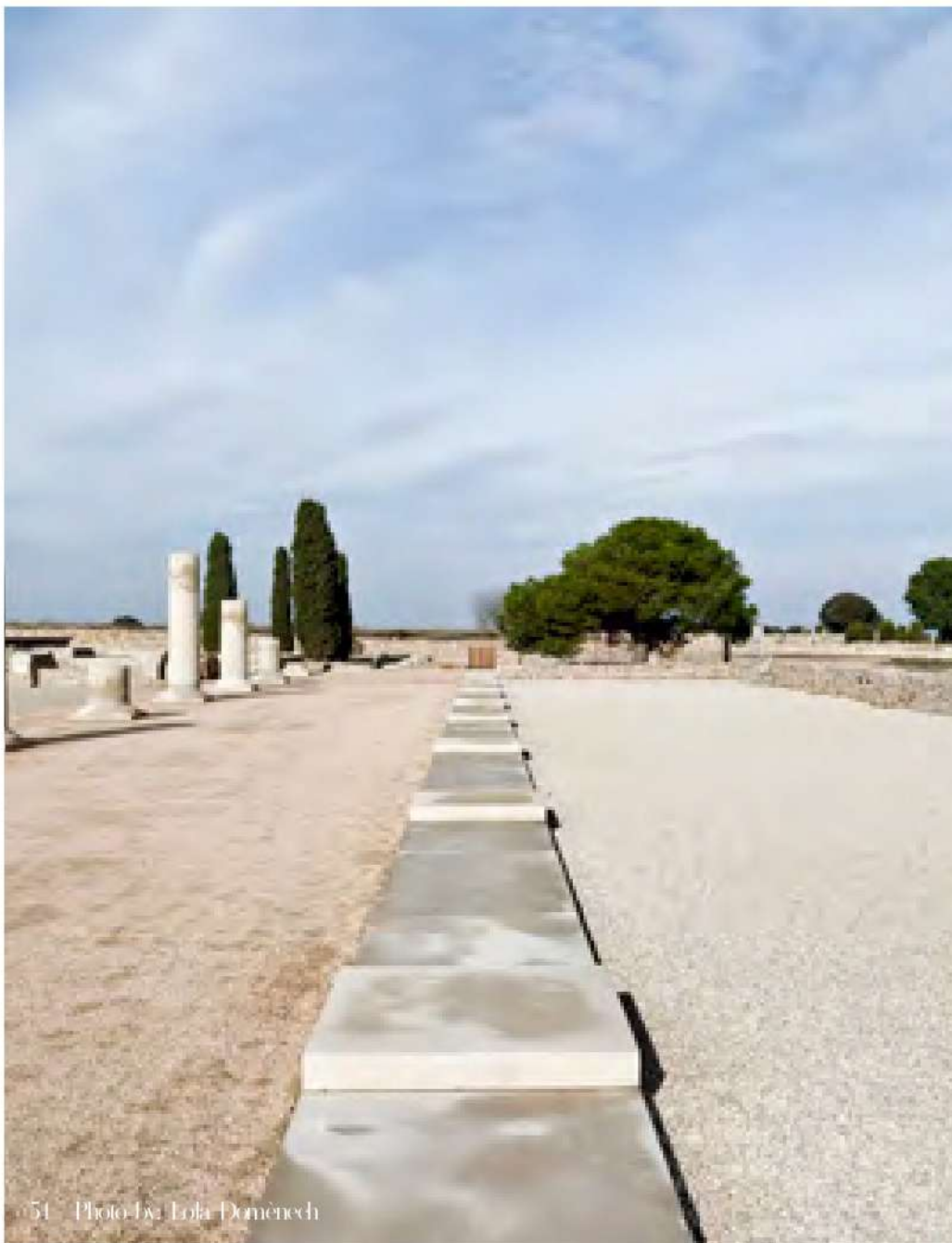
### Humidity

Water vapour in the Earth's atmosphere has only a marginal impact upon optical observations, but it is a very significant source of absorption of the infrared light from astronomical sources. Since most large optical telescopes built today have also been designed to operate in the near infrared, finding sites with low water vapour content is of importance.<sup>30</sup>

<sup>30</sup> Avilés, J. A. (n.d). Archaeoastronomy and its educational potential. Instituto de Astrofísica de Canarias, Canarias, España: NASE Publications.

# Study cases

## Roman Forum of Empúries – Lola Domènech



Project location: Girona, Spain  
Typology: Cultural Heritage/  
Restoration  
Built: 2009

Before beginning the Forum refurbishment project the team of architects and archeologists carried out an exhaustive analysis in order to identify the site's key problems after which they set down the guidelines for the project. To begin with, we realized that visitors couldn't clearly distinguish the different areas, spaces and buildings that made up the Forum. The square, the ambulatory, the tabernae, the cryptoportico, the basilica, the curia, the religious area and the garden were unrecognizable spaces for visitors. Visitors couldn't identify the main roads, the cardo and the decumanus, either. Secondly, some of the areas inside the Forum were closed off to visitors for safety reasons, because they were in a bad state and inaccessible.

On top of this, there was the serious problem of accessibility and the lack of a route inside the Forum. The space inside the Forum was inaccessible and

even dangerous because of the uneven levels produced following previous archeological excavations and due to soil erosion from the rain. Once the problems were studied and identified the next step was to set down the project's key objectives: The first priority was to conserve and preserve the archeological remains and the second priority was to make the area of the Forum accessible, visitable and comprehensible. The project of refurbishing the Forum for museum visits entailed close collaboration between the archeologists and architects, who after coming up with these objectives went on to define the specific strategies for the renovation work.

One of the first tasks was to demolish all the inaccurate reproductions (executed during previous archeological interventions) in order to preserve the value of the original ruins. The second task was to consolidate, restore and rebuild some of the most significant and relevant archeological structures according to the criteria set down by the team of archeologists from the MAC. Another key criterion was

# Roman Forum of Empúries – Lola Domènech

to recover the original floor levels and to suggest in a subtle way what the different archeological spaces that make up the Roman forum were like. The aim here was to show and highlight the emblematic features of the Roman Forum's architecture by differentiating the (drained) paving surfaces in each particular space thus making it stand out from the others.

And finally to mark out a suitable route for visitors inside the site. The new entrances for visitors were strategically placed on the former roads, the *cardo maximus* (N\_S) and the *decumanus maximus* (E\_W) thus highlighting the Cartesian order. Visitors are now able to clearly understand the relation between the different spaces that make up the Forum (the square, the *ambulacrum*, the *tabernae*, the *curia*, the *basilica*, the *temple*, the *garden* and the *cryptoportico*).

The project basically intended to recreate the atmosphere of order that prevailed in the Roman city. When carrying out the works special attention was paid to the materials, techniques and designed solutions, constantly looking for a balance in the dialogue between the original ruins and the new structures, steering clear of mimicry and false reproductions. The refurbishment of the Roman Forum was not only an archeological and architectural undertaking but a landscaping one as well. At all times this project was respectful with the value of history and the landscape.

*Text taken from the website.*



55 Photo by: Lola Domènech



56 Photo by: Lola Domènech

## Adaptation of the Roman Ruins of Can Tacó – Toni Gironès



57 Photo by: Sabem.com i Aeroproduccions

Project location: Montornès del Vallès, Spain

Typology: Cultural Heritage/ Restoration

Built: 2012

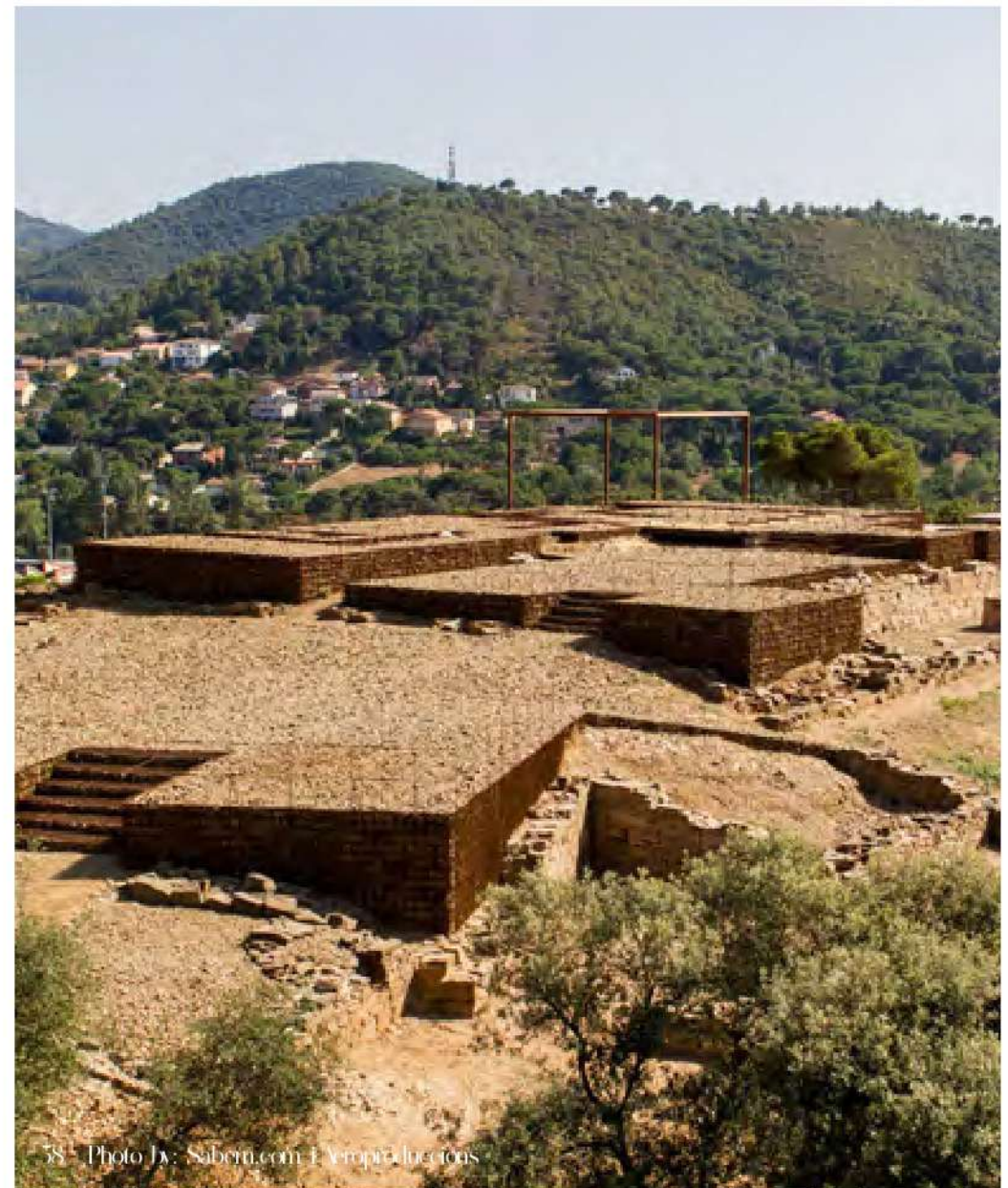
The archaeological site of Can Tacó in Turó d'en Roina, in the natural setting of Turons de les Tres Creus. In a highly fragmented metropolitan area, arises the need to project some places previous an area with a great natural and archaeological interests.

Built by successive terracing and partly with site stone licorella, what had been an important settlement prior to construction of the Via Augusta, is today a natural viewpoint to the counties of Vallès. It intervenes in the backfill of Roman traces, improving the content (the space) and highlighting the container (the walls). It has been worked with the lands that over the time covered the remains and are accumulated outside the site produced from the archaeological excavation.

These lands, just like the gravels and the rocks of the old supposedly Roman quarry, are selected and tidy,

but with a new disposition, giving them a new meaning. A first steel mesh contains the new stones, and these contain land and gravel that jointly will reproduce the successive horizontal planes where the Romans transited. A second denser and thinner mesh is arranged like a curtain over a period of time, a backdrop where the various archaeological remains are projected. In this way stone and steel, mountain and industry, living in these landscapes of accumulation and, however, dynamic by the contact between the fragments; interpreting the existing, putting in value and activating, adding and not erasing, and at the same time co-evolving with the environment trying to optimize resources.

*Text taken from the website.*



58 Photo by: Sabem.com i Aeroproduccions

## Recovery of Merola's Tower – Carles Enrich Studio



59 - Photo by: Adrià Goula

Project location: Puig Reig, Spain  
 Typology: Cultural Heritage/  
 Restoration  
 Built: 2019

In the south of the municipality of Puig Reig stand the remains of the heritage site of the castle of Merola, dated from the late thirteenth century. Due to the documented earth tremors that shook Catalonia in the 1500s, only one of the faces of the defense tower, originally with a rectangular plant of 5 x 3.8 m and 14.8 m height, is still standing. The detachment of part of its coronation in 2016 put Puig reig Town Council on alert. The high risk of collapse, with the subsequent loss of the monument, called for an intervention to guarantee the preservation of the remains and the recovery of the building for the village as an attraction for visitors.

Two basic lines of intervention were adopted to meet these aims: the consolidation of the surviving remains and the reinforcement of the medieval structure. The reinforcement takes the form of a timber structure comprising 18

sections of a 14 cm square that follow the original perimeter of the stone wall. Like a scaffolding, it structurally stabilizes the pre-existing construction, recovers the original volume and restores its function in the territory as a lookout and defense point. The new structure resolves the functional reinforcement conditions and establishes a dialogue with the pre-existing stone wall, evidencing the intervention with respect to the original construction.

The missing foundation is recovered with lime concrete and the two structures are tied using wooden profiles anchored to the stone canvas at 14 points. The insertion of a stairway inside the structure provides access to the three original levels of circulation and facilitates the future maintenance of the monument. The ascent to the upper level of the tower recovers a point of view that had been inaccessible since the fifteenth century. Finally, the stones found in the archaeological excavation are reused to delimit the intervention and show the original demolition material.

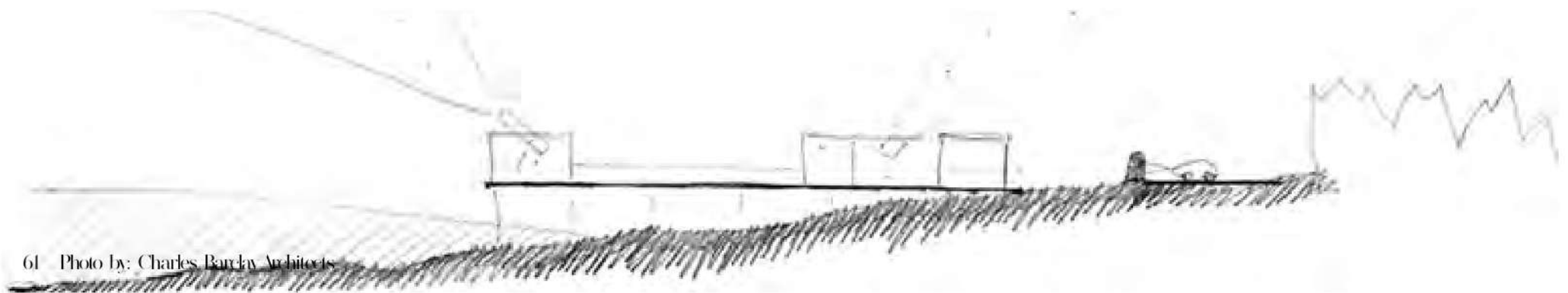
*Text taken from the website*



60 - Photo by: Adrià Goula

# Study cases

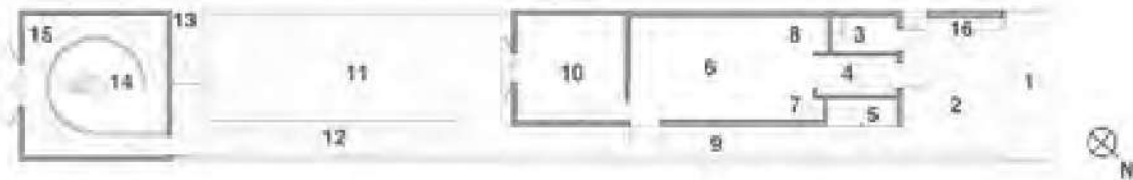
## Kielder Observatory – Charles Barclay Architects



61 Photo by: Charles Barclay Architects

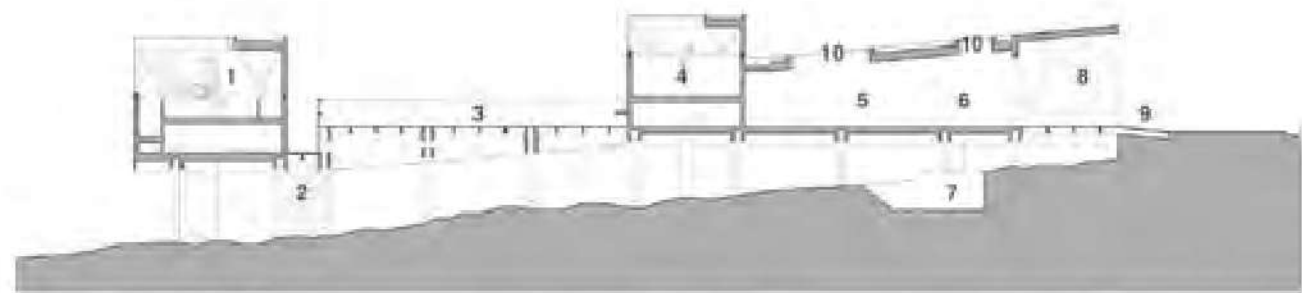
Project location: North  
Humberland, United Kingdom  
Typology: Astronomical  
observatory  
Built: 2008

The astronomical observatory, won in competition in 2005, was completed for the Kielder Partnership in May 2008 and has been acclaimed by architectural critics, the astronomical community and the public. The first observatory to use a 'land pier' form and all-timber construction, it houses two permanent telescopes and is designed to suit amateurs and professional astronomers alike. During the day, the observatory serves as a belvedere overlooking Kielder Forest. The observatory is an exemplar off-grid building, entirely self-powered by means of a wind turbine and photovoltaic panels and features as the 'mothership' for the renowned Kielder star camps. The observatory has received 2009 awards from the RIBA and the Civic Trust, a Hadrian Award from Northern Architecture and featured in the inaugural World Architecture Festival. For information on opening times see [www.kielderobservatory.org](http://www.kielderobservatory.org)



Floor plan.

- |                          |                  |                      |
|--------------------------|------------------|----------------------|
| 1. Entry ramp            | 6. Warm room     | 11. Observation deck |
| 2. Covered entrance area | 7. Stair         | 12. Ramp             |
| 3. w/c                   | 8. Kielderistic  | 13. Escape stair     |
| 4. Entrance              | 9. Gangway       | 14. Pulzar turret    |
| 5. Battery Cupboard      | 10. Meade turret | 15. Circular ramp    |
|                          |                  | 16. Bench seat       |



Section.

- |                                  |                          |
|----------------------------------|--------------------------|
| 1. Pulzar turret                 | 6. Entry Hall            |
| 2. Galvanised steel escape stair | 7. Composting Vault      |
| 3. Observation deck              | 8. Covered entrance area |
| 4. Meade Turret                  | 9. Concrete ramp         |
| 5. Warm room                     | 10. Rooflights           |

62 Photo by: Charles Barclay Architects

*Text taken from the website.*



Study cases  
Kielder Observatory – Charles Barclay Architects





## Chapter IV : The project

Current state of the site  
Rebirth of Tulum - Urban  
intervention  
Rebirth of Tulum - Ix Tower  
Façade  
Floorplans  
First floor - The inner jungle  
Second Floor - The Cosmos  
Garden - Xibalba



## How to approach the site?

After the theory research and the better understanding of the guidelines the Maya used to built their cities and their architecture, the first step of the project was to analyze the current state of the site.

The city was firstly discovered in 1518, during the Spanish conquest but it was left behind, later on, in 1841, it was "rediscovered" by the explorers and travelers John Lloyd Stephens and Frederick Catherwood.

From that date on, the archeological zone has been restored a couple of

times, the last one being in 2018, which consisted in cleaning and waterproofing the roofs of those buildings that have murals and mortar patching on façades.

Most of the buildings can be found in good condition, nevertheless, the floor is in bad condition since it doesn't have any type of covering or protection, therefore grass and other type of flora has covered it which can cause damage in the building in the future. The principal platforms are well preserved but the secondary ones

are mostly destroyed, some of them still have part of the perimeter as guidelines: they don't have any type of delimitation or protection, thus people can walk and pass through them, causing a deterioration.

The existing paths have no material in particular and present no concept or axis as guidelines, they cross the entire site but without an intention behind. The four access on the corners are still functioning, however, the one that was once considered to be the "main access" has been closed down.







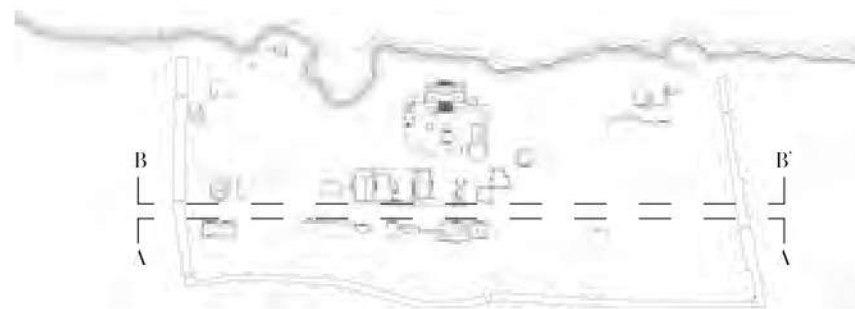
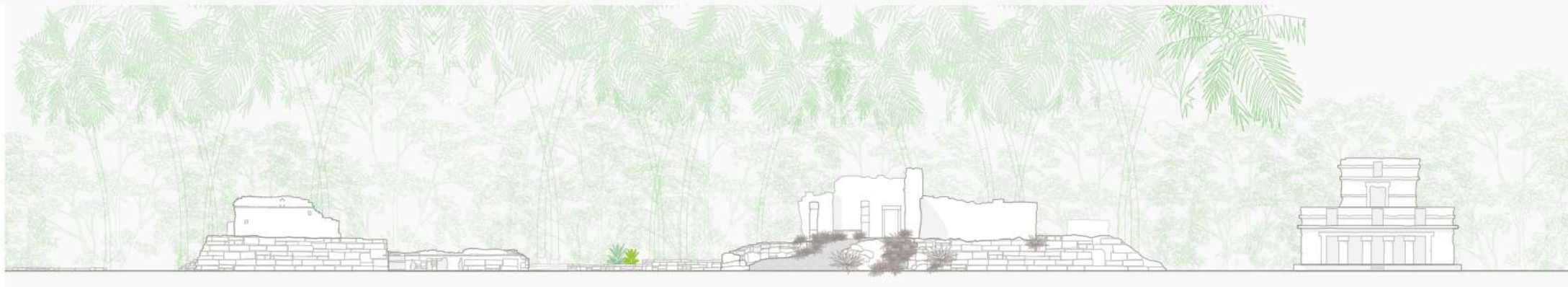
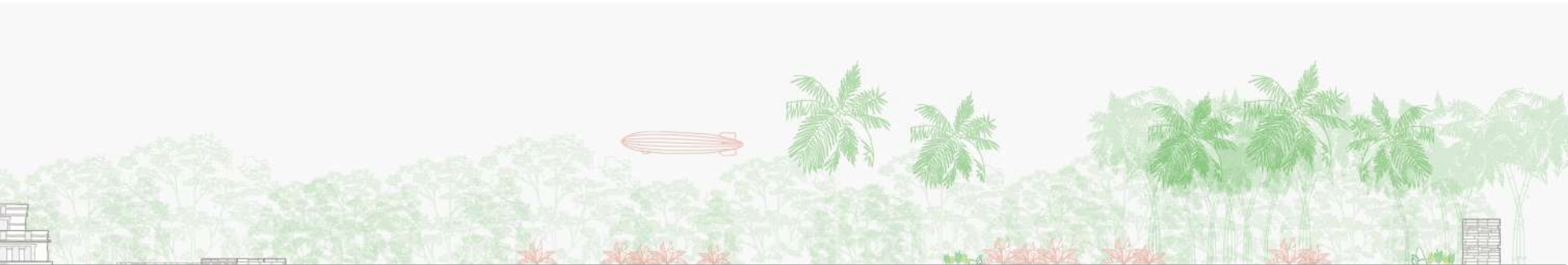
Masterplan - Current state of the site - 1:1000



Elevation A A' - Current state of the site - 1:800

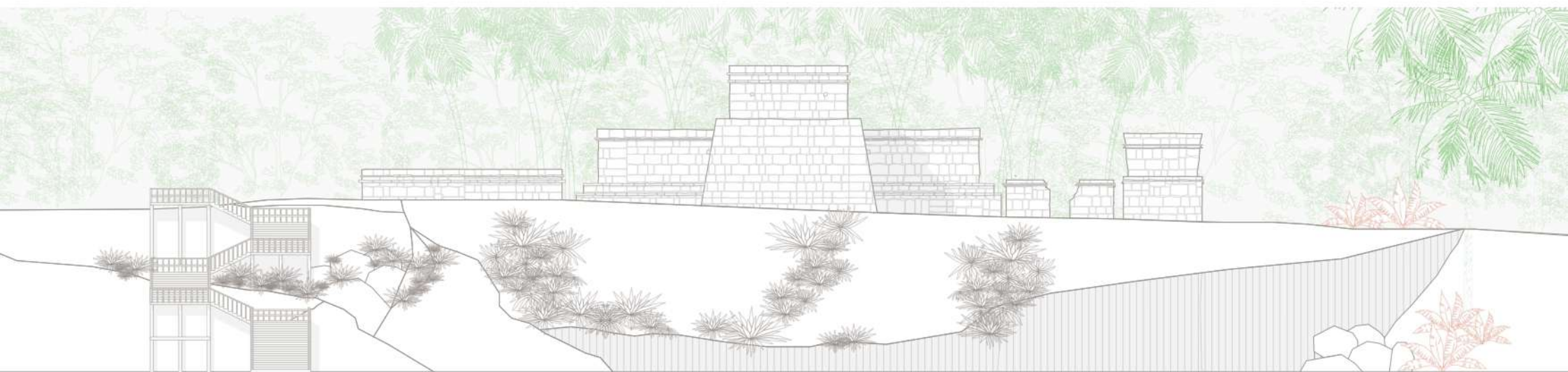


Elevation B B' - Current state of the site - 1:800



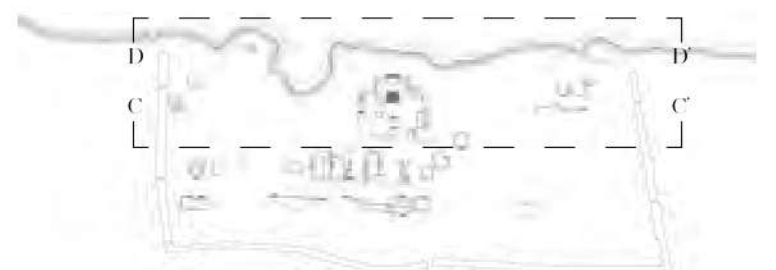


Elevation C-C' - Current state of the site - 1:800



Elevation D-D' - Current state of the site - 1:800







Reconnection  
to the  
cosmos

# Rebirth of Tulum

## Urban intervention

Retaking the concept and vision regarding the astronomical bodies and being as less invasive as possible were the general ideas behind the intervention. The general design consists in the generation of a new urban layer and the insertion of an astronomical observatory (*I'x tower*) which would be the intersection point between the past and the present. This intervention seeks to bring back the concept of being one with nature, to be immersed in the cosmos and to respect the surroundings. The urban design consists in three major interventions:

### **New paths**

The cardinal points North and South were taken back to serve as guideline to create the new paths, crossing the site in a longitudinal way from one access to the other, these ones are the primary roads, and, just as the secondary ones, they're made of blocks of rammed earth. The entrance located in the axis of the cardinal point East, is meant to be re-opened, thus a secondary path was created which is going to be connected to the lower primary road.

On each entrance, the small piazza has been redesigned, changing its size and putting gravel as floor.

### **Area differentiation**

This intervention has two purposes: reflooring the ruins and differentiate the areas by it's

importance. Retaking the nature and earth concept, a different shade of brown and yellow gravel can be found depending on the area.

### **Restoration of the platforms and delimitation of the ruins**

To bring back to life the platforms, and to keep its main material but marking the difference of an intervention, stone gabions were used to make a reconstruction following their original shape.

The same concept of a simply steel structure was used to create a railing to delimitate certain areas near the ruins and most of the platforms.



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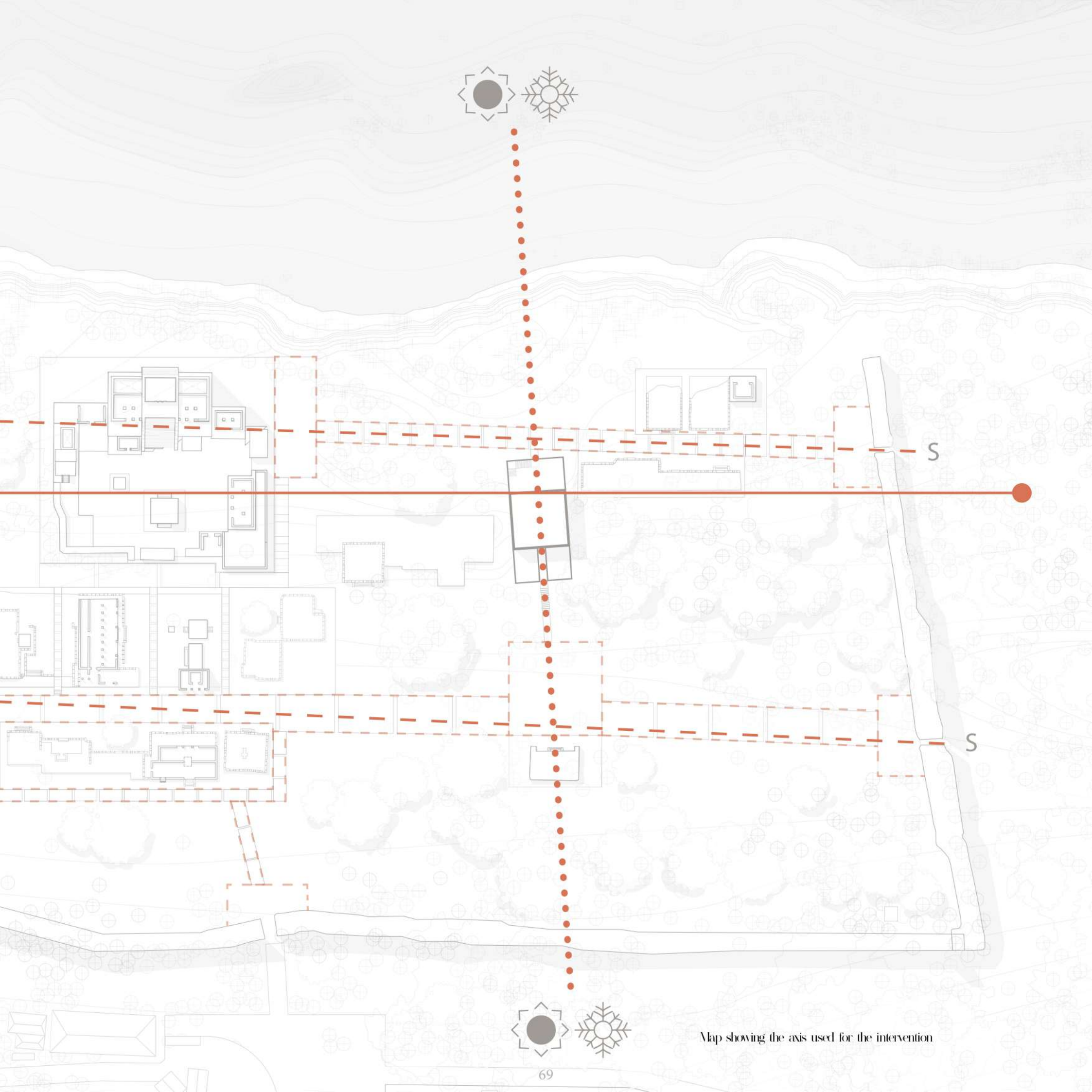
Axis - Cardinal points



Axis - Alignment of other buildings with the fifth element. Structure 8



Alignments with the Sun during the Winter Solstice



Map showing the axis used for the intervention





Masterplan - Intervention - 1:1000

## Area differentiation

There are two palette colors depending on the area, brown for the buildings and yellow for the piazzas gathering and or connection points. These differentiation was made to emphasize and differentiate the hierarchy of the intervention .

The lightest shade of brown is for the sacred, inner areas, which symbolizes the importance these zones had for the Mayas. This color can be found in the piazza of the inner enclosure and the smaller piazzas of the segment in the center of the site: these are located in front of the House of Columns, House of Halach Uinik, the Temple of Frescoes and two big platforms on the right of the temple.

The darkest shade of brown delimitates the exterior part of the ruins.

The lightest shade of yellow indicates the emplacement of the new piazzas as for the darkest one, indicates the piazzas that could be found in the site before, being those designed by the Mayas or by the archeological reconstruction.

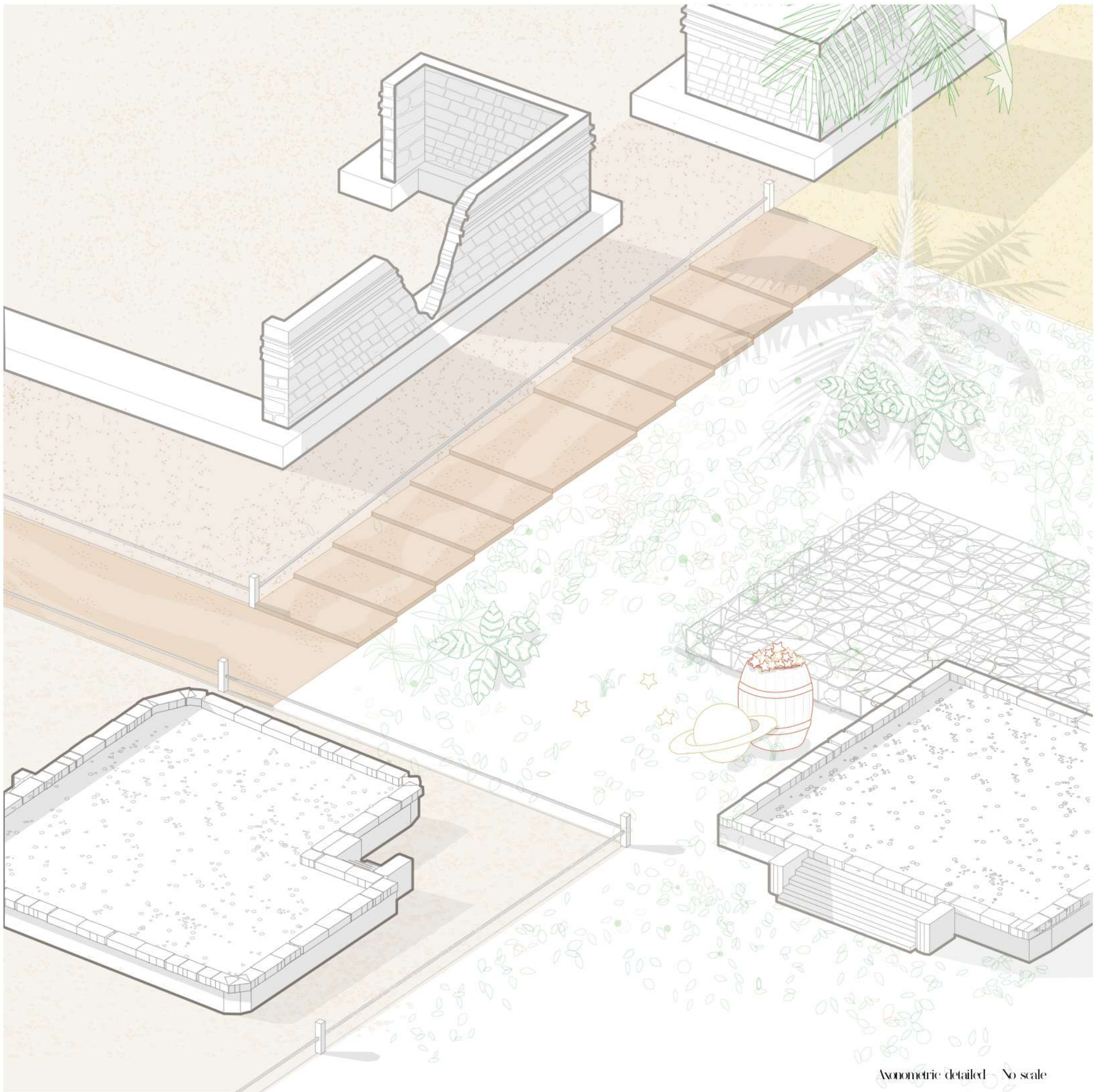






Color of the gravel - 1:1000





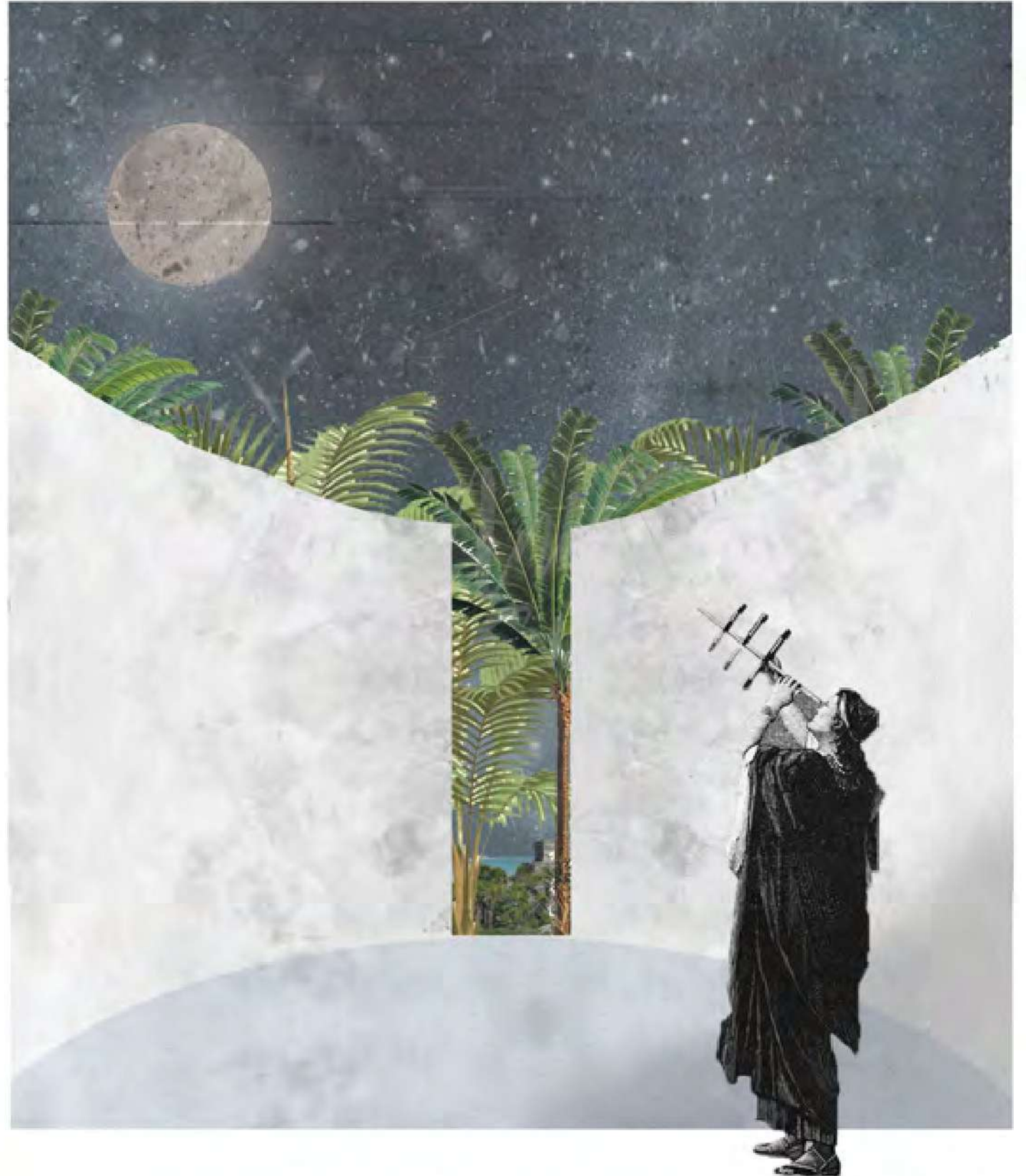
Anometric detailed - No scale

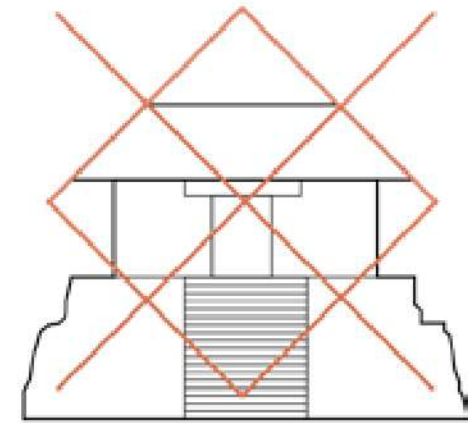
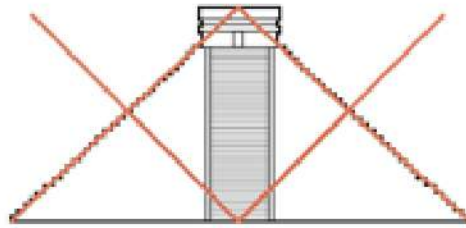
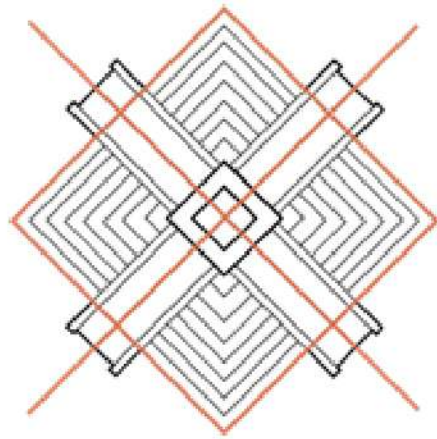




# Rebirth of Tulum Ix Tower

Restoring the urban layer was the first step but the remaining question was: *how to bring back Tulum to the contemporary time?* The intervention should be an intersection point between the past and the present and, at the same time, something intrinsic, a building that needed no further explanation and that the user could easily relate to the Mayas. That's how the Ix Tower was created: an astronomical tower whose concept departs from the Maya's horizontal and vertical idea of the world, the astronomical phenomena alignments, the insertion of architecture into nature and the respect of it.

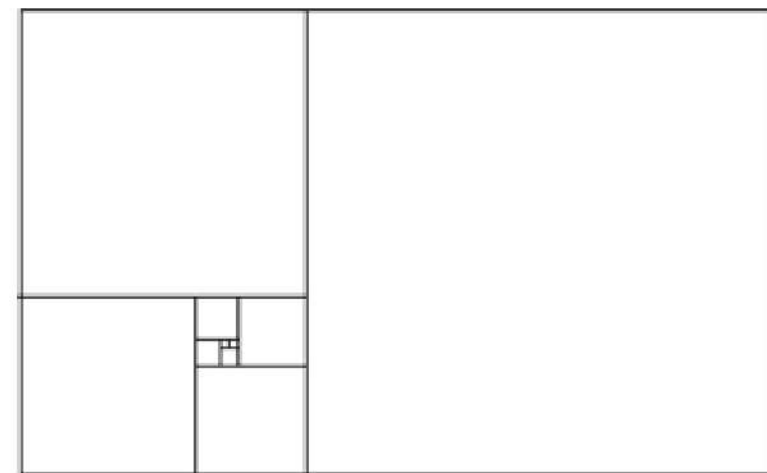




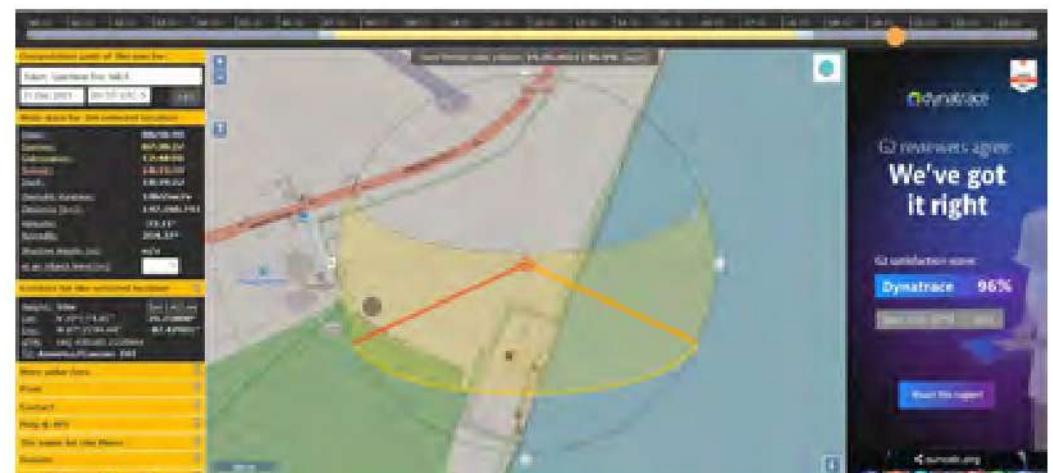
Square proportions in Maya buildings

The starting point certainly had its difficulties, where to place the tower? what measures should it have? The tower should be located in a place where it could have its own protagonism but at the same time, remain armonic with the whole site thus the right part of the terrain was the suitable option since it doesn't have further constructions than the Temple of the Sea and some platforms, furthermore, the natural elevation of the site would allow the tower to have a view from the whole site and the ocean. After following the Maya's axis, the emplacement came naturally: the tower is aligned with the platform (Structure 8) located in the inner enclosure, in front of El Castillo; and, since this intervention is a "new beggining and rebirth" of the site, the astronomical phenomena chosen for the second alignment

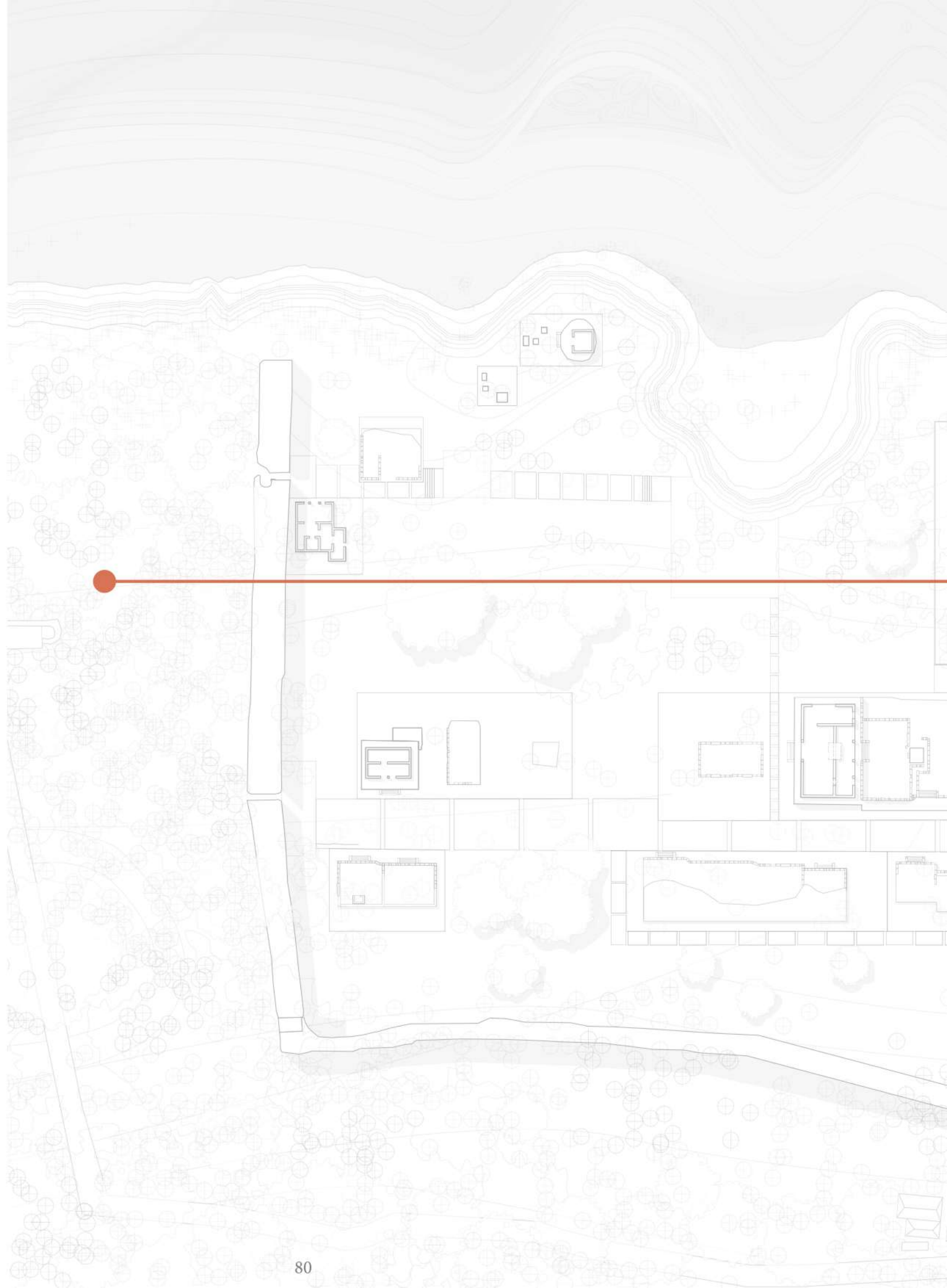
was the winter solstice, since this was its meaning for the Mayas. The second part was "deciding" the appropriate proportions for the tower but once again, the answer was hidden within the site, several buildings have a side with 15 mts long and or are proportioned to it, and it has been found that the Mayas used the aurea proportion in their architecture, therefore the proportions were settled: a squared floorplan of 15m x 15m and, following the aurea proportions, a garden and a basin of 9,2705m x 15m each. The horizontal, cosmogonic square idea behind the tower is now settled, the fifth element is hidden within the walls of the tower and the Maya's vertical concept resides in the double life of the tower, a place that can be used both during the day and night.



Aurea proportion



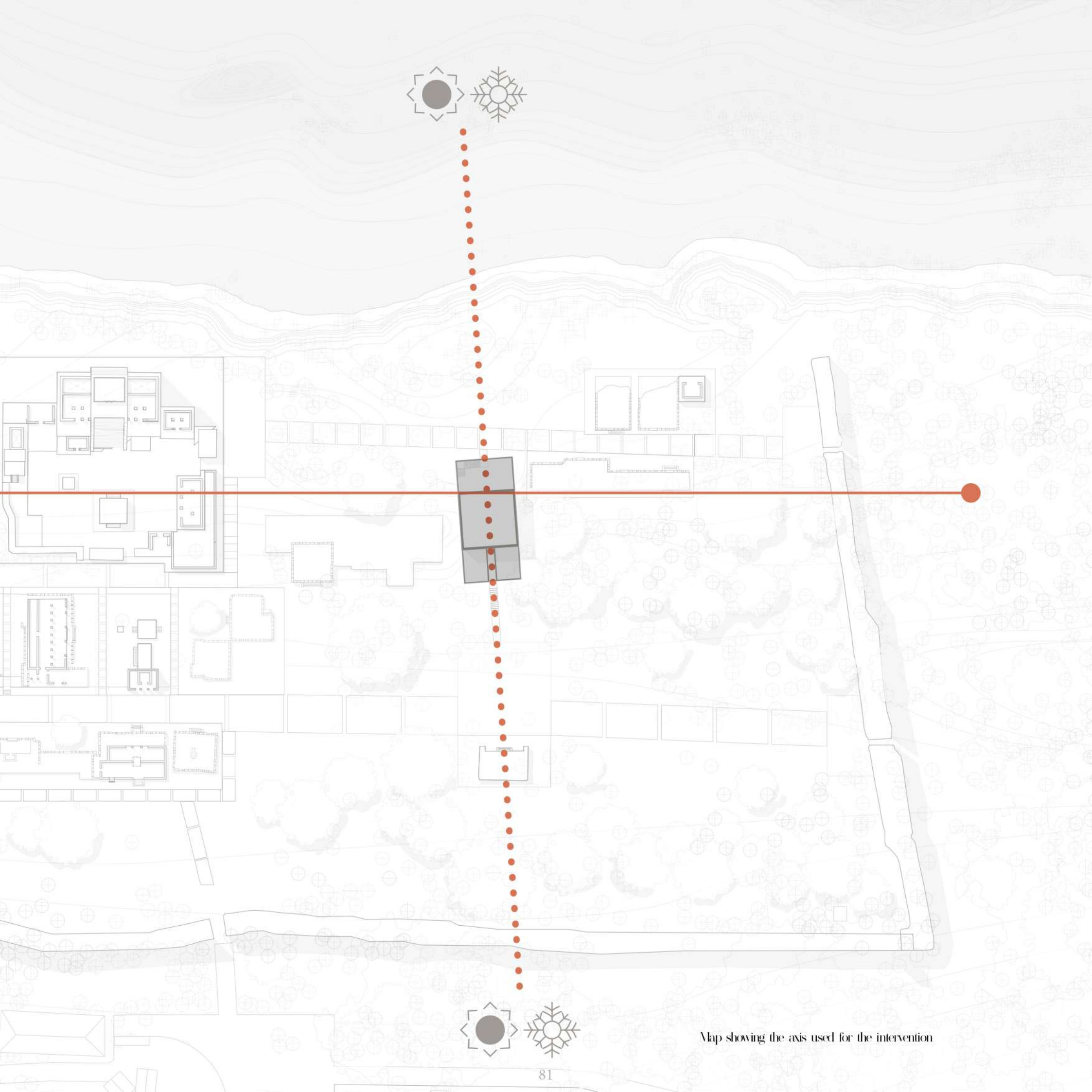
69. Inclination of the Sun during the Winter Solstice (Dec 21st 2021)



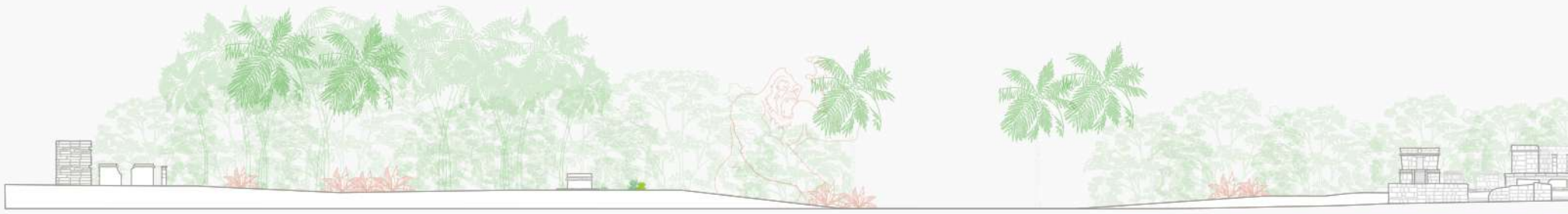
● — ●  
Axis - Alignment of other  
buildings with the fifth element,  
Structure 8

☀      ❄  
Alignments with the Sun during  
the Winter Solstice

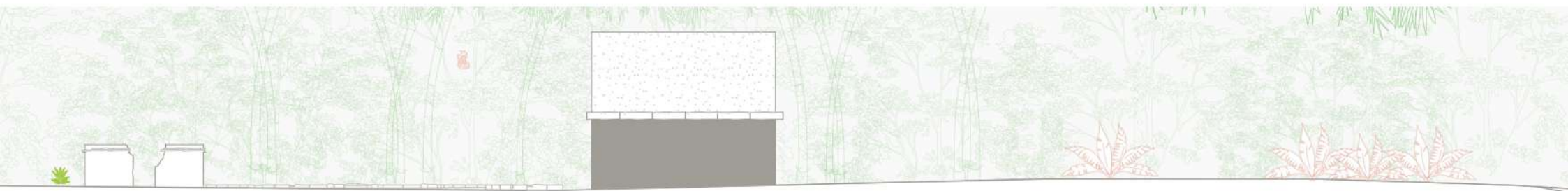
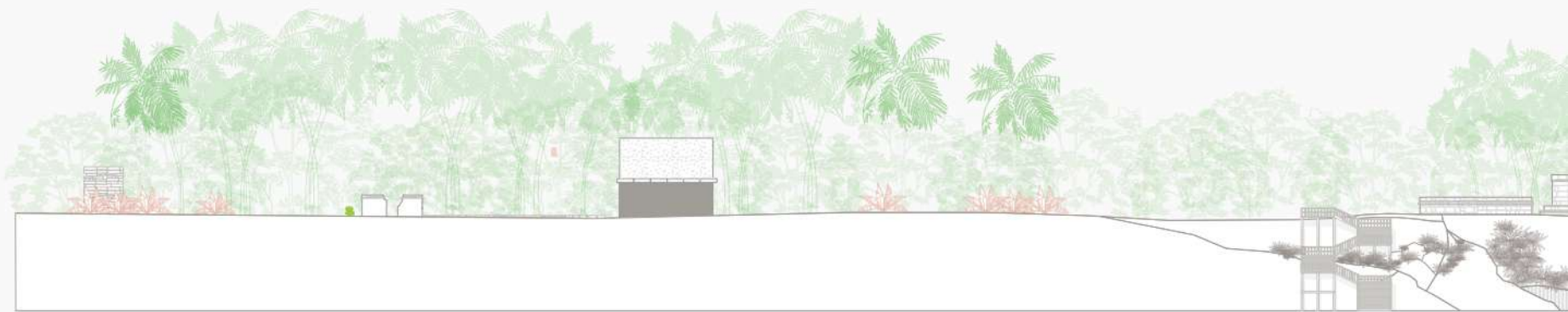
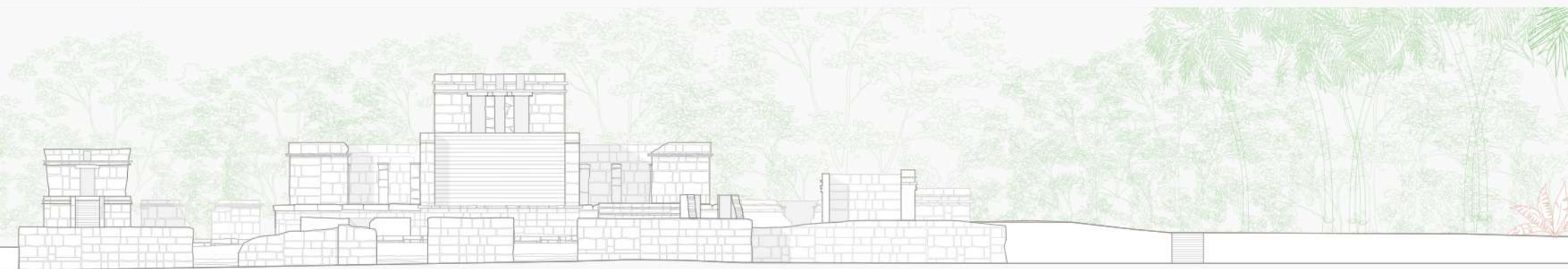




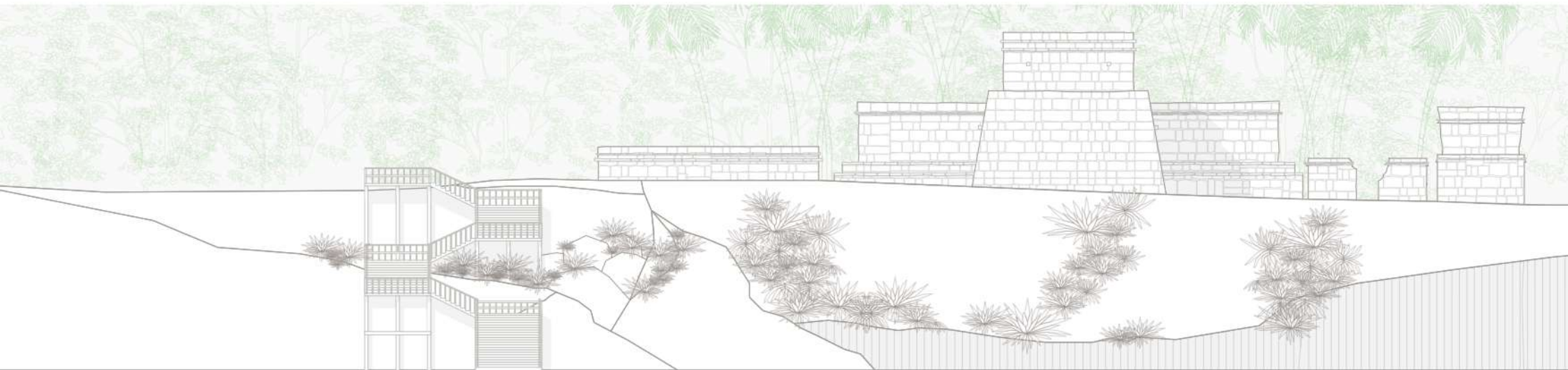
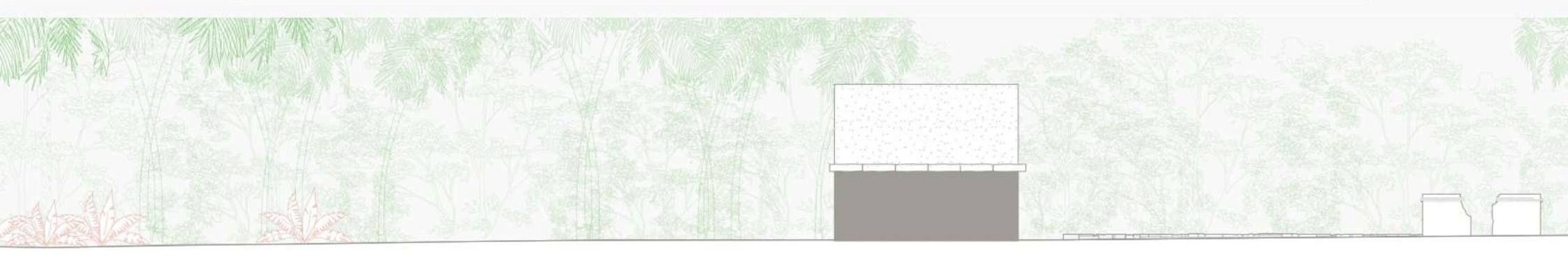
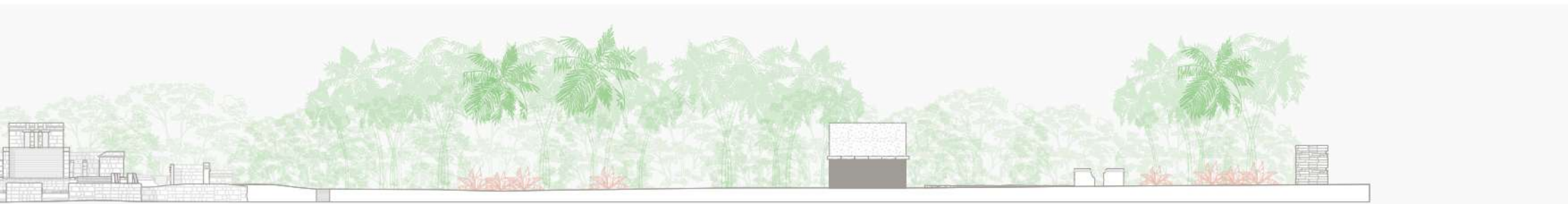
Map showing the axis used for the intervention



Elevation C-C' - Intervention - 1:800



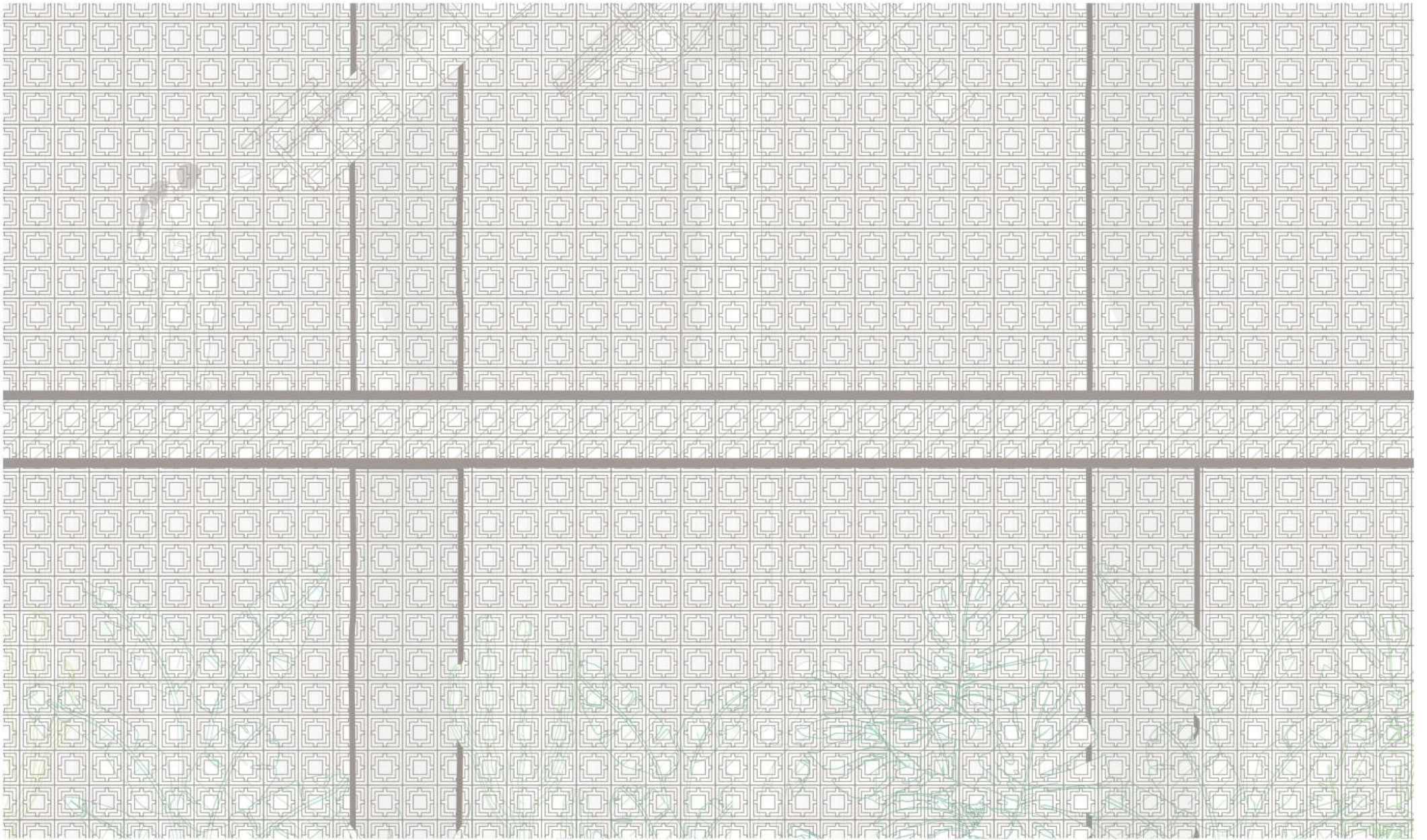
Elevation D-D' - Intervention - 1:800







# Rebirth of Tulum Ix Tower - Façade



The link between this new world and the Maya's one resides in the columns. exterior world; a lattice capable to frame the beauty that surrounds it, able to give the sensation of

The square shape, symbol of the cosmogonic concept and the four corners of the world, remains present in the lattice. The design of it was meant to be able to keep the privacy of the life happening inside but, at the same time, reveals a circumstantial part to being submerged in the ocean but floating at the same time.



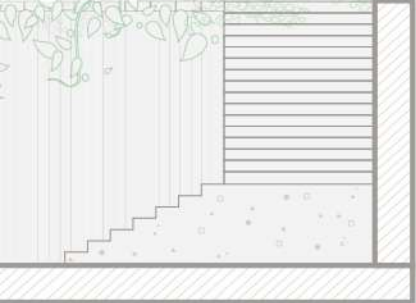
Front facade 1:100





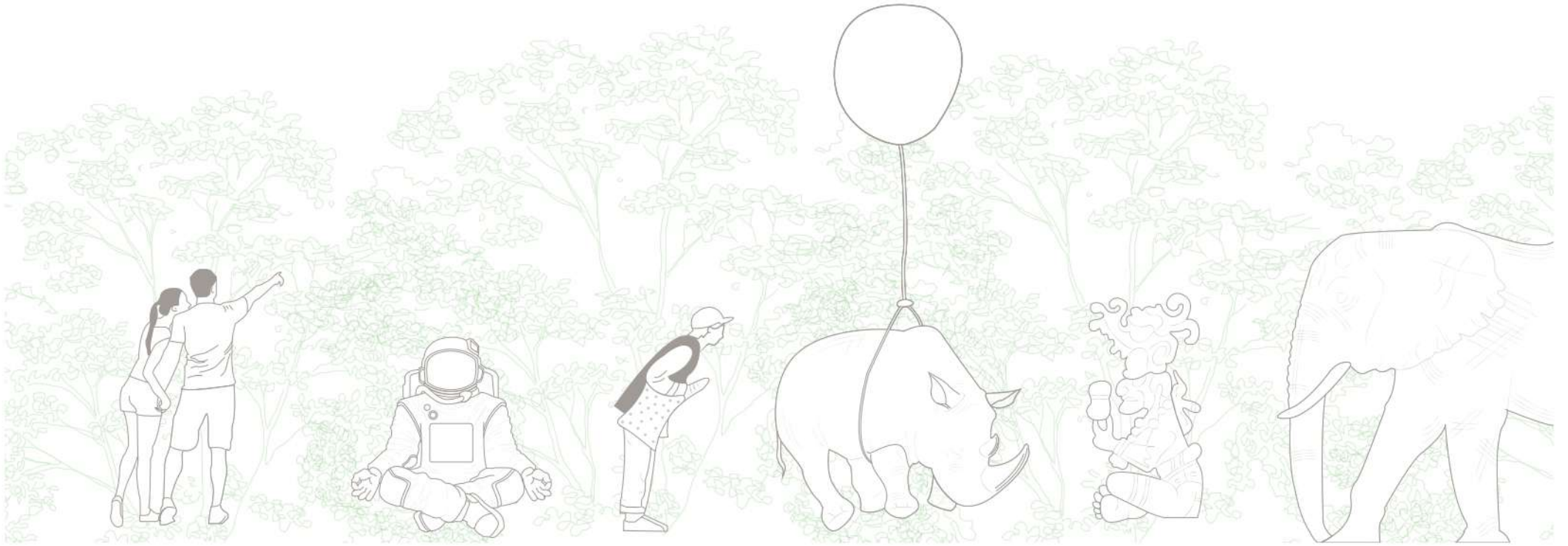






South facade 1:50

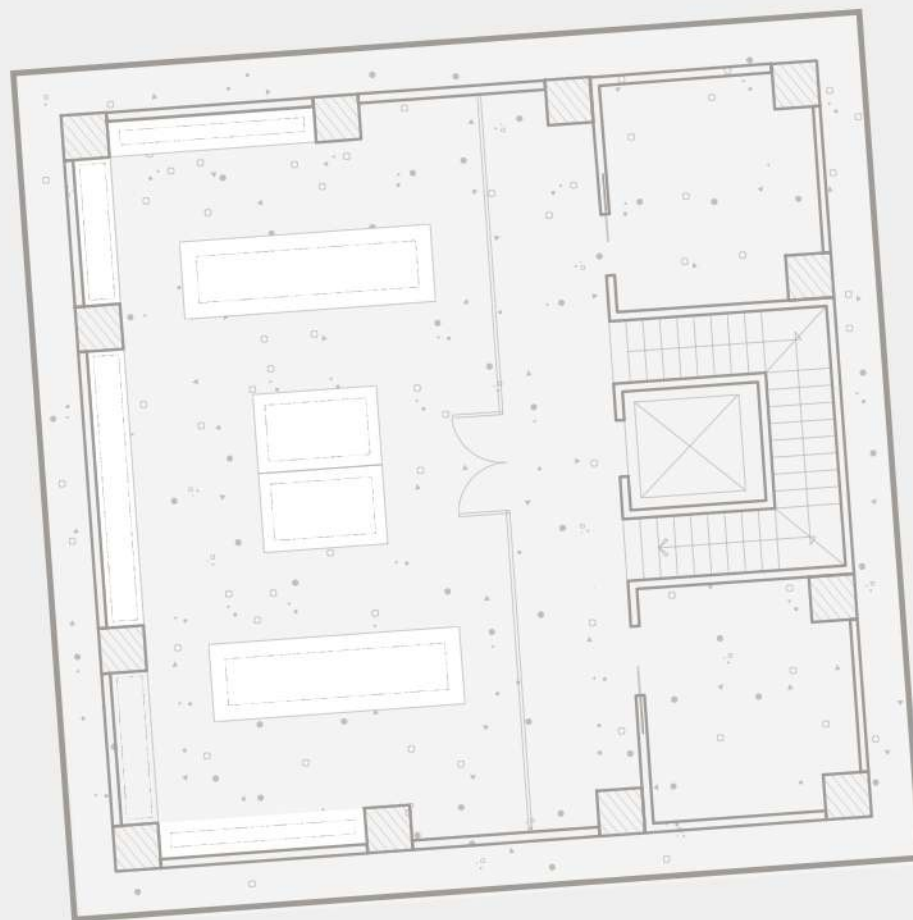
# Rebirth of Tulum Ix Tower – Floorplans

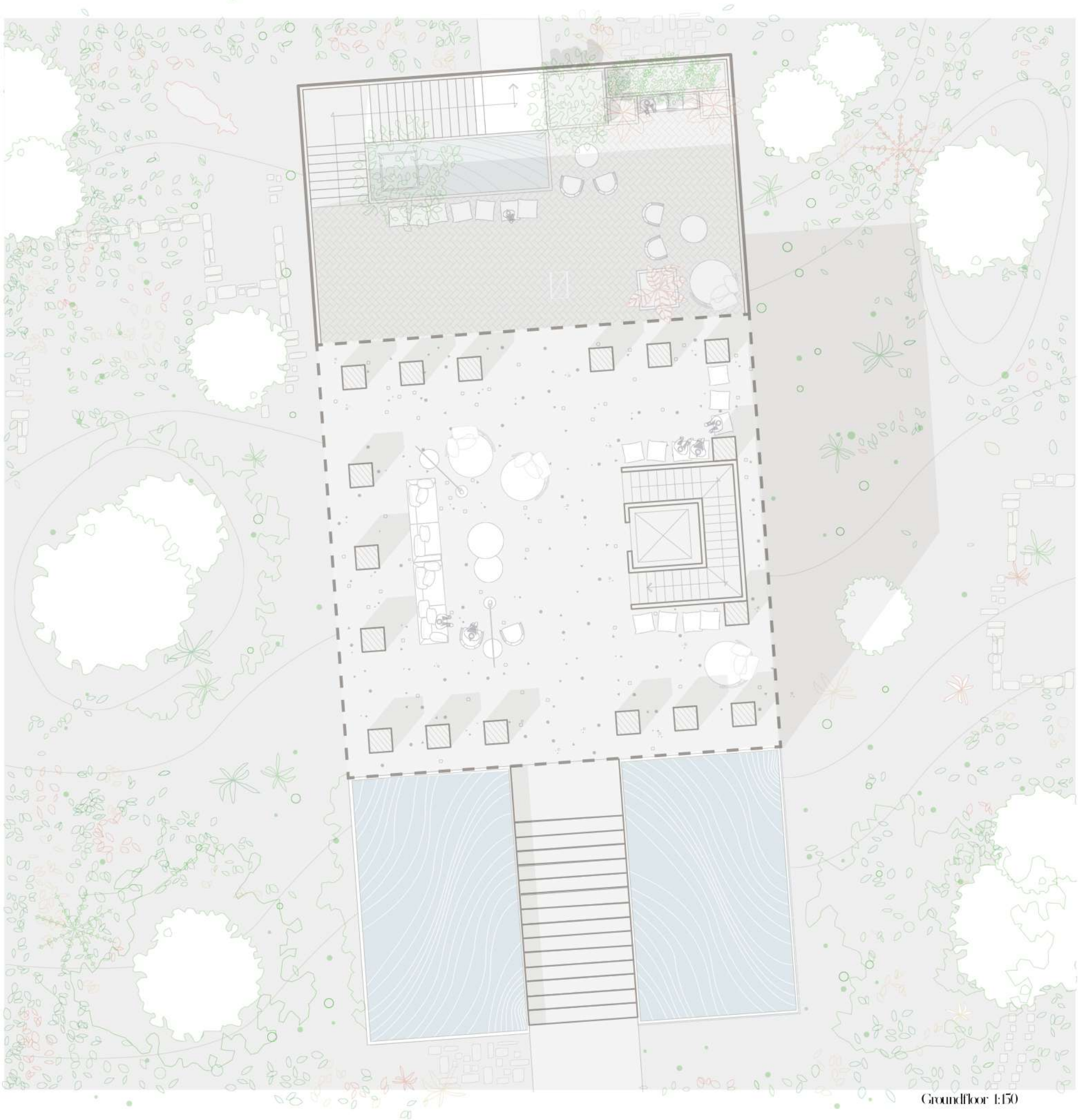


A design suitable for everyone, and we mean everyone

Imagine yourself walking around as a place. The water basins open the site, when suddenly, you see a tower with semi-closed walls; -“*what’s that inside? are they plants?*”- you think for yourself. you’re not entirely sure what’s there but it surely invited you in. The basement is the foundation upon which the tower is built. Its the functional heart that no one sees with its machines and core technical implants. But you are firstly presented by the first floor. It aims to be a sensation as much

as a place. The water basins open up in the middle to show you a path that looks like its going to take you deep in the ocean behind. A metaphysical leap that starts the journey to the top from the deep. The tangibility of water, the quiet dance of water lilies, the waves resonating with your every step, the playful reflection of the stars, disconnect you from the earthly world and make you ready for your pilgrimage towards the heavens.





Groundfloor 1:50



First floor - Greenhouse E:150



Second floor - Telescope 1:150



# Rebirth of Tulum Ix Tower – Garden



Plants used in the project

Your instinct and curiosity starting from the lower level and brought you to this place, where rising up to the sky.

did you come from? From the Despite its “dark” meaning, path facing the ocean or the road this place was designed to be peaceful, a hidden area with crossing the ruins? Either way, niches between plants and basins you’re here.

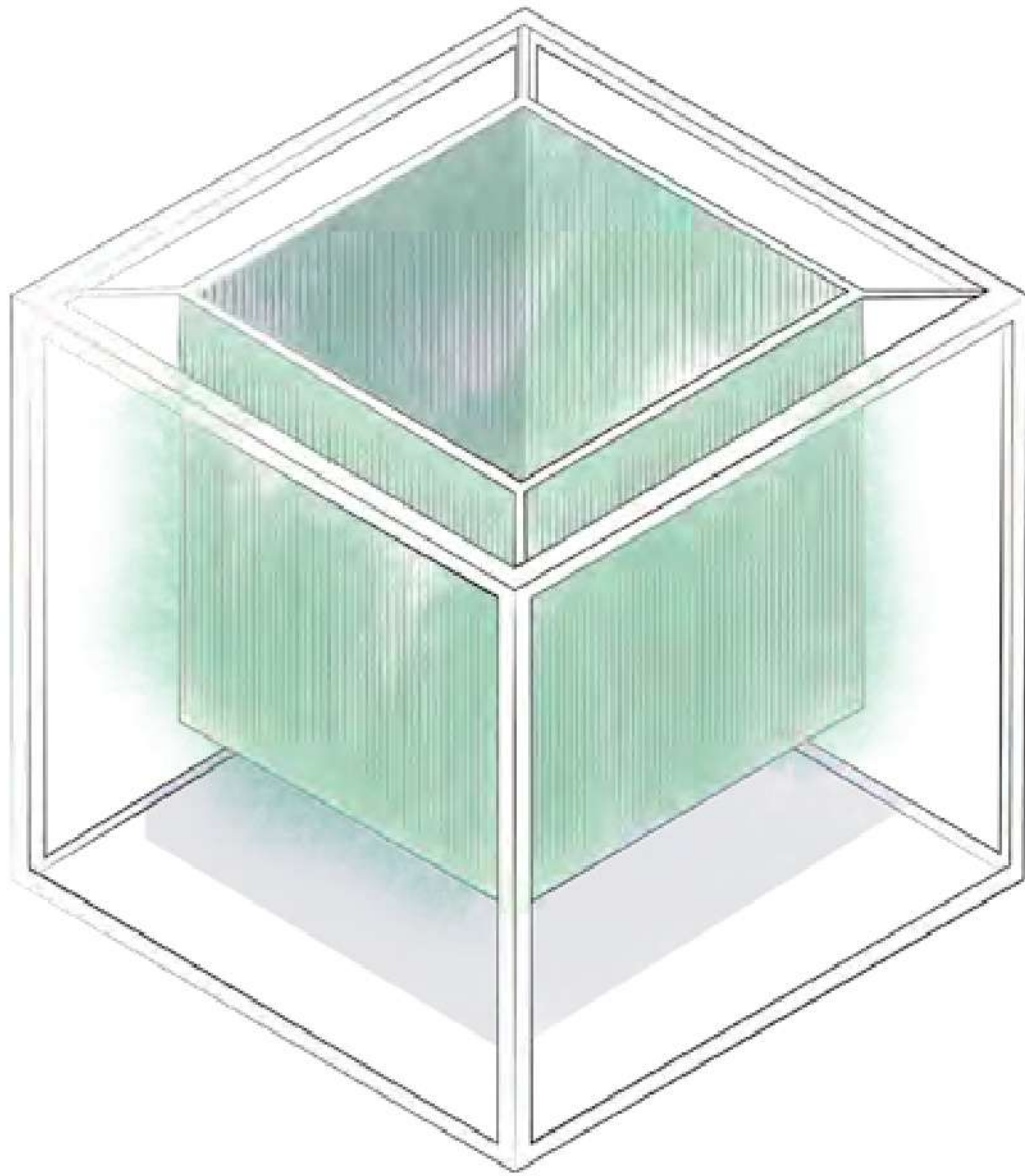
The garden conjoins the vertical view from the Maya world, a place to sit down, clear your mind and at the bottom, in the underworld contemplate the beauty of the of Xibalba where the sources of surroundings. water can be found.

Here you are a star and just as the Sun and the Moon; you’ll make the journey between worlds.



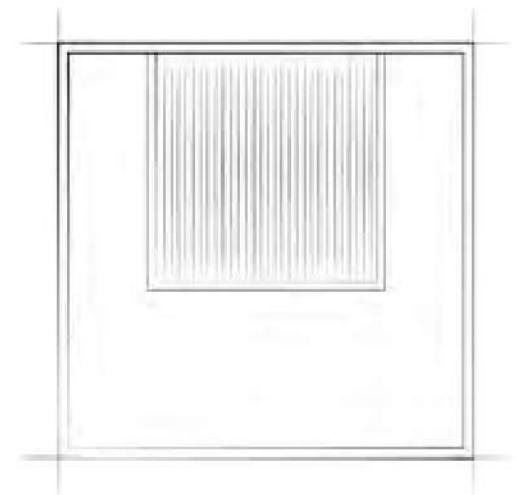
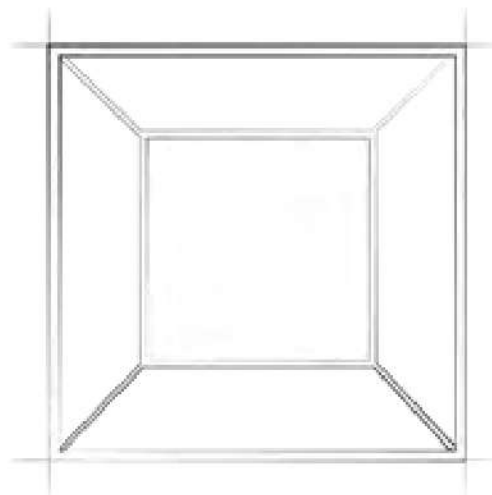
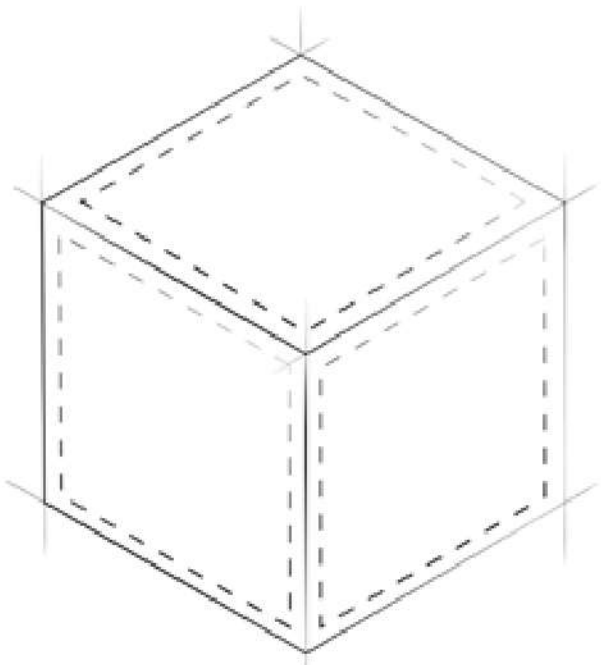
Garden 1:80





The "Boon" lamps designed for the garden retake the colorful mexican folklore, and the cosmogonic square concept.

"Boon" means "color" in Maya language. These lamps are characterized by their geometric form, their colors and materials: black iron and handed weaved beads.





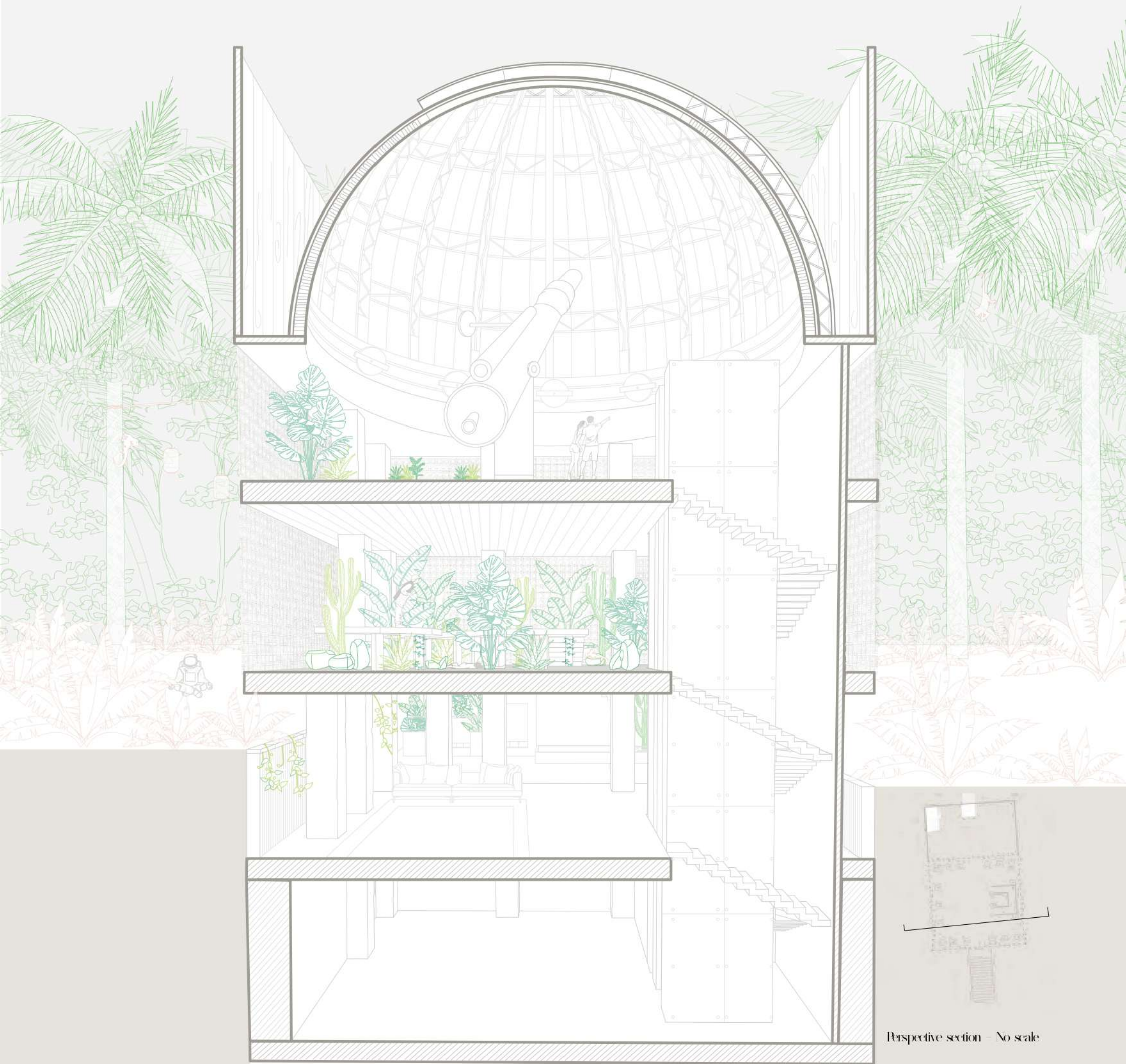
# Rebirth of Tulum

## Ix Tower – First floor – Inner jungle



The journey into this new center of the cosmogonic square, pilgrimage began once you set foot into the leading path to the tower, you wandered the emptiness of the groundfloor and the magical sensation of the garden but something is calling you to go further, to climb those stairs inside the tower and to go deeper into this unknown world. You have now reached the first part of the fifth element, the

A jungle within a jungle. A whole floor dedicated to the Maya's concept of being one with nature, a whole floor that transports you to another dimension where you can walk through the highest trees and, where the ceiling is not the limit but the lamps in it are the sensation of touching the sky and the stars.



Perspective section - No scale

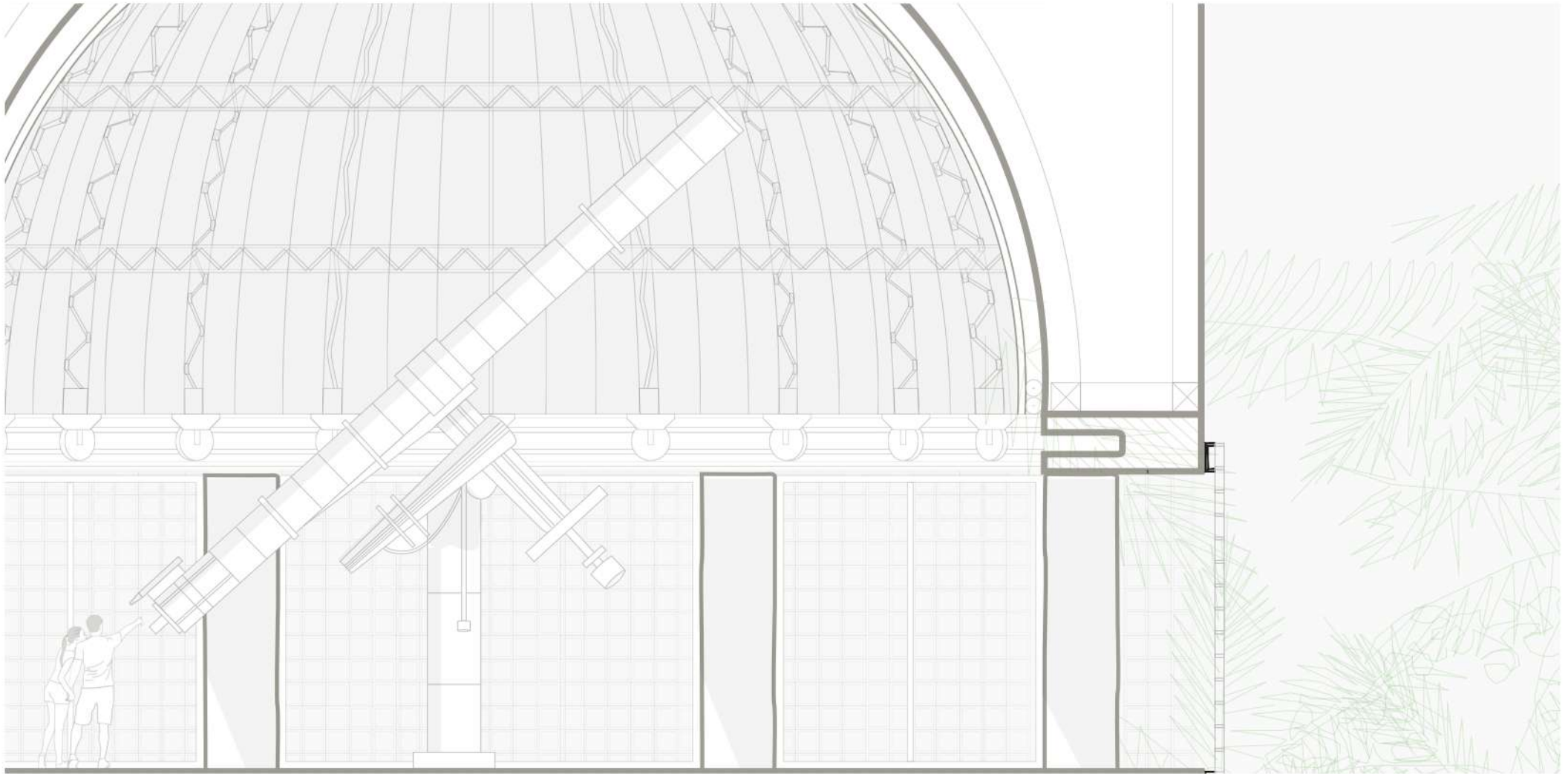






# Rebirth of Tulum

## Ix Tower – Second floor – The Cosmos



The second and final part of the fifth element is now in front of you, or shall we say is it just the beginning of the journey to reach the stars?

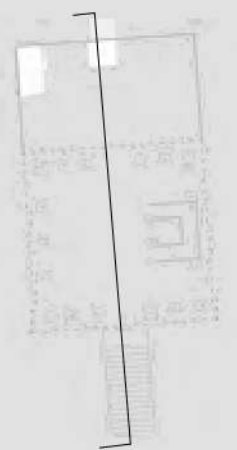
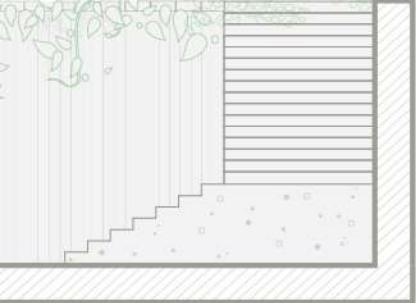
The heart of the tower, the connection between the past and the present is guarded in the upper floor, just like the Maya did with their temples, keeping the sanctuary in the highest place so the mortals could reach the heavens and the gods.

Once you step into the floor, you'll see it is surrounded by plants, they seem to be protecting the telescope at the center of the area; as you continue wandering, you'll find a smaller telescope and a pair of binoculars so you can explore the life happening outside the tower, here, on Earth. When you finally reach the telescope, you'll see the roof is hiding a secret you couldn't see from the outside, a high dome ceiling.

Wait, what's happening? Did the roof just opened? Now, the journey heading to the stars have just begun.







Section 1:150

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P r e s e n t a t i o n  
b o a r d s



I'x Tower  
Valorization of Tulum's Archeological Zone



### Chapter I: Introduction to the past

Located on the east of the Yucatan peninsula, in the state of Quintana Roo, in southern Mexico, the city of Tulum was founded in what is considered the "late classic" of the Mayan culture, around the year 450 A.D. It was the last city inhabited and built by the Mayas that lasted active even during the Spanish invasion. Tulum was built atop of a 12-meter cliff that rises from the Caribbean seas and has a 6km length next to the coast. It has a 20°13'N in latitude, 87°28'W in length.

There are several impressive characteristics about their architecture, but some of the most significant are: constructing without any aid of metal cutting tools and the carefully emplacement method of their buildings according to the surroundings, they believed that the most they respected the nature around them, the closest they will be to build something worth for the gods.

Tulum's architecture style is known as "East Coast" which is defined by the presence of miniature temples, adoratories within adoratories, buildings with intentionally collapsed walls and palaces with flat roofs and columned vestibules that replaced the vaulted roofs characteristic of older Maya buildings. Most of the buildings have a sculpture of a god guarding the entrance, which is believed, was the "Descendent God" or "God K", who was the god of corn and at the same time, was related to birth and rebirth of humans. This metaphor is believed to be applied to the city itself, since it is facing the East, where the sunrise happens, which according to the mayas, was the symbol of rebirth.



1

Scuola di Architettura Urbanistica  
Med Architecture Built Environment - Interiors

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## Chapter II: Birth of Tulum

The name of "Tulum" was given by the Spanish, which translates as *palisade* referring to the wall but originally, the city's name was "Zamá" which means *morning* in maya.

For the Mayas, the cardinal points had a closed connection with the divine world, for instance, the West and the South are associated with the Underworld and the East with the Upperworld. Their gods were related to astronomical bodies and the three most important ones, the Sun who was Kin, the moon who was Ix Chel and Venus who was Kukulcán, always follow a path between East and West.

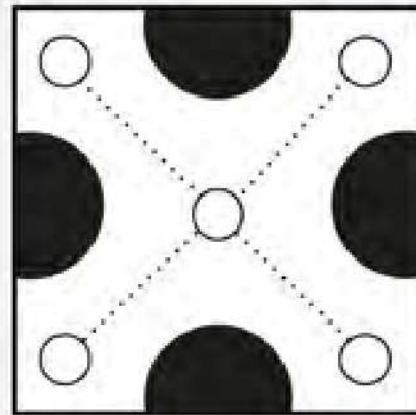
The explanation of their urban layer and orientations derives from their beliefs regarding the Earth plane, which they thought it to be flat and of a square surface with four major points located in each corner -the cardinal points- that were surrounding a fifth element in the middle, denominated the center of the world.

Tulum was built following the four corners of the world concept: it has four entrances in each corner where the watching towers were built as well. The wall has a dual purpose, to protect their people from physic and magic dangers; since Tulum was a spiritual center, it was believed that the pilgrims were sometimes in danger when they entered the city without precautions as "the sacred is always dangerous." (Vargas, 1995, 61).

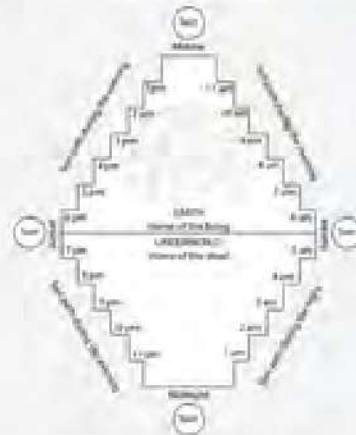
The fifth element or the center of the world in Tulum, is represented by two buildings, structure 8 and 18-platforms-, the first one is located in the inner sanctuary in front of El Castillo, and apparently, its purpose was to point out the East-West since they were the most important cardinal points for the Mayas.

Structure 18 is in front of the Temple of the Frescoes and it is the physic center of the whole site. In front of the inner enclosure, the main piazza is located and follows a north-south direction, many buildings are aligned to this axis just like the palaces: House of Columns and Halach Uinik's house.

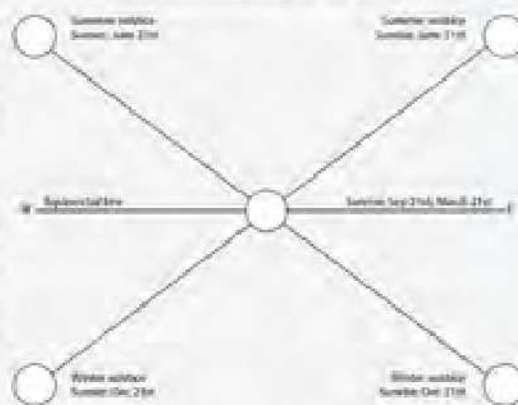
Located at the north-east part of the site the Cenote and a rounded base building, the Temple of the Wind, related to Kukulcán, god of the wind.



Cosmogonic square



Vertical dimension of the world



Sky corners, marked by the sun during the solstices, the central point is the zenith



West façade of structure 25, looking from the stairway of structure 29 to the east



Structure 25 seen to the west through the holes in the east and west walls of the south anteroom.

Current state



3

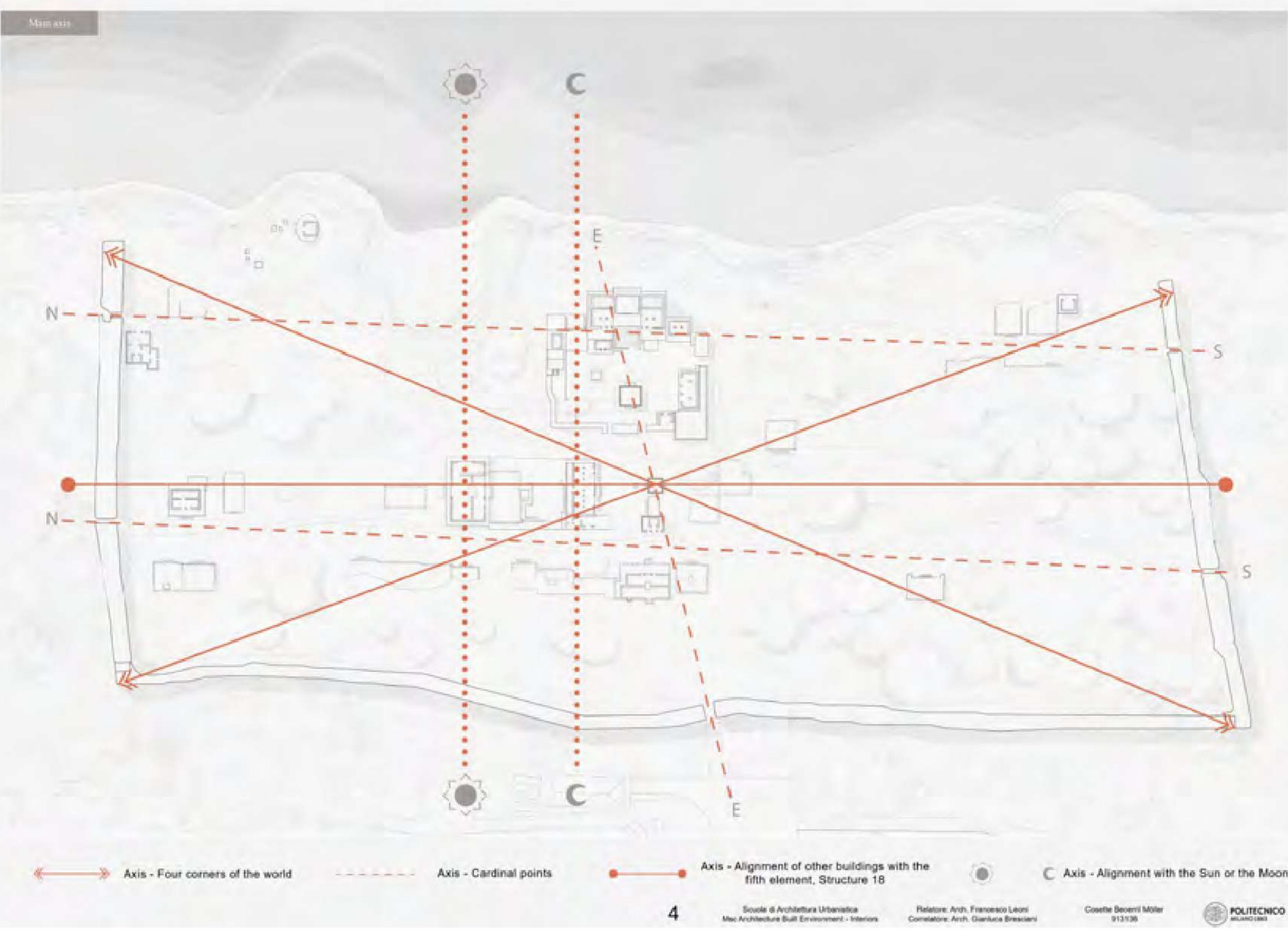
*Scuola di Architettura Urbanistica*  
Master Architecture Built Environment - Interiors

Relatore: Arch. Francesco Leoni  
Correlatore: Arch. Gianluca Bresciani

Cosette Becchi Müller  
913136

 **POLITECNICO**  
MILANO







God of the Sun

### Chapter III: Tulum today

The city was firstly discovered in 1518, during the Spanish conquest but it was left behind, later on, in 1841, it was "rediscovered" by the explorers and travelers John Lloyd Stephens and Frederick Catherwood. From that date on, the archeological zone has been restored a couple of times, the last one being in 2018, which consisted in cleaning and waterproofing the roofs of those buildings that have murals and mortar patching on façades.

Most of the buildings can be found in good condition, nevertheless, the floor is in bad condition since it doesn't have any type of covering or protection, therefore grass and other type of flora has covered it which can cause damage in the building in the future. The principal platforms are well preserved but the secondary ones are mostly destroyed, some of them still have part of the perimeter as guidelines: they don't have any type of delimitation or protection, thus people can walk and pass through them, causing a deterioration.

The existing paths have no material in particular and present no concept or axis as guidelines, they cross the entire site but without an intention behind. The four access on the corners are still functioning, however, the one that was once considered to be the "main access" has been closed down.



5

Scuola di Architettura Urbanistica  
Medi Architecture Built Environment - Interiors

Relatore: Arch. Francesco Leoni  
Correlatore: Arch. Gianluca Bressani

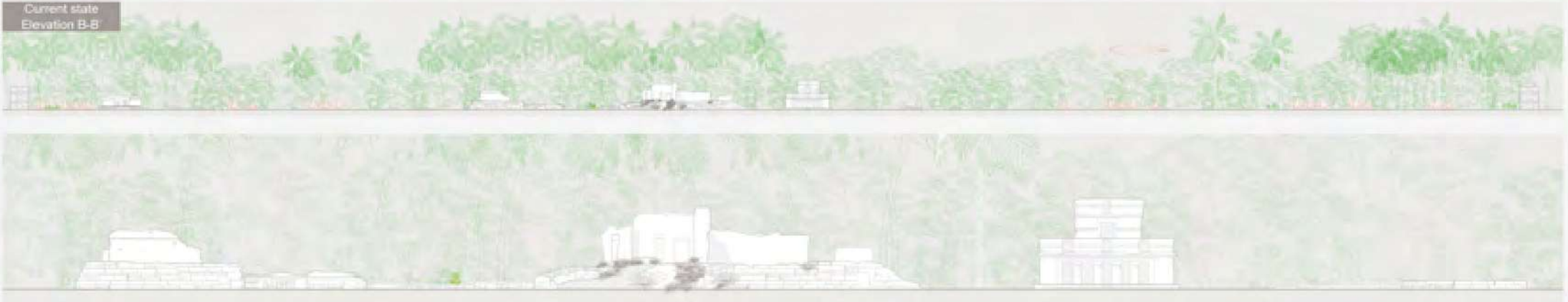
Cosetta Boveri Miller  
912136

POLITECNICO  
DI MILANO

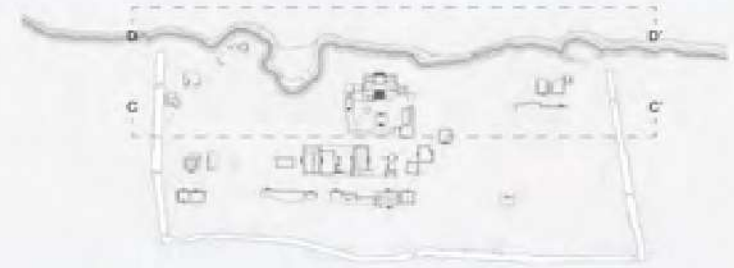
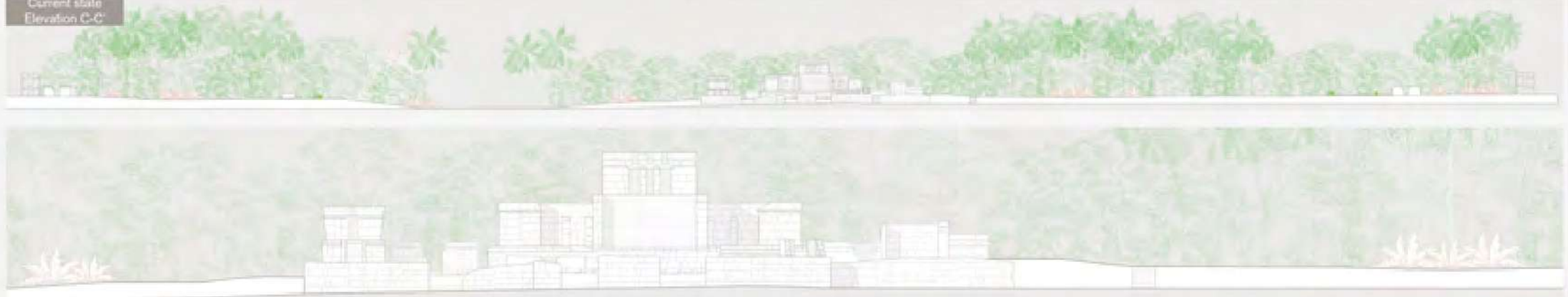
Current state  
Elevation A-A



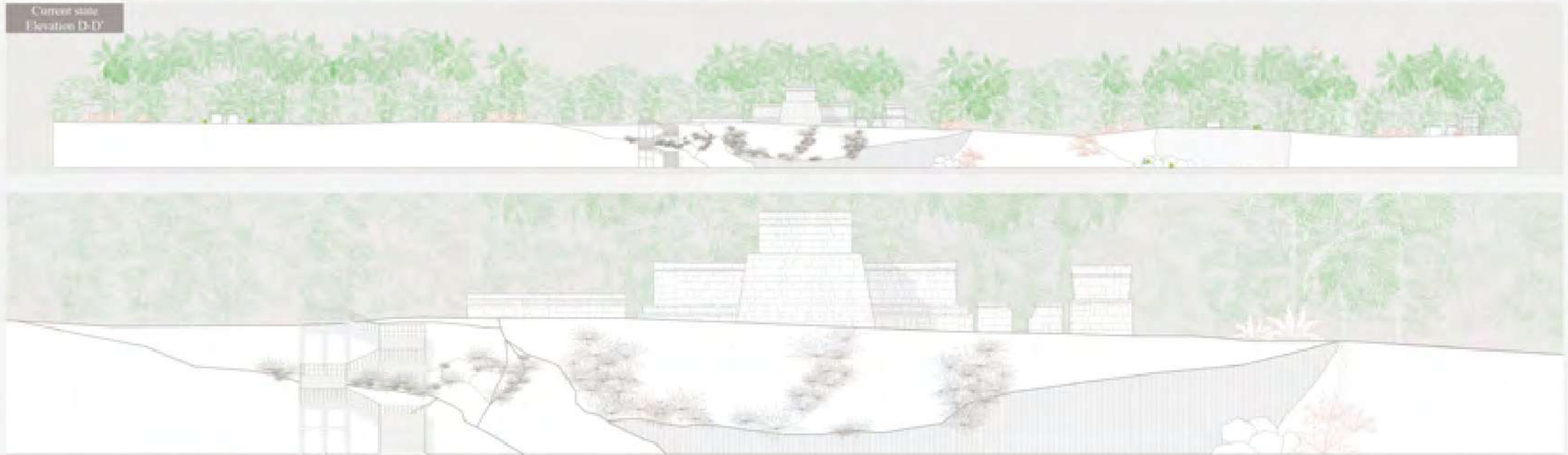
Current state  
Elevation B-B



Current state  
Elevation C-C'



Current state  
Elevation D-D'





God E. God of life

#### Chapter IV: Rebirth of Tulum | Urban Intervention

Retaking the concept and vision regarding the astronomical bodies and being as less invasive as possible were the general ideas behind the intervention. The general design consists in the generation of a new urban layer and the insertion of an astronomical observatory (*I'x tower*) which would be the intersection point between the past and the present.

This intervention seeks to bring back the concept of being one with nature, to be immersed in the cosmos and to respect the surroundings.

The urban design consists in three major interventions:

##### New paths

The cardinal points North and South were taken back to serve as guideline to create the new paths, crossing the site in a longitudinal way from one access to the other, these ones are the primary roads, and, just as the secondary ones, they're made of blocks of rammed earth. The entrance located in the axis of the cardinal point East, is meant to be re-opened, thus a secondary path was created which is going to be connected to the lower primary road.

On each entrance, the small piazza has been redesigned, changing its size and putting gravel as floor.

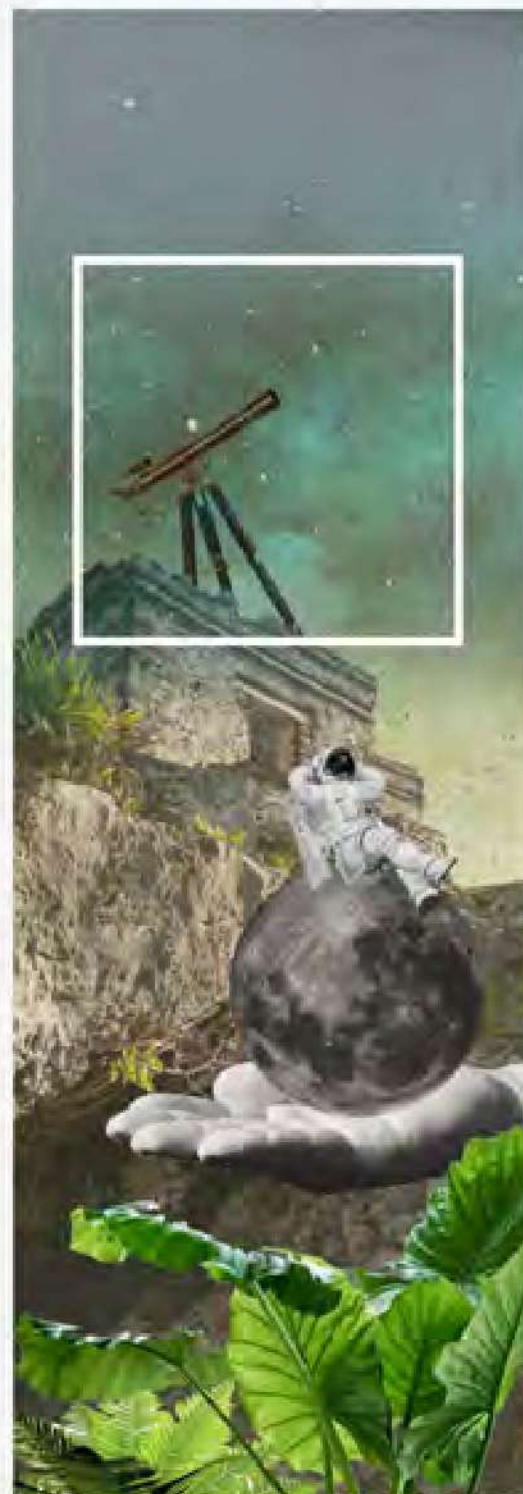
##### Area differentiation

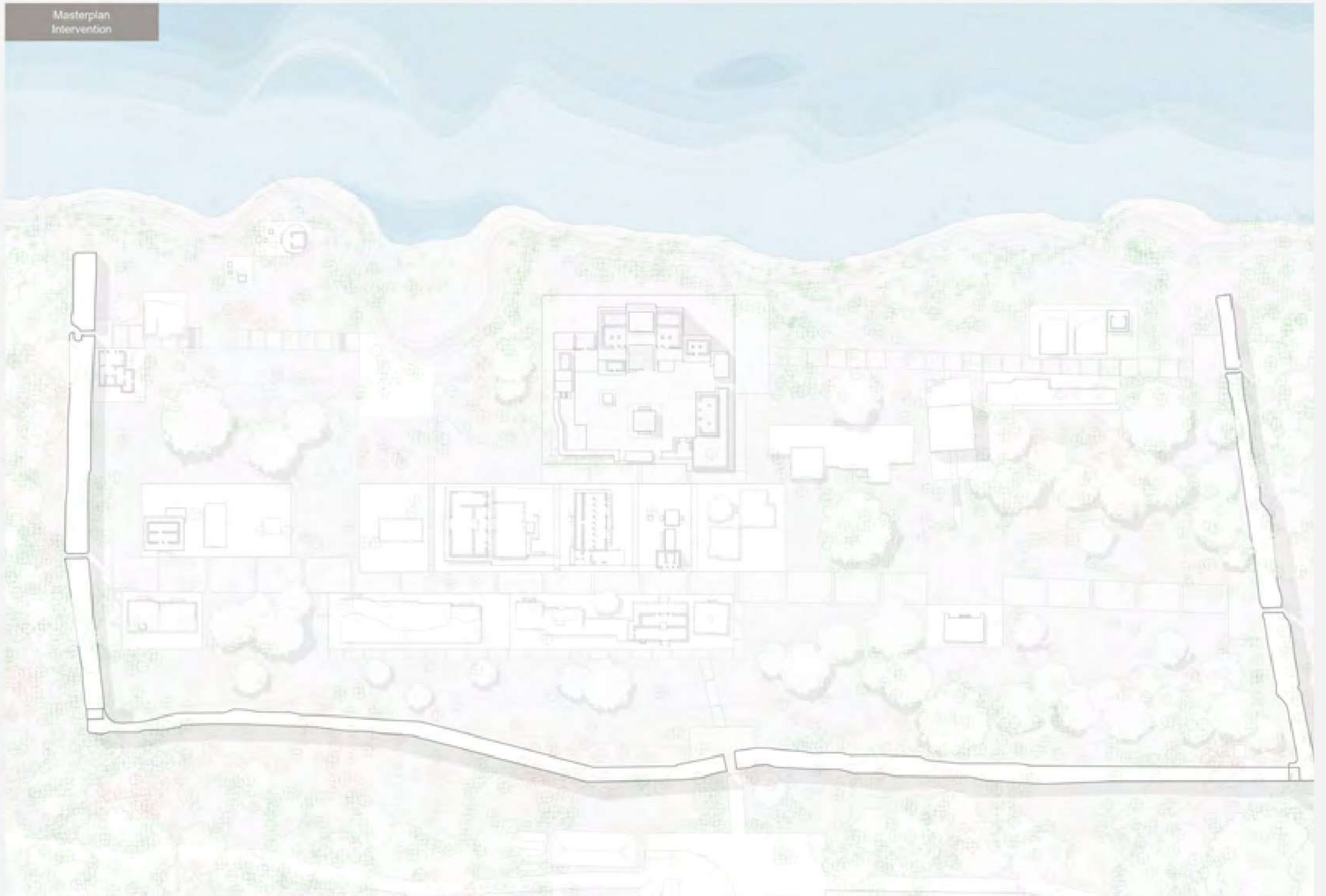
This intervention has two purposes: re-flooring the ruins and differentiate the areas by its importance. Retaking the nature and earth concept, a different shade of brown and yellow gravel can be found depending on the area.

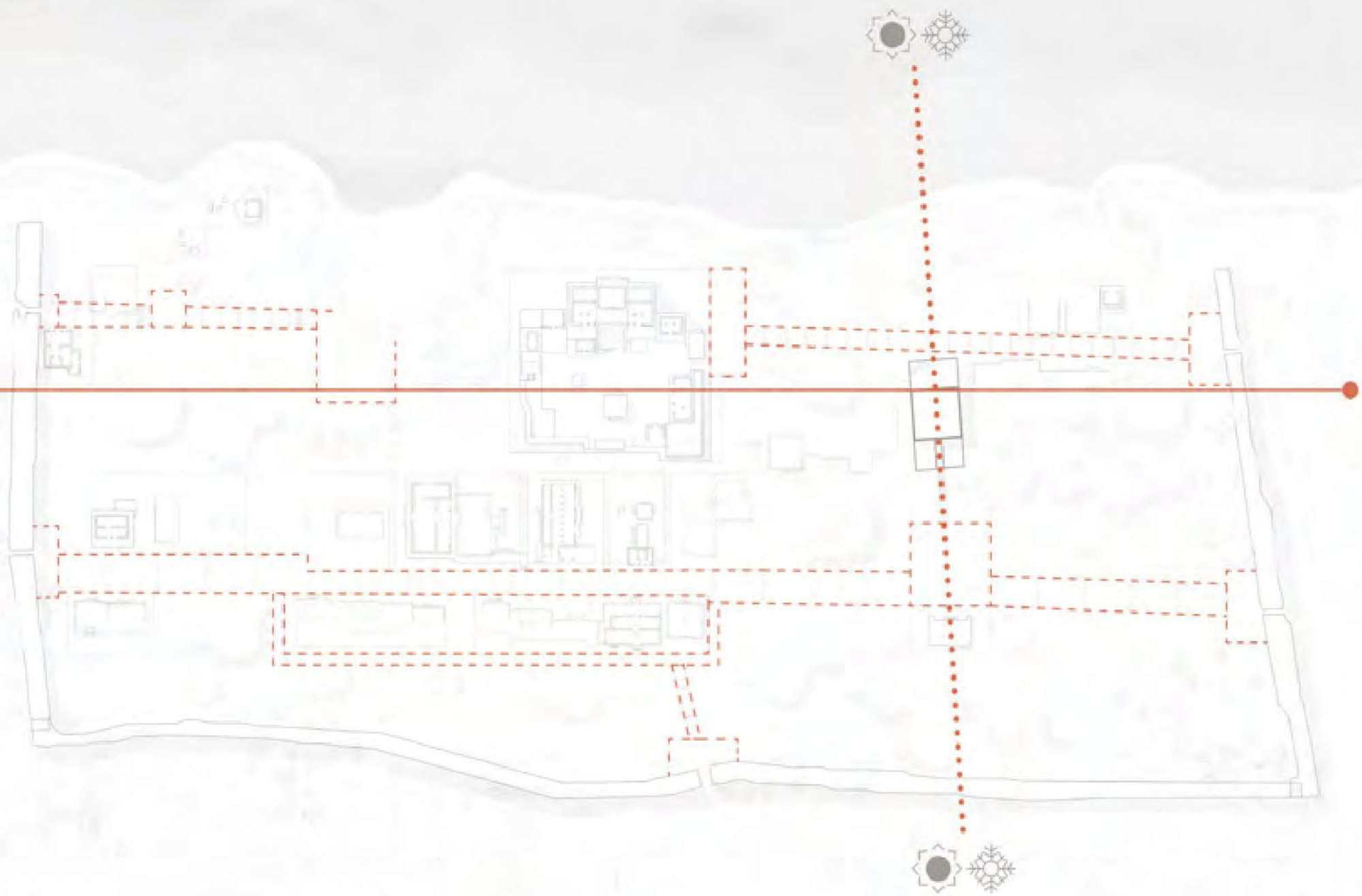
##### Restoration of the platforms and delimitation of the ruins

To bring back to life the platforms, and to keep its main material but marking the difference of an intervention, stone gabions were used to make a reconstruction following their original shape.

The same concept of a simply steel structure was used to create a railing to delimitate certain areas near the ruins and most of the platforms.







--- Axis - Cardinal points



Axis - Alignment of other buildings with the fifth element, Structure 18



Axis - Alignment with the Sun during the winter solstice

#### Color for the ruins



Sacred area  
#F2E9DC



Outside the ruins  
#CDA680

#### Color for the paths and piazzas



New piazzas  
#FDD759



Existing piazzas  
#E48D3E

#### Area differentiation - Shade of color

There are two palette colors depending on the area, brown for the buildings and yellow for the piazzas/gathering and or connection points. These differentiation was made to emphasize and differentiate the hierarchy of the intervention .

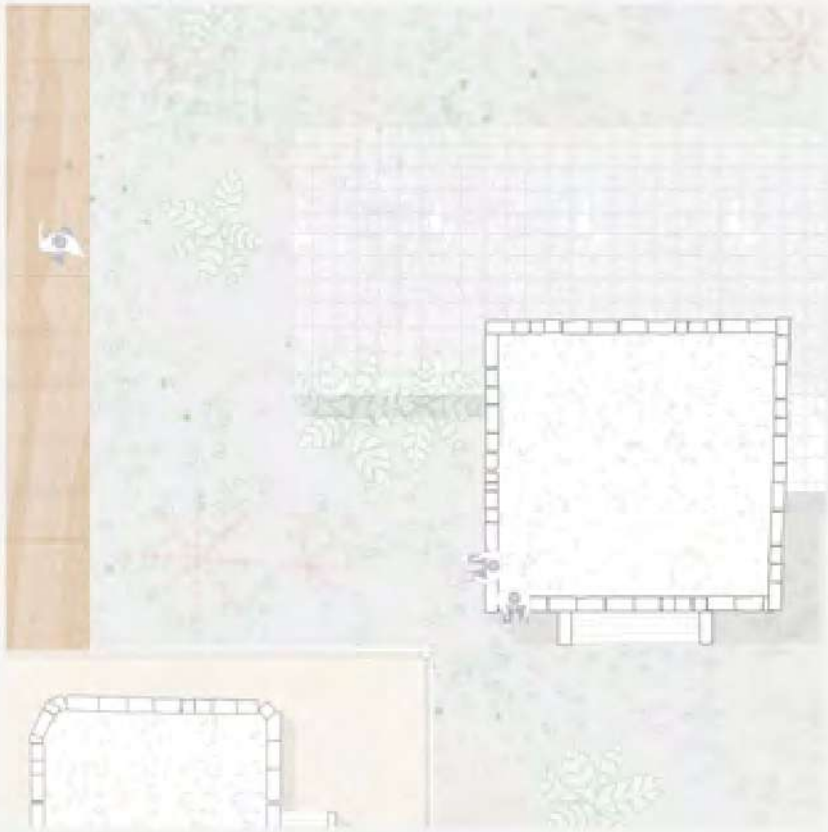
The lightest shade of brown is for the sacred, inner areas, which symbolizes the importance these zones had for the Mayas. This color can be found in the piazza of the inner enclosure and the smaller piazzas of the segment in the center of the site; these are located in front of the House of Columns, House of Halach Uinik, the Temple of Frescoes and two big platforms on the right of the temple. The darkest shade of brown delimitates the exterior part of the ruins.

The lightest shade of yellow indicates the emplacement of the new piazzas as for the darkest one, indicates the piazzas that could be found in the site before, being those designed by the Mayas or by the archeological reconstruction.

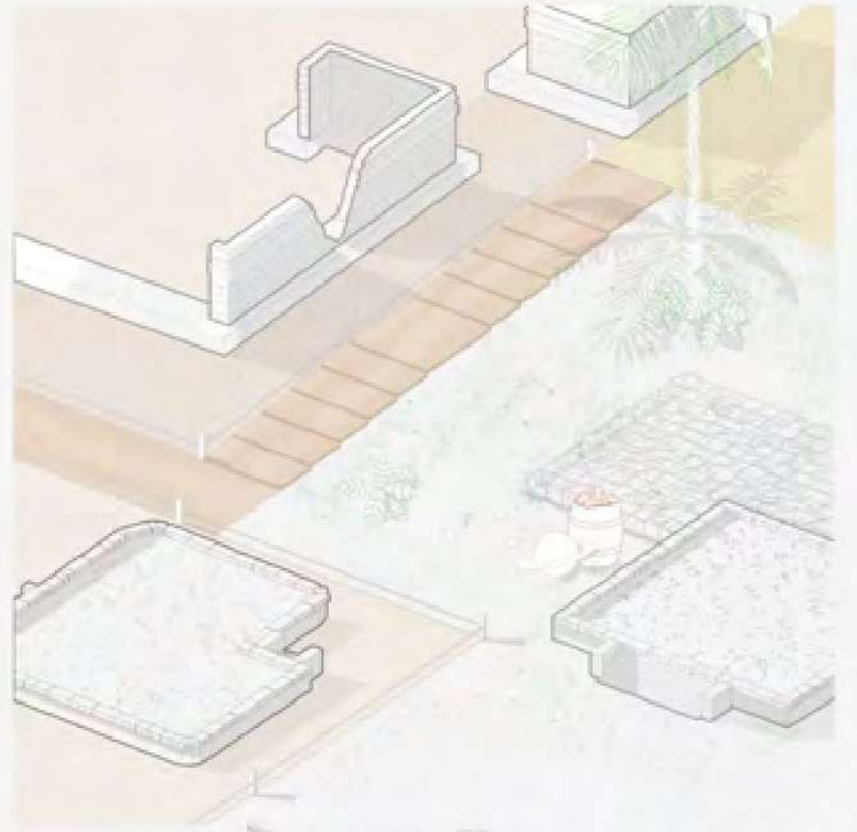




Detailed of intervention - Floorplan



Axometric detail of intervention



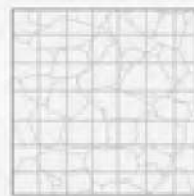
Intervention elements



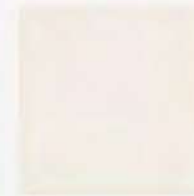
Vegetation



Rammed earth



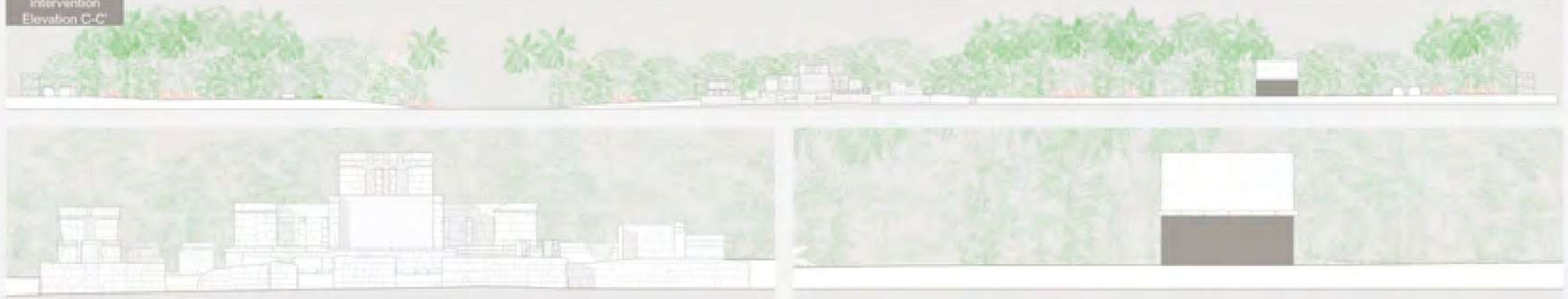
Gabions



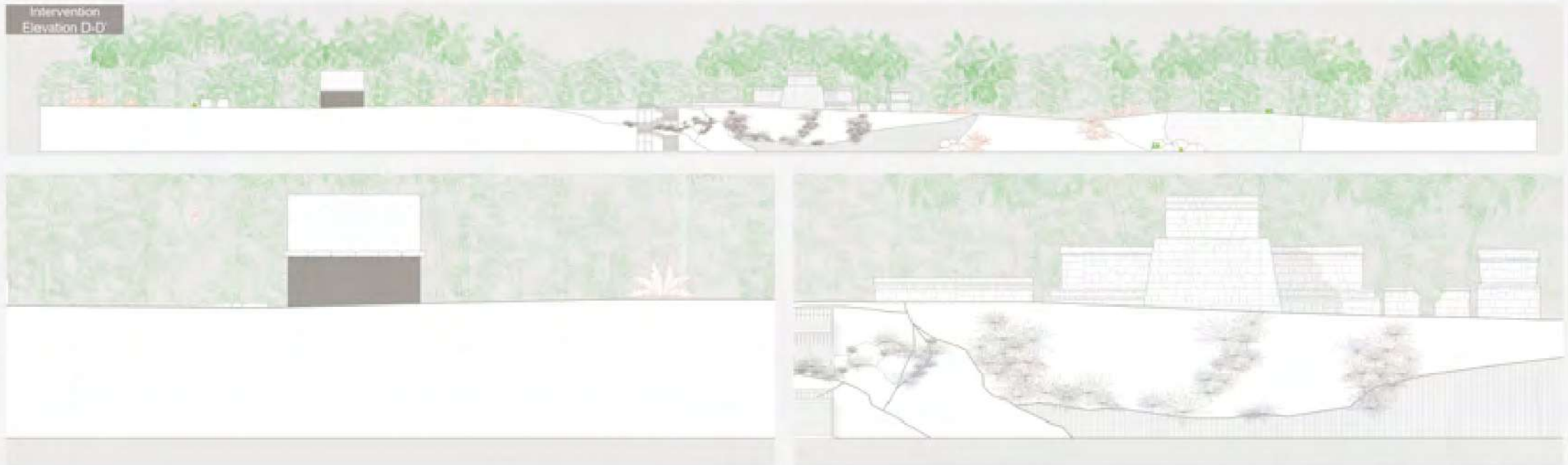
Identifying gravel



Intervention  
Elevation C-C



Intervention  
Elevation D-D



Master plan - Intervention  
Render view



Master plan - Intervention  
Render view





God (D) God of the right

## Chapter V: Rebirth of Tulum | I'x Tower

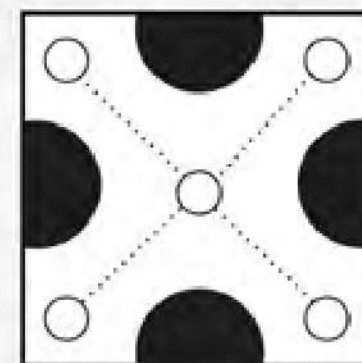
Restoring the urban layer was the first step but the remaining question was: *how to bring back Tulum to the contemporary time?* The intervention should be an intersection point between the past and the present and, at the same time, something intrinsic, a building that needed no further explanation and that the user could easily relate to the Mayas. That's how the I'x Tower was created: an astronomical tower whose concept departs from the Maya's horizontal and vertical idea of the world, the astronomical phenomena alignments, the insertion of architecture into nature and the respect of it.

The starting point certainly had its difficulties, where to place the tower? what measures should it have? The tower should be located in a place where it could have its own protagonism but at the same time, remain armonic with the whole site thus the right part of the terrain was the suitable option since it doesn't have further constructions than the Temple of the Sea and some platforms, furthermore, the natural elevation of the site would allow the tower to have a view from the whole site and the ocean.

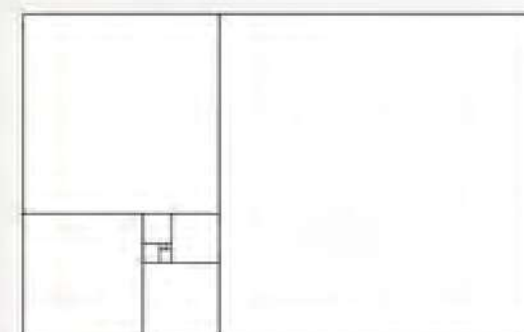
After following the Maya's axis, the emplacement came naturally; the tower is aligned with the platform (Structure 8) located in the inner enclosure, in front of El Castillo; and, since this intervention is a "new beginning and rebirth" of the site, the astronomical phenomena chosen for the second alignment was the winter solstice, since this was its meaning for the Mayas.

The second part was "deciding" the appropriate proportions for the tower but once again, the answer was hidden within the site, several buildings have a side with 15 mts long and/or are proportioned to it, and it has been found that the Mayas used the aurea proportion in their architecture, therefore the proportions were settled: a squared floorplan of 15m x 15m and, following the aurea proportions, a garden and a basin of 9,2705m x 15m, each.

The horizontal, cosmogonic square idea behind the tower is now settled, the fifth element is hidden within the walls of the tower and the Maya's vertical concept resides in the double life of the tower, a place that can be used both during the day and night.



Cosmogonic square



Aurea proportion

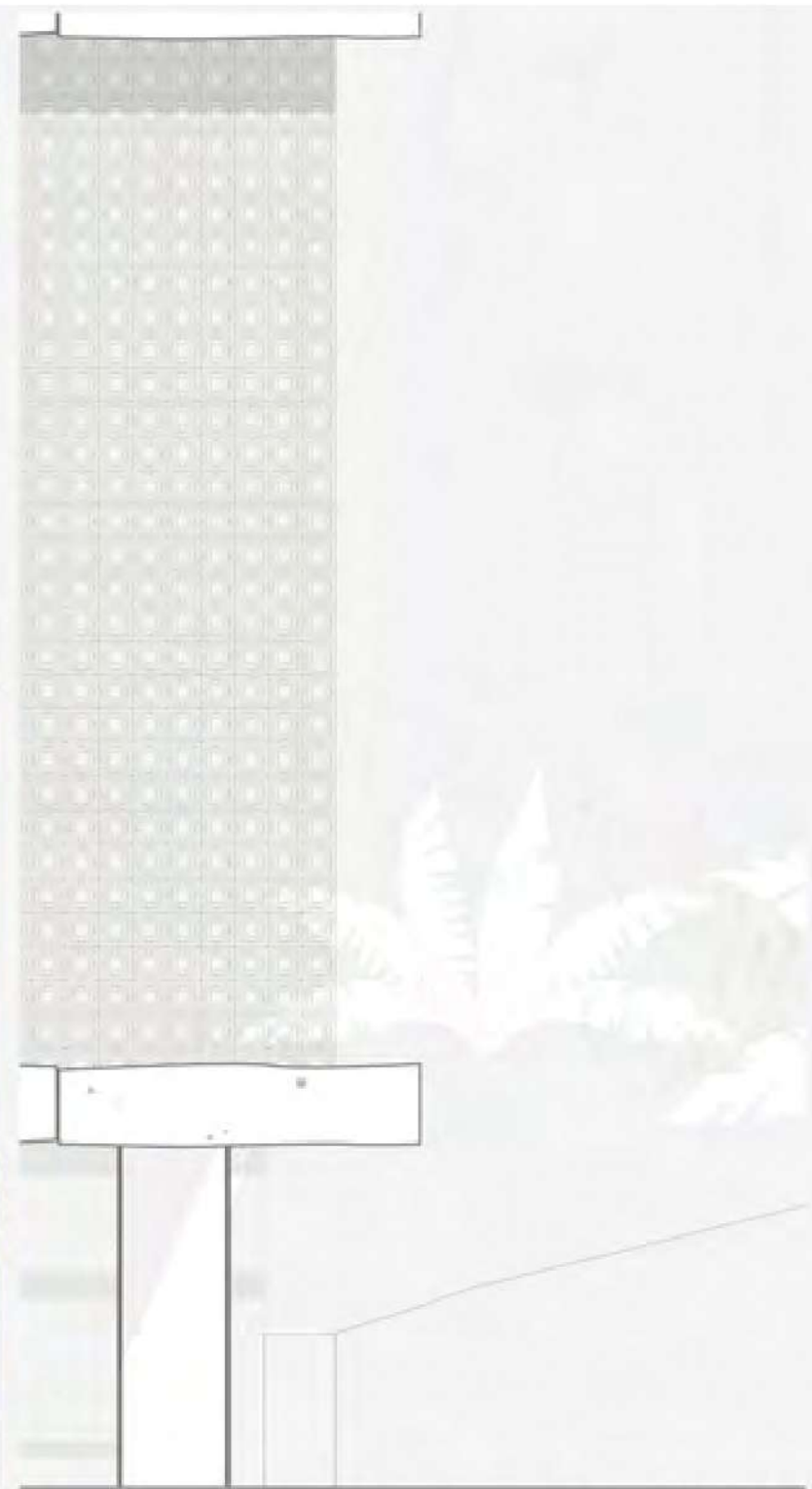
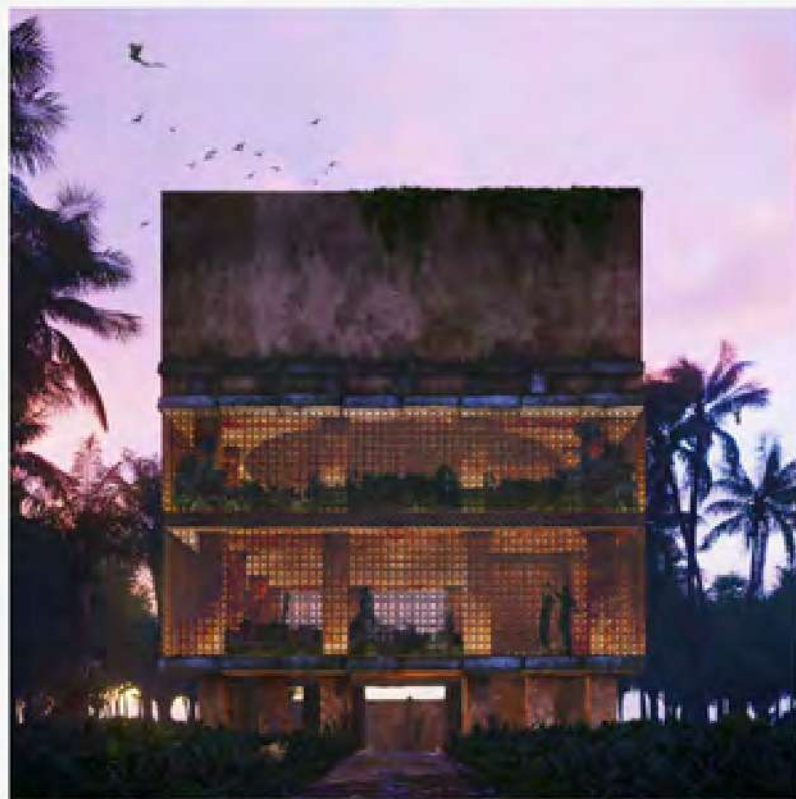


Squared proportion in different Maya buildings

### The façade

The link between this new world and the Maya's one resides in the columns.

The square shape, symbol of the cosmogonic concept and the four corners of the world, remains present in the lattice. The design of it was meant to be able to keep the privacy of the life happening inside but, at the same time, reveals a circumstantial part to exterior world; a lattice capable to frame the beauty that surrounds it, able to give the sensation of being submerged in the ocean but floating at the same time.

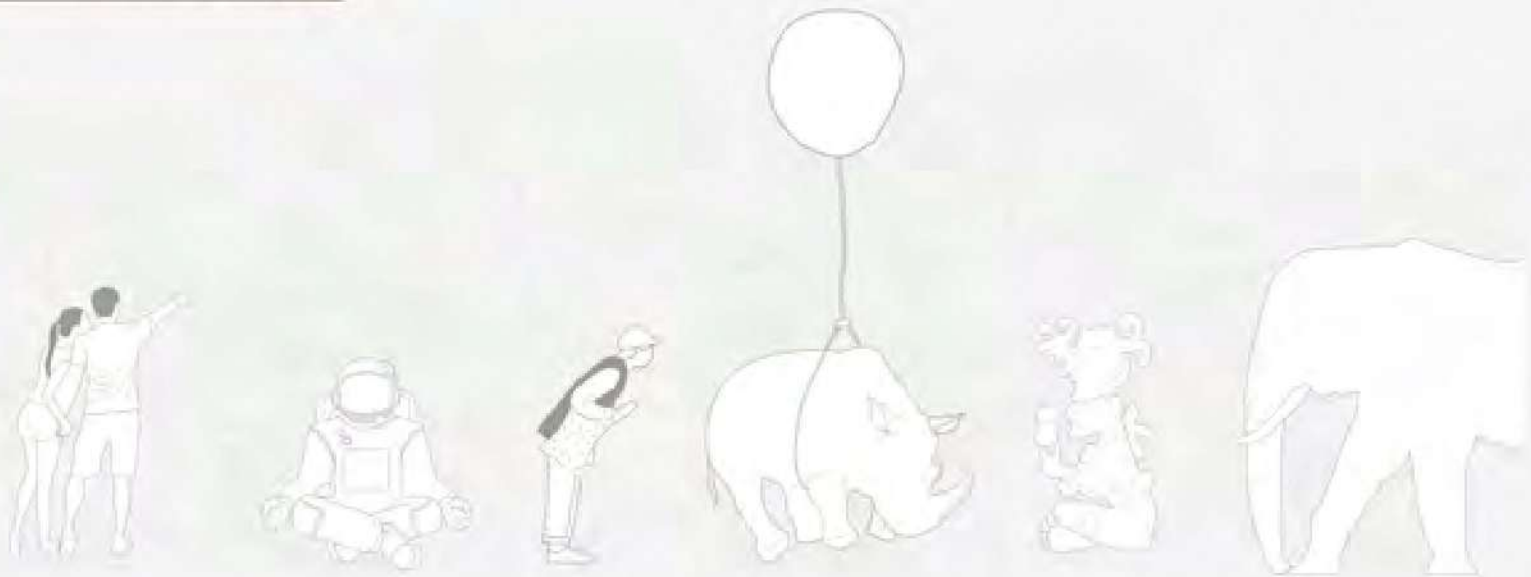




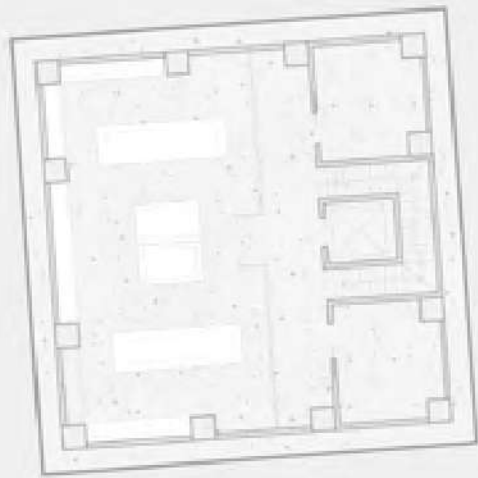
### Floorplans

Imagine yourself walking around the site, when suddenly, you see a tower with semi-closed walls; -"what's that inside? are they plants?"- you think for yourself, you're not entirely sure what's there but it surely invited you in. The basement is the foundation upon which the tower is built. Its the functional heart that no one sees with its machines and core technical implants. But you are firstly presented by the first floor. It aims to be a sensation as much as a place. The water basins open up in the middle to show you a path that looks like its going to take you deep into the ocean behind. A metaphysical leap that starts the journey to the top from the deep. The tangibility of water, the quiet dance of water lilies, the waves resonating with your every step, the playful reflection of the stars, disconnect you from the earthly world and make you ready for your pilgrimage towards the heavens.

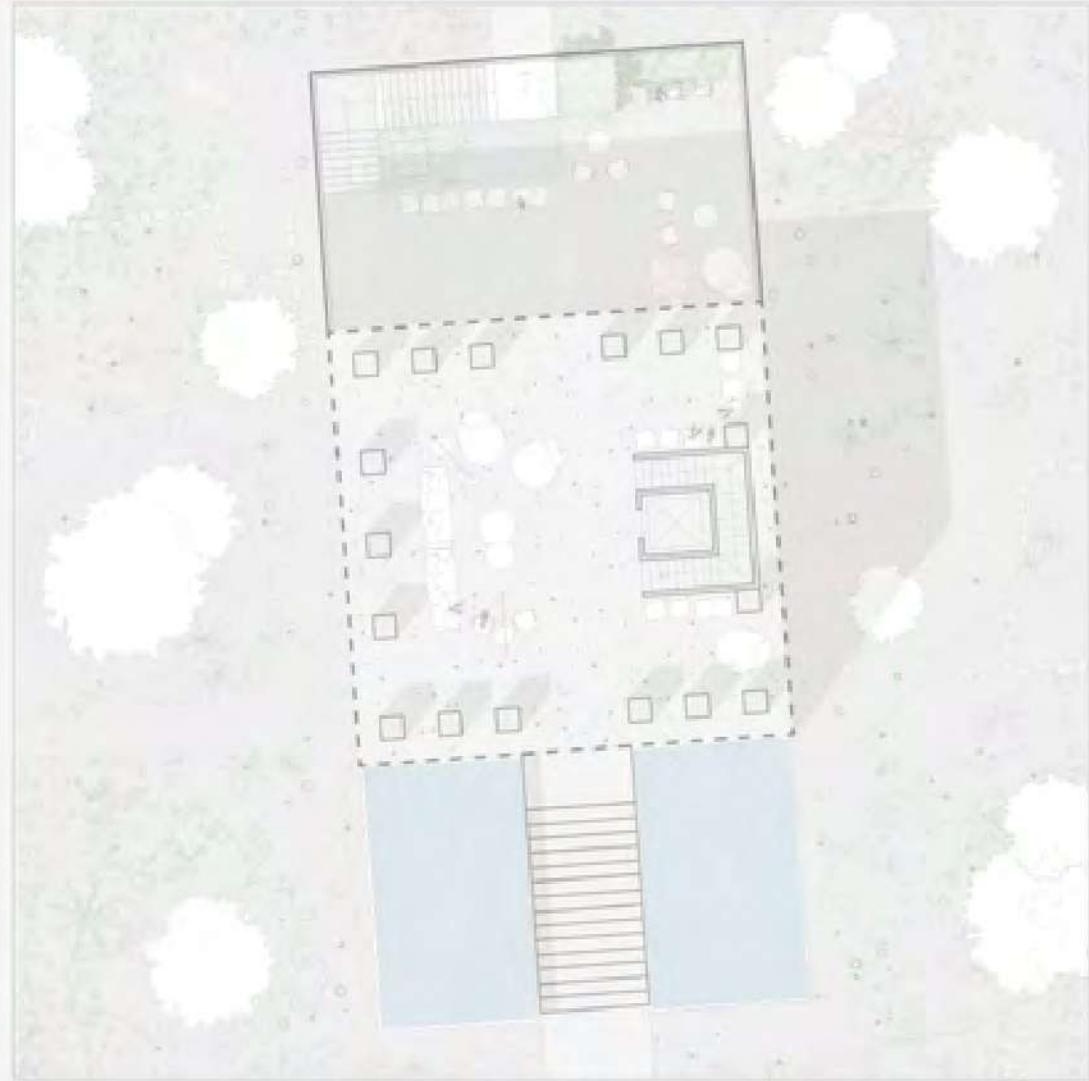
A design meant for everyone, really, everyone



Basement



Ground floor





First floor - The inner jungle



Second floor - The cosmos





### The garden - Xibalba

Your instinct and curiosity brought you to this place, where did you come from? From the path facing the ocean or the road crossing the ruins? Either way, you're here.

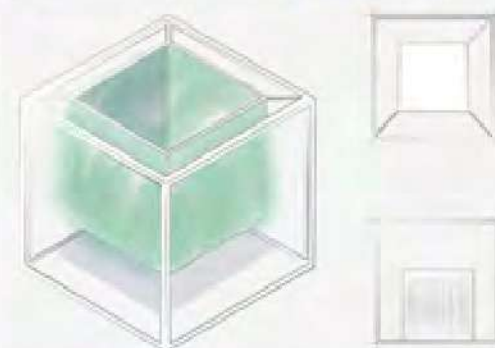
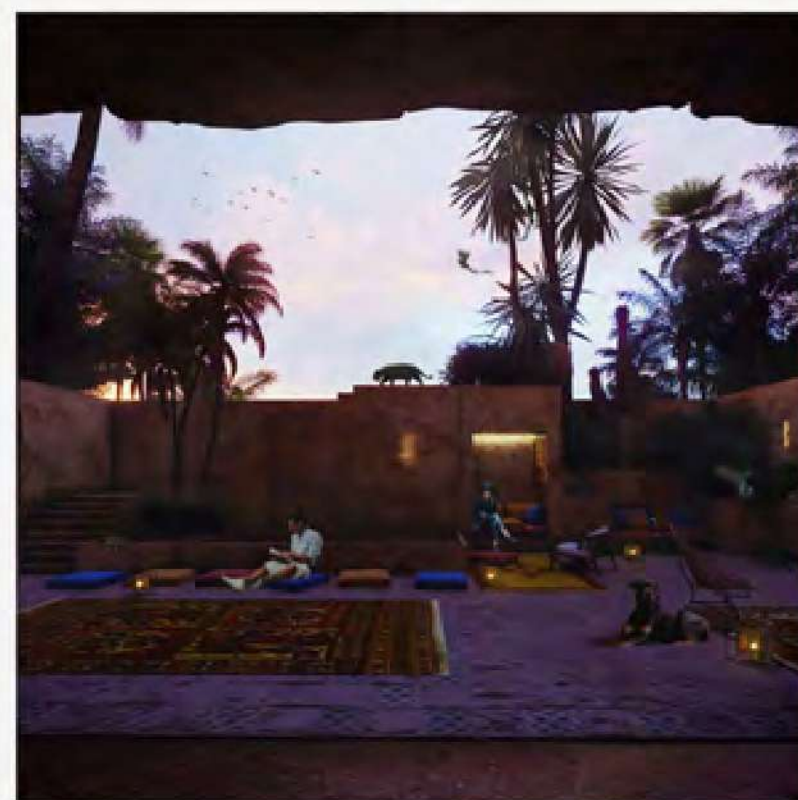
The garden conjoins the vertical view from the Maya world, a place at the bottom, in the underworld of Xibalba where the sources of water can be found.

Here you are a star and just as the Sun and the Moon; you'll make the journey between worlds, starting from the lower level and rising up to the sky.

Despite its "dark" meaning, this place was designed to be peaceful, a hidden area with niches between plants and basins to sit down, clear your mind and contemplate the beauty of the surroundings.

The "Boon" lamps designed for the garden retake the colorful mexican folklore, and the cosmogonic square concept.

"Boon" means "color" in Maya language. These lamps are characterized by their geometric form, their colors and materials: black iron and handed weaved beads.







### First floor - The inner jungle

The journey into this new pilgrimage began once you set foot into the leading path to the tower, you wandered the emptiness of the groundfloor and the magical sensation of the garden but something is calling you to go further, to climb those stairs inside the tower and to go deeper into this unknown world.

You have now reached the first part of the fifth element, the center of the cosmogonic square.

A jungle within a jungle.  
A whole floor dedicated to the Maya's concept of being one with nature, a whole floor that transports you to another dimension where you can walk through the highest trees and, where the ceiling is not the limit but the lamps in it are the sensation of touching the sky and the stars.

Perspective section



Zoom of the first floor - The inner jungle



Render view of The first floor - The inner jungle





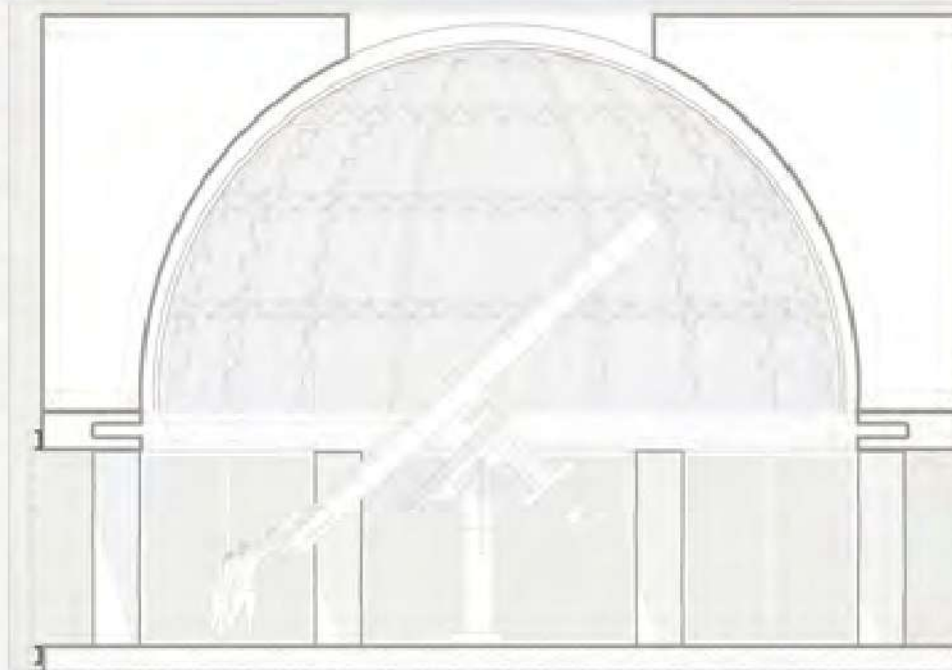
### First floor - The inner jungle

The second and final part of the fifth element is now in front of you, or shall we say is it just the beginning of the journey to reach the stars?

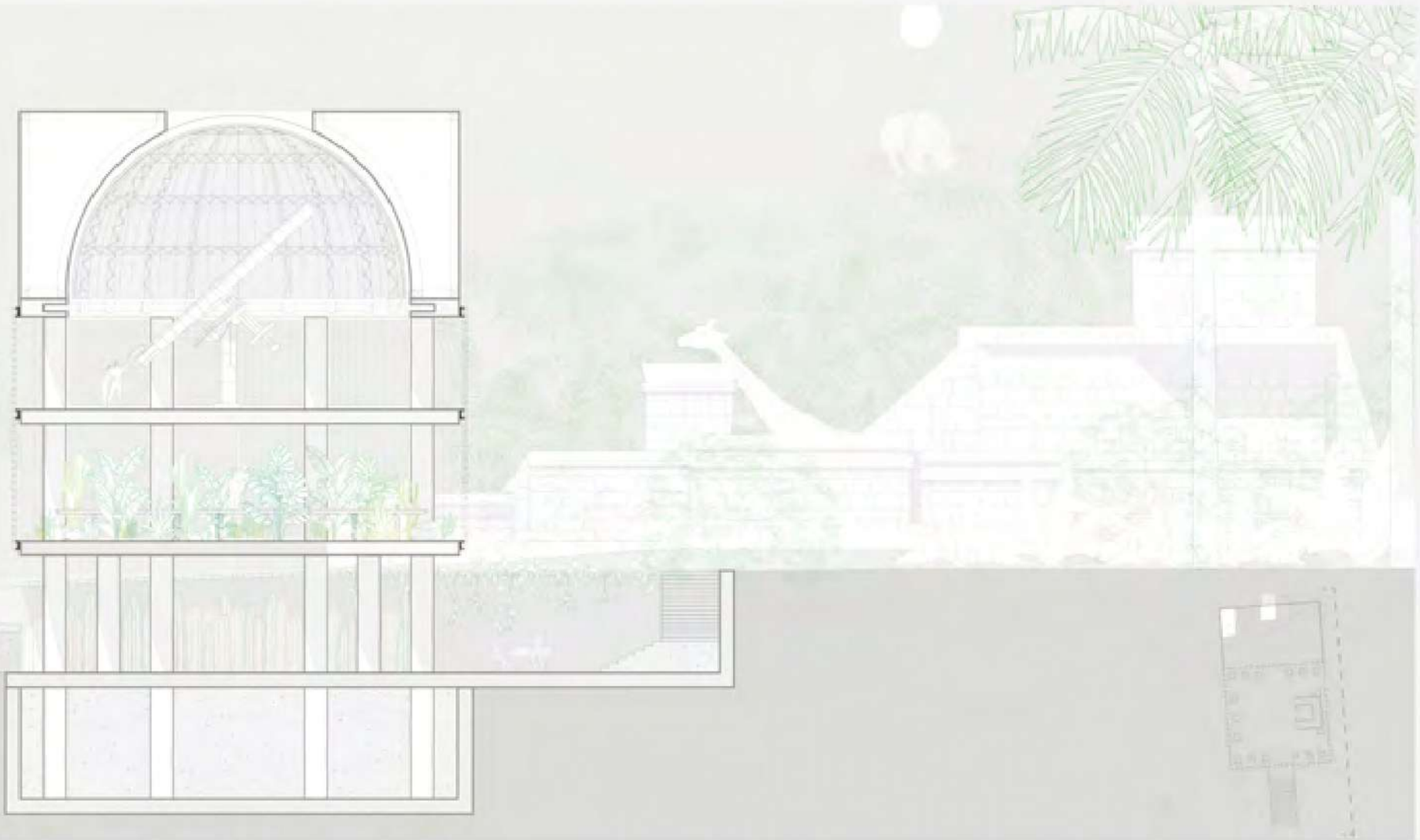
The heart of the tower, the connection between the past and the present is guarded in the upper floor, just like the Maya did with their temples, keeping the sanctuary in the highest place so the mortals could reach the heavens and the gods.

Once you step into the floor, you'll see it is surrounded by plants, they seem to be protecting the telescope at the center of the area; as you continue wandering, you'll find a smaller telescope and a pair of binoculars so you can explore the life happening outside the tower, here, on Earth. When you finally reach the telescope, you'll see the roof is hiding a secret you couldn't see from the outside, a high dome ceiling.

Wait, what's happening? Did the roof just opened? Now, the journey heading to the stars have just begun.











“That’s all  
folks!”  
—Bugs  
Bunny

