Section F

The Territorial Strategy: Stitching the Coastal Fringe

F

Chapter 6 - The Territorial Strategy: Stitching the Coastal Fringe.

6.1 OVERALL DESIGN GOALS AND OBJECTIVES

The overarching design goals and objectives of the project encompass a multifaceted approach aimed at revitalizing and preserving the coastline of Eilat. The primary objective is to regenerate the coastline, enhancing its appeal to tourists while safeguarding its natural desert landscape. Central to this vision is the creation of a unique and harmonious connection between the coastline and a newly envisioned promenade, fostering a seamless integration of the built environment with the surrounding natural beauty.

At the heart of the architectural design is the development of a comprehensive resort complex, meticulously curated to offer a diverse range of amenities and experiences. Featuring a diving centre, bar-restaurant, hotels, and a desert garden, the resort aims to provide guests with an immersive eco-tourism experience cantered around the region's pristine marine and desert ecosystems. By prioritizing sustainability and environmental stewardship in its design and operations, the project seeks to minimize its ecological footprint and serve as a model for responsible development in coastal areas.

One of the key objectives is to create a sense of continuity along the coastline, bridging barriers and establishing a cohesive environment that celebrates the natural landscape. This includes transforming a section of the coastline into a car-free beach, offering visitors a tranquil and environmentally conscious setting unlike any other in Eilat. Through careful planning and innovative design solutions, the project endeavours to preserve the unique character of the coastline while enhancing its accessibility and attractiveness to both residents and tourists alike.

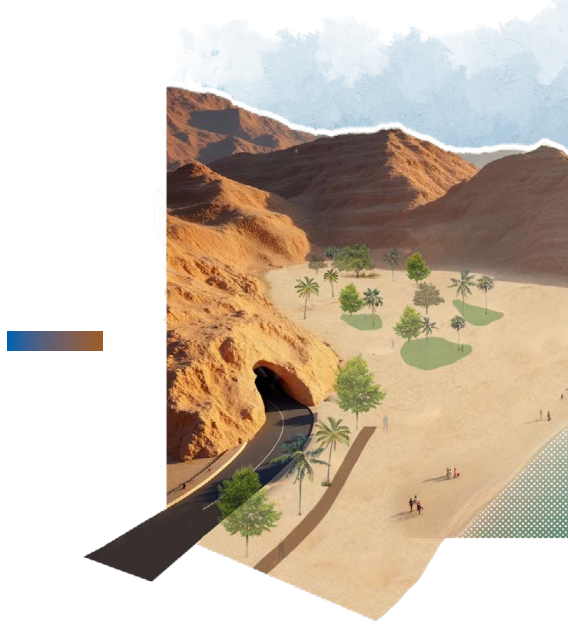
6.2 VISION - 3 ELEMENTS

The strategic vision for the regeneration of Eilat's coastal fringe is articulated through three systemic operations aimed at resolving the identified conflicts. By adopting a Resilient Subtraction logic, the plan moves beyond traditional additive expansion to restore the natural gradient between the mountains and the sea. This strategy transforms the waterfront from a series of fragmented barriers into a continuous ecological resource integrated with a circular metabolic hub.

RESTORING LINEAR CONTINUITY

Stitching the fragmented coastline to resolve the 44.7% barrier occupancy, creating a continuous thread of soft infrastructure

TOPOGR RECONN



Restoring continuity t
Displacement, rec
gradient from the n

APHICAL
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ountains to the sea.

THE SUBTRACTIVE TYPOLOGICAL HUB

Architecture defined by excavation to utilize thermal inertia, integrated with a circular water metabolism

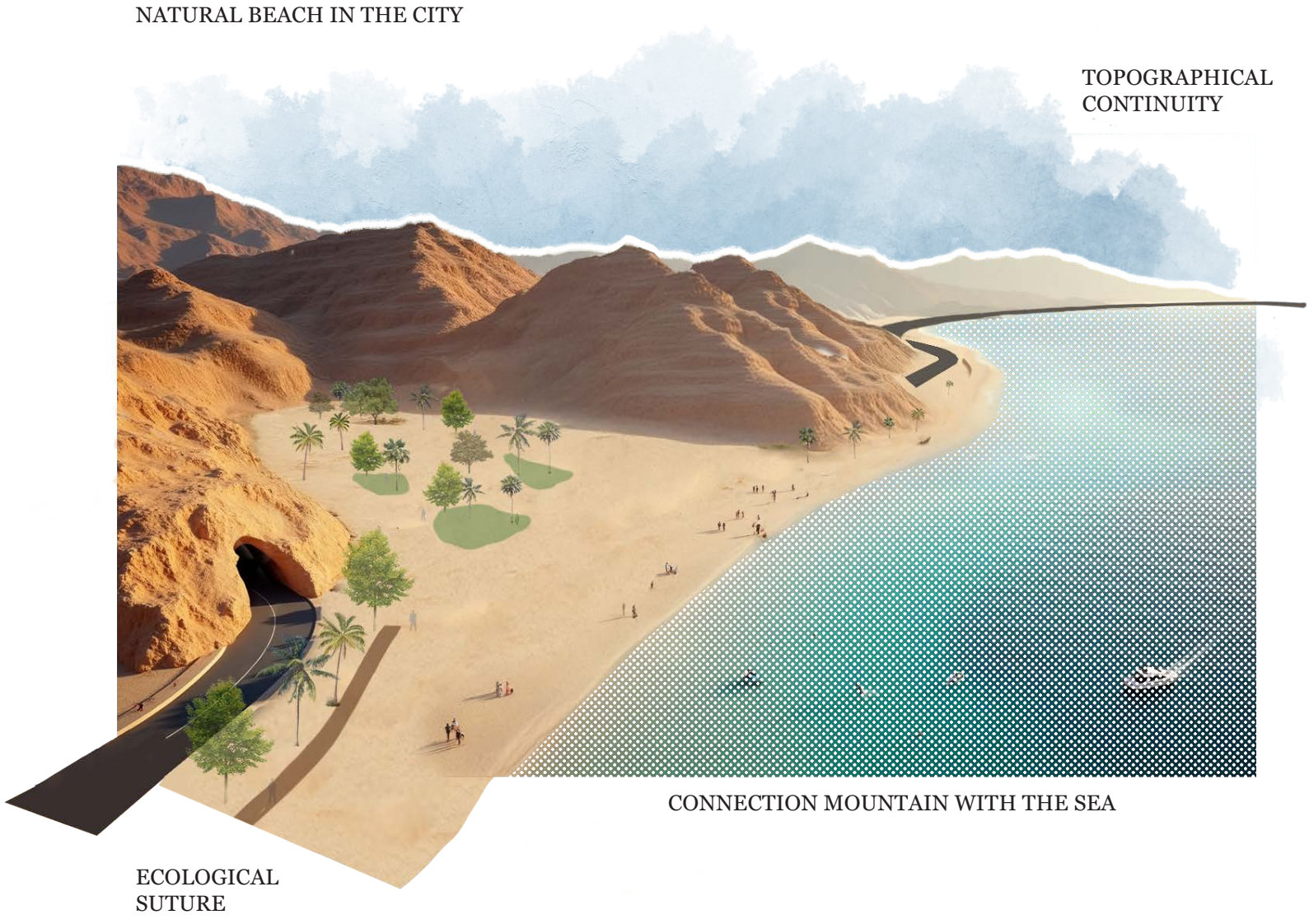
RESTORING LINEAR CONTINUITY

The transformation of Eilat's fragmented coastal fringe into a cohesive, uninterrupted pedestrian axis re-establishes longitudinal connectivity along the gulf. By replacing rigid physical boundaries with a continuous thread of soft infrastructure, the design creates a seamless, accessible corridor. This directly addresses current infrastructural saturation, reclaiming the waterfront for public flow and inviting visitors to engage with the coastline at a human scale, free from the immediate disruption of vehicular traffic.

Drawing 181. *Connected promenade Collage. Source: Author*

TOPOGRAPHICAL RECONNECTION

The primary infrastructural intervention of this thesis is the displacement of the coastal highway into a sub-surface mountain tunnel. This deliberate shift liberates the shoreline, establishing Eilat's first truly car-free natural beach. By removing the asphalt barrier, the design reclaims the original topographical gradient from the desert mountains down to the sea. This intervention not only eliminates acoustic and physical pollution but also fosters a tranquil, environmentally conscious sanctuary that prioritises the ecological integrity of the desert margin over vehicular dominance.



Drawing 182. *Natural beach in the city Collage. Source: Author*

THE SUBTRACTIVE TYPOLOGICAL HUB

At the programmatic heart of the eco-resort, sustainable architecture and the pristine marine ecosystem intersect. Utilising a subtractive design approach that excavates into the topography to harness natural thermal inertia, the hub inherently minimises its ecological footprint. It integrates a circular water metabolism with the surrounding desert gardens and the dedicated diving centre. This establishes an immersive eco-tourism experience that harmonises human recreation and hospitality with the fragile realities of the surrounding desert and marine environments.

WATER RECYCLING

PRESERVING NATURAL VIEW

ECO TOURISM THRESHOLD

6.3 STRATEGIC PROJECT SITE: RECLAMATION OF THE COASTAL EDGE THROUGH SUB-SURFACE INFRASTRUCTURE DISPLACEMENT

This proposal addresses the fragmentation of the Eilat coastline by categorising the waterfront into three operational systems. The core of the intervention, located in the South Coast, utilises sub-surface tunnelling to remove vehicular traffic, thereby restoring topographical continuity and preserving the natural serenity of the gulf. This transition from 'Industrial Reclamation' to 'Ecological Restoration' ensures a continuous public flow while protecting the sensitive marine environment.

ECOLOGICAL RESTORATION & COASTAL PRESERVATION

CURRENT STATE	PROPOSED STRATEGY
Thin beach constrained by vehicular corridor; high noise pollution & physical fragmentation	Topographical Reunification via Sub-surface Tunnelling
Area behind public beach that do not have direct access that needs shading, trees, vegetation	Dissolving Physical Barriers for Visual Connectivity
Areas with access to the beach	Ecological Restoration and Native Pedestrian Trail
Princess Beach Area	Seamless Connection to the Protected Southern Coastline
Hotel & Water Sport Precinct	Developing a Low-Impact Natural Boardwalk with Integrated Shading.

INDUSTRIAL & INFRASTRUCTURAL RECLAMATION

CURRENT STATE	PROPOSED STRATEGY
Navy Area with walls on each side	Enhancing Thermal Comfort through Xeriscaping & Shading
Infrastructure Harbour area	Implementing Multi-modal Transit & Active Recreational Nodes
Oil port area	Establishing Visual Porosity
Semi built up area Underwater Observatory Precinct	Mitigating Vertical Obstructions with Pedestrian Walkways

URBAN CONNECTIVITY & FLOW

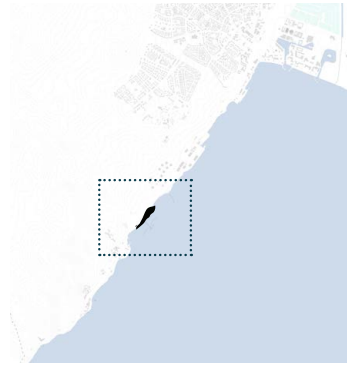
CURRENT STATE	PROPOSED STRATEGY
Existing North Coast Promenade-Urban promenade	Integrate with the South Coast Pedestrian Spine
The Southern Gateway	Establishing a Verdant Transitional Gateway
Existing Promenade	Integrating and extending the naturalized coastal path
Existing Promenade	Integrating and extending the naturalised coastal path
Existing old Promenade	Revitalising Existing Infrastructure with Scenic Vistas
New Existing Promenade (Good conditions)	Integrating and extending the naturalized coastal path

STRATEGIC PLAN VISION FOR EILAT
COASTLINE STRIPE - TYPES OF
PROMENADE

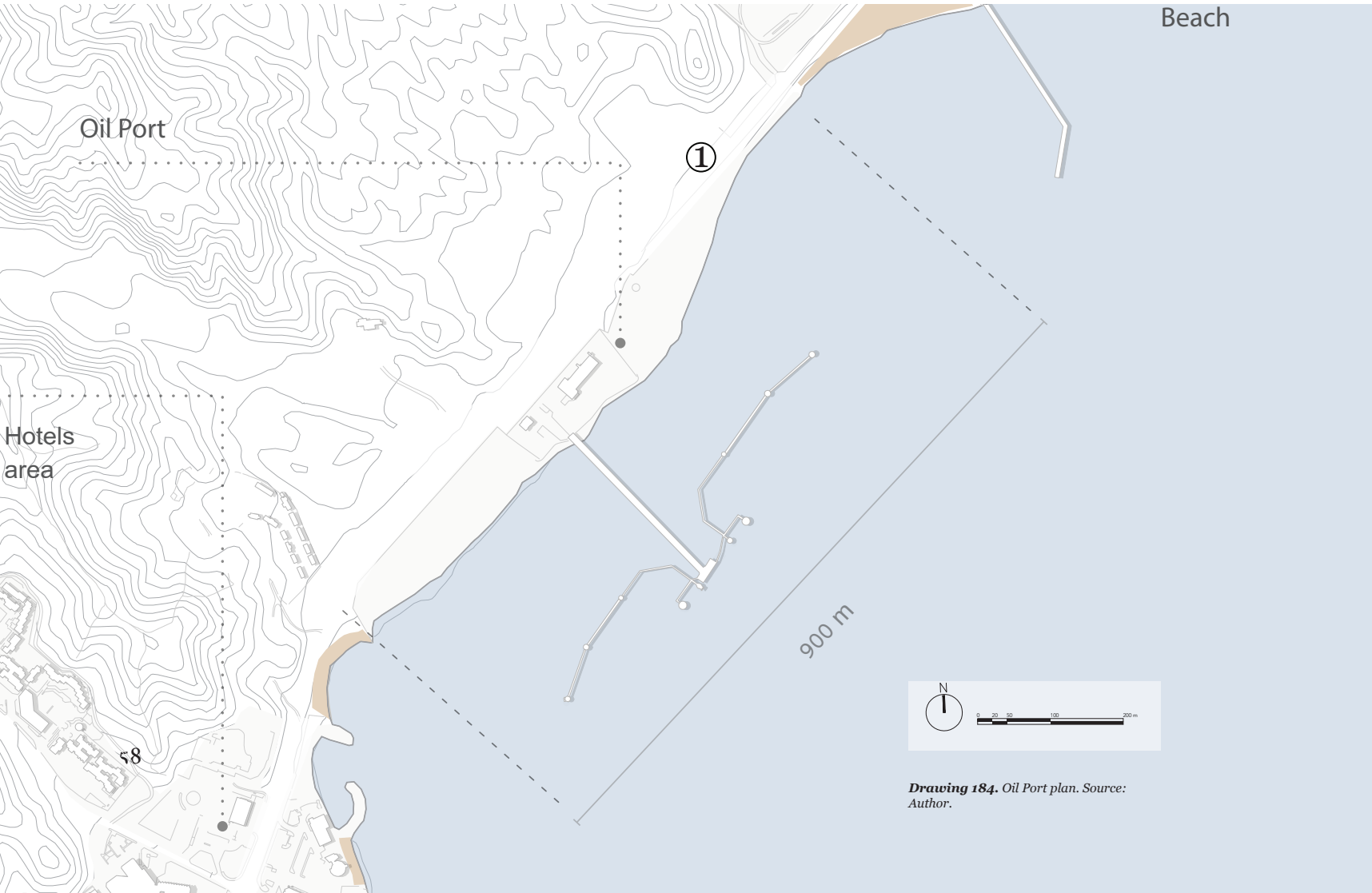
6.4 THE HORIZONTAL STITCH – CONNECTED PROMENADE

6.4.1 COASTLINE WALKWAYS

To address the challenges posed by the numerous barriers along Eilat's coastline, the city should consider developing a pleasant and accessible walking path. A proposed solution involves creating



Drawing 185. *Oil Port key plan. Source: Author.*



Drawing 184. *Oil Port plan. Source: Author.*

SCENARIO A: THE OIL PORT (KATZA):

CURRENT SITUATION - OIL PORT AREA

Figure 432. *Current situation of the walkway aside the Katza oil, 2024. Source: Author*

a promenade that spans the entire coastline, providing a continuous and inviting route for pedestrians. Trees and vegetation play a crucial role in this design, not only enhancing the natural scenery but also providing much-needed shade to alleviate the discomfort of walking in hot weather conditions.
An illustration exemplifies this

SCENARIO A:

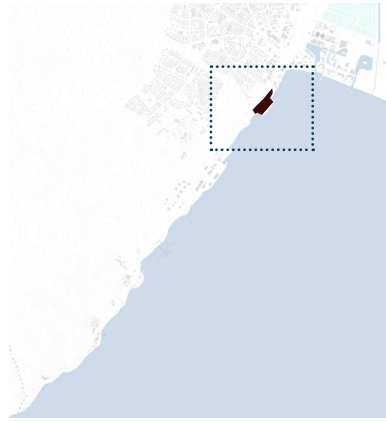
Drawing 186. *Moving the car road into the mountains. Source: Author*

concept, focusing on an area near the Oil Port that currently lacks proper infrastructure, with only a dirt path in place. Located on the south side of Eilat's coastline, characterized by its natural desert landscape, this area is ripe for development. The proposed promenade design features wooden decking and native desert vegetation and trees, seamlessly blending with the surrounding environment.

Additionally, the inclusion of a bicycle path aims to encourage alternative modes of transportation, such as cycling and scootering, further promoting sustainability and reducing congestion. Overall, this integrated approach not only enhances connectivity and accessibility but also celebrates Eilat's unique natural beauty while addressing the needs of both residents and visitors alike.

6.4.2 COASTLINE WALKWAYS

In this particular area, there exists a walking path and a bicycle path, but it lacks adequate shade. Situated in Eilat's Harbour, this location serves primarily as a port and lacks connectivity with the walking path. Although there is a view of the sea, the pedestrian path is distanced from it.
The illustration highlights the potential for incorporating functional elements



Drawing 188. *Oil Port plan. Source: Author.*

Drawing 187. *Eilat's Harbour area plan. Source: Author.*

SCENARIO B: EILAT'S HARBOUR:

CURRENT SITUATION - EILAT HARBOUR AREA

Figure 434. *Current situation of the walkway aside the Harbour, 2024. Source: Author*

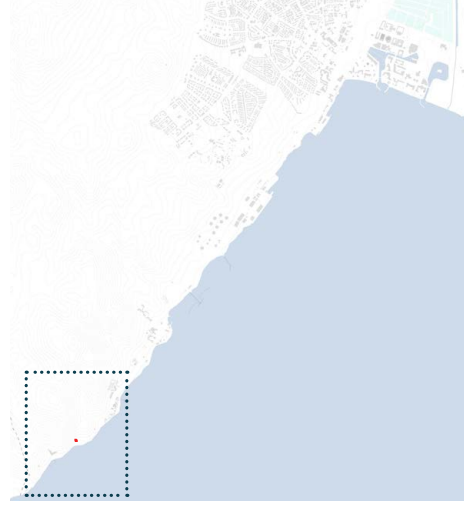
along the promenade to enhance its attractiveness. Introducing amenities such as an open-air gym can incentivize people to utilize the promenade. By activating the barrier area created by the harbour, the promenade becomes more engaging. Individuals can jog along the promenade, utilize the outdoor gym equipment, and appreciate the scenic views of the sea and mountains simultaneously. This integration of functional spaces not only enhances the user experience but also transforms the area into a vibrant public space.

SCENARIO B:

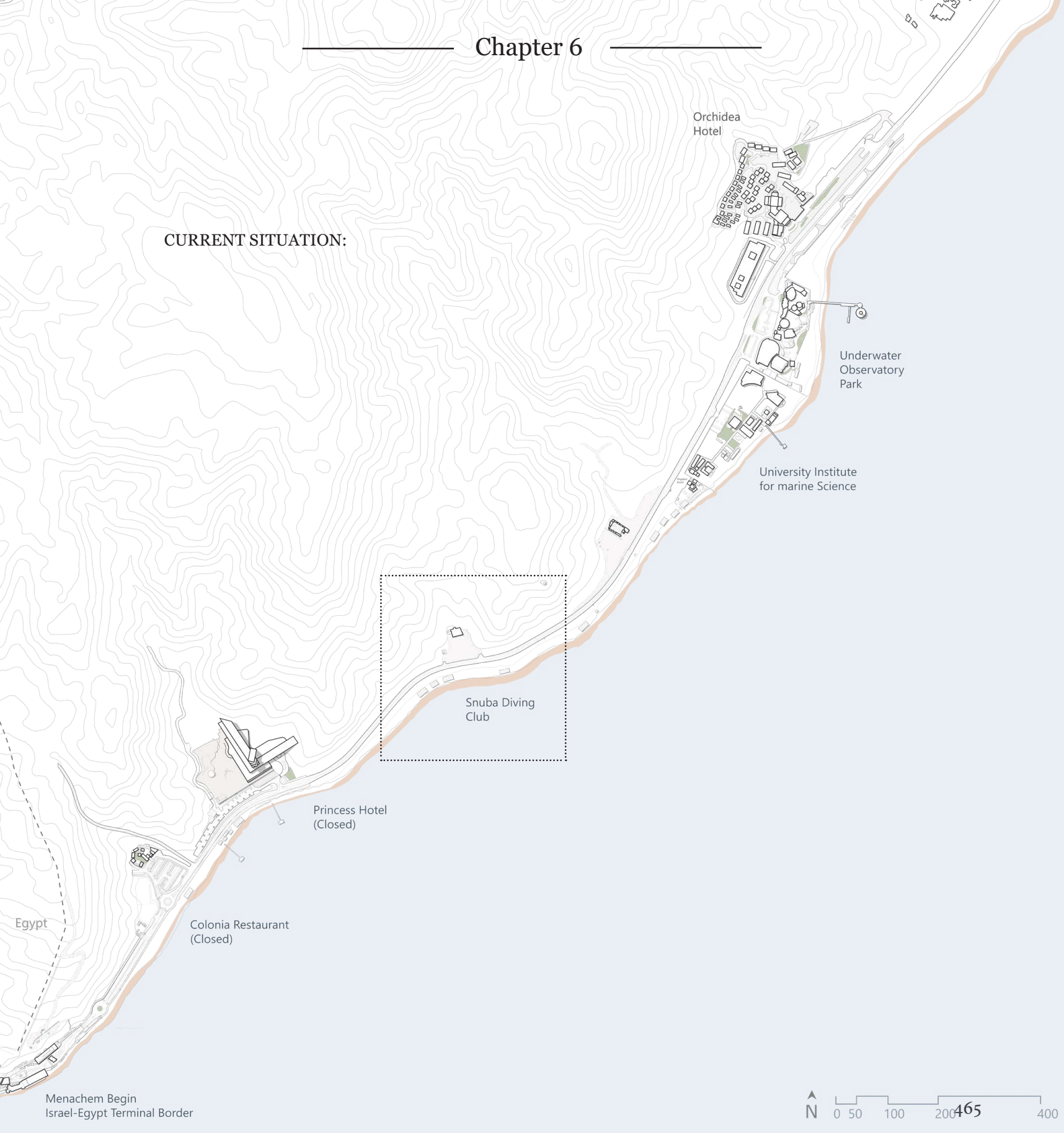
Figure 433. *New connecting points at the promenade. Source: Author*

6.5 CONTEXT SITE NEAR THE SITE

This area has been selected for the architecture thesis project. It is located in the southern part of Eilat's coastline, which is characterized by two distinct environments: the northern section features urban development, while the southern section remains more natural. The project site is situated within this natural portion of the coastline, one of six main facilities in this region. This area is reaching the border with Sinai, Egypt, which make this area as the southern area of Israel.



CURRENT SITUATION:



Drawing 189. *Chosen Site Area- current situation. Source: Author*

6.5.1 SNUBA DIVING CLUB- PROJECT SITE AREA

Snuba Diving Club is a small dive centre. About a ten minute walk from the border with Egypt is the Southernmost dive club in the country. This is a small place, which is characterized by peace and tranquility. Snuba belongs to the oldest dive clubs in Eilat. It became active starting from 1990, and maintains the atmosphere of intimacy and tenderness. The club has a nostalgic atmosphere of Sinai or of the old city of Eilat, where there was nothing but the blue water line.

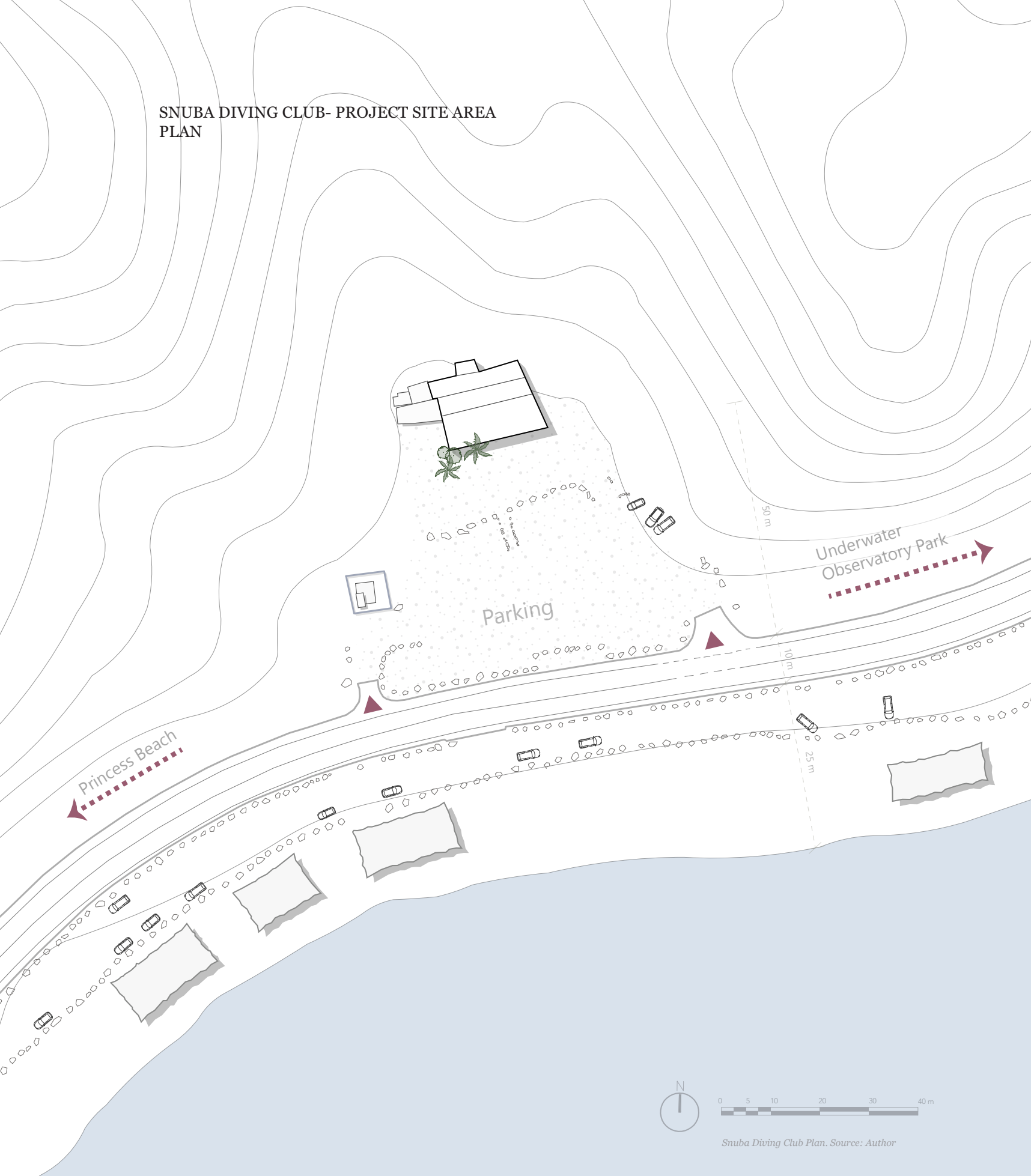
Figure 435. *Aerial view of the coast infront of Snuba Diving Club Images. Source: Author*

Key map. Source: Author

SNUBA AERIAL VIEW

Chosen Site Area- current situation. Source: Author

SNUBA DIVING CLUB- PROJECT SITE AREA PLAN



Snuba Diving Club Plan. Source: Author

INTERIOR AND FACADE OF THE SNUBA DIVING CLUB

Figure 438. *Snuba Diving Club Images. Source: Snuba Diving Club*

FRONT OF THE EXISTING SNUBA DIVING CLUB

Figure 439. *Facade and entrance of the Snuba Diving Club, 2024. The dust area in front of the club is serve as public parking. Source: Author*

BEACH IN FRONT OF THE SITE

Figure 436. *Coast infromt of the Snuba Diving Club, 2024. Mountain and water are divided by the veichle road . Source: Author*

SIDE VIEW OF THE EXISTING SNUBA DIVING CLUB

Figure 437. *Area of the Snuba Diving Club, 2024. Source: Author*

6.5.2 MENACHEM BEGIN ISRAEL-EGYPT TERMINAL BORDER

The Menachem Begin Terminal is situated approximately 10 kilometres south of Eilat, marking the southernmost border point of Israel. It overlooks the neighbouring countries of Jordan and Egypt to the south.

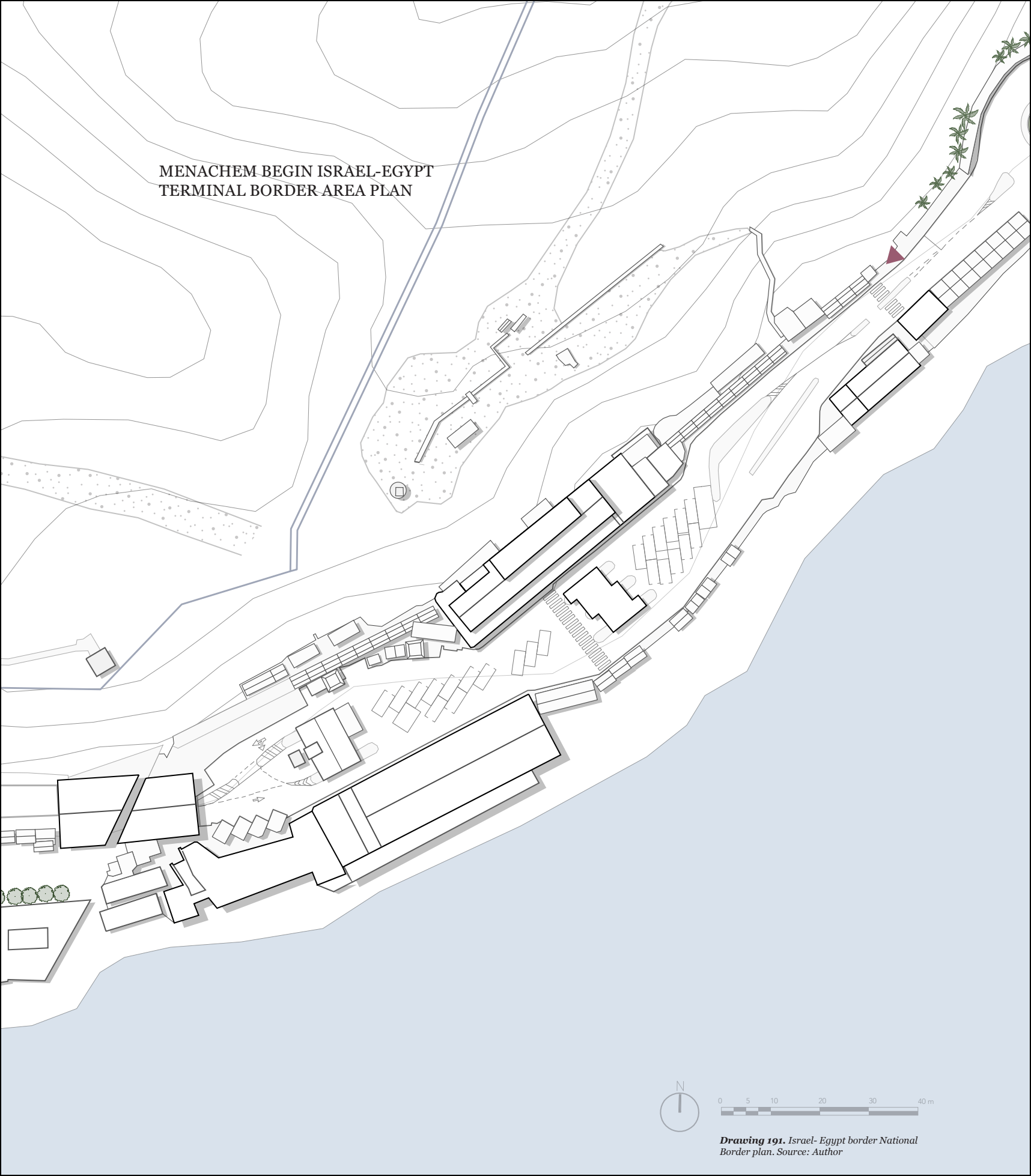
This terminal acts as a conduit between Israel and Egypt. It permits passage for Israeli citizens, foreign tourists, those with Egyptian visas in their passports, new immigrants, and Palestinians who have an Israeli transit document. Established at the base of Mount Tlul, the terminal is flanked by the Egyptian border on one side and a beach designated as a nature reserve on the other. Due to its special geographical location, it occupies a narrow area measuring 45 meters in width and 200 meters in length. Each year, this slender corridor facilitates the movement of nearly one million passengers and around 70,000 vehicles. Pilgrims also utilize this route for their journeys to sacred sites in Israel such as Jerusalem, Nazareth, and Bethlehem.

Figure 440. *Israel- Egypt border plan. Source: Wikipedia*

Figure 441. *Israel- Egypt border plan. Source: Wikipedia*

Drawing 190. *Key map. Source: Author*

Figure 442. *people are waiting to pass the border in holiday periods. Colonia Restaurant in on the left side. Source: Globus*



Drawing 191. *Israel- Egypt border National Border plan. Source: Author*

6.5.3 COLONIA RESTAURANT

The Colonia Restaurant, located at the southernmost point in Eilat, was a restaurant and accommodation resort situated at an elevated level. There is a car parking area at the front of the Colonia complex. However, it closed during the Covid-19 period and did not reopen thereafter.

Colonia Eilat was a modern-style accommodation venue based on tent lodging within an impressive camping compound set amidst nature. It was considered the southernmost accommodation destination in Israel, with the Egyptian border - Taba - just a few minutes' walk away, allowing access to the Sinai Peninsula.

The complex itself comprised eight luxurious tent accommodations suitable for families with children and couples. Each tent featured a shower, private facilities, air conditioning, double wooden beds, and the option to add mattresses as needed. The area also includes two

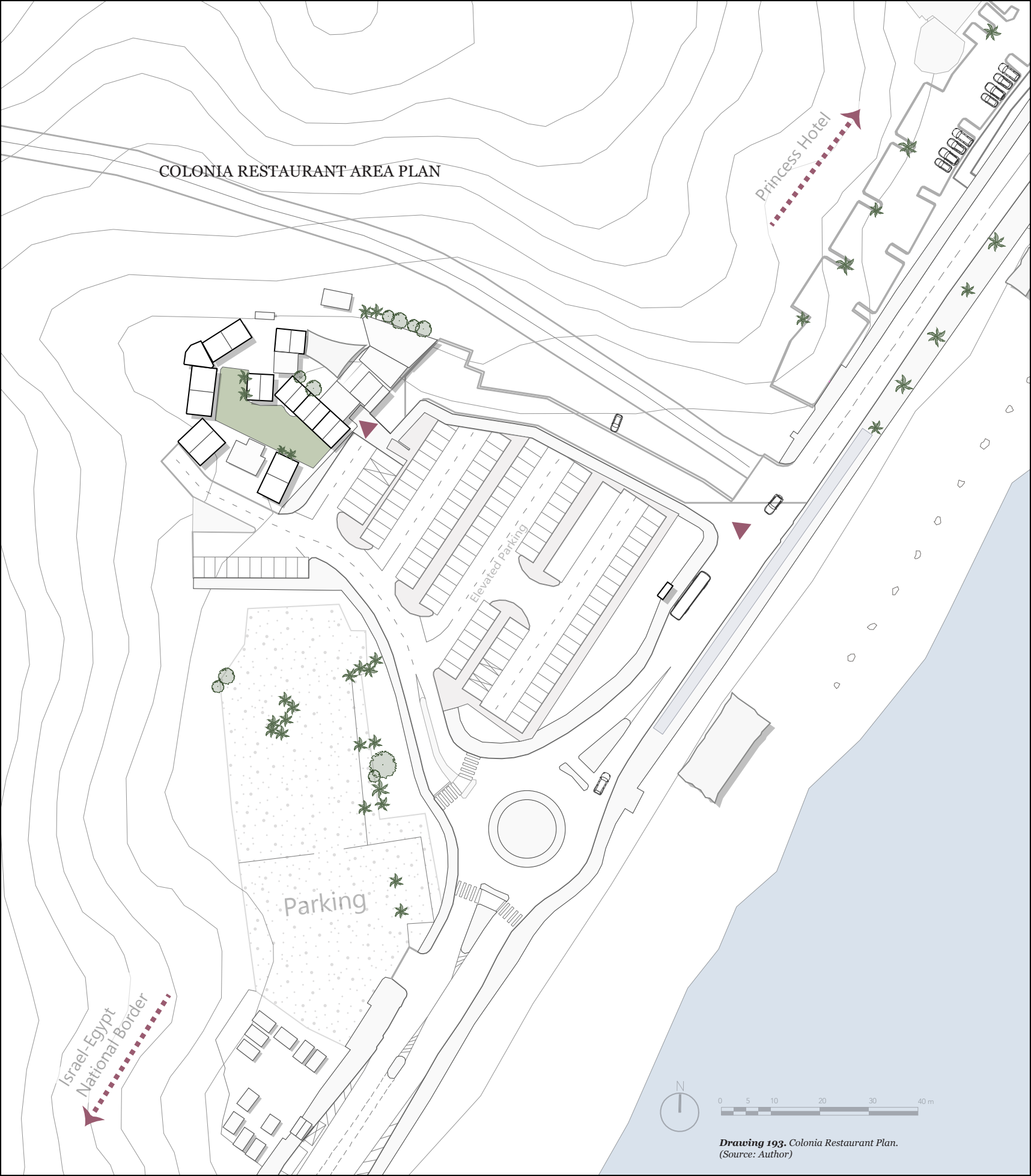
Drawing 192. *Key map. Source: Author*

COLONIA RESTAURANT

Figure 443. *Facade of the colonia restaurant, 2024. Source: Author*

ELEVATED PARKING

Figure 444. *Elevated paved parking in front of the complex, 2024. Source: Author*



Drawing 193. *Colonia Restaurant Plan.*
(Source: Author)

parking lots. One is elevated on top of the hill at the front of the Colonia complex, and the another parking, a dirt parking, is located south to the complex.

The Colonia Eilat complex was established in the late 2000s. It quickly gained popularity as a unique accommodation and dining destination due to its scenic location and modern amenities. Over the years, it became a favoured spot for tourists and locals alike, offering a blend of natural beauty and comfortable lodging options. However, despite its initial success, the onset of the Covid-19 pandemic in 2020 brought about its closure, halting its operations indefinitely.

SIDE DIRT PARKING

Figure 446. *Dust parking aside the paved parking, 2024. Source: Author*

PAVED PARKING

Figure 447. *Paved parking in front of the complex, 2024. Source: Author*

COLONIA RESTAURANT

Figure 445. *Side view of the restaurant and the paved parking' 2024. Source: Author*

6.5.4 PRINCESS HOTEL AND BEACH

The Princess Hotel in Eilat, located in the southern part of the city near the Taba border crossing, closed in November 2015 due to financial debts and has since been abandoned. During its operation, the hotel featured 419 rooms, including 64 suites.

Directly opposite the abandoned hotel lies Princess Beach in Eilat, a wild beach that retains a natural and untouched feel, with rocks gently sliding into the serene blue waters. The beach is a nature

PRINCES HOTEL

Figure 448. *Front of thePrinces hotel, 2024. Source: Author*

Drawing 194. *Figure x Key map. Source: Author*

PRINCES HOTEL ROAD

Figure 449. *Road infront of the Princes hotel, 2024. Parking on the left and the coast on the right. In this area there is a small paved promenade. Source: Author*

PRINCESS HOTEL AND BEACH AREA PLAN

Drawing 195. *Princess Beach Hotel.*
(Source: Author)

reserve, and entry is marked by ropes with buoys. There are two bridges that provide direct access to deeper waters. Despite its natural and unregulated status, Princess Beach (Hof Ha'Nesicha Eilat) is well-maintained, clean, inviting, and lacks lifeguard services. However, amenities such as shade, restrooms, beach showers, and a snack bar are available.

PRINCES BEACH'S BRIDGE

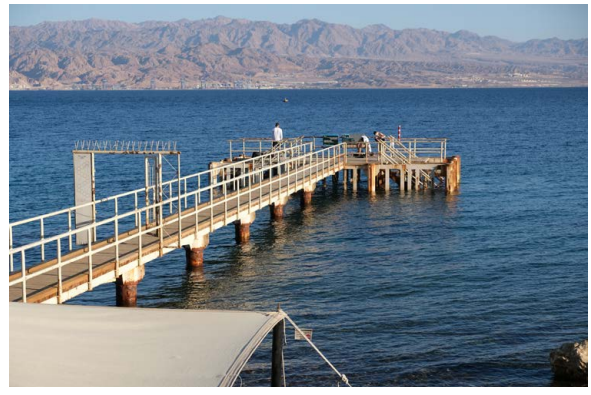


Figure 450. *Bridge at the Princess Beach, 2024. this is a landmark at the city. Source: Author*

PRINCES BEACH

Figure 451. *Two Bridges at the Princess Beach, 2024. the shadow on the lst shows the elevated roas and walkway which makes the coast very narrow Source: Author*

6.4.5 UNDERWATER OBSERVATORY PARK AND THE UNIVERSITY INSTITUTE FOR MARINE SCIENCE

The Coral Beach Nature Reserve, also known as the Eilat Coral Reserve (locally referred to as “Coral Beach” and “Coral Beach Reserve”), is a declared natural reserve under the management of the Israel Nature and Parks Authority. It contains the northernmost shallow water coral reef in the world and is the only coral reef in Israel. This reserve represents the most protected segment of the reef that historically extended along the entire western coast of the Gulf of Eilat and now serves as a focal point for the reef’s rehabilitation and conservation throughout the bay.

Located alongside the Red Sea, the reserve stretches over approximately 1.2 kilometers of coral reef. Adjacent to the south of the reserve is the Underwater Observatory Marine Park, which itself is a significant conservation and rehabilitation center for the reef. The reserve effectively continues southwards along the coast of the observatory. The beach area near the observatory is designated as a separate nature reserve, known as the “Southern Eilat Sea Nature Reserve,” and is not accessible to tourists. Although Coral Beach is not designated for bathing, it remains a popular tourist attraction because it provides easy access for diving and snorkeling along the reef.

Drawing 196. *Key map. Source: Author*

Drawing 197. *Underwater Observatory Park and the University Institute for marine Science plan. (Source: Author)*

The Eilat Underwater Observatory Marine Park (formerly known as Coral World) is a public aquarium situated on Coral Beach Reserve. It features the world's first underwater observatory of its kind, which allows visitors to observe marine life. The observatory was the park's first attraction, established in 1974 by Morris Kahn in collaboration with marine biologist David Friedman. It was the first such facility globally and also the first public aquarium in Israel. Subsequent exhibits were built later and are not directly connected to the Red Sea.
The Interuniversity Institute for Marine Sciences in Eilat is a multidisciplinary research institute located on Coral Beach in Eilat, operated by the universities in Israel. It was founded on the basis of the Marine Biology Laboratory established by the Hebrew University in 1968. In 1985, the Council for Higher Education decided to convert the laboratory into an all-university institute, making it the only academic institution in Israel where all universities are partners. Its budget and administration are directly determined by the Planning and Budgeting Committee of the Council for Higher Education, although the Hebrew University continues to own the institute's assets.
The institute conducts teaching and research in a variety of marine science fields including marine ecology and biology, chemical, physical, and biological oceanography, ichthyology, vertebrate and invertebrate biology, neurobiology, molecular biology, and toxicology. It offers enrichment courses for educational institutions in and around Eilat and features various laboratories, pools, sea water tanks, an advanced diving centre, and boats. The institute's location adjoins the Underwater Observatory Marine Park

UNIVERSITY INSTITUTE FOR MARINE SCIENCES

Figure 452. *Building of the University Institute for marine Science, 2024. Source: Author*

UNDERWATER OBSERVATORY PARK

Figure 453. *Building of the Underwater Observatory Park, 2024. This is a landmak of the city. Source: Author*

BACKSIDE TO THE INSTITUTE

Figure 454. *Dirt side walk of the University Institute for marine Science, 2024. this area serve as parking as well Source: Author*

UNDERWATER OBSERVATORY PARK BUILDING

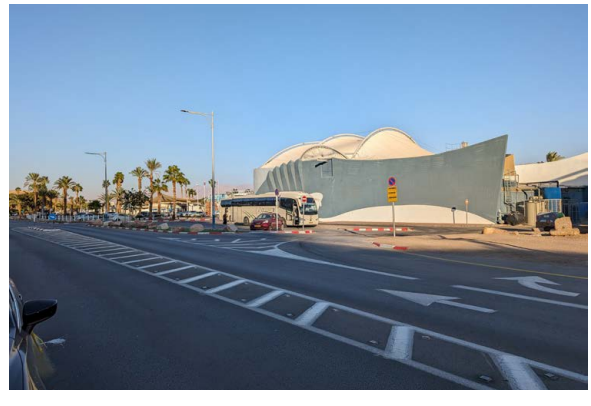


Figure 455. *Front of the Underwater Observatory Park, 2024. this area serve as parking as well Source: Author*

6.5.6 ORCHIDEA HOTEL AND PROMENADE

The Orchid Hotel in Eilat, established in 1993, is situated at the foothills of the Eilat Mountains, near the Underwater Observatory and Coral Beach. This location provides proximity to prominent local attractions while offering scenic views of the natural surroundings.
The hotel comprises 144 rooms, featuring a variety of accommodations including wooden cabins styled after the Far East, and a luxurious wing named "Shangri-La." This range of room types caters to diverse guest preferences and requirements.

As a pioneer in environmental sustainability, the Orchid Hotel has implemented a solar energy system on its rooftops, contributing significantly to its energy supply. This initiative positions the hotel as a leader in sustainable practices within the region, often referred to as "the first green hotel."

Drawing 198. *Figure x Key map. Source: Author*

ORCHIDEA HOTEL

Figure 456. *Orchidea Hotel, 2024. Source: Author*

PROMENADE

Figure 457. *Paved promenade with vegetation at the Orchidea Hotel area, 2024. Source: Author*

ORCHIDEA HOTEL

Figure 458. *Front of the Orchidea Hotel, 2024. Source: Author*

CORAL BEACH NATURAL RESERVE

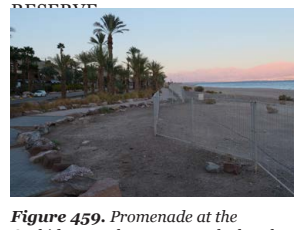


Figure 459. *Promenade at the Orchidea Hotel area, 2024. the beach on the left side is a natural resurve which open to public in a specific time of the day. Source: Author*

Drawing 199. *Orchidea Hotel and Promenade area Plan. (Source: Author)*

6.6 THE VERTICAL STITCH - CAR TUNNEL

At a broader scale, the project aims to establish a natural beach devoid of vehicular traffic, nestled between the mountains and the sea—an uncommon feature in the city of Eilat, where beaches typically border roads. Given the limited width of Eilat's beaches, the presence of a prominent road is often unavoidable. To address this, the design proposes a tunnel through the mountains for vehicular traffic, creating a car-free zone along the beachfront.

NATURAL BEACH IN THE CITY

Figure x Natural beach in the city Collage. Source: Author

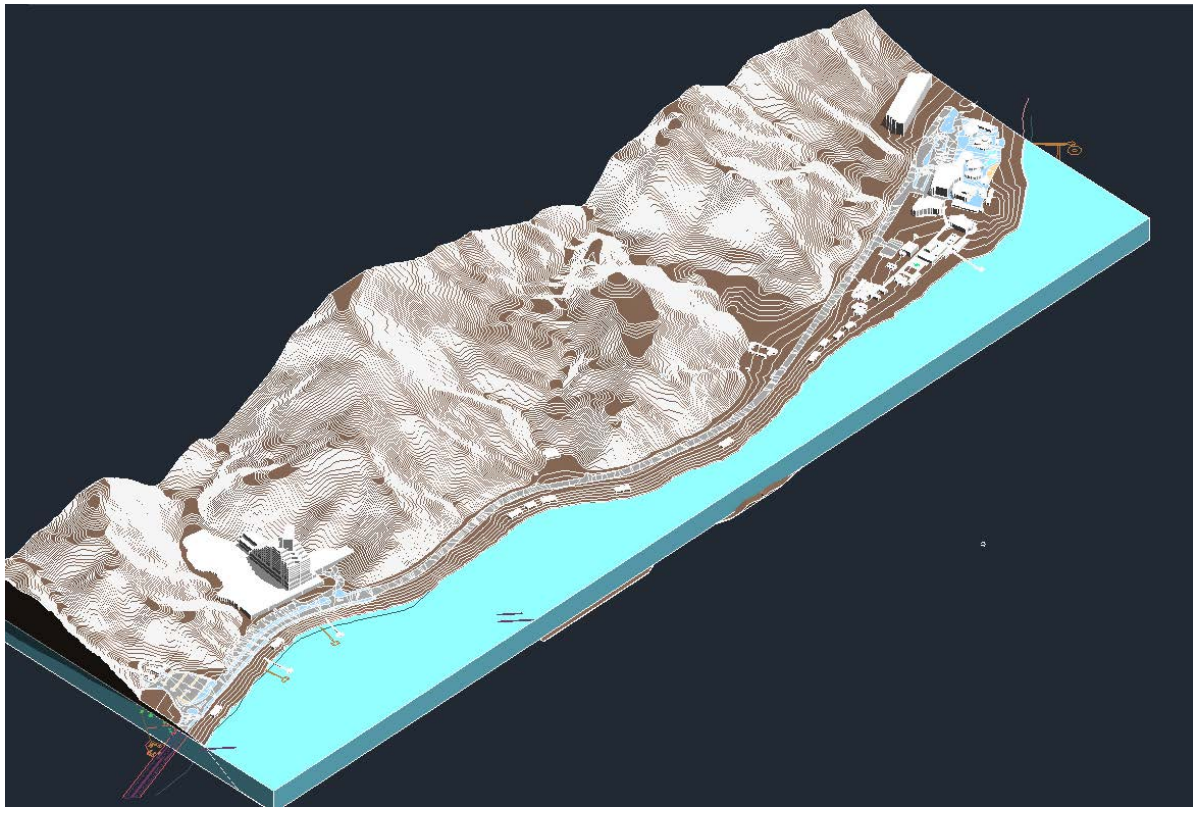
Drawing 200. *Context Plan Area- current situation. (Source: Author)*

Replacing the traditional car road, a pedestrian path adorned with vegetation and trees will be implemented, enhancing the natural ambiance, and accentuating the desert landscape. This transformation aims to provide a tranquil escape from the urban environment, allowing visitors to immerse themselves in the serene beauty of the surroundings.

Before each tunnel entrance, parking lots will be strategically located, enabling individuals to park their vehicles and access the beach on foot, bicycle, or scooter. Additionally, stations for shared electric bicycles and scooters will be installed along the entire pedestrian promenade along the coastline, as well as integrated into the pedestrian path of the new natural beach.

The new car-free natural beach spans 940 meters, offering ample space for visitors to relax, unwind, and appreciate the pristine beauty of the coastline without the intrusion of vehicular traffic.

EXISTING SITUATION



Drawing 201. *Chosen Site Area Axo- current situation. Source: Author*

6.6.1 STRATEGY - RECONNECTING THE MOUNTAIN WITH THE SEA

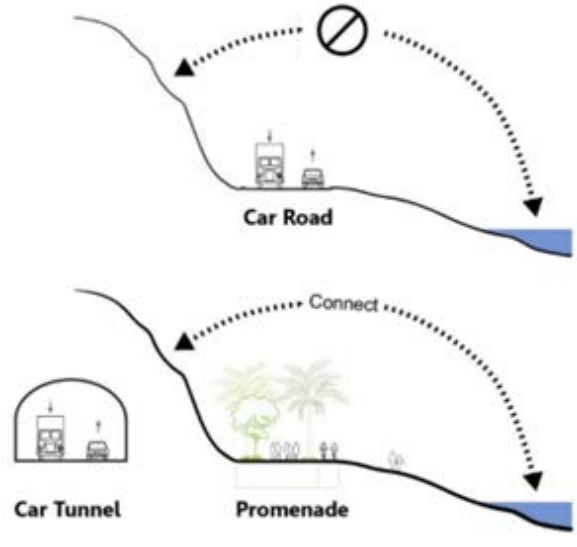
The architectural design addresses a prominent challenge in Eilat: a vehicular road that disrupts the natural connection between the mountainous regions and the coastal line. Currently, this road impedes direct access to the beach and constricts the available beachfront, limiting its potential for public use and natural expansion.

To mitigate this issue, the design introduces a vehicular tunnel integrated into the mountain. This strategic intervention relocates the road underground, thereby restoring a direct connection between the mountainous and coastal regions. The removal of the road from the landscape allows for the natural beachfront to be preserved and expanded, enhancing the coastal environment and public accessibility.

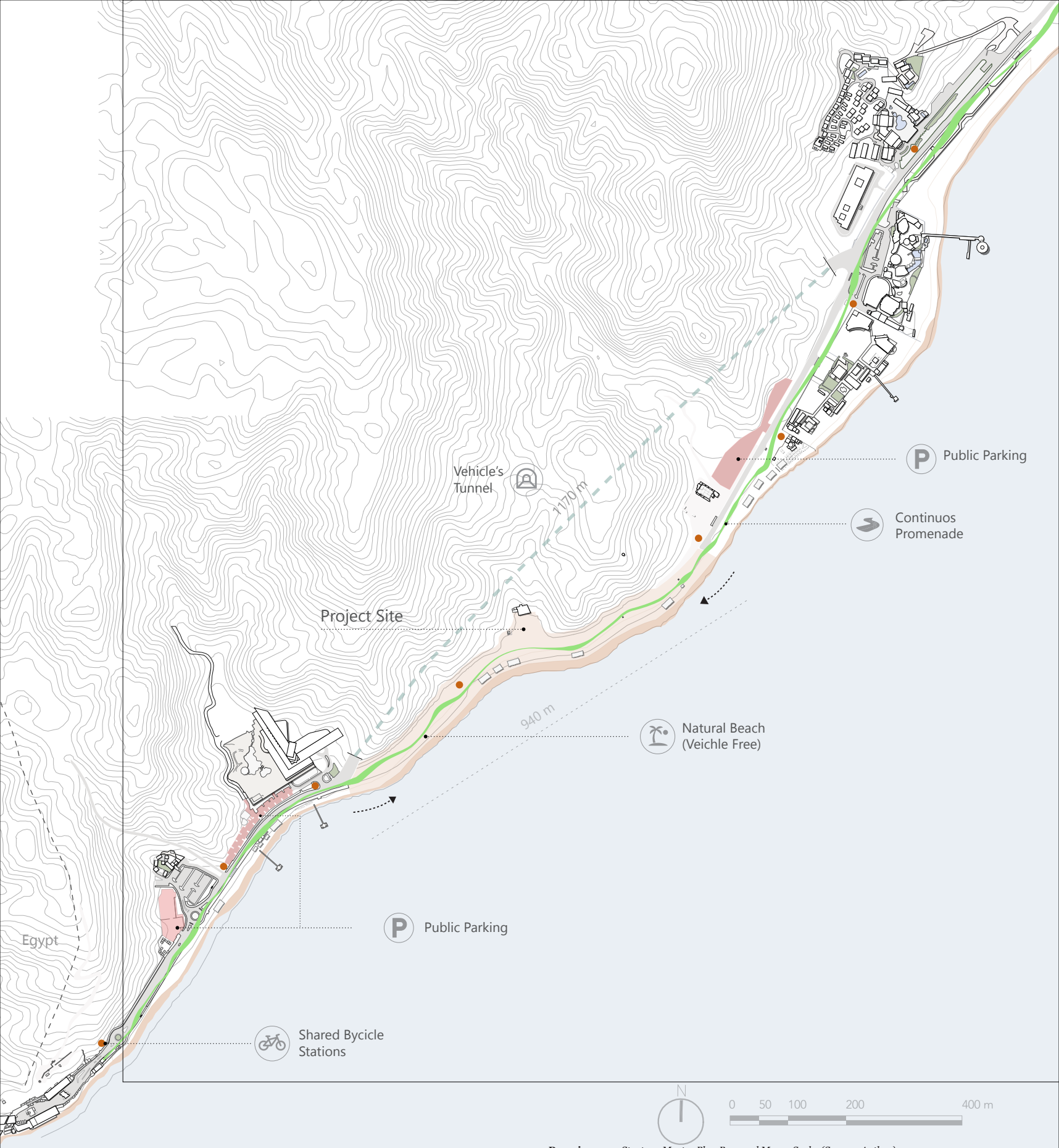
Adjacent to both tunnel entrances, facilities for parking and electronic bike and scooter sharing are established. These facilities are designed to promote sustainable transportation options, positioned to enhance accessibility to the beach and its surrounding areas.

Along the coastline, the design includes a promenade and a dedicated bicycle path. These features are thoughtfully aligned to provide scenic views and facilitate easy movement across the area. They are aimed at promoting environmentally friendly transportation and leisure activities, fostering a deeper connection with the environment while minimizing the ecological footprint.

The project site, strategically located along this enhanced coastline, features additional facilities for bike and scooter sharing. These are seamlessly integrated into the natural promenade that leads directly to the central area of the project. This configuration not only enhances the functional accessibility but also elevates the overall visitor experience, encouraging interaction with the revitalized coastal setting of Eilat.



Drawing 202. *moving the car road into the mountains. Source: Author*



Drawing 203. *Strategy Master Plan Proposal Macro Scale. (Source: Author)*

Section F

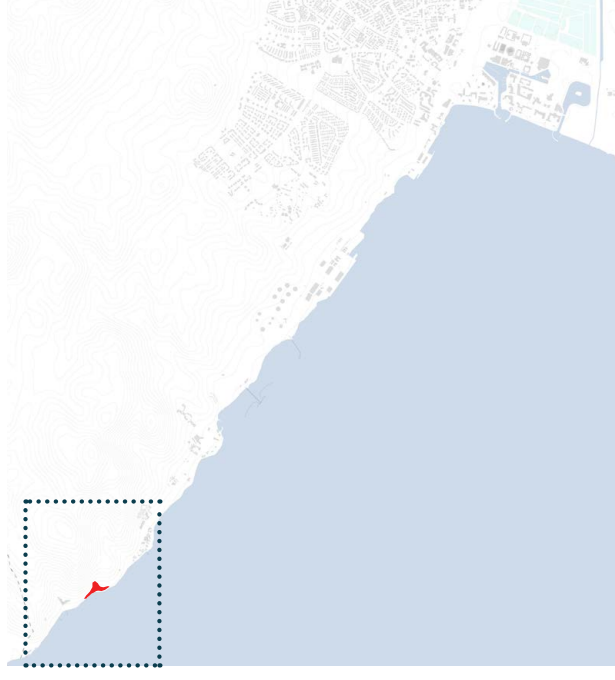
The Architectural Prototype: The Ecological Cave as a Bioclimatic Gateway.

F

Chapter 7 - The Architectural Prototype: The Ecological Cave as a Bioclimatic Gateway

Oasis In the Desert

Ecological scuaba diving centre - ceck for better title



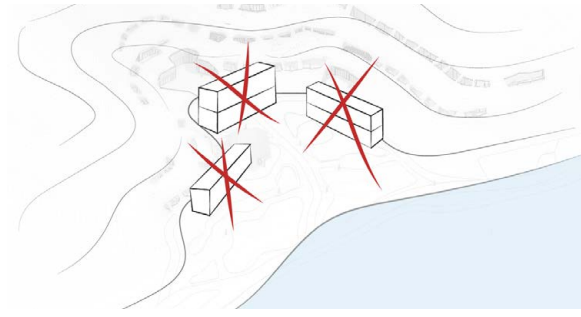
OASIS IN THE DESERT

Drawing 183. *Project area plan*

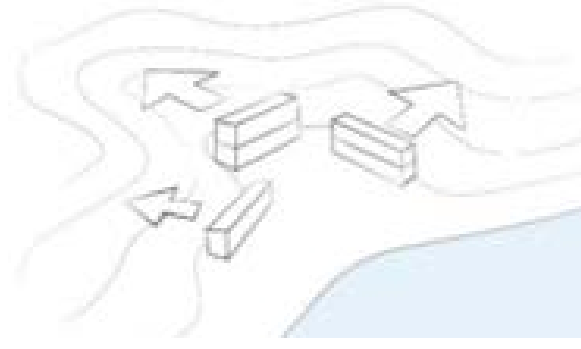
7.1 DESIGN CONCEPT STRATEGIES

The central concept of the project is to establish an oasis amidst the desert landscape. Situated along the southern stretch of Eilat's coastline, known for its rugged desert terrain, the project seeks to amplify this unique characteristic. By eliminating the car road from this area, the project aims to cultivate a more authentic natural ambiance along this beach section, seamlessly integrating with the surrounding desert environment.

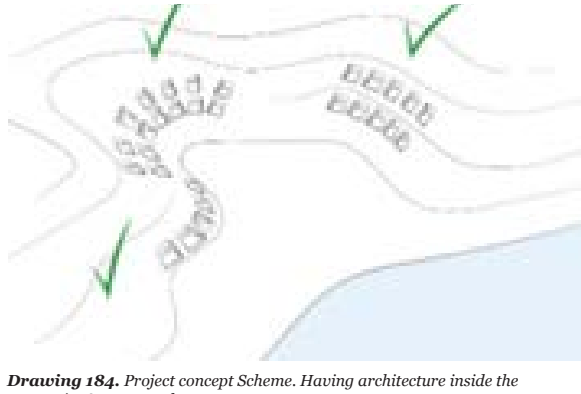
To preserve the integrity of the surrounding natural landscape and seamlessly integrate the architecture with the desert environment, the design approach eschews conventional building structures in favour of a more harmonious solution. Rather than erecting buildings that stand out prominently against the desert backdrop, the architectural concept embraces cave architecture. This approach involves constructing edifices that are nestled within the natural terrain, blending organically with the rugged landscape, and minimizing visual disruption to the pristine



Drawing 186. *Project concept Scheme. Having architecture inside the mountain. Source: Author*

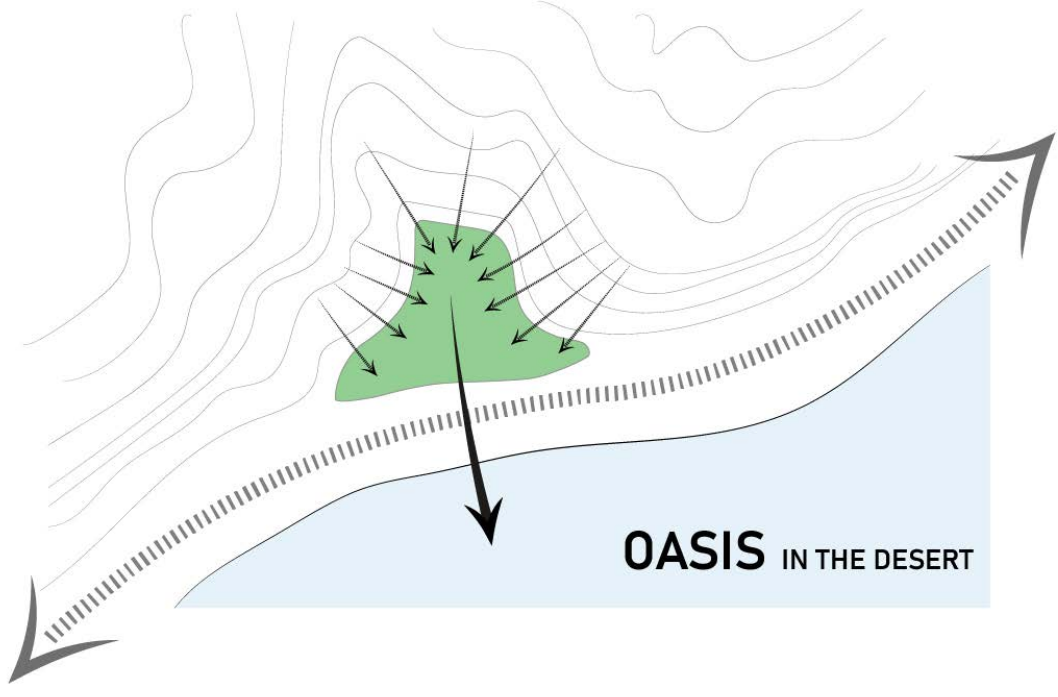


Drawing 185. *Project concept Scheme. Having architecture inside the mountain. Source: Author*



Drawing 184. *Project concept Scheme. Having architecture inside the mountain. Source: Author*

OASIS IN THE DESERT

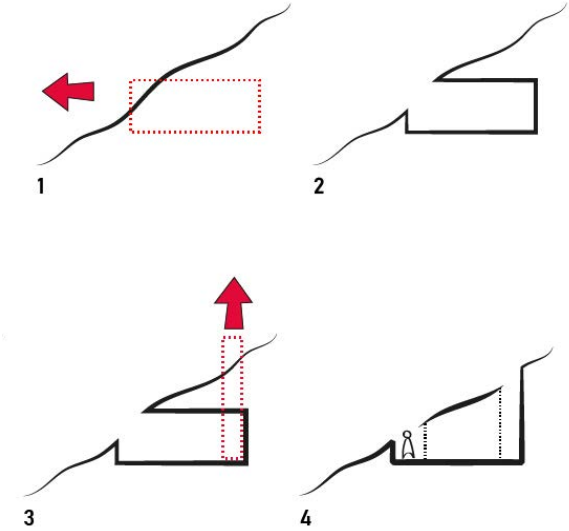


Drawing 187. *Architecture project concept. Source: Author*

surroundings. To preserve the integrity of the surrounding natural landscape and seamlessly integrate the architecture with the desert environment, the design approach eschews conventional building structures in favour of a more harmonious solution. Rather than erecting buildings that stand out prominently against the desert backdrop, the architectural concept embraces cave architecture. This approach involves constructing edifices that are nestled within the natural terrain, blending organically with the rugged landscape, and minimizing visual disruption to the pristine surroundings.

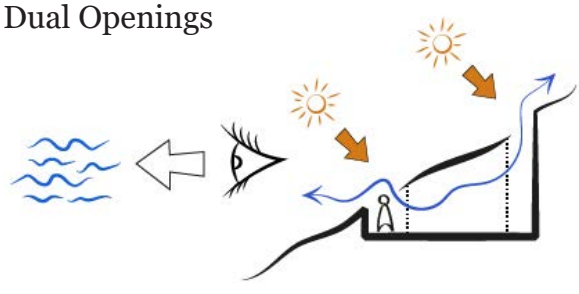
The caves are thoughtfully designed with dual openings, a feature that not only enhances natural ventilation by creating a wind circulation pathway but also maximizes the entry of natural light into the deeper areas of the caves. This architectural strategy effectively uses the natural environment to maintain a comfortable interior climate and brighten the space, reducing the need for artificial lighting and climate control.

Moreover, these openings are strategically positioned to provide expansive views of the sea, integrating the breathtaking coastal scenery directly into the living

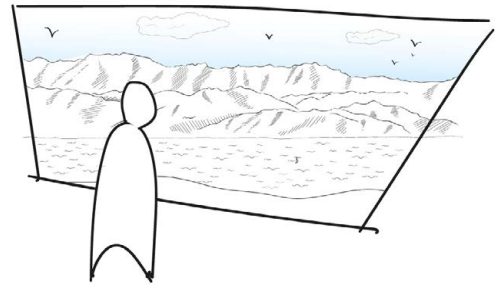


Drawing 188. *Cave diagram. Source: Author*

Dual Openings



Drawing 189. *Cave architecture concept. Source: Author*



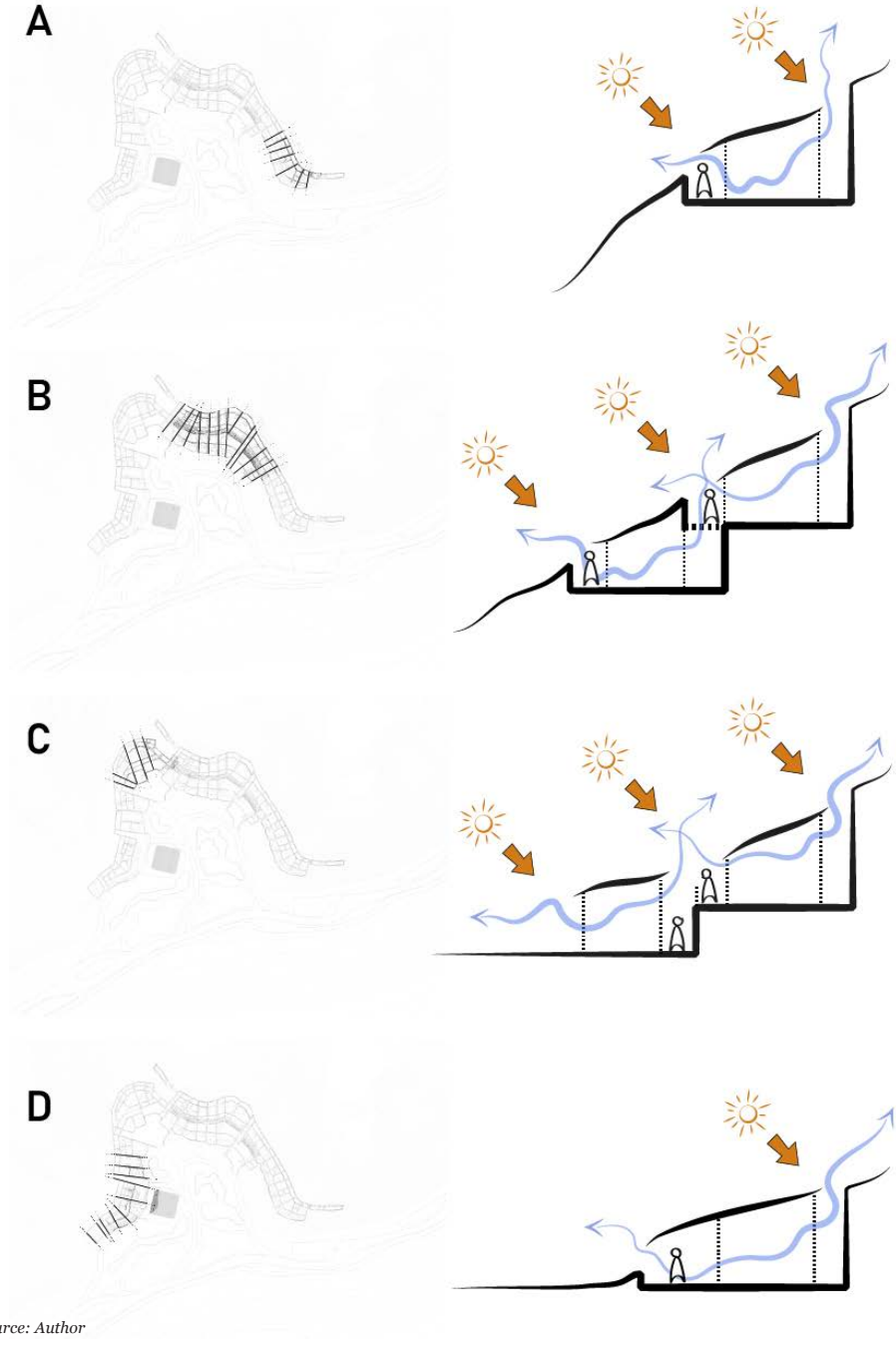
Drawing 190. *Framing the view. Source: Author*

experience. This connection to the outdoors enriches the aesthetic appeal of the caves, making them not just functional dwellings but also serene retreats that allow inhabitants to feel continuously connected to the natural surroundings. The incorporation of these elements reflects a deep consideration for ecological and sustainable design principles, aiming to enhance the well-being of occupants while minimizing environmental impact.

Drawing 191. *Ariel View. Source: Author*

7.2 DIVING RESORT MASTER PLAN- ECOLOGICAL CAVES

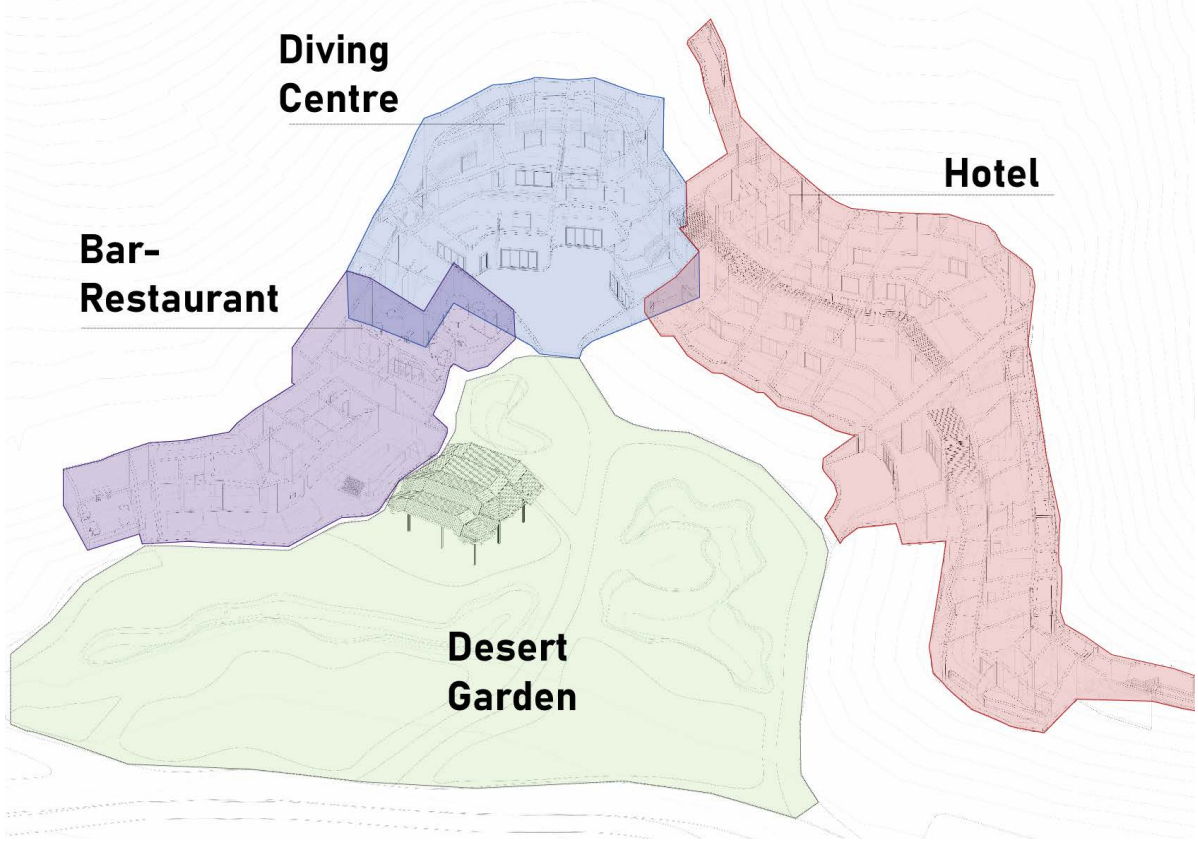
SLOPE TYPES



Drawing 192. *Slope types. Source: Author*

Drawing 193. *Master plan. Source: Author*

7.2.1 PROGRAM DIAGRAM



Drawing 194. *Program Diagram. Source: Author*

STRUCTURE FOLLOW MOUNTAIN CONTORTIONS

Drawing 195. *Program Diagram. Source: Author*

6.3 NAME OF THE PROJECT (OASIS IN THE DESERT

6.3.1 LEVEL 1

Level 1 of the project site is meticulously designed to optimize both functionality and aesthetic coherence. The layout strategically places the bar-restaurant on the left side and the dive centre patio at the northern edge, effectively using the peripheral areas of the site for specific activities. This placement ensures intuitive access and efficient use of space. Additionally, there are two staircases that lead to the upper levels of the hotel and the diving centre, complemented by disability access via a ramp, ensuring inclusivity and accessibility for all guests. The architectural feature of the restaurant's outdoor area includes a wooden pergola, adorned with vegetation on its roof. This design choice not only provides essential shade but also integrates biophilic elements into the built environment, enhancing the dining experience amidst natural surroundings.

Furthermore, the site incorporates two natural swimming pools, integrated with a regeneration river system that filters the water naturally. This sustainable feature aligns with eco-friendly design principles. The smaller pool, situated adjacent to the dive centre, is specifically tailored for introductory diving sessions for beginners, offering a controlled and safe environment for initial underwater experiences.

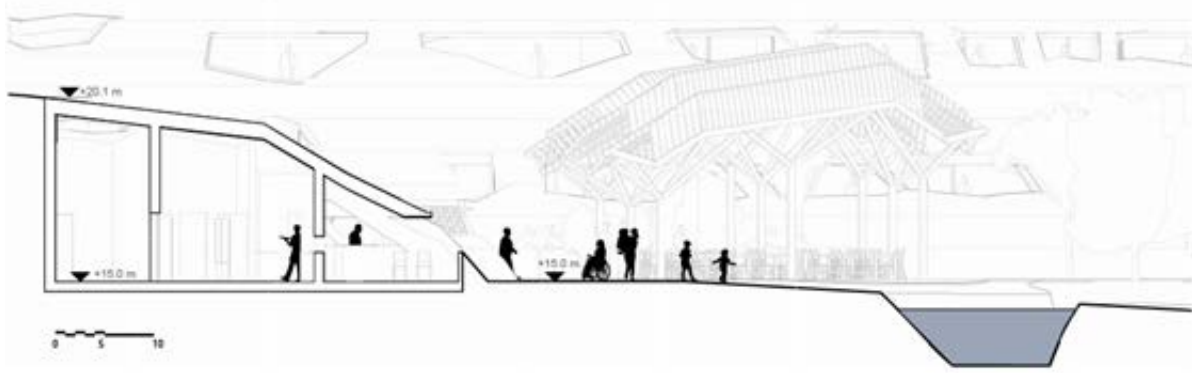
A well-defined pathway on the right guides visitors to the hotel's lobby and extends connectivity to the dive centre caves, ensuring seamless navigation through the site. A central pathway serves as the main artery, leading visitors directly to both the bar-restaurant and the dive centre. The entry point of the site features a desert garden with trees, introducing visitors to a serene landscape that sets a calming tone upon arrival.

LEVEL 1 PLAN

LEVEL 1 PLAN - DIVING CENTRE (LEFT) AND HOTEL LOBBY

Drawing 197. *Level 1 plan Diving Centre (left) and hotel lobby (right). Source: Author*

SECTION AA' - BAR-RESTAURANT



Drawing 199. *Section AA'. Source: Author*

LEVEL 1 PLAN - BAR-RESTAURANT PLAN

Drawing 198. *Level 1 Bar-Restaurant plan. Source: Author*

6.3.1 LEVEL 1.5

Level 1.5 of the project refers to the first floor of the hotel, which is directly accessible from the hotel lobby. Within the lobby, a staircase on the right leads up to Level 1.5 and the other upper floors of the hotel. Upon reaching Level 1.5 from the staircase, guests encounter a common area designed for relaxation and social interaction.

The room typology on this level consists of shared rooms, each equipped with four beds and individual storage closets for guests. Every room boasts a private balcony that offers views of the garden and the sea, providing a scenic backdrop for guests. To access the rooms, guests walk through a corridor that also leads to communal bathrooms and showers on this floor.

At the end of this corridor, another staircase provides access to the upper floors of the hotel or down to the first floor of the diving centre. This corridor is connected to the second floor of the diving centre, which is elevated by 0.5 meters and accessible via a small ramp. Following the ramp, there is another corridor in the diving centre that links to the disability ramp access, ensuring smooth and inclusive mobility throughout the building.

LEVEL 1.5 PLAN

Drawing 200. *Level 1.5 plan. Source: Author*

LEVEL 1.5 PLAN- HOTEL SHARED ROOMS

Drawing 201. *Level 1.5 plan- Hotel shared rooms. Source: Author*

6.3.2 LEVEL 2

Level 2 corresponds to the second floor of the diving centre, which can be accessed either via stairs on the right-hand side or from a ramp on the left. This floor is efficiently designed to cater to the operational needs of the diving centre. It features a room dedicated to the staff of the diving centre, ensuring they have a private space for administrative duties and breaks.

Additionally, this level includes a versatile room equipped with sliding panels that can divide the space into two separate areas. This adaptive setup allows the room to function both as a workshop for equipment maintenance and as a study room for conducting diving courses, providing flexibility depending on the centre's needs at any given time.

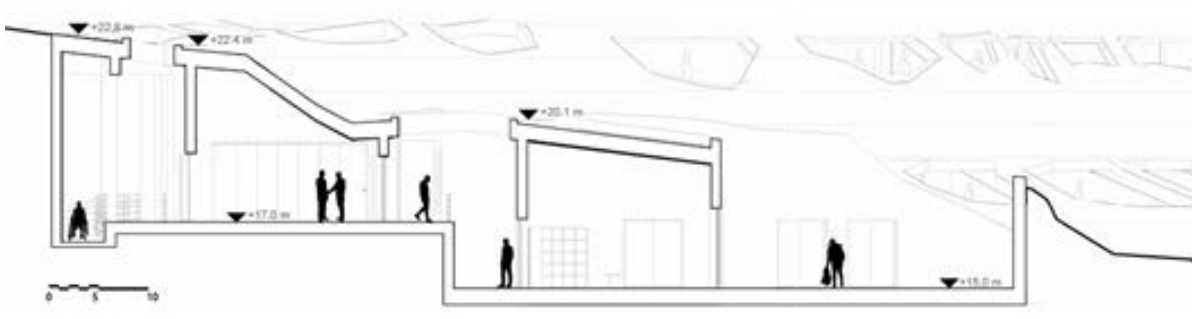
Adjacent to these functional spaces, there is a storage room on the right side, which is used for storing diving gear and other equipment, keeping the centre organized and efficient.

At the front of these rooms, there is a balcony that provides a visual connection to the backside of the rooms on the first floor of the diving centre. This architectural feature not only enhances the aesthetic appeal of the space but also fosters a sense of openness and connectivity across different levels of the facility.

LEVEL 2 PLAN

Drawing 202. *Level 1.5 plan. Source: Author*

SECTION BB', DIVING CENTRE



Drawing 204. *Section BB', Diving Centre. Source: Author*

LEVEL 2 PLAN- DIVIDING CENTRE CLASSES ROOMS

Drawing 203. *Level 2 plan- Dividing Centre classes rooms. Source: Author*

6.3.3 LEVEL 3

Level 3 corresponds to the second floor of the hotel and is accessible via a staircase situated on the right side. This floor is designated for private accommodations, each featuring its own balcony with views of the desert garden and the beach, creating a serene environment for guests. Each room is equipped with its own shower and toilet, ensuring privacy and convenience.

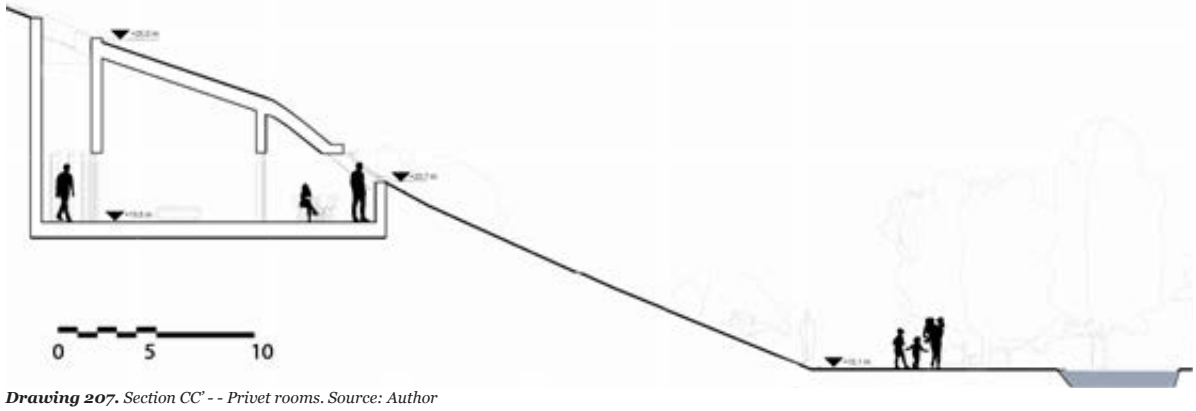
Additionally, this level includes a suite that is larger than the other rooms, offering expanded amenities and space for guests seeking a more luxurious experience. Upon entering this floor, visitors find a common area which provides a welcoming space for relaxation or casual interactions among guests.

A back corridor leading to the room entrances enhances the floor's layout. This corridor is architecturally designed with openings in the roof that allow natural light and air to flow in, contributing to a bright and airy atmosphere. At the far end of this corridor, there is a staircase that serves as a fire escape but also doubles as a viewpoint, offering an elevated perspective of the surrounding scenery. This thoughtful design element not only enhances safety but also adds an additional amenity for guests, emphasizing the hotel's commitment to both comfort and functionality.

LEVEL 3 PLAN

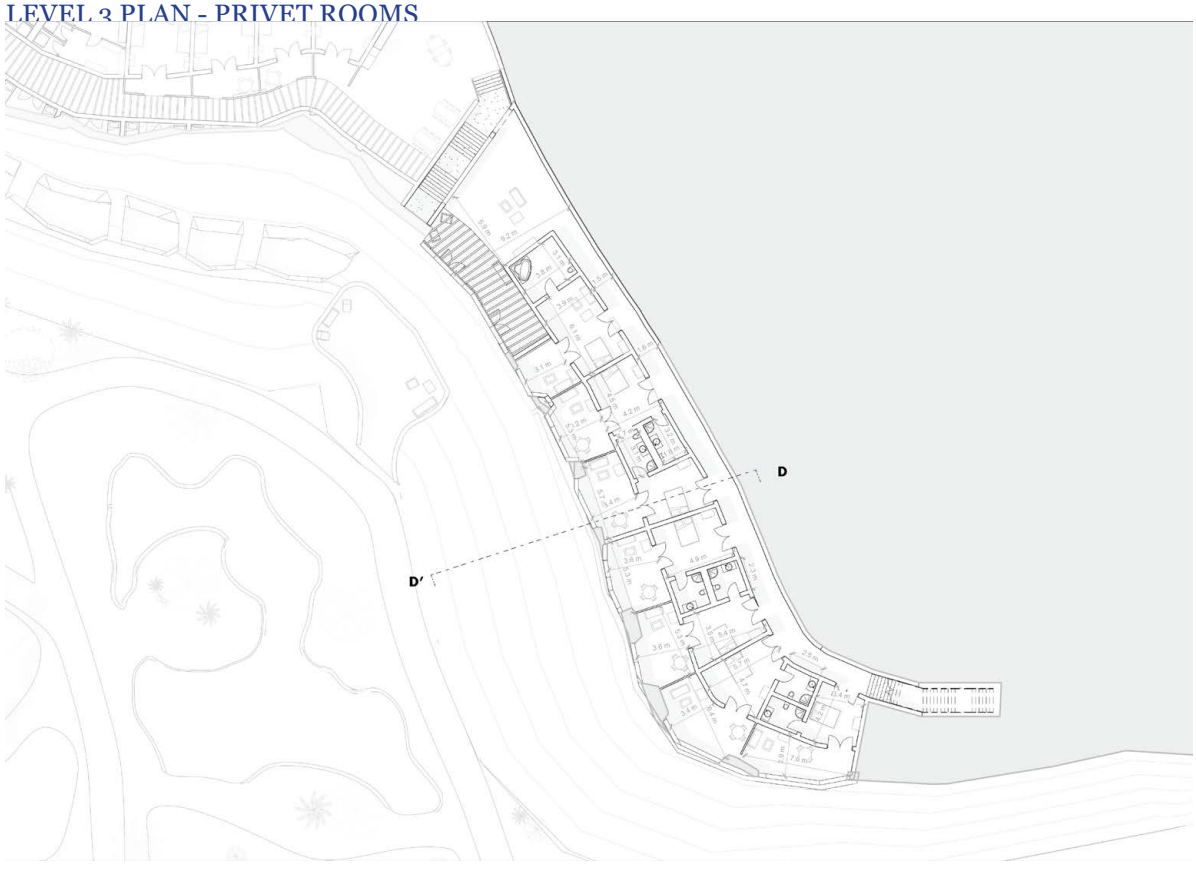
Drawing 205. *Level 3 plan.*
Source: Author.

SECTION CC' - PRIVET ROOMS



Drawing 207. *Section CC' - - Privet rooms. Source: Author*

LEVEL 3 PLAN - PRIVET ROOMS



Drawing 206. *Level 3 plan- Privet rooms. Source: Author*

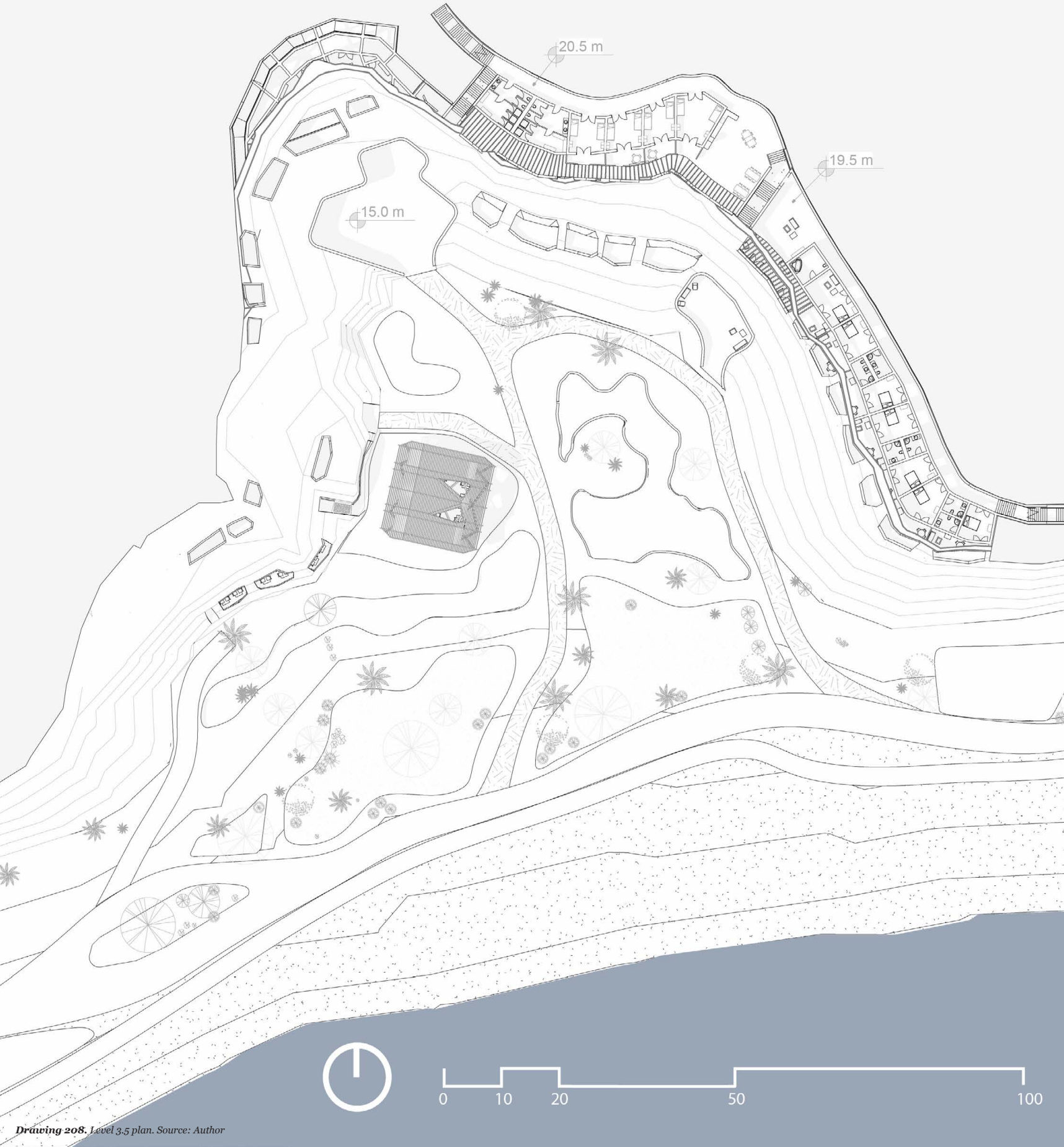
6.3.3.1 LEVEL 3.5

Floor 3.5, located on the third floor of the hotel, features a shared room typology. Each room accommodates four beds and opens out to a shared longitudinal balcony, with divisions for each room to ensure privacy. The balcony floor is constructed from wooden beams and a metal net, which not only adds to the aesthetic but also facilitates the passage of light and air down to the back corridor of Level 1.5, enhancing the environmental comfort of lower floors.

Upon accessing this floor, guests first enter a common space designed as a shared kitchen, available for all guests on the floor. This area fosters a communal atmosphere where guests can prepare meals and socialize.

At the end of the back corridor, shared toilet and shower facilities are strategically located directly above those on the floor below, maintaining consistency in the layout and maximizing plumbing infrastructure. Adjacent to these facilities is a staircase that provides convenient access to the lower floors. Additionally, there is an adjacent fire escape staircase that also functions as a viewpoint, offering guests an alternative space to enjoy panoramic views of the surrounding landscape. This dual-function staircase enhances both the safety and the recreational value of the hotel.

LEVEL 3.5 PLAN

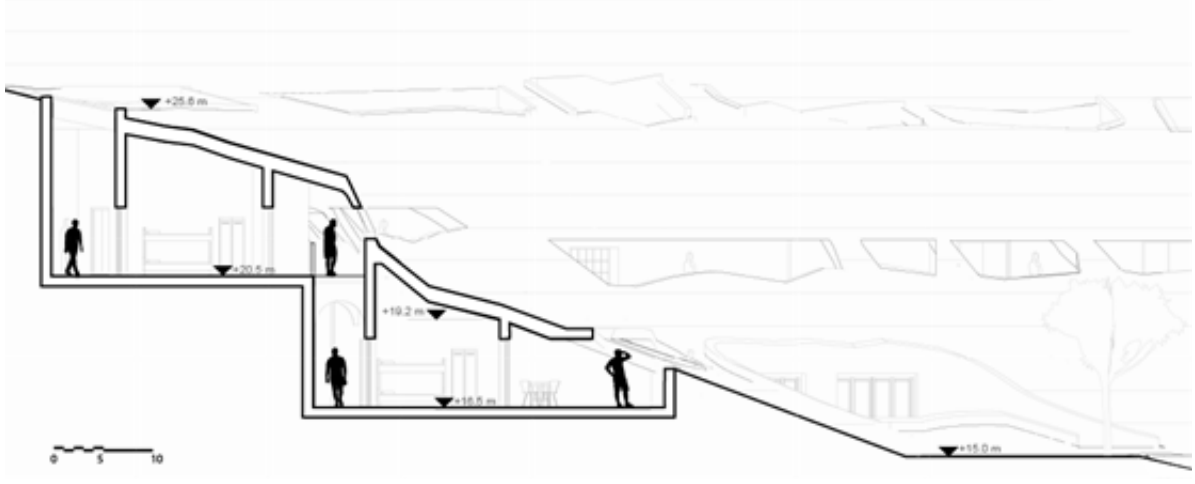


Drawing 208. *Level 3.5 plan. Source: Author*

LEVEL 3.5 PLAN- SHARED ROOM

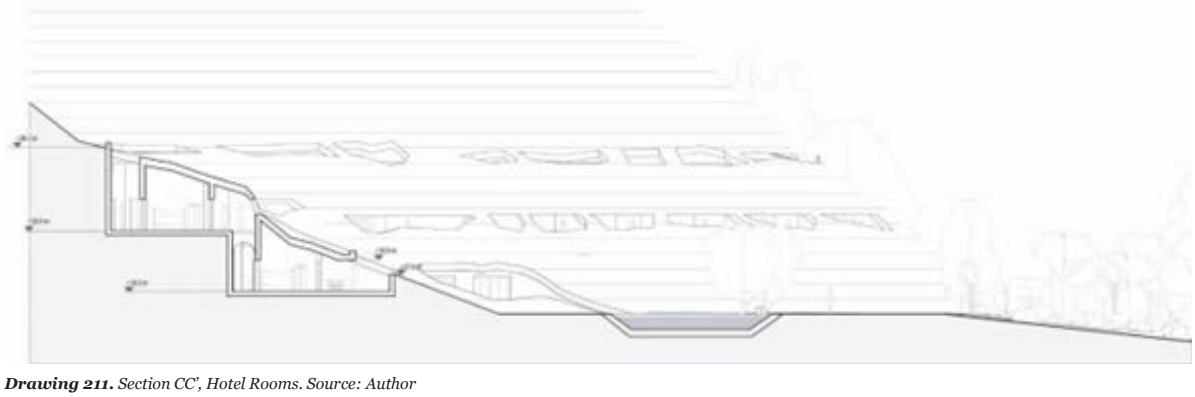
Drawing 209. *Level 3.5 plan- Shared room. Source: Author*

SECTION DD' - HOTEL ROOMS



Drawing 210. *Section CC', Hotel Rooms. Source: Author*

SECTION EE' - HOTEL ROOMS



Drawing 211. *Section CC', Hotel Rooms. Source: Author*

6.2.2 DIVING CENTRE CIRCULATION

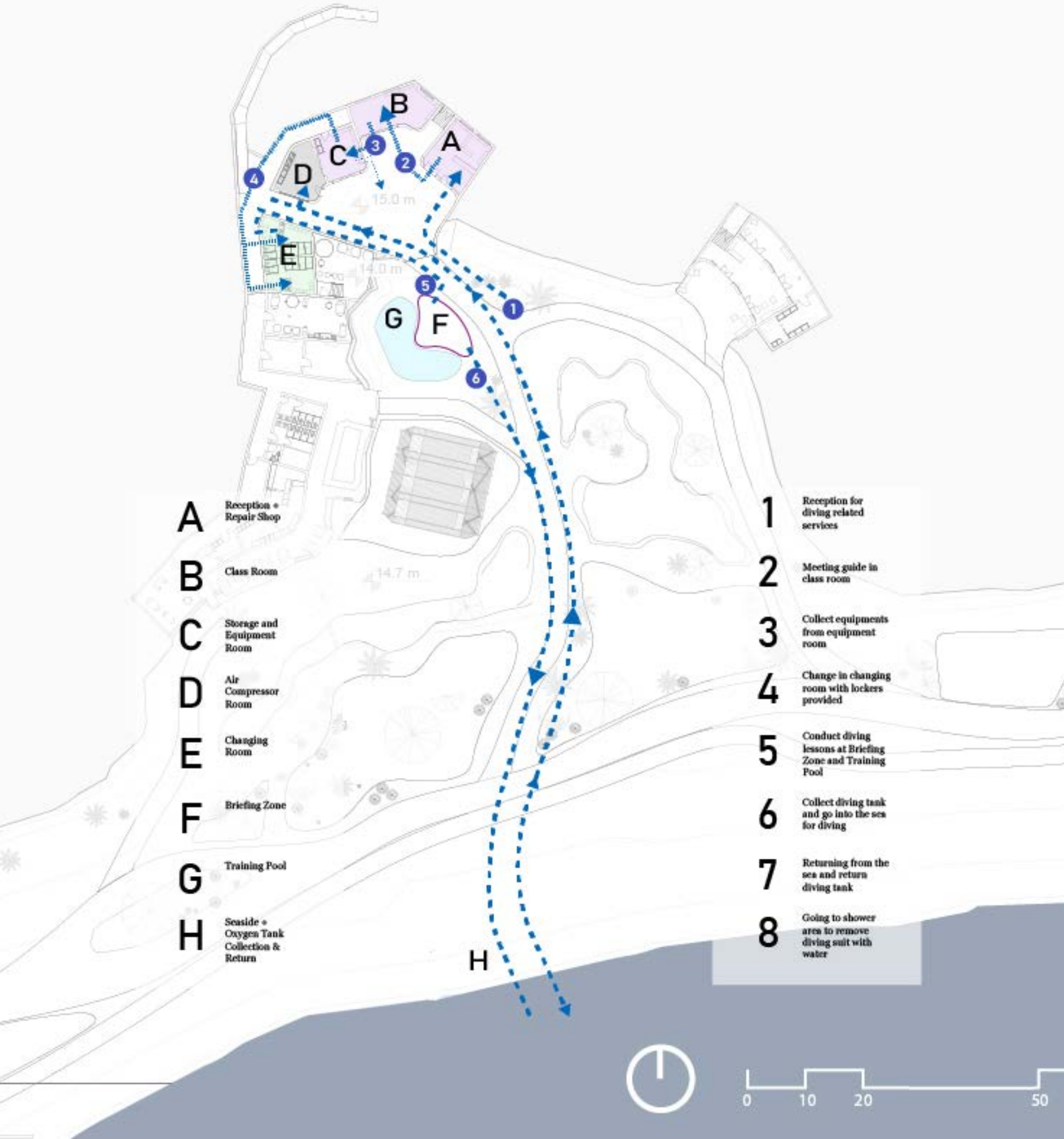
The circulation within the diving centre is designed to facilitate a seamless and efficient experience for divers, prioritising functionality and spatial clarity. Visitors begin at the reception area, where all diving-related services are managed. From there, they proceed to a designated classroom to meet with their guide and receive initial instructions. Equipment collection follows in a dedicated room, after which divers move to the changing rooms equipped with lockers for personal storage. Preliminary training and briefings are conducted at the Briefing Zone and adjacent Training Pool, allowing for practical orientation before entering open water. Once prepared, divers collect their tanks and proceed to the sea for their diving session. Upon return, the tanks are deposited, and divers conclude the sequence by accessing the shower area to remove and clean their diving suits, ensuring a hygienic and organised post-dive routine.

NATURAL SWIMMING POOL

Drawing 212. *Natural Swimming Collage. Source: Author*

GREY WATER RECYCLLING

Drawing 213. *Grey water recycling Collage. Source: Author*



A Reception + Repair Shop

B Class Room

C Storage and Equipment Room

D Air Compressor Room

E Changing Room

F Briefing Zone

G Training Pool

H Seaside + Oxygen Tank Collection & Return

1 Reception for diving related services

2 Meeting guide in class room

3 Collect equipments from equipment room

4 Change in changing room with lockers provided

5 Conduct diving lessons at Briefing Zone and Training Pool

6 Collect diving tank and go into the sea for diving

7 Returning from the sea and return diving tank

8 Going to shower area to remove diving suit with water

6.5 WATER MANAGEMENT

6.5.1 NATURAL SWIMMING POOL

This plan illustrates the water system filtration process for the natural swimming pool (NSP). The NSP functions as a balanced ecosystem where plant materials, microorganisms, and nutrients interact within a gravel and sand filtering system, resulting in living water. Unlike traditional methods, this system is chemical- and disinfectant-free, relying on natural processes for cleansing. Isolating membranes guide water through the filtration process, starting at the regeneration biological filtration zone located at the east end of the site.

Here, water passes through various filtration components, including a river with a sand and stone subversive pond and a planted hydrobotanic pond. This regeneration zone facilitates natural purification before the filtered water is directed to the pump room. From the pump room, the filtered water is further processed in the testing room and then distributed to the pools, ensuring a continuous supply of clean water.

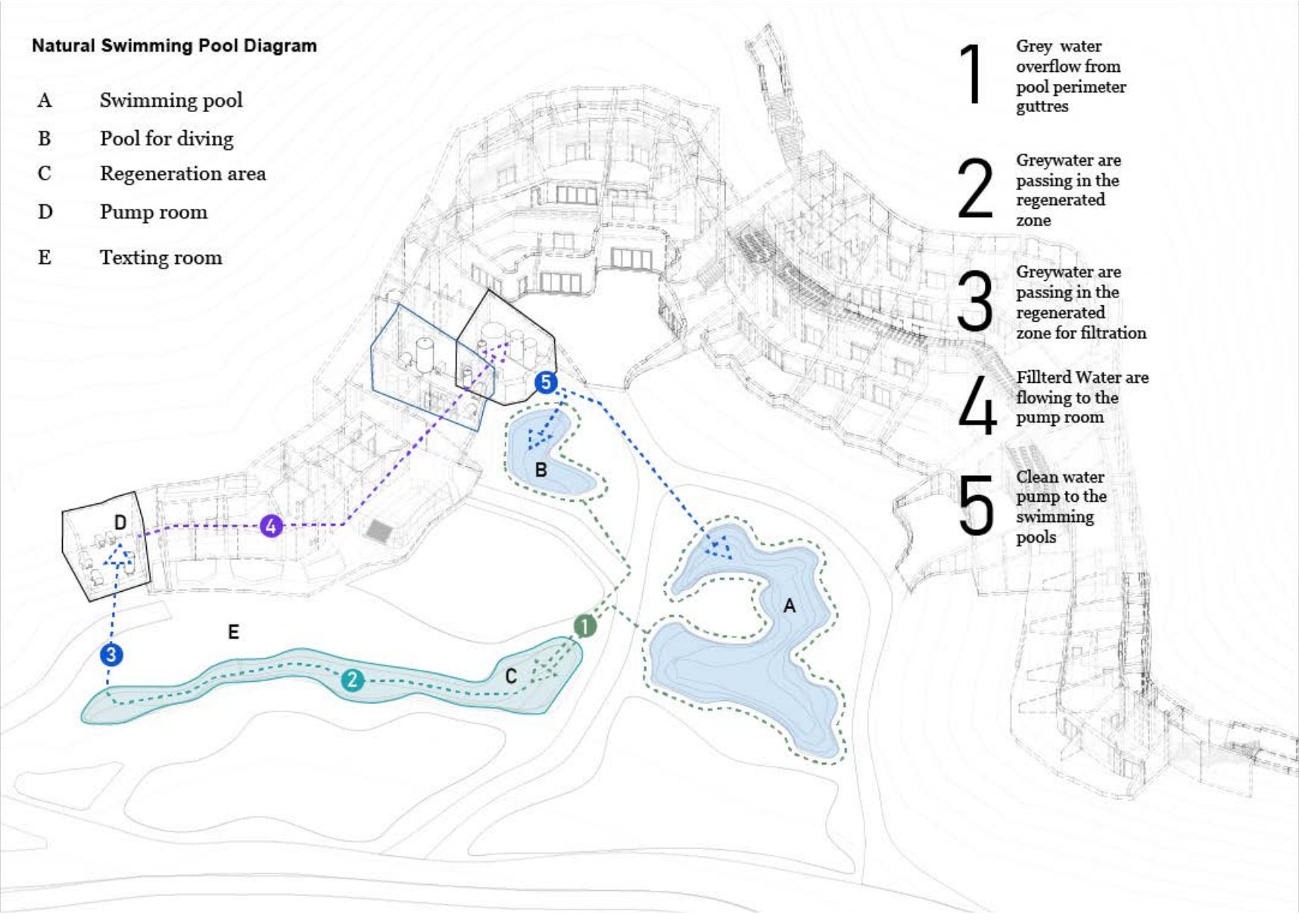


Figure 6-5-1-1 Natural Swimming Pool System Diagram. Source: Author

6.6 RENDERINGS

Figure 6-6-2 Natural Swimming Pool System Diagram. Source: Author

GRENNERY AND SHADOW

Figure 6-6-3 Site Entrance. Source: Author

FRAMING THE VIEW

Figure 6-6-4 View From hotel. Source: Author

FRAMING THE VIEW

Figure 6-6-6 Bar-Restaurant. Source: Author

ARCHETECTURE IS HIDING

View to Hotel and Garden. Source: Author

ARCHETECTURE IS HIDING

Figure 6-6-8 View to Regeneration filter pond. Source: Author

ARCHETECTURE IS HIDING

Figure 6-6-9 View From the sea. Source: Author

Chapter 6

H

Chapter 8 - Conclusion

This thesis has meticulously examined the interplay between sustainable tourism and urban development, culminating in a focused case study on Eilat. As a coastal city uniquely positioned in a desert environment, Eilat exemplifies the challenges and opportunities inherent in balancing economic growth with environmental and cultural preservation. The city's evolution from a strategic port to a premier tourist destination encapsulates the potential for coastal cities to transform their economies through targeted development and sustainability initiatives.

Eilat's approach to urban planning and tourism development offers valuable lessons in sustainability. By integrating innovative technologies such as photovoltaic systems and implementing passive cooling strategies, Eilat has taken significant steps towards reducing its environmental impact and enhancing energy efficiency. These measures not only support the city's green tourism agenda but also align with global sustainability standards that other coastal cities aspire to meet.

Furthermore, Eilat's commitment to preserving its unique marine and desert ecosystems through sustainable tourism practices demonstrates a proactive approach to ecological conservation. The city's efforts to balance its economic aspirations with environmental stewardship serve as a model for sustainable urban development in ecologically sensitive areas.

Looking forward, the continued success of Eilat as a sustainable tourist destination will depend on its ability to innovate and adapt to the changing environmental, economic, and social landscapes. This involves not only maintaining the sustainability measures already in place but also embracing new technologies and strategies that could further enhance its compatibility with the natural environment.

In conclusion, this thesis highlights Eilat as a paradigm of how urban development and sustainability can coexist harmoniously in coastal cities. The strategies employed by Eilat provide a blueprint for other cities facing similar challenges, emphasizing that the future

of urban development in coastal areas lies in a balanced, innovative approach that prioritizes both economic viability and ecological integrity. By drawing on the lessons from Eilat, other cities can navigate their paths towards becoming resilient, sustainable, and thriving communities.

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8.1 SOCIAL AND ECONOMIC DEVELOPMENT

8.1.1 THE IMPORTANCE OF UNIQUENESS IN ECONOMY-BASED COASTAL TOURIST DESERT TOWNS

Economy-based coastal tourist desert towns, exemplified by Eilat, occupy a unique niche within the global tourism industry. Their distinct geographical and cultural landscapes offer a blend of rare desert and marine experiences that appeal to a diverse tourist demographic. This literature review explores the significance of such destinations maintaining their uniqueness and the strategies they can employ to navigate the competitive global tourism market.

The uniqueness of a destination is a critical factor in its attractiveness and competitiveness in the global tourism market. Azaryahu (2005) highlights Eilat's evolution from a strategic military location to a thriving tourist resort, emphasizing its unique positioning at the nexus of desert and sea. This unique geographical setting provides diverse activities, from desert adventures to marine exploration, underscoring the importance of leveraging natural landscapes to create a distinctive tourist experience. Ghosh (2011) further elaborates on the need for sustainable tourism development, arguing that preserving the natural and cultural assets that contribute to a destination's uniqueness is essential for attracting environmentally conscious tourists and ensuring long-term viability. This perspective is crucial for coastal desert cities like Eilat, where the delicate balance between development and conservation shapes their unique appeal.

Diversifying tourism offerings is vital for appealing to a broader audience. Tirosh (2013) discusses the strategic positioning of Eilat and Aqaba, emphasizing the importance of developing a wide range of tourism products that capitalize on both desert and marine environments. Eilat's unique desert-marine ecosystem offers a canvas for diversifying tourism products. Beyond traditional beach holidays, Eilat can expand into eco-tourism, adventure tourism (such as desert safaris and diving), and cultural tourism that showcases the region's history and Bedouin culture. This diversification can attract different segments of tourists, from adventure seekers to cultural enthusiasts, thereby broadening Eilat's appeal.

Building on the premise of diversification, Brandao (2019) suggests that innovation and technology are vital to enhancing the attractiveness of destinations like Eilat. Incorporating modern technology in tourism services can create unique

experiences that set a destination apart in the competitive market. Embracing technology can transform Eilat's tourism experience. For instance, virtual reality (VR) tours of coral reefs or historical sites can offer unique experiences to visitors. Additionally, mobile apps providing personalized travel guides, online booking for eco-friendly accommodations, or platforms for sharing eco-tourism experiences can enhance tourists' convenience and engagement. Such technological innovations can position Eilat as a forward-thinking, tourist-friendly destination.

Moreover, Ramos (2017) emphasizes the role of effective marketing and branding in developing a solid identity for unique destinations. For coastal desert cities, highlighting their distinctive features through targeted marketing campaigns can enhance their global visibility. Developing a strong brand identity that highlights Eilat's unique characteristics is crucial. Effective marketing strategies could emphasize Eilat's position as a place where the desert meets the sea, offering unparalleled natural beauty and adventure. Social media campaigns, international tourism fairs, and partnerships with travel influencers can help in reaching a global audience. Tailored marketing campaigns focusing on niche markets can also elevate Eilat's profile on the world stage.

In addition to marketing, building networks with other tourism destinations and organizations can facilitate knowledge exchange and joint marketing efforts. Brandao (2019) highlights the importance of international networks in driving innovation and competitiveness in tourism. Building networks with other tourism destinations, international tourism organizations, and the private sector can open up new opportunities for Eilat. Collaborations can lead to the exchange of best practices in sustainable tourism, joint marketing efforts, and the development of cross-border tourism packages, especially with neighbouring countries like Jordan. Such collaborations can enhance Eilat's visibility and access to international markets.

Furthermore, developing high-quality tourism infrastructure and services is essential for improving the tourist experience and encouraging repeat visits (Ghosh, 2011). This includes investments in accommodation, transportation, and recreational facilities tailored to the unique environment of coastal desert cities. Therefore, investing in high-quality, sustainable tourism infrastructure and services is essential for Eilat. This includes eco-friendly accommodations, efficient public transportation, and well-maintained recreational facilities. Improving infrastructure not only enhances the tourist experience but

also underscores Eilat's commitment to sustainability, an increasingly important consideration for global travellers.

Lastly, preserving the cultural heritage and traditions of the region adds significant value to the tourism experience. Engaging tourists in cultural festivals and interactive experiences with local communities can enrich their visit and foster a deeper connection with the destination (Ramos, 2017). Showcasing and preserving Eilat's cultural heritage and traditions can offer tourists a unique and authentic experience. Cultural festivals, museums, and interactive experiences with local communities can enrich tourists' understanding and appreciation of the region. Promoting cultural tourism can also support local economies and foster a sense of pride and identity among residents.

To conclude, economy-based coastal tourist desert towns like Eilat should leverage their uniqueness to remain competitive in the global tourism market. By diversifying tourism products, incorporating innovation and technology, and focusing on sustainable development, these destinations can enhance their appeal and sustainability. Effective marketing, collaboration, and a commitment to quality and cultural preservation are also crucial for navigating the challenges of global competition. The literature underscores the importance of a multifaceted approach that balances development with conservation, ensuring that the unique qualities of coastal desert cities are preserved and celebrated.

8.1.2 MERGING ECOLOGY WITH TOURISM IN COASTAL DESERT CITIES: CHALLENGES AND PROSPECTS

The fusion of ecology and tourism in coastal desert cities, such as Eilat, presents a distinctive blend of challenges and opportunities. These urban areas are marked by their unique ecosystems, encompassing both marine and desert biomes. Cities like Eilat attract tourists with their singular landscapes, rich biodiversity, and favourable climates. Nevertheless, without sustainable management, the surge of tourism can threaten these delicate ecosystems. This review delves into the interplay between ecology and tourism in these locales, spotlighting sustainable tourism initiatives, conservation measures, and their socio-economic effects on indigenous populations.

The emphasis on sustainable tourism practices in coastal desert cities plays a pivotal role in aligning tourism development with ecological preservation. Gössling (2018) and Davenport (2006)

highlight the need for eco-friendly tourism development that engages local communities, institutions, and stakeholders in a collaborative effort to minimize tourism's ecological footprint. This approach not only seeks to mitigate the adverse effects of tourism on natural resources but also aims to foster an increased environmental consciousness among visitors, thereby supporting the ongoing preservation of both marine and desert habitats.

Building on the foundation of sustainable tourism, the conservation of the unique biodiversity found within coastal desert cities emerges as an equally critical endeavour. Agardy (1993) and Nitivattananon (2019) emphasize the integration of ecotourism into the broader framework of environmental management and governance. Through carefully managed tourism practices, there exists a powerful opportunity to generate both economic and political backing for conservation efforts. This is particularly relevant in the face of challenges such as urbanization and climate change, where the strategic improvement of governance and public infrastructure can play a significant role in enhancing environmental and climate resilience. Together, sustainable tourism practices and robust conservation efforts create a synergistic relationship that supports the long-term viability and ecological health of coastal desert regions, ensuring that these unique environments can be enjoyed by future generations while maintaining their biological diversity and ecological integrity.

Following the emphasis on sustainable tourism practices and the importance of conservation efforts in coastal desert cities, the socio-economic impacts on local communities come into focus. The interplay between ecology and tourism not only shapes the environmental landscape but also profoundly influences the socio-economic structure of these regions. Liu (2017) provides a critical examination of the eco-efficiency of tourism, revealing the complex relationship between tourism development and environmental sustainability. The findings suggest that while economic and ecological considerations can enhance eco-efficiency, the pressures of increased tourist volumes and associated pollutants present significant challenges.

Fan (2020) further expands on this discourse by exploring the potential of sports tourism as an avenue for sustainable development in new coastal areas. The emphasis on resource integration and the development of in-depth tourism products underscore the need for innovative approaches that align tourism growth with ecological sustainability. This transition to eco-efficient tourism models and the exploration of

sustainable tourism niches like sports tourism represent key strategies for coastal desert cities. These efforts aim to harmonize tourism development with environmental conservation, ensuring that the socio-economic benefits of tourism are realized without compromising the ecological integrity of these unique landscapes. Through such integrated approaches, coastal desert cities can foster a sustainable tourism sector that supports both their ecological systems and the socio-economic well-being of their communities, paving the way for a resilient and prosperous future. Integrating ecology and tourism in coastal desert cities, such as Eilat, necessitates a multifaceted approach that emphasizes sustainability, conservation, and socio-economic benefits. To enrich the understanding of this integration, it is beneficial to examine examples that illustrate successful practices, challenges faced, and innovative solutions implemented in various coastal desert cities around the world.

Dubai, although not traditionally considered a coastal desert city, offers insights into sustainable tourism practices in a desert environment with coastal features. The city has implemented several eco-friendly initiatives, such as the Dubai Sustainable Tourism Initiative, which aims to reduce the tourism sector's carbon footprint while promoting energy conservation and sustainability. An example is the Al Maha Resort, situated in the desert outside Dubai, which operates with a strong commitment to conservation and sustainability, offering guests an immersive experience in the desert ecosystem while ensuring minimal environmental impact.

Beside this, Cabo Pulmo, a coastal desert region on the Baja California Peninsula, showcases effective conservation efforts in a marine protected area. Once facing the brink of ecological collapse due to overfishing, the community and government collaborated to establish the Cabo Pulmo National Park, which has since become a success story for marine conservation. The protection of the coral reef has led to a significant increase in marine life, attracting eco-conscious tourists interested in snorkelling and diving, thus integrating tourism with ecology in a manner that supports both conservation and local livelihoods.

Moreover, Swakopmund, situated along Namibia's coast adjacent to the Namib Desert, demonstrates the socio-economic impacts of integrating ecology and tourism. The city has capitalized on its unique desert and coastal landscapes by offering eco-adventures such as desert tours, dune boarding, and marine cruises that educate tourists about the local ecosystems. These activities not only provide employment opportunities

for locals but also raise awareness about the importance of conserving the fragile desert and marine environments.

While not a coastal city, Masdar City in the UAE represents an innovative approach to sustainability that coastal desert cities can learn from. As a planned city project, it aims to be one of the world's most sustainable urban communities, powered by renewable energy and designed to minimize ecological impact. The city's initiatives, such as its sustainable transport system and energy-efficient buildings, offer valuable lessons for coastal desert cities looking to integrate ecology and tourism sustainably.

In the case of Eilat, the city directly faces the challenges and opportunities of integrating ecology and tourism. The city is renowned for its coral reef diving sites, which attract tourists from around the globe. However, the pressure from tourism and development poses threats to marine ecosystems. In response, Eilat has undertaken efforts to protect its coral reefs, including the establishment of the Coral Beach Nature Reserve and the use of artificial reefs to divert divers from sensitive areas. These measures highlight the delicate balance between promoting tourism and preserving natural resources.

To conclude, the amalgamation of ecology and tourism in coastal desert cities demands a holistic approach that accommodates environmental preservation, eco-friendly tourism practices, and the socio-economic health of local communities. Strategies for sustainable tourism, robust conservation efforts, and mindful socio-economic considerations are imperative for safeguarding the distinct ecosystems of coastal desert cities and enhancing their tourism appeal. The examples of Dubai, Cabo Pulmo, Swakopmund, and Masdar City illustrate the diverse approaches to integrating ecology and tourism in coastal desert environments. Each case underscores the importance of sustainable practices, conservation efforts, and the consideration of socio-economic impacts to ensure that tourism development enhances rather than detracts from ecological and community well-being. These examples serve as valuable references for other coastal desert cities aiming to achieve sustainable tourism development.

8.1.3 URBAN HEAT ISLAND MITIGATION THROUGH VEGETATION IN COASTAL DESERT TOWNS

The Urban Heat Island (UHI) effect poses a significant challenge in coastal desert towns like Eilat, where urbanization and the region's naturally hot, arid climate

amplify thermal discomfort for both the environment and its inhabitants. Mitigating UHI through the strategic integration of vegetation offers a sustainable urban design adaptation, harnessing the cooling effects of plants to forge more habitable spaces. This literature review collates recent findings on the efficacy of vegetation in countering UHI impacts, spotlighting strategies apt for coastal desert urban contexts.

Tan (2016) delineates the UHI effect as the elevated temperatures found in urban locales relative to their rural counterparts, a phenomenon exacerbated by human activity and the abundance of heat-absorbing materials within urban settings. This effect critically influences human comfort, energy demands, and health in coastal desert towns, necessitating its consideration in urban planning and design, as underscored by Wong (2021).

Vegetation is a natural countermeasure to UHI, leveraging shading, evapotranspiration, and modifying urban surface thermal properties to reduce temperatures. Gillner (2015) and Wang (2016) note that vegetation's capacity to shade minimizes solar radiation absorption, while evapotranspiration effectively cools the air, collectively diminishing urban temperatures.

The success of vegetative strategies in cooling urban environments hinges on carefully selecting and placing species alongside thoughtful urban greenery design. Lanza (2016) emphasizes the necessity of choosing tree species that adapt well to evolving urban climates. Concurrently, Tan (2016) points to the strategic placement of green corridors in alignment with prevailing winds to maximize cooling effects.

Empirical and simulation-based studies provide further insights into optimizing vegetation for UHI mitigation. For instance, Rosheidat (2010) and Abu-Hijleh (2014) have shown that low-height vegetation and medium-density trees can balance daytime cooling without hindering nighttime heat release. Esfehankalateh (2021)'s investigation into the impact of tree canopy coverage and leaf area density offers crucial data for urban design adaptations in hot climates.

Incorporating vegetation into urban infrastructure in towns like Eilat—via green roofs, walls, and shaded pathways—emerges as an effective strategy to mitigate heat, improve aesthetic appeal, and bolster biodiversity (Wong, 2021; Price, 2015; Wang, 2016). Beyond offering thermal relief, these interventions contribute to energy conservation and enhanced human comfort.

Eilat presents unique challenges, including limited water resources and space constraints. However, innovative

urban greening projects demonstrate the potential to overcome these obstacles by employing drought-tolerant plant species and efficient irrigation technologies. The adaptation of xeriscaping principles — designing landscapes to reduce or eliminate the need for irrigation — exemplifies how cities in hot climates can embrace vegetation to mitigate UHIs effectively.

Nevertheless, realizing vegetation's full potential in mitigating UHI requires the support of urban policies and planning frameworks that emphasize green infrastructure, species diversity, and water-efficient landscaping, ensuring the sustainability of such interventions in arid settings (Aboelata, 2017; Szkordilisz, 2014).

In conclusion, vegetation emerges as a viable strategy to address the challenges posed by the UHI effect in coastal desert towns, offering a path towards more sustainable, resilient, and liveable urban environments. Future efforts should concentrate on localized research in similar climatic conditions to further refine vegetative strategies and develop bespoke solutions for effective urban heat management.

8.2 URBAN AND ARCHITECTURE DEVELOPMENT

8.2.1 THE ROLE OF LANDSCAPE PROMENADES IN ENHANCING COASTAL DESERT TOWNS

The integration of landscape promenades into coastal desert towns presents a unique opportunity to harmonise urban development with the natural environment, enhancing the quality of life for residents and the overall experience for visitors. In Eilat, the implementation of these promenades stands as a testament to the multifaceted role they play in urban enhancement and community well-being, drawing upon insights from global examples to tailor solutions that resonate with the local context.

The transformative potential of landscape promenades in enriching the aesthetic appeal and urban identity of towns like Eilat is evident through comparative studies like that of Al-Hagla (2010) in Sharm El-Shaikh, Egypt. These insights underline the importance of design and functionality in crafting promenades that not only serve as urban landmarks but

also embody the unique desert-coastal identity of the town. Abdelrahman (2018)'s emphasis on engaging landscaping elements further supports the idea that Eilat's promenades could leverage native flora and sustainable design to foster local pride and attract tourism, thereby enhancing the urban landscape in a manner that is both beautiful and meaningful.

Moreover, promenades emerge as critical spaces for social interaction, offering a canvas for the community life in coastal desert towns to flourish. The greenways along the Danube, as explored by Kristiánová (2017), suggest a blueprint for Eilat to transform its promenades into vibrant community hubs that balance recreational needs with social cohesion. Gorji (2016) highlights the social benefits of promenades in urban tourism development, applicable to Eilat's setting. The study indicates that promenades can facilitate meaningful interactions among locals and tourists, contributing to a cohesive urban community. This aspect is particularly relevant for Eilat, where fostering a sense of community can enrich the overall urban experience.

On the economic front, the role of promenades extends to supporting and stimulating the local economy, as observed in Spanish coastal towns by Valls (2017). For Eilat, this translates into an opportunity to diversify tourism offerings and enhance visitor experiences, thereby bolstering local businesses and contributing to economic growth. This aspect of promenades as drivers of economic vitality underscores their significance beyond mere aesthetic and social contributions, positioning them as integral components of urban planning and development strategies.

In conclusion, landscape promenades hold the potential to transform coastal desert towns like Eilat, offering benefits that span aesthetic enhancement, urban identity, social cohesion, and economic development. The insights from the literature underscore the importance of integrating promenades into the urban fabric thoughtfully and sustainably. Future research should explore context-specific design strategies and innovative practices to maximise the benefits of landscape promenades in Eilat and similar coastal desert towns.

8.2.2 PRINCIPLES OF ECOLOGICAL INTEGRATION IN ARCHITECTURE IN ARID DESERT CLIMATES

Integrating ecological principles in architecture, particularly in arid desert climates like Eilat, is a critical area of study that addresses the challenges of sustainability, energy efficiency, and

environmental harmony. This literature review synthesizes scholarly contributions on strategies, methods, and case studies relevant to ecological architecture in desert settings, highlighting the importance of bioclimatic design, the use of local materials, renewable energy integration, water conservation, landscape preservation, and adaptive design.

Bioclimatic design and passive cooling techniques are foundational to ecological architecture in arid climates. Rojas-Caldelas (2006) emphasizes landscape design's role in modifying microclimatic conditions to achieve sustainable architecture. The study advocates for natural ventilation, thermal mass, and shading as means to reduce energy consumption while preserving ecological landscape features. This approach underscores the necessity of designing buildings that respond to desert environments' unique thermal and solar conditions.

Another principle central to ecological integration is the utilization of local materials and traditional architectural techniques. Divandari (2015) highlights the significance of employing materials and methods adapted to desert conditions, ensuring ecological compatibility and conserving cultural heritage. Traditional desert architecture, characterized by thick walls, small openings, and courtyard configurations, provides valuable insights into achieving thermal comfort and energy efficiency, demonstrating the relevance of indigenous knowledge in contemporary ecological design. In addition, Day & Gwilliam (2019)'s emphasis on natural, locally sourced materials speaks directly to the context of Eilat, where the use of materials such as local stone, earth, and other natural resources can not only reduce transportation and manufacturing impacts but also ensure that buildings blend aesthetically with the desert landscape. Moreover, these materials' inherent properties, such as high thermal mass, can contribute to better indoor climate control, reducing the need for mechanical cooling in Eilat's hot summers.

Integrating renewable energy sources, especially solar energy, is a fundamental element in the sustainable development of desert architecture, leveraging the natural abundance of solar radiation in these regions. Ottmann (2015) articulates how cities, and their architectural practices can evolve to embrace ecological principles, turning the challenge of intense solar exposure into an asset. By adopting photovoltaic systems and solar thermal collectors, buildings in desert areas like Eilat have the potential to achieve energy self-sufficiency, thereby drastically reducing their ecological

footprint. Building on the foundation laid by the principles of renewable energy integration, Wang, Zheng, & Dai (2017) delve into the broader implications of sustainable architectural practices in arid climates. Their research underscores the critical need for an integrated design system that prioritizes energy efficiency and responsiveness to the harsh thermal conditions characteristic of desert environments. Such a system not only highlights the value of passive cooling strategies and the use of materials with high thermal mass but also underscores the importance of solar shading techniques. These approaches are instrumental in minimizing the environmental impact of buildings in desert cities like Eilat, aiming to reduce energy consumption primarily for cooling purposes. By focusing on designs that lower energy demand, Eilat can make significant strides towards sustainability, further reducing the city's reliance on traditional energy resources and reinforcing its commitment to environmental stewardship. This holistic approach to architecture and urban planning, which harmonizes renewable energy integration with strategies to minimize environmental footprints, paves the way for creating more resilient and sustainable urban environments in arid regions.

Water conservation and management are imperative in arid regions. Al-Sallal (2014) presents a sustainable eco-house design that emphasizes water conservation through greywater recycling, water-efficient landscaping, and rainwater harvesting. These strategies are essential for sustaining life in desert climates while minimizing the impact on scarce water resources.

Preserving the desert ecosystem and landscape is a critical principle in ecological architecture. Ramírez (2018) explores the relationship between architecture and the desert landscape, advocating for designs that minimize visual and ecological impacts. The study calls for an understanding of the desert as a fragile ecosystem that requires careful intervention to maintain its biodiversity and aesthetic qualities. Shen & Nagai (2018) advocate for the preservation of natural landscapes and the integration of green spaces into architectural design. For Eilat, this means designing urban spaces that respect the desert landscape and its biodiversity. Implementing xeriscaping in public and private gardens, preserving natural water bodies, and ensuring that new developments enhance rather than detract from the area's natural beauty and ecological function are all crucial. This approach not only maintains the ecological value of Eilat but also enhances its appeal as a tourist destination.

Lastly, the unpredictable nature of desert climates necessitates adaptive

and resilient architectural designs. Setiawan (2018) explores ecological and green architecture theories, stressing the necessity for buildings to be climate-conscious and capable of adaptation to changes in environmental conditions. This includes designing for extreme temperatures, sandstorms, and potential water scarcity, ensuring that buildings can withstand and adapt to these challenges.

In conclusion, the literature on ecological integration in architecture for arid desert climates like Eilat underscores a holistic approach that considers desert environments' unique challenges and opportunities. It calls for sustainable, resilient, and culturally sensitive architectural solutions that optimise natural resources, preserve local ecosystems, and utilise traditional knowledge and modern technologies.

8.2.3 URBAN BARRIERS AND COASTAL ACCESSIBILITY

The relationship between urban development and coastal accessibility is a growing concern, especially in coastal cities like Eilat, where the balance between development and accessibility to coastal spaces is critical. This review draws on recent studies to explore the impacts of urban barriers on coastal accessibility and strategies to mitigate these barriers, ensuring coastlines remain open and accessible to all, with a particular focus on Eilat and similar settings.

Urban barriers, including infrastructure developments, sea walls, and the privatisation of coastal lands, significantly restrict public access to coastal areas, thereby reducing their recreational and ecological value. Samoilenko (2021) discusses the necessity of a systematic approach to the urban organisation of coastal zones, stressing the importance of integrating water protection measures with the recreational and town-planning potential of these territories. This comprehensive strategy is vital for cities like Eilat, where urban growth directly influences coastal accessibility and biodiversity.

In exploring solutions to enhance coastal accessibility, Silva, King, & Lemar (2019) advocate for sustainability planning that prioritises accessibility, drawing from their analysis in Tempe, Arizona. The challenges identified in prioritising accessibility in urban planning resonate with Eilat's efforts to harmonise urban development with coastal space utilisation. The study underscores the significance of regulatory measures, design interventions, and public engagement as foundational strategies to ensure coastal development incorporates accessibility as a paramount concern.

Similarly, Samad, Said, & Rahim (2018) highlight the importance of planning for accessibility within the Malaysian built environment, advocating for seamless connectivity between indoor and outdoor spaces. This perspective directly aligns with the challenges coastal cities like Eilat face in ensuring that coastal regions remain integrated with and accessible through urban planning efforts.

Examples include the San Francisco Waterfront Redevelopment and the Cheonggyecheon Stream Restoration in Seoul, showcasing successful initiatives to mitigate urban barriers and enhance access to coastal and waterway spaces. These projects have transformed areas that were previously inaccessible or underutilized into vibrant public spaces, effectively re-establishing the connection between the urban environment and natural waterways. For cities like Eilat, these examples offer valuable insights into how strategic planning and community involvement can convert urban development challenges into opportunities for creating accessible, sustainable coastal spaces.

In conclusion, addressing the issue of urban barriers to coastal accessibility is of paramount importance for coastal cities, including Eilat. Adopting a holistic approach that prioritizes the dismantling of physical barriers and promotes the integration of urban development strategies with coastal environmental conservation can ensure the continued accessibility and ecological health of coastlines. Such an approach not only improves the living conditions for residents and the experience for visitors but also plays a crucial role in the sustainable development and environmental resilience of coastal urban areas amidst ongoing urban expansion and the challenges posed by climate change.

Figure 460. *The Cheonggyecheon River, 2008. Photo: Michael Sotnikov. Source: Archdaily*

8.2.4 CAVE ARCHITECTURE: AN ANCIENT SOLUTION FOR MODERN SUSTAINABILITY IN ARID DESERT CLIMATES

Cave architecture, an enduring testament to human ingenuity, holds renewed promise in the quest for sustainable development and environmental conservation, especially within the challenging conditions of arid desert climates. This literature review delves into the historical significance, ecological advantages, and the modern potential of cave dwellings for sustainable living, drawing on a range of scholarly insights to illustrate how these ancient structures can inform contemporary sustainability efforts.

Historically, cave architecture has provided humans with shelter, a stable indoor climate, and protection against harsh outdoor elements. In regions characterized by extreme temperatures and limited water resources, such as arid deserts, cave dwellings have offered an effective solution to environmental challenges. Chun-long (2009) discusses innovative cave dwelling designs in the Loess Plateau, focusing on energy-saving methods that leverage natural resources to foster sustainable, comfortable living conditions.

Echoing this sentiment, Liu (2010) examines the energy conservation attributes of Loess Plateau's cave dwellings, marrying modern building efficiency principles with traditional cave construction techniques. This blend of age-old practices and current sustainability objectives illustrates the enduring relevance of cave architecture in tackling today's environmental issues.

Maksoud (2021) explores the geoheritage of remote desert caves, such as Egypt's Djara Cave, underscoring their ecological and archaeological importance while advocating for their preservation and sustainable tourism development. Protecting such sites is vital for understanding historical human-environment interactions and for encouraging future sustainable initiatives.

Litkouhi (2013) identifies sustainable architecture principles prevalent in desert areas, principles that align with traditional cave dwelling characteristics, including natural climate adaptation, energy efficiency, and minimal ecological footprint. The inherent adaptability of cave dwellings, with their minimal landscape alteration, offers a compelling blueprint for sustainable living in harmony with the environment.

The contemporary relevance of cave architecture is further highlighted through studies on the Sassi of Matera, Italy, by Negro (2016) and Varriale

(2019). These works detail how historical cave dwellings can undergo energy performance enhancements without sacrificing their cultural and architectural integrity. The Sassi of Matera serves as a model for integrating cave architecture into modern urban planning, showcasing sustainable living practices and ethical conservation.

Cave architecture represents a unique approach to living in unison with the natural world. By utilizing the existing landscapes and formations, this style of building minimizes environmental disruption and blends seamlessly with its surroundings. It not only preserves the natural beauty but also provides a sustainable way of constructing habitats that are naturally insulated and energy efficient. Embracing cave architecture is a step towards reducing our ecological footprint and enhancing our connection with nature.

Figure 461. *The Sassi of Matera. Source: Archdaily*

However, integrating cave architecture into present-day sustainability efforts poses challenges, such as gentrification, maintaining historical authenticity, and adapting to modern living standards. A nuanced approach that honours the historical and ecological significance of cave dwellings, while embracing contemporary technologies and sustainable methodologies, is essential.

Future research should aim at creating scalable, adaptable cave architecture models for diverse arid desert environments and examining the socio-economic impacts of sustainable tourism and conservation efforts related to cave sites. This could further solidify the role of cave architecture as a viable modern sustainability solution.

In sum, cave architecture offers profound lessons for sustainable living in arid climates, blending historical wisdom with modern sustainability principles. By revisiting and innovatively applying these ancient solutions, cave architecture can make a substantial contribution to global sustainable development and environmental conservation efforts, illuminating a path forward that respects the past while embracing the future.

8.3 TECHNOLOGIES AND MATERIAL DEVELOPMENT

8.3.1 GREYWATER SYSTEMS AND SUSTAINABLE WATER USE

Considering the increasing challenges of water scarcity, particularly in arid regions like Eilat, the adoption of sustainable water management practices has become imperative for sustainable development. Greywater recycling systems emerge as a pragmatic solution for conserving freshwater resources by reutilising relatively clean wastewater from household activities. This section delves deeper into the technology, benefits, challenges, and successful applications of greywater recycling, integrating insights from recent studies relevant to arid environments similar to Eilat.

Greywater recycling involves reusing water from baths, sinks, and appliances for non-potable purposes. The simplicity of greywater treatment compared to blackwater, due to its lower contamination level, makes it an appealing option for reducing freshwater consumption. Technologies for greywater recycling vary from basic systems for immediate landscape irrigation to advanced systems incorporating filtration and disinfection for broader applications. Pradhan et al. (2019) review the integration of greywater treatment with green building structures like living walls and green roofs, emphasising the dual benefits of water recycling and urban cooling in arid environments, a concept highly applicable to Eilat's urban landscape (Pradhan et al., 2019).

A dominant benefit of greywater recycling is the substantial reduction in freshwater demand, which is crucial for water-scarce regions like Eilat. By harnessing greywater for landscape irrigation and other non-potable uses, buildings can significantly lower their water footprint and operational costs. Beyond conservation, greywater systems can alleviate the load on municipal wastewater treatment facilities and foster a sustainability ethos among residents. Oh et al. (2018) discuss the global implementation of greywater recycling, highlighting its potential to mitigate long-term soil impacts through careful treatment and use, emphasising the relevance of such practices for arid urban settings (Oh et al., 2018).

While greywater recycling offers numerous benefits, its adoption is not without challenges. Quality safety, adherence to regulations, and the cost of system installation and maintenance are significant concerns. In Eilat and similar arid regions, the efficient use of water resources must also consider the limitations imposed by the climate, necessitating systems that are both

water-efficient and adaptable to low-water-use landscapes. Khajvand et al. (2022) address these considerations, proposing decentralized treatment systems as effective solutions for arid areas, focusing on the balance between water conservation and ensuring public health through proper water treatment and reuse strategies (Khajvand et al., 2022).

Eilat can draw inspiration from global examples of greywater recycling implementation. The study by Pradhan et al. (2019) suggests that integrated greywater treatment using green infrastructures could serve dual purposes—water recycling and urban cooling—pointing towards a promising method for arid cities like Eilat to adopt. This approach aligns with the city's need for sustainable water management while contributing to urban greening and cooling, mitigating the UHI effect in hot-dry climate conditions.

In sum, for arid regions like Eilat, greywater recycling systems present a sustainable strategy to address water scarcity by reducing freshwater consumption and promoting an eco-conscious community ethos. The insights from recent studies underscore the viability and multifaceted benefits of these systems, emphasizing their role in sustainable urban development. As technology advances and awareness of water scarcity grows, the adoption of greywater recycling is poised to become a cornerstone of water management practices in Eilat and similar environments, contributing to the broader goals of sustainability and ecological resilience.

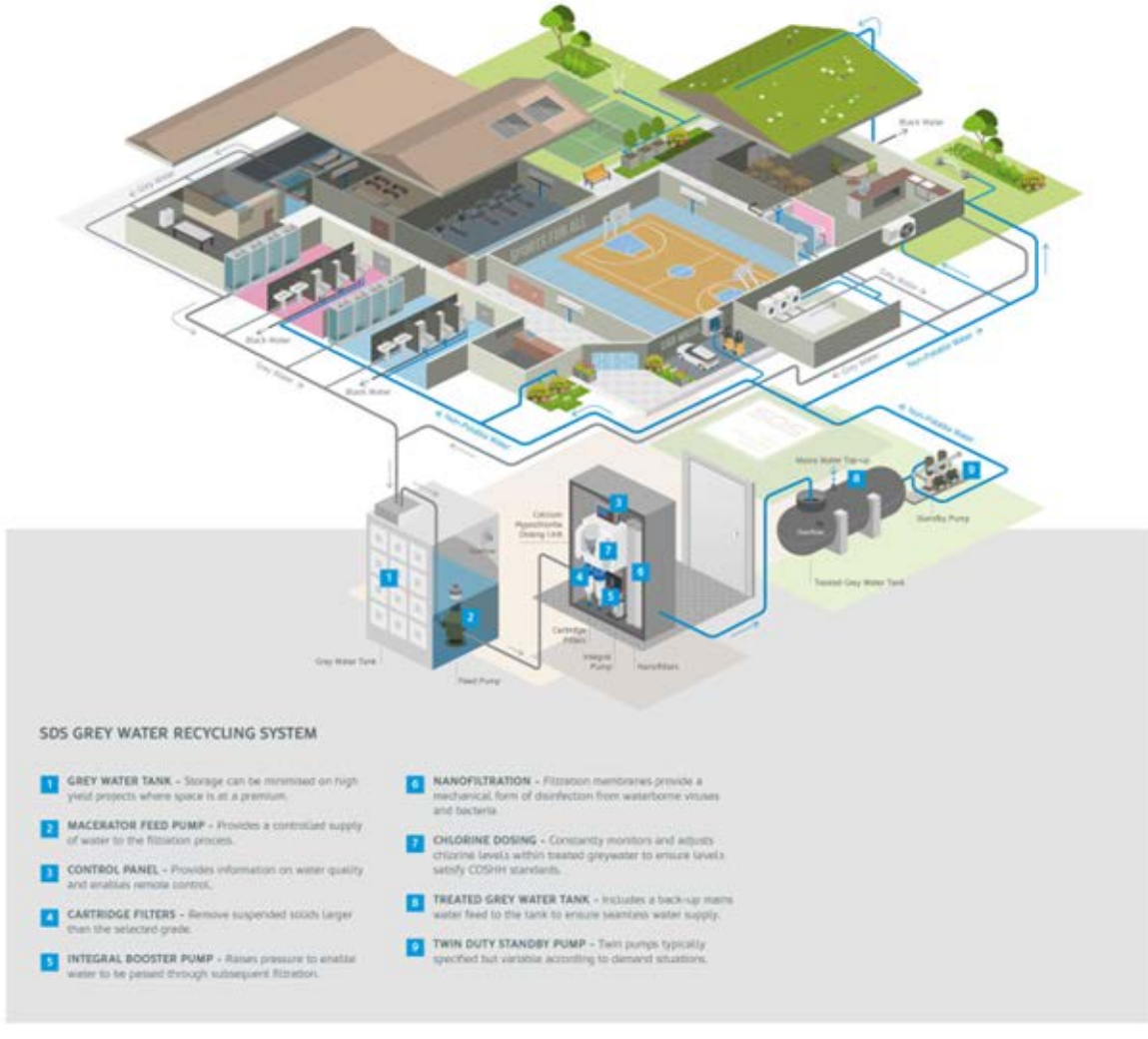


Figure 462. *Grey water recycling system: SDS Water Infrastructure Systems*

8.3.2 NATURAL SWIMMING POOLS IN HOT, DRY, DESERT CLIMATES

Natural swimming pools (NSPs) have garnered significant attention as sustainable alternatives to traditional chlorinated swimming pools, particularly in their ability to integrate ecological processes for water purification. In hot, dry, desert climates, implementing NSPs faces specific challenges, including water conservation, evaporation control, and maintaining ecological balance in extreme temperatures. This review explores the current academic discourse surrounding NSPs in arid environments, drawing insights from the provided studies on their design, functionality, and adaptation to desert climates.

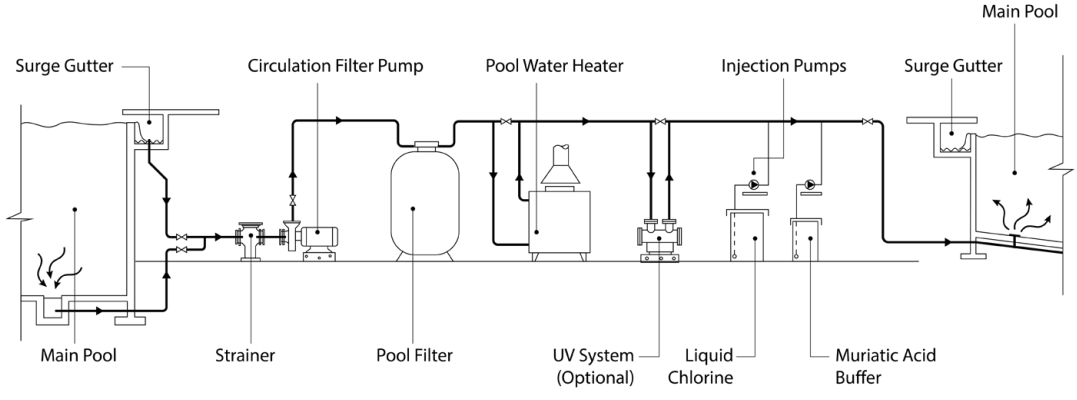
One of the primary concerns in arid climates is the efficient use of water, given the scarcity of this resource. The case study of selected nature swimming pools in the South Moravian Region illustrates the importance of innovative design solutions that minimize water loss through evaporation and maximize the recycling of water within the system (Poloprutská et al., 2021). These insights are crucial for adapting NSP designs to desert environments, where water conservation is paramount.

The adaptation of NSPs to hot, dry climates also involves the selection of appropriate vegetation that can thrive under arid conditions while effectively participating in the water purification process. Vymazal (2013) emphasizes the role of emergent and submerged plants in the phytoremediation process, suggesting that the choice of plant species must consider their water consumption rates and tolerance to high temperatures. In desert settings, the design of NSPs must address the high evaporation rates and potential for water quality degradation due to elevated temperatures. The integration of shading structures, both natural and man-made, is a strategy highlighted in the literature for reducing water temperature and evaporation (HCMA Architecture + Design, 2016). Additionally, the use of insulated pool linings and covers during periods of non-use can further reduce water loss, as suggested by architectural and design principles that cater to the unique environmental conditions of deserts.

Technological innovations are crucial for successful NSP implementation in desert climates. For instance, applying advanced filtration systems that require minimal water turnover can significantly reduce the need for top-up water, conserving this precious resource. Furthermore, incorporating solar-powered pumps and UV sterilization systems aligns with the sustainable ethos of NSPs, leveraging the abundant solar energy available in desert regions (Schönborn & Junge, 2018).

To conclude, the literature on natural swimming pools in hot, dry, desert climates underscore the potential of these systems to provide sustainable recreational solutions while addressing the specific environmental challenges of arid regions. Through innovative design, careful selection of vegetation, and the application of appropriate technologies, NSPs can successfully operate within desert climates, offering a model for environmentally responsible water management in recreational facilities.

TYPICAL POOL SYSTEM



NATURAL POOL SYSTEM

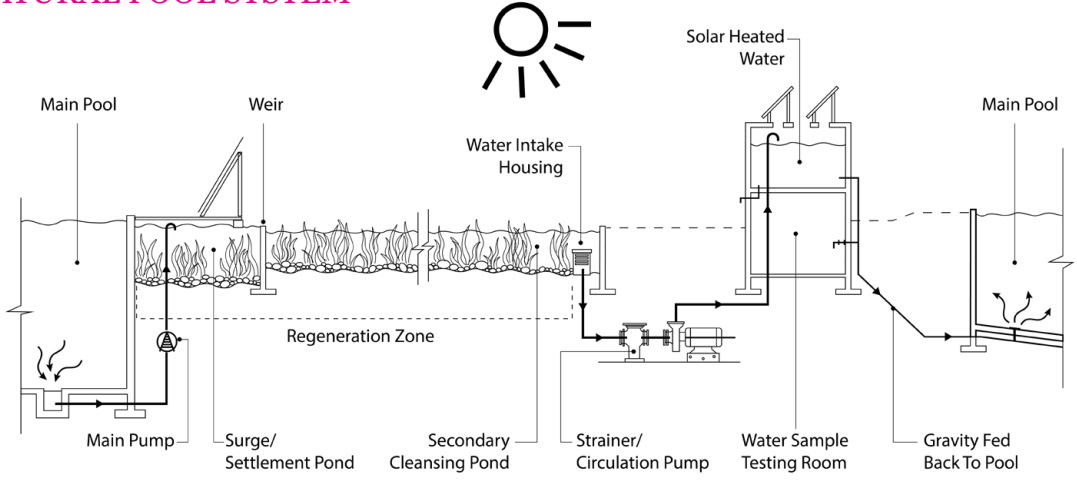


Figure 463. *The Natural swimming pool vs. Typical swimming pool. Source: Author , based on HCMA Architecture*

8.3.3 PRINCIPLES OF PASSIVE DESIGN IN HOT DRY, DESERT ARID CLIMATE

The principles of passive design in hot, dry, arid desert climates are crucial for creating comfortable living environments while minimising energy consumption. This literature review explores various strategies and approaches to passive design, drawing on research from different regions with similar climatic conditions.

One fundamental aspect of passive design in desert climates is the orientation and spatial organisation of buildings. Kamal (2012) emphasises the importance of designing buildings to minimise solar gain and maximise natural ventilation. This involves orienting longer sides of buildings to intercept prevailing winds and shorter sides to face the direction of the most substantial solar radiation. Similarly, Attia (2011) discusses the bioclimatic landscape design strategy, which includes zoning concepts and the use of vegetation and water to improve microclimate and passive cooling.

Thermal mass and insulation are other critical components of passive design in desert climates. Schnieders (2015) illustrates how residential Passive Houses in various climate zones, including hot and arid, can achieve comfortable indoor conditions with extremely low heating and cooling loads through the use of high-quality insulation and window materials. Lavafpour (2011) also highlights the importance of material selection, including the use of thermal mass materials to delay heat transfer and lightweight materials for spaces used at night to allow rapid cooling.

Shading and solar control are essential to reduce heat gain through windows and opaque building parts. Taleb (2014) explains that solar shading, alongside the use of double glazing and green roofing, can significantly reduce energy consumption in residential buildings in Dubai, UAE. Salameh (2022) further supports the effectiveness of traditional passive design solutions, such as enhanced shading in outdoor areas, in improving thermal comfort and reducing air temperature in modern urban designs.

Ventilation strategies play a pivotal role in passive design for hot, arid climates. Harkouss (2018) examines the optimisation of passive design parameters, including natural ventilation and blinds, to improve thermal comfort and reduce cooling demands. The study underscores the importance of multi-criteria decision-making in identifying optimal passive solutions that significantly decrease overheating.

Water features and vegetation, as discussed by Attia (2011) and Mahmoud

(2019), are instrumental in creating thermally pleasant environments through evaporative cooling and shading. When integrated into landscape design, these elements can contribute to passive cooling and enhance the microclimate around buildings.

However, while passive design principles present a promising route to sustainable architecture in the demanding climates of hot, dry deserts, their practical application, especially in areas like Eilat, is accompanied by several challenges. A significant critique concerns the flexibility of passive design in adapting to local cultural contexts and architectural traditions. Mahmoud (2019) warns against the indiscriminate application of passive design strategies without considering local aesthetics, cultural practices, and lifestyle demands. This approach could lead to solutions that, while environmentally efficient, end up being socially and culturally detached. The real difficulty is in incorporating passive design principles into the fabric of regions like Eilat's architectural heritage and cultural expectations, ensuring that the solutions are both environmentally and socially coherent.

Economic constraints also pose substantial hurdles, particularly the upfront costs associated with integrating passive design features such as high-grade insulation, advanced glazing, and green roofs. Fokaides (2016) highlights the dilemma faced by builders and residents alike, where the initial investment in materials and technologies that adhere to passive design standards, despite offering long-term energy savings, might deter their widespread adoption due to immediate financial implications.

Technological limitations further complicate the implementation of passive design strategies. In locales such as Eilat, where temperatures can reach extreme highs, the reliance on strategies like natural ventilation and evaporative cooling might not always provide sufficient comfort, as Harkouss (2018) points out. This necessitates the consideration of supplementary mechanical cooling systems to achieve the desired indoor conditions.

Moreover, water scarcity, especially in desert regions, presents a significant challenge when utilising water features for evaporative cooling and vegetation for shading and microclimate management. Attia (2011) questions the sustainability of these strategies in water-constrained environments like Eilat, emphasising the need for careful consideration of water use for landscaping and cooling purposes against the backdrop of pressing conservation needs.

The maintenance demands and durability of passive design elements, particularly those exposed to harsh

desert conditions, also raise concerns. Litkouhi (2013) discusses the impact of extreme temperatures, sunlight, and dust on the effectiveness and longevity of materials and systems used in passive design, such as shading devices, reflective coatings, and green roofs, highlighting the necessity for regular maintenance and, occasionally, replacement to ensure continued performance.

In addition, regulatory and policy frameworks often do not sufficiently incentivise or mandate energy-efficient construction practices, creating additional barriers to adopting passive design strategies. Marincic (2014) emphasises the need for supportive policies, building codes, and incentives that promote the adoption of these strategies, particularly in regions like Eilat, where traditional construction methods may fall short of sustainable design standards.

In summary, while passive design holds considerable promise for transforming sustainable architecture in arid desert climates, its application in regions like Eilat is fraught with cultural, economic, technological, and regulatory challenges. Overcoming these hurdles requires a nuanced approach that balances environmental efficiency with cultural appropriateness, economic feasibility, and technological adaptability, underpinned by supportive policy measures. Future efforts in passive design must, therefore, navigate these complexities to develop environmentally sustainable solutions aligned with the unique characteristics and needs of desert communities.

8.3.4 PASSIVE DESIGN FOR MODERN CAVES IN HOT, DRY, ARID DESERT CLIMATES

Passive design in modern cave architecture, particularly in hot, dry, arid desert climates such as Eilat, is rooted in a deep understanding of the local environment and the utilisation of natural resources to achieve thermal comfort, energy efficiency, and sustainability. This literature review explores various studies and projects that have investigated and implemented passive design strategies in such contexts, highlighting the effectiveness of these approaches in enhancing the liveability and environmental performance of modern cave dwellings.

Zhu (2020) provides a comprehensive analysis of the thermal performance of traditional underground cave dwellings in China's Loess Plateau, which shares similar climatic characteristics with Eilat. Through qualitative and quantitative evaluations, Zhu demonstrates that the passive strategies employed in these vernacular architectures, such as

orientation, the inclusion of underground courtyards, and the use of biomass massive building envelopes, significantly contribute to creating comfortable indoor environments. This study suggests that the principles underlying these traditional designs can be adapted and applied to modern cave dwellings in similar climates.

Marincic (2014) discusses the adaptation of passive design strategies in the context of social housing in Mexico's desert climate. The study emphasizes the importance of orientation, shading devices, thermal mass, and ventilation in achieving thermal comfort without relying on mechanical cooling systems. The project showcases how modern cave dwellings can benefit from high thermal mass materials and strategic ventilation to maintain comfortable indoor temperatures throughout the year.

Fokaides (2016) presents the monitored performance of the first Passive House in Cyprus, a region with subtropical climatic conditions that share similarities with hot, dry, arid desert climates. The study highlights the challenges and opportunities in adapting Passive House standards to different climatic contexts, including the need for optimized night ventilation and the application of external thermal coatings to improve thermal performance. This research underscores the potential of Passive House principles in enhancing the sustainability of modern cave dwellings in hot, dry climates.

Litkouhi (2013) explores the sustainable architecture principles extant in the heart of desert areas of Iran, focusing on the traditional architecture's response to the harsh climate. The study identifies key features such as narrow streets, lofty air traps, and vaulted roofed chambers that contribute to the ecological and sustainable nature of these buildings. By examining these traditional strategies, Litkouhi provides valuable insights into how modern cave dwellings can incorporate similar principles to achieve energy efficiency and environmental compatibility.

Attia (2011) investigates bioclimatic landscape design strategies in extremely hot and arid climates, emphasizing the role of vegetation and water in controlling and improving the microclimate around buildings. The study proposes a three-layered approach to landscape design that includes bioclimatic zones, thematic walled gardens, and extensive and intensive landscaping. Attia's research highlights the importance of integrating landscape design with passive architectural strategies to enhance the thermal performance of modern cave dwellings in desert climates.

In conclusion, the principles of passive design for modern cave dwellings in hot, dry, arid desert climates, as exemplified

by the case of Eilat, revolve around the strategic use of orientation, thermal mass, ventilation, shading, and landscape design. These strategies, rooted in traditional architecture and adapted through contemporary research, offer a sustainable path towards achieving thermal comfort and energy efficiency in challenging climatic conditions.

8.3.5 SOLAR ENERGY TECHNOLOGIES IN DESERT CLIMATE

Integrating solar energy technologies within architecture is crucial for sustainable and energy-efficient urban development, particularly in desert climates such as Eilat. This literature review synthesizes insights from recent advancements in photovoltaic (PV) and solar thermal technologies, highlighting their efficiency and integration within the built environment of arid regions.

Recent innovations in photovoltaic materials have markedly improved their efficiency and adaptability, making them economically viable for architectural integration. These advancements are crucial in regions like Eilat, where high solar irradiance facilitates broader applications. Gholami et al. (2019) discuss the economic feasibility of Building Integrated Photovoltaics (BIPV) systems, which are increasingly pivotal in sustainable urban planning in desert climates (Gholami et al., 2019). These systems seamlessly integrate into building facades, reducing the visual impact of traditional solar installations while enhancing the building's energy self-sufficiency.

Parallel to the advancements in PV technologies, solar thermal systems in desert climates like Eilat are gaining attention due to their effective use of abundant solar energy. Attar and Farhat (2015) have shown that solar water heating systems can significantly reduce energy costs, especially in settings such as agricultural greenhouses, which are prevalent in arid regions (Attar & Farhat, 2015). This synergy between solar thermal systems and agricultural needs highlights a sustainable path for energy use in desert economies.

Building-integrated photovoltaics (BIPV) and solar thermal systems also enhance the aesthetic and functional aspects of modern architecture. This integration is crucial in maintaining the architectural integrity of urban landscapes while improving energy efficiency. Sovetova et al. (2019) explored how phase change materials (PCMs) in buildings can stabilize indoor temperatures in hot desert climates, further reducing cooling

needs and enhancing comfort (Sovetova et al., 2019). The combination of PCMs with BIPV and solar thermal technologies presents a comprehensive approach to energy efficiency in arid environments.
Despite their potential, solar energy technologies face significant challenges, such as high costs and maintenance issues in harsh environments. Addressing these challenges, the study by Sovetova et al. (2019) investigates the use of phase change materials (PCMs) in buildings to enhance the thermal performance and energy efficiency of buildings in hot desert climates. This research demonstrates that integrating PCMs can significantly moderate indoor temperature fluctuations, thus reducing cooling loads and enhancing energy efficiency in arid regions like Eilat (Sovetova et al., 2019).
Integrating solar energy technologies, particularly photovoltaics and solar thermal systems, in desert climates such as Eilat, offers substantial benefits for sustainable development. These technologies contribute significant energy savings and enhance buildings' architectural and functional quality. Emphasizing practical implementations like thermal storage can help maximize the efficiency and viability of these systems in challenging environments.

Figure 464. *Sharing E-bicycle in Milan. Source: Author*

2.3.6 Green Mobility in Coastal Cities

Green sharing mobility, particularly in coastal cities like Eilat, represents a transformative approach to urban transportation, aiming to reduce environmental impacts, enhance urban liveability, and improve the efficiency of urban mobility systems. Coastal cities, with their unique geographical settings, face distinct challenges and opportunities in implementing green-sharing mobility solutions. This literature review explores the concept of green sharing mobility, its benefits, challenges, and specific considerations for coastal cities, focusing on the potential for cities like Eilat.
Green sharing mobility encompasses a range of shared transportation services, including car-sharing, bike-sharing,

ridesharing, and on-demand ride services powered by green energy sources or employing zero-emission vehicles (Shaheen, 2015). These services offer an alternative to private vehicle ownership, aiming to reduce traffic congestion, lower greenhouse gas emissions, and decrease urban pollution levels. For coastal cities, which often experience high levels of tourism and associated traffic peaks, green-sharing mobility can provide flexible and sustainable transportation options that cater to both residents and visitors (Dalis, 2015).

Developing infrastructure for green vehicles and strategically locating charging stations is necessary to implement green-sharing mobility in coastal cities (Bianchessi, 2014). Additionally, Coastal cities should ensure that sharing mobility services can adjust to seasonal tourism transportation demand (Tarkowski, 2021).

Coastal cities like Eilat have unique considerations when implementing green sharing mobility. The geographical constraints of coastal cities can limit the expansion of transportation infrastructure, making efficient use of space and resources imperative (Thanh, 2017). Coastal cities also have a vested interest in preserving their natural environments and reducing pollution to maintain their appeal as tourist destinations. Green sharing mobility can contribute to these goals by reducing the reliance on fossil-fuel-powered vehicles and promoting more sustainable forms of transportation (Dalis, 2015).

Eilat, as a coastal city, could benefit significantly from implementing green-sharing mobility solutions. The city's status as a tourist destination means it experiences fluctuations in transportation demand, which green-sharing mobility can accommodate through flexible, on-demand services. Initiatives such as electric bike-sharing programs or electric car-sharing services could reduce traffic congestion and pollution, improving residents' quality of life and visitors' experience. Strategic partnerships between the city, mobility service providers, and technology companies could facilitate the development of the necessary infrastructure and regulatory support for these services (Dalis, 2015).

Projects like Milan's Green Move initiative demonstrate the effectiveness of integrating electric vehicle sharing with renewable energy sources. This project supported the development of zero-emission transport solutions and aligned with global sustainability goals, offering a relevant blueprint for Eilat. Eilat can enhance its appeal as a modern, eco-friendly tourist destination by adopting similar technologies while improving local infrastructure to support sustainable transport solutions like e-scooters,

e-bikes, and e-cars and, therefore, create a sustainable and scalable green mobility network (Lué et al., 2012).

Green sharing mobility presents a promising avenue for coastal cities like Eilat to address their unique transportation challenges while advancing sustainability goals. By leveraging shared, green transportation services, coastal cities can reduce environmental impacts, improve urban mobility, and enhance their appeal as sustainable tourist destinations. However, successfully implementing these services requires careful planning, infrastructure investment, and stakeholder collaboration.

8.4 SITES COMPARISON

In this subchapter is looking at four sites in Eilat that has greenery. Eilat is a desert city where the climate is challenging for vegetation greenery. Three of the sites are beach complexes and one is a Botanic Garden which is not close to the beach.

8.4.1 DOLPHIN REEF BEACH

Dolphin Reef Beach in Eilat, established in 1990, spans 1.6 hectares and features a 138-meter stretch of coastline. This unique facility integrates thoughtful architectural design with a strong ecological ethos, creating a sanctuary where visitors can interact with dolphins in a natural yet controlled environment. These dolphins are not trained for shows but live freely, allowing them to approach humans on their own terms, reflecting a respectful blend of natural habitat and human interaction.

From an architectural perspective, Dolphin Reef Beach employs sustainable practices and materials to minimize its environmental footprint. The structures and pathways are constructed using locally sourced materials that blend seamlessly with the natural surroundings. The design prioritizes low impact on the marine environment while ensuring durability and aesthetic harmony with the

Figure 466. *Ariel veuw of Dolphin Reef Beach, Source: Author*

Figure 465. *Dolphin Reef Beach, Source:*

coastal landscape. This careful selection of materials and design approach aids in preserving the integrity of the beach and its marine residents.

Accessibility is a vital component of the beach's design. Facilities and viewing platforms are strategically placed to allow all visitors, including those with disabilities, to fully engage with the dolphin experience. This inclusive design extends to the floating piers and snorkelling areas, which are accessible via gently sloping paths that ensure ease of access while preserving the natural topography of the beachfront.

The water management system at Dolphin Reef is a model of sustainability. Greywater from showers and other facilities is collected and passed through a sophisticated filtration system, then reused for irrigation and in the showers. This system reflects a commitment to ecological conservation, ensuring that the lush, botanical-like setting thrives without wasting precious freshwater resources. The landscaping includes

Figure 468. *Wooden structure covered with plants*

Figure 469. *Wooden structure covered with plants*

Figure 467. *Shading covers at Dolphin Reef Beach, Source: Author*

Figure 470. *Wooden and metal bars structure covered with plants*

a variety of plant species, some native and others carefully adapted to the local climate, which are irrigated with the treated water, enhancing the site's green coverage and contributing to local biodiversity.

Dolphin Reef Beach is more than a tourist attraction; it is an educational platform where visitors gain awareness of marine ecosystems and the importance of conservation. The architecture and operational practices are designed to educate visitors about sustainability and responsible interaction with wildlife, making Dolphin Reef a beacon of environmental stewardship and innovative ecological architecture. This facility not only provides a memorable experience but also instils a sense of responsibility and appreciation for marine life conservation.

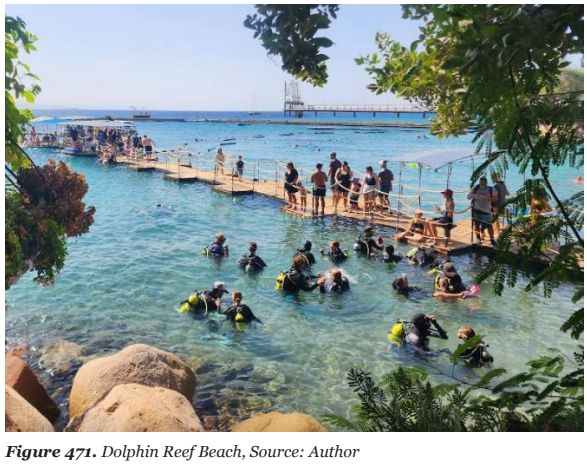


Figure 471. *Dolphin Reef Beach, Source: Author*

8.9 RECYCLING GREY WATER MANAGEMENT AT DOLPHIN REEF BEACH

Dolphin Reef Beach in Eilat is renowned not only for its unique interactive experiences with dolphins but also for its robust environmental stewardship, particularly its sophisticated water recycling system. This system plays a crucial role in the sustainability practices of the beach, especially given the extensive use of water in daily operations.

The beach attracts visitors who engage in activities such as swimming, snorkelling, and diving, which necessitate thorough rinsing post-exposure to seawater. Diving equipment and scuba suits, in particular, require fresh water rinsing to prevent saltwater corrosion and to facilitate the wearing of tight diving suits. To manage this high demand for freshwater efficiently, Dolphin Reef has implemented an advanced greywater recycling system.

This system collects greywater from showers and other non-sewage sources, which includes water used by visitors washing off sea salt after swimming or cleaning their diving gear. The collected greywater is then routed through a series of filters that purify the water to a level safe enough for reuse. This filtered water is subsequently used to supply

the showers and irrigate the site's lush vegetation.

The recycling process is designed to ensure that no water is wasted. Water that emerges from the filtration system and is not redirected back into the showers or

Photo A – Part of the water from the showers undergoes fertilisation, while another portion is diverted to a storage tank.

Photo B – Fertilisation process.

Photo C – Storage tank receiving greywater from the showers.

Photo D – Greywater exiting the storage tank.

Photo E – The greywater exiting the storage tank and passes through a hair filter to remove coarse debris before entering the main filtration system

Photo F – The water undergoes filtration through a system called Spin Clean.

Photo G – The water passes through a sand filter and is then used for irrigation at a pressure of 3.5 atmospheres.

Photo H – To avoid wasting the filter's backwash water, it is collected in the black tank and then used for irrigation in specific areas of the beach.

Figure 472. *Water recycling at Dolphin Reef Beach, Source: Author*

other facilities is used for irrigation. This is particularly important for the diverse array of plants and trees at Dolphin Reef, which includes species that thrive in a botanic garden-like setting. These plants receive the cleanest water output from the recycling process, which is vital for their health and growth.

This comprehensive water recycling system underscores Dolphin Reef's commitment to environmental sustainability. By efficiently reusing water, the beach not only conserves this precious resource but also supports a vibrant ecosystem that enhances the visitor experience. The presence of varied plant life not only beautifies the area but also contributes to the ecological health of the environment, making Dolphin Reef a model of responsible water management in a tourist setting.

8.9.2 DEKEL BEACH

Dekel Beach, located in Eilat, is a prime example of modern coastal architecture designed to harmonize with the natural environment while offering accessible and enjoyable public spaces. Established in 2000, the beach spans a surface area of 0.011 square kilometres with a 240-meter-long sandy stretch, making it a favourable destination for beachgoers.

From an architectural standpoint, Dekel

Figure 473. *Dekel Beach, Source: Author*

Figure 474. *Ariel View of Dekel Beach, Source:*

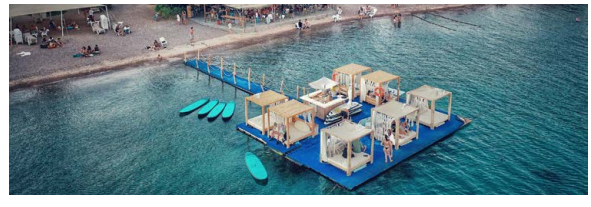


Figure 475. *Ariel View of Dekel Beach, Source:*

Beach prioritizes sustainability and functionality, incorporating materials and designs that blend seamlessly with

the Red Sea's scenic coastline. Structures and pathways integrate naturally with the local landscape, utilizing materials such as weather-resistant wood and natural stone. These materials are chosen not only for their durability and environmental resilience but also for their aesthetic compatibility with the surrounding beach and rocky terrain.

Accessibility is a key component of the beach's design. Ample walkways and ramps ensure all visitors, including those with mobility challenges, can easily access the beachfront. The beach is open every day of the week, offering facilities such as a bar-restaurant, a children's activity area, and a unique Bedouin tent, enhancing the visitor experience with a touch of local culture.

Environmental sustainability features prominently at Dekel Beach. Solar panels power the beach's lighting, and water conservation systems are in place to minimize the environmental footprint. These eco-friendly initiatives support the conservation of the local ecosystem while providing modern comforts to visitors.

The beach promotes social interaction and community engagement through its open and flexible public spaces, designed to accommodate both large gatherings and intimate events. The inclusion of a floating tanning raft and a boardwalk that allows a comfortable and safe walk up to the waterline caters to a diverse range

GOUNOD TYPES

Figure 476. *Wooden deck, Source: Author*

Figure 477. *Bricks, Source: Author*

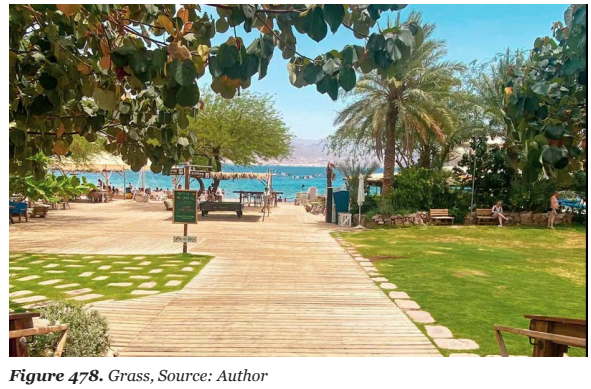


Figure 478. *Grass, Source: Author*

Figure 479. *Small light fabric Shadings, Source: Author*

Figure 480. *Wooden structure with palm leafs, Source: Author*

Figure 481. *light fabric Shadings, Source: Author*

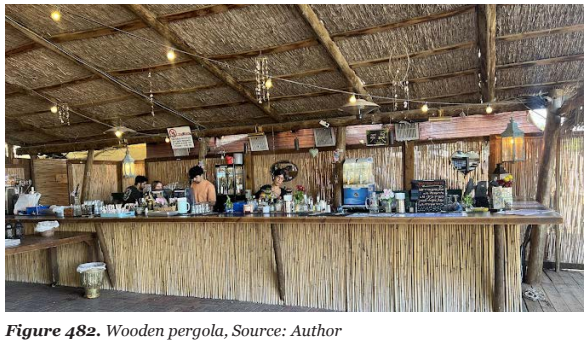


Figure 482. *Wooden pergola, Source: Author*

of beach activities. Chairs and parasols are available free of charge, although sunbeds can be rented for a fee, which includes a complimentary drink. A buffet on the beach offers a variety of dining options, although bringing outside food is prohibited.

The cleanliness and maintenance of facilities such as showers and toilets are meticulously managed, ensuring a pleasant experience for all visitors. Ample parking and the availability of the area for special event rentals further add to the beach's appeal, making it a sought-after location for both leisure and special occasions.

In conclusion, Dekel Beach represents a successful integration of thoughtful architectural design with practical functionality and environmental stewardship. It stands as a model for future coastal development projects in Eilat and beyond, offering a sustainable and enjoyable beach environment that attracts families and couples looking for a premium seaside experience.

4.9.3 MUSH'S BEACH- ECOLOGICAL BEACH

Moshe's Beach, adjacent to Dekel Beach, is committed to minimalist and functional coastal architecture design that enhances its picturesque seaside setting. Spanning

a surface area of 3,179 square meters with a length of 63 meters along the coast, the design at Moshe's Beach is deeply rooted in sustainability and integration with the natural environment.

The use of natural materials such as wood and stone, sourced locally, is a key feature of the beach's architecture. These materials are chosen for their environmental resilience and aesthetic qualities that harmonize with the surrounding landscape, ensuring the beach's natural beauty is preserved. The structures and pathways are built to blend seamlessly with the environment, emphasizing durability and ecological sensitivity.

Sustainability is at the forefront of the beach's design, incorporating solar-powered facilities, water conservation systems, and comprehensive waste recycling programs. These eco-friendly initiatives are integrated discreetly to maintain the area's visual appeal while promoting environmental stewardship. Additionally, the landscaping incorporates a variety of native, drought-resistant plants that not only stabilize the sandy soils but also enhance the beach's ecological value.

The greenery at Moshe's Beach in Eilat significantly enhances both the ecological and recreational appeal of the area. The landscape design integrates native species such as palms and other desert-

Figure 483. *Ariel view of Mush Beach, Source: Author*

Figure 484. *Mush Beach, Source: Author*

adapted shrubs, alongside various plants that are not native to the region but have been carefully acclimated to thrive in Eilat's arid conditions. This thoughtful selection of vegetation supports the local ecosystems by stabilizing the environment and providing natural habitats for local wildlife.

Additionally, the diverse plant life creates shaded retreats for visitors, offering relief from the intense desert sun and enhancing the overall beach experience. These shaded areas not only contribute

to the comfort of beachgoers but also blend seamlessly into the natural scenery, reinforcing the beach's role as a serene escape within the bustling city. The integration of these plants demonstrates a commitment to sustainability and environmental stewardship, ensuring that Moshe's Beach remains a vibrant and inviting destination for both relaxation and nature appreciation.

In addition to providing environmental benefits, the plantings at Moshe's Beach create a welcoming and shaded environment for visitors. They offer natural canopies under which families and individuals can relax, escape the intense sun, and enjoy the serene beach atmosphere. The green spaces are thoughtfully designed to promote biodiversity, contributing to the overall health of the coastal ecosystem.

Moshe's Beach also addresses the challenges of its past environmental impact, notably transforming from a site previously polluted by a fish restaurant. Before the beach's redevelopment, the restaurant contributed to significant environmental degradation, with plastic

Figure 485. *Vertical cover- Can be opened and closed, Source: Author*

Figure 486. *Wooden pergola, Source: Author*

Figure 487. *Wooden structure with palm leafs, Source: Author*

Figure 488. *Shading trees, Source: Author*

waste melting into harmful tar that contaminated the beach and harmed marine life. The new design has not only remediated these issues but also transformed Moshe's Beach into a pristine example of ecological beach development.

This beach now not only enhances the visitor experience but also serves the local community, hosting a variety of events, educational programs, and cultural activities that strengthen community ties. With its thoughtful integration of modern design, environmental responsibility, and community-focused amenities, Moshe's Beach stands as a beacon of sustainable coastal development, preserving the beauty and ecological integrity of the natural landscape for future generations.

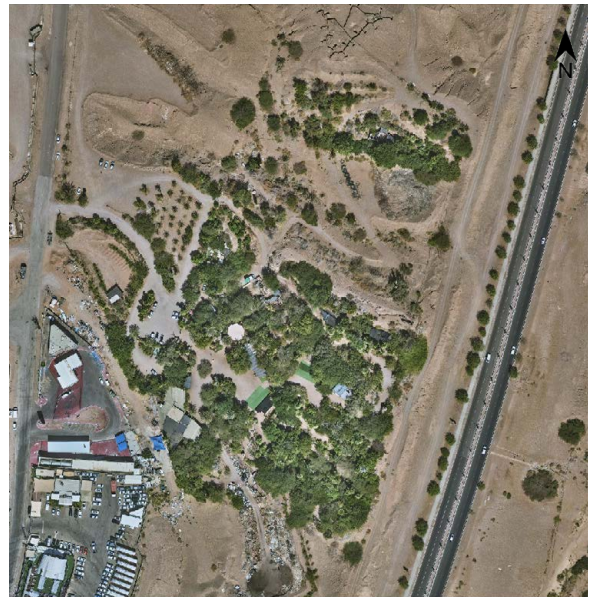


Figure 489. *Ariel view of the Botanic Garden. Source: Author*

Figure 490. *Artificial pond at the Botanic Garden. Source: Author*

Figure 491. *Artificial pond at the Botanic Garden. Source: Author*

8.9.4 BOTANIC GARDEN

Nestled within the arid landscape of Eilat, the Botanical Gardens presents a remarkable contrast to its surroundings. Dubbed the "Tropical Jungle," this enclave hosts a diverse array of plants sourced from various regions worldwide, thriving despite the challenging climate conditions of the area. Established in 1998 and covering a modest area of

0.045 square kilometres, the gardens have become a notable attraction for both locals and tourists.
Visitors can explore the gardens through guided tours and engage in enrichment workshops, experiencing the unexpected richness of biodiversity within this desert environment. The success of the gardens is attributed to their adaptive cultivation methods, including the use of compost-enriched soil and traditional terracing techniques to accommodate plant growth. Beyond its botanical significance, the presence of the Botanical Gardens serves as a testament to nature's resilience in adapting to diverse environments. Despite Eilat's limited rainfall and harsh climate, this enclave stands as a reminder of the capacity of life to thrive in unexpected settings, offering visitors a unique opportunity to connect with nature amidst the arid landscape.

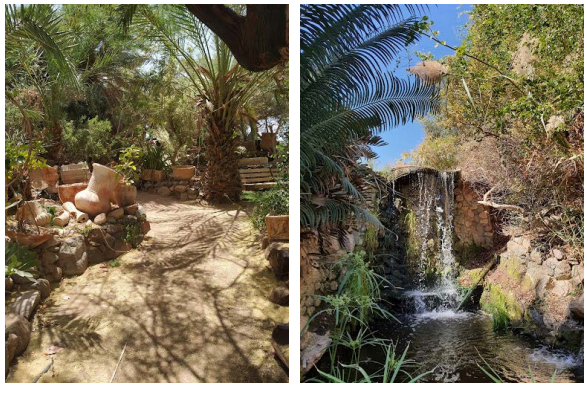


Figure 492. *Eilat´s Botanic Garden, Source: Author*

8.10 PROMENADE CASES

4.10.1 PROMENADES IN ISRAEL

The central promenade in Tel Aviv, a significant urban revitalization project, has dramatically transformed the city's relationship with its coastline. Situated along Herbert Samuel Street in Tel Aviv-Yafo, Israel, this project was undertaken by Mayslits Kassif Architects, commissioned by the Tel Aviv Municipality. Spanning a length of 2.3 kilometres, the project was initiated in the design phase from 2006 to 2015 and constructed between 2012 and 2018. It represents a pivotal redevelopment within the metropolitan area, attracting attention and acclaim for its innovative design and substantial impact on public space utilization along the city's waterfront.

8.10.2 TEL AVIV PROMANADE

Historically, the promenade has evolved through various phases since its inception in the late 1930s. Originally a modest walkway, it later became a neglected area in the 1960s before undergoing a significant renovation in the 1980s. Each transformation played a key role in shaping the dynamic interface between the bustling urban environment

and the serene Mediterranean shore. The most recent renovation aimed to eradicate the previous barriers that hindered pedestrian flow, creating a seamless transition from the city streets to the sandy beaches, thereby enhancing accessibility and continuity along the waterfront.

The redesign of the promenade was strategically focused on enhancing flow, continuity, accessibility, and ecological sustainability. It introduced a series of sitting-stairs and ramps that facilitated an unobstructed movement from the urban fabric to the beach, effectively mending the physical rupture between the city and the sea. The project also extended the promenade to connect with the city's waterfront walkways to the north and south, creating a continuous pedestrian and cycling route.

In terms of accessibility, the design included a new lower walkway to ensure that everyone, including the disabled, elderly, toddlers, and those with strollers, could easily access the beach. Ecological considerations were carefully integrated into the project through the use of sustainable materials and construction techniques, such as precast elements and bamboo woodwork, and by repurposing existing infrastructure.

The renovation expanded the promenade towards the beach with terraced sitting platforms and large shaded areas, adding recreational zones equipped with sports facilities, game courts, playgrounds, and relaxation areas under the palms. Additionally, the project refurbished coastal cafes and beach service buildings to high standards, enhancing the area's hospitality and making it a welcoming public space.

The promenade now serves as a vibrant, multicultural public domain that successfully blends urban life with coastal leisure, fostering a new urban culture where community life thrives.

Figure 493. *Tel Aviv's Central Promenade evolution. Source: Mayslits Kassif Architects*

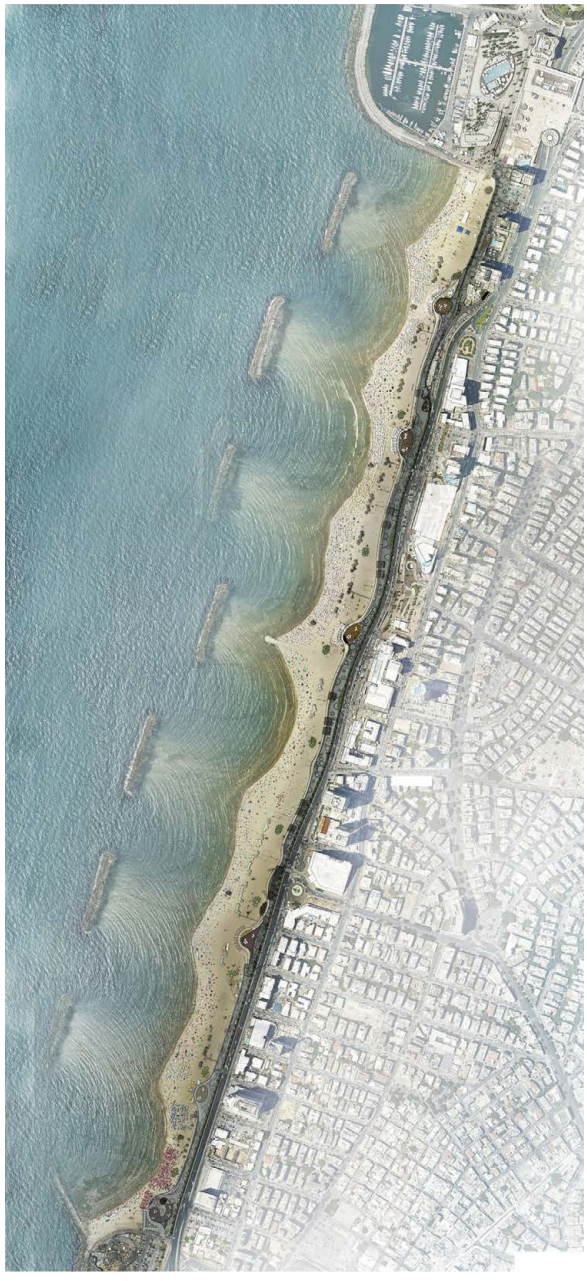


Figure 494. *General Plan of Tel Aviv's Central Promenade. Source: Mayslits Kassif Architects*

Figure 495. *Plan of Frishman- Bugrashov Segment of the Promenade. Source: Mayslits Kassif Architects*

Figure 497. *Sections of the Promenade. Source: Mayslits Kassif Architects*

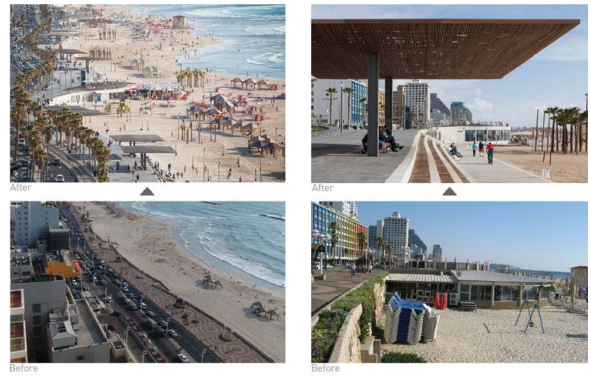


Figure 496. *Before and after images of the Promenade. Source: Mayslits Kassif Architects*

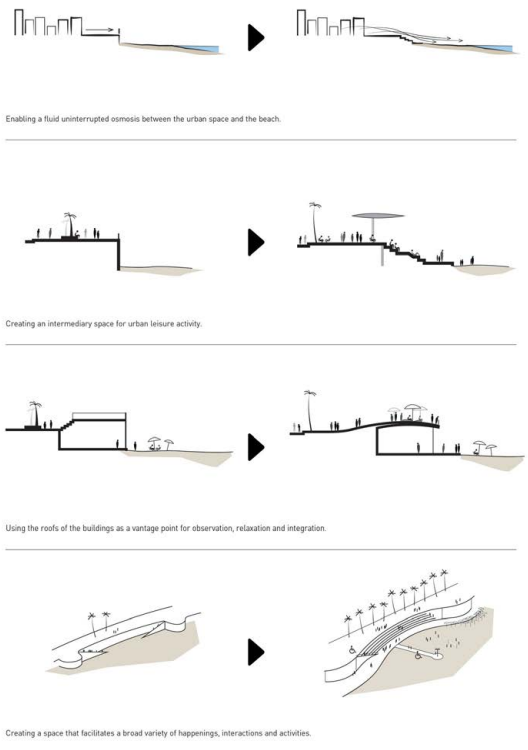


Figure 498. *Tel Aviv Promenade concept. Source: Mayslits Kassif Architects*

It hosts over 9 million visitors annually, making it one of the liveliest and nature-close public spaces in the country. This 'in-between' space, neither fully city nor beach, has become a vital melting pot for diverse social interactions, reflecting the unique character of Tel Aviv and setting a benchmark for urban coastal development (Mayslits Kassif Architects, 2019).

8.10.3 TEL AVIV'S NEW PROMENADE

The Coastal Park Promenade, designed by Studio Urbanof and completed in 2023, represents a significant enhancement to Tel Aviv's urban landscape. Located within Tel Aviv itself, this expansive promenade stretches over 2 kilometres and covers a surface area of 500,000 square meters, seamlessly connecting the northern region near Herzliya to the southern outskirts toward Bat Yam. This strategic positioning makes it a central and accessible feature of the city, easily reachable from any part of Tel Aviv.
Investment in the promenade's design and construction is evident, featuring an accessible path for wheelchairs and strollers, along with a separate bicycle lane to ensure safety and prevent conflicts with cyclists and electric scooter riders. The promenade's thoughtful layout includes wooden observation decks that enhance the viewing experience,

Figure 499. *Tel Aviv's New Promenade Ariel View. Source: Studio Urbanof*

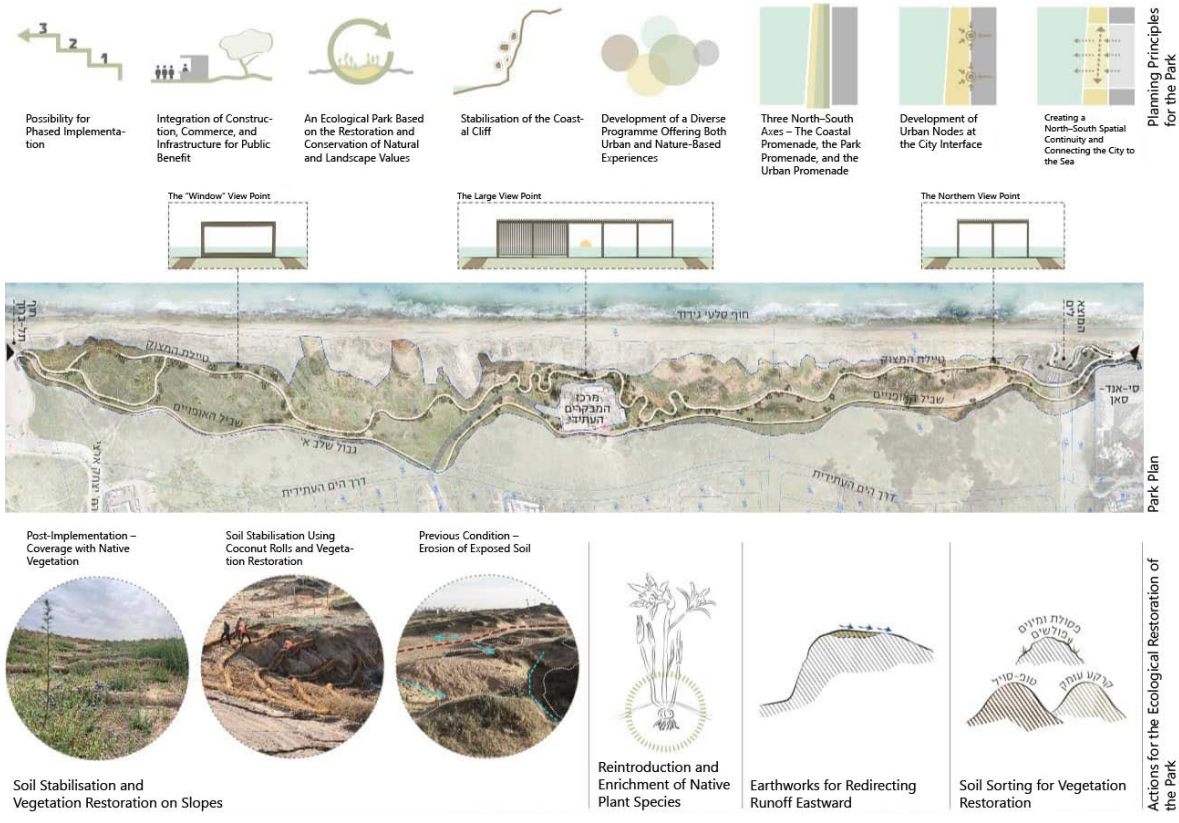


Figure 500. *Tel Aviv's New Promenade Plan. Source: Studio Urbanof*

allowing visitors to gaze out over the sea from various vantage points. These decks are integrated with steps that connect different levels of the pathway, making the scenic route accessible to all.

One of the unique attractions within the Coastal Park is a large wooden frame that offers visitors a picturesque photo opportunity against the backdrop of the sea, creating the illusion of being part of a framed seascape. Additionally, benches

Figure 501. *Tel Aviv's New Promenade Ariel View. Source: Studio Urbanof*

placed at the edges of the cliffs provide tranquil spots for solitude and reflection. The planning of this impressive promenade by Studio Urbanof also considered ecological sustainability, aiming to preserve the natural environment. This is highlighted during walks along the route, where one might spot local wildlife, such as the Bonelli's eagle, engaging in natural behaviours. The ecological design includes measures to protect the area from damage by off-road vehicles, which previously threatened the local flora and fauna.

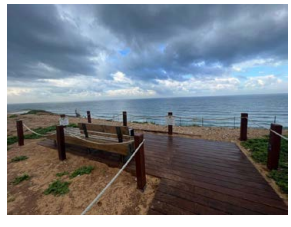


Figure 503. *View points along the promenade. Source: Studio Urbanof*

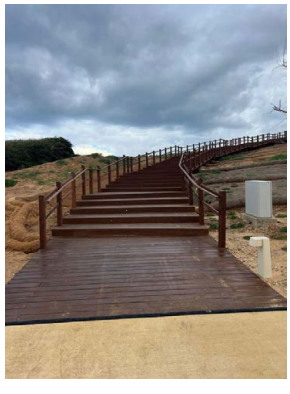


Figure 502. *Stairs of the promenade (right) and areal view of the promenade at night (left). Source: Studio Urbanof*

The Coastal Park Promenade not only serves as a recreational pathway linking the beachfronts of Bat Yam in the south and Herzliya in the north but also acts as an ecological barrier. It protects the delicate kurkar ridge while providing a continuous space for public enjoyment. This project has transformed the area into a vital cultural and recreational hub in Tel Aviv, reflecting the city's commitment to sustainable urban development and enhancing the quality of life for its residents and visitors alike.

8.10.4 DEAD SEA PROMENADE

The Dead Sea Promenade, situated in Ein Bokek, Israel, is an architectural and environmental project completed in 2017 and designed by Shlomo Aronson Architects. This 5.5-kilometre-long promenade was developed to address the environmental issue of rising sea levels in the southern Dead Sea, exacerbated by industrial activities (Shlomo Aronson Architects, n.d.). It is designed to seamlessly integrate public spaces ranging from beaches and promenades to parks and hotel zones, all set against the striking backdrop of desert cliffs (Shlomo Aronson Architects, n.d.).

This thoughtful design incorporates various zones that enhance the visitor

Figure 504. *Dead Sea Promenade. Source: Shlomo Aronson Architects*

Figure 505. *Areal View of the Dead Sea Promenade. Source: Shlomo Aronson Architects*

Figure 507. *Tthe Dead Sea Promenade (left) and open air gym at the promenade (right). Source: Braudo Maoz Landscape Architecture*

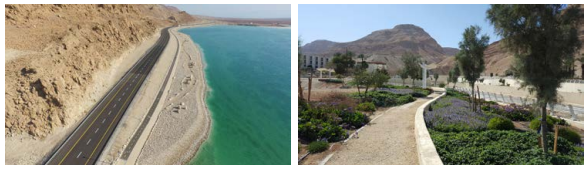


Figure 506. *Areal View of the Dead Sea Promenade (left) and vegetation at the promenade (right). Source: Braudo Maoz Landscape Architecture*

experience. Accessible decks extend into the sea, allowing easy water access for bathers. At the same time, large shade structures provide respite from the region's intense summer heat, facilitating comfortable spaces for relaxation and social interaction (Shlomo Aronson Architects, n.d.). The promenade's white shade sails not only offer protection from the sun but also visually complement the surrounding desert landscape and the blue sea, aligning with the distant views of the Jordanian Hills (Shlomo Aronson Architects, n.d.).

Adjacent to the promenade is the meticulously designed beach park, characterized by rows of date palms that evoke the area's traditional agricultural settings. This park includes grassy areas for picnics and native desert plantings, all irrigated sustainably with treated wastewater from nearby hotels, emphasizing the project's ecological consciousness (Shlomo Aronson Architects, n.d.).

The Dead Sea Promenade is part of a broader network of developments along Road 90, extending 13 kilometres along the southern Dead Sea's coast, known as Pool 5. This network stretches from Ein Bokek to the northern boundary of Pool 5 and includes a four-kilometre segment specifically designed as part of an integrated plan to protect and develop the area (Braudo Maoz

Landscape Architecture, n.d.). This plan, overseen by the Dead Sea Preservation Government Company Ltd., features both pedestrian and bicycle paths and is interspersed with shaded rest stops and a scenic sculpture garden (Braudo Maoz Landscape Architecture, n.d.).

Additionally, the Road 90 project incorporates significant infrastructure improvements to prevent flooding and enhance accessibility. It includes raising road segments and improving drainage systems, crucial for protecting the area against environmental damage. These infrastructural enhancements ensure that the promenade not only serves as a recreational space but also as a protective barrier for the region (Dead Sea Preservation Government Company Ltd., n.d.).

While the Dead Sea Promenade project focuses on the southern region of the Dead Sea, it serves as a model of sustainable development that could inspire similar initiatives in other parts of Israel, including Eilat. Eilat, located at the southern tip of Israel by the Red Sea, faces its own unique environmental and urban challenges. Drawing from the successful integration of ecological sustainability and recreational functionality seen in the Dead Sea projects, Eilat could implement similar design principles to enhance its coastal areas. Such initiatives could foster improved accessibility, protect against environmental degradation, and enhance the visitor experience in Eilat, much like the promenade has done for the Dead Sea region. By adopting and adapting the strategies used in the Dead Sea Promenade, Eilat could further establish itself as a leading destination for eco-friendly tourism and urban development in Israel.

In summary, the Dead Sea Promenade and the associated Road 90 development represent a comprehensive approach to integrating tourism and environmental protection. These projects not only make the region more accessible and enjoyable for visitors but also play a crucial role in preserving the unique natural environment of the Dead Sea area.

8.11.1 THE SIX-DAY AVENUE PROMENADE IN EILAT

The Six-Day Avenue Promenade (Shderot Sheshet HaYamim) is a magor thoroughfare in Eilat, functioning as the city's western bypass road near its entrance. Running alongside this avenue is a pedestrian walkway designed for walking, jogging, and outdoor exercise, providing a convenient and safe environment for visitors. The promenade is lined with well-maintained greenery, trees, and benches, creating a pleasant setting for outdoor activities. However, the lack of sufficient shade along the promenade

makes it challenging to use during the hot summer months. Additionally, the area features a public fitness park equipped with a variety of exercise stations, available for free public use. Maintained by the municipality, the fitness park is strategically positioned along the pedestrian path, adjacent to the bypass road and close to the city's entrance. The park itself is well-shaded, complemented by seating areas, and offers ample parking, ensuring accessibility and comfort for visitors engaging in physical activity or relaxation. The combination of the pedestrian promenade and the fitness park establishes a dynamic public space that promotes an active and healthy lifestyle. This area serves as a valuable recreational zone for both Eilat residents and tourists, contributing to a well-integrated urban landscape that encourages outdoor activities while fostering a strong connection with the surrounding natural environment.

Figure 508. *Sheshet Hayamim Promenade. Source: Author*

Figure 511. *Trees and vegetation at thr Sheshet Hayamim Promenade. Source: Author*

Figure 509. *Benches at the Sheshet Hayamim Promenade. Source: Author*

Figure 510. *Open air gym with pergola at the Sheshet Hayamim Promenade. Source: Author*

Chapter 4