

WORLD-CLASS OCEANARIUM AT MAHABALIPURAM

A THESIS

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Architecture degree

By

**AISHUWARYA V
(37210002)**



**DEPARTMENT OF ARCHITECTURE
SCHOOL OF BUILDING AND ENVIRONMENT**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY) Accredited**

With Grade "A" by NAAC

**JEPPIAAR NAGAR, RAJIV GANDHI
SALAI, CHENNAI - 600 119**

NOVEMBER 2021



SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF ARCHITECTURE

BONAFIDE CERTIFICATE

This is to certify that this Thesis Report is the bonafide work of AISHUWARYA V (37210002) who carried out the Thesis entitled “World-Class oceanarium at Mahabalipuram” under our supervision from July 2021 to November 2021.

Internal Guide
Ar.Catherine

Internal Review Member
Ar. Arulmalar

External Guide
Ar.Saritha Vaikkara

Dean and Head of the Department

Dr. DEVYANI GANGOPADHYAY

Submitted for Viva voce Examination held on 09-12-2021

Internal Examiner
Ar. Sheethal Amraotkar

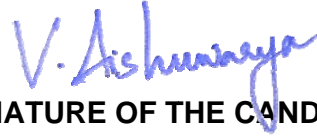
External Examiner
Ar. T. Vennila

DECLARATION

I, **AISHUWARYA V** hereby declare that the Thesis Report entitled “**World-class oceanarium at Mahabalipuram**” done by me under the guidance of **Ar.Catherine** (Internal Guide), **Ar.Arulmalar** (Internal Review Member) and **Ar. Saritha Vaikkara** (External Guide) Sathyabama Institute of Science and Technology is submitted in partial fulfilment of the requirements for the award of Bachelor of Architecture Degree.

DATE:06-12-2021

PLACE: Chennai



SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **Sathyabama Institute of Science and Technology** for their kind encouragement in doing this Thesis and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. DevyaniGangopadhay**, Dean and Head of the Department, School of Building and Environment, Our Design Chair **Dr. SureshKuppuswamy**, Thesis Coordinator **Ar.SuryaRajkumar** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Thesis Internal guide **Ar.Catherine**, Internal Review member **Ar.Arulmalar** and External Guide **Ar.Saritha Vaikkara** their guidance, suggestions and constant encouragement which paved the way for the successful completion of my Thesis work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Architecture** who were helpful in many ways for the completion of the Thesis.

AISHUWARYA V

THESIS SYNOPSIS

A place that connects 2 different environment at place is Oceanarium. Oceanarium is said to be Ocean + aquarium. The aquarium is set as an ocean atmosphere to give the visitors the lively feeling of the ocean and the marine animals.

The oceanarium is to promote tourism in Mahablipuram, tender circulated by the government of tamilnadu. To create an oceanarium with an international standard to attract the foreign tourists as well.

The oceanarium designed will be a fun place for all age group, and also it attracts not only one person rather the whole family. The facility also provides various water sport activity to give various experience for the visitors. The main challenge in the design is to recreate the marine environment for the marine animals and also to connect the human friendly environment. The facility also has the research facility and hospital to help the marine animals that are in extinction.

TABLE OF CONTENTS

CHAPTER No.	TITLE	PAGE No.
	THESIS SYNOPSIS	V
	LIST OF FIGURES	viii
	LIST OF TABLES	ix
	LIST OF PLATES	x
1	INTRODUCTION	1
1.1	INTRODUCTION	1
1.2	AIM	1
1.3	OBJECTIVE	2
1.4	METHODOLOGY	2
1.5	NEED FOR THE PROJECT	3
1.6	SCOPE OF THE PROJECT	3
1.7	OCEANERIUM AT MAHABALIPURAM	3
1.8	PURPOSE OF THE PROJECT	4
2	LITERATURE STUDY	5
2.1	FACTORS AFFECTING DESIGN	5
2.2	WATER SUPPLY	6
2.3	TYPES OF SEAWATER INTAKE	8
2.4	WATER CYCLE IN OCEANARIUM	9
2.5	LIFE SUPPORT SYSTEM	9
2.6	TYPES OF DISPLAY TANK	14
2.7	TANK DIMENSION	14
3	CASE STUDY	16
3.1	GEORGIA AQUARIUM	16
3.2	ANTALYA AQUARIUM	22
3.3	THE BLUE PLANET AQUARIUM	26
3.4	VGP MARINE KINGDOM	28
3.5	COMPARITIVE ANALYSIS OF CASE STUDIES	31
4	AREA STATEMENT	33

5	SITE STUDY	35
5.1	SITE LOCATION	35
5.2	SITE JUSTIFICATION	36
5.3	SITE STUDY	37
5.4	SITE ANALYSIS	39
6	ARCHITECTURAL DESIGN	41
6.1	SITE ZONING	41
6.2	MASTER PLAN	42
6.3	FUNCTIONS MAPPING	43
6.4	PLAN AT +5m LVL	45
6.5	SITE SECTIONS	46
6.6	OCEANARIUM BLOCK	48
6.7	AUDITORIUM	49
6.8	ADMIN AND UNDERWATER ACCOMODATION	50
6.9	MUSEUM AND MUSICAL FOUNTAIN	51
6.10	FOOD COURT AND TURTLE PARK	52
7	REFERENCE	53

LIST OF FIGURES

FIGURE No.	TITLE	PAGE No.
1.1	Methodology	2
1.2	NEWS article about the tender by government of Tamilnadu	4
2.1	Open water system	6
2.2	Semi closed water system	7
2.3	Closed water system	8
2.4	Open water intake	8
2.5	Subsurface seawater intake	9
2.6	Water cycle in oceanarium	9
2.7	Protein skimmer	10
2.8	Foam fractionators	11
2.9	Bag filters	11
2.10	Sand filters	12
2.11	UV filters	12
2.12	Ozone generators	13
2.13	Heat pump	13
3.1	Georgia aquarium- Location map	16
3.2	Georgia aquarium- Site features	16
3.3	Georgia aquarium- Ground floor plan	17
3.4	Georgia aquarium- Ground movement plan	18
3.5	Georgia aquarium- Ballroom plan	19
3.6	Ocean voyager tank feeding	20
3.7	Quarantine lab - Georgia aquarium	20
3.8	Life support system - Georgia aquarium	21
3.9	Antalya aquarium	23
3.10	Antalya aquarium- Site plan	23
3.11	Antalya aquarium- Visitor movement 1	23
3.12	Antalya aquarium- Visitor movement 2	24

3.13	Antalya aquarium- Visitor movement 3	24
3.14	Antalya aquarium- South east elevation	25
3.15	Antalya aquarium- South west elevation	25
3.16	Antalya aquarium- Ground floor plan	25
3.17	Antalya aquarium- First floor plan	25
3.18	The blue planet aquarium	26
3.19	The blue planet aquarium - Zones	27
3.20	The blue planet aquarium - Elevation 1	27
3.21	The blue planet aquarium - Elevation 2	27
3.22	The blue planet aquarium - Visitor movement	28
3.23	VGP Marine kingdom - Visitor movement	30
3.24	VGP Marine kingdom - Schematic isometric view	30
5.1	Schematic representation of tourist spots at Mahabalipuram	36
5.2	CRZ regulation map	38

LIST OF PLATES

TABLE No.	TITLE	PAGE No.
1	Site location	35
2	Site study	37
3	Site analysis	39
4	Site analysis	40
5	Site zoning	41
6	Master plan	42
7	Functions mapping	43
8	Functions mapping	44
9	Plan at +5m lvl	45
10	Site sections	46
11	Site section	47
12	Oceanarium block	48
13	Auditorium	49
14	Admin and underwater accommodation	50
15	Museum and Musical fountain	51
16	Food court and turtle park	52

CHAPTER 1:INTRODUCTION

1.1 INTRODUCTION

The Oceanarium is a centre for entertainment, education, and scientific research for the general public. The majority of oceanarium are located along coastlines. The world's first large oceanarium, currently known as Marine land, was completed in 1938 near St. Augustine, Florida. Oceanarium, sometimes known as marine aquariums, are often built-in or near a body of water, such as an ocean, bay, or river. They have huge, clear windows that offer the finest possible viewing of aquatic life.

Oceanarium are harder to take care of than freshwater aquariums. Changes in salinity complicate the interactions between the temperature, acidity, and oxygen levels in an aquatic system, resulting in complex maintenance difficulties that require frequent attention if fragile fish and other species are to be kept healthy. Oceanarium, on the other hand, offer a number of benefits. Marine habitats have a much wider variety of fish than freshwater ecosystems, allowing for a wider range of displays.

1.2 AIM

- i. The aim of the project is to design a oceanarium complex at Mahabalipuram to promote tourism.
- ii. The oceanarium will be built in such a way that it would attract not only a single visitor but the entire family to the facility.
- iii. To create a recreational activity for people from all age groups.
- iv. The design would also be friendly for the physically challenged.
- v. To recreate the marine environment and ecosystem as well as connect it with a human-friendly environment.

1.3 OBJECTIVE

- a. To study about the functions, environment qualities, machinery and equipment supporting the marine environment.
- b. To explore the various oceanarium buildings across the world and understand the spatial strategies and design concepts of the oceanarium.
- c. To conclude with a proper design program, and design according to the study and program.
- d. The designing phase includes recreating the marine ecosystem. with inclusive design concepts for the visitor zone.

1.4 METHODOLOGY

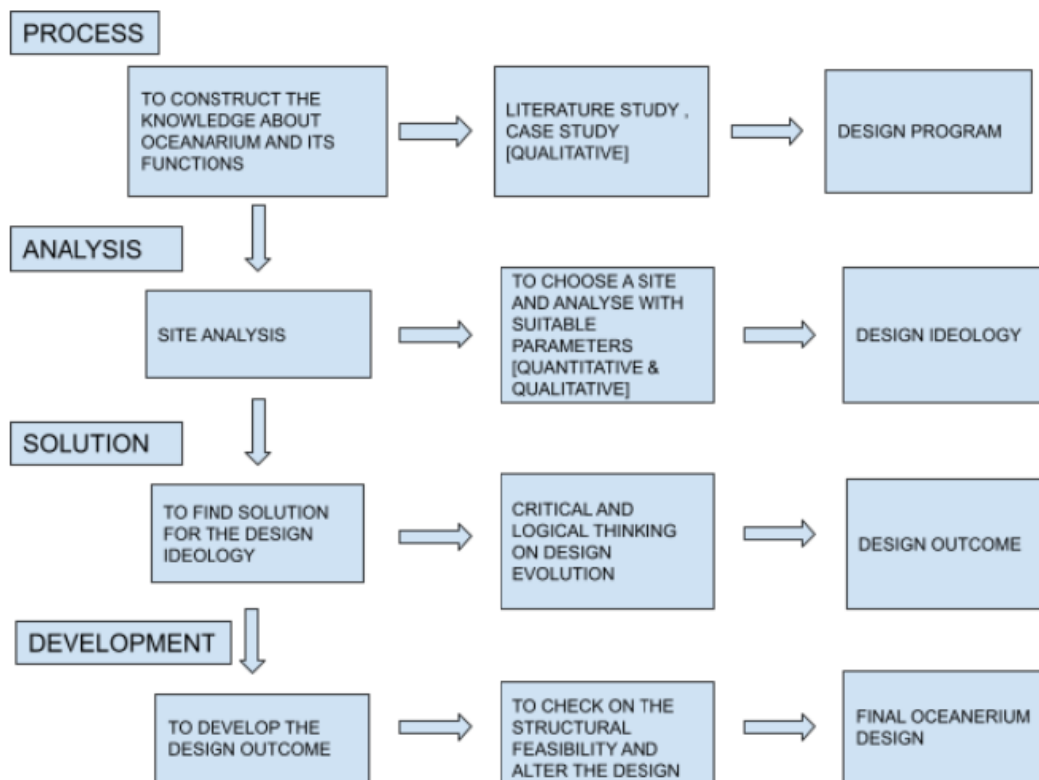


Fig 1.1:Methodology

1.5 NEED FOR THE PROJECT

An oceanarium is an important feature of this seafront development since it demonstrates the beauty that may be found within the enigmatic water. It is a sea within a building in and of itself. It also aids the ongoing research into the water and its creatures. The slogan of oceanarium all around the world is "Species Conversation." The need for an oceanarium was emphasized, as it is not only a recreational area but also a study platform where significant flora and fauna research can be undertaken.

1.6 SCOPE OF THE PROJECT

Tourism is one of the industries that give the most job opportunities per dollar invested. It is a sector that provides prospects for self-employment, particularly for unskilled and semi-skilled people. An Oceanarium in Mahabalipuram will provide a turn to the tourism endeavors in the region, with more than 100 million domestic tourists and roughly 3 million foreign tourists visiting Tamil Nadu.

This belt is developing a multitude of resorts and recreational facilities, making it a suitable location for an Oceanarium. The oceanarium has a lot of potential in India because it will be the first of its type in the country to display the entire range of aquatic life. A world with a package of entertainment It would be a first for the Indian people because no large-scale marine park has ever been built in the country. With its conservation programme, it will aim to educate as well as entertain the general public.

1.7 OCEANARIUM AT MAHABALIPURAM

The Oceanarium Project At Mahabalipuram Comes Under Pipeline Projects. The Project Proposal Is Taken Control By The Department Of Fisheries, Tamil Nadu Government Department Of Tourism.

**GOVERNMENT OF TAMILNADU
DEPARTMENT OF FISHERIES**

**Development of World Class Oceanarium at Mamallapuram (Chennai), India
on PPP Mode**

Request for Expression of Interest (REOI)

Department of Fisheries (DoF) intends to develop a world-class Oceanarium with state-of-the-art facility on Public Private Partnership (PPP) basis in Mamallapuram, Chennai. Oceanarium in India is First-of-its-kind; the project is envisaged to be implemented on PPP Mode in an environmentally sustainable manner. The land identified is sea facing and measures about 16 Acres. Longer 'Lease Period' would be provided for the developers. The proposed project should enhance the beauty and ecology of abutting 'Beach Front' without changing the basic nature and ecology of the area. All concepts and activities proposed should be in accordance with Coastal Regulation Zone (CRZ) Rules of Ministry of Environment & Forests, Government of India and any other relevant rules framed by Government of Tamilnadu from time to time. The State Government shall provide 20% of Project cost as Viability Gap Funding (VGF) and other concessions as deemed necessary for the project.

REQUEST FOR EXPRESSION OF INTEREST INVITATION

Department of Fisheries (DoF) invites Request for Expression of Interest (REOI) from Interested developers as individual entity/ consortium who have experience in developing, operating and maintaining projects such as: Aquariums / Oceanarium Parks, Science City/Convention Centre, Urban Infrastructure, Development Projects, Amusement parks etc. The Capital cost of each project should be more than Rs.25 Crores.

The REOI should include following documents:

- > Organization Profile, Management structures, Details of current projects/investments.
- > Details of similar projects implemented with details of implementation period, cost etc.
- > Annual Reports for the last three (3) financial years.

Selection of Developer:
Selection of developer will be on the basis of competitive bidding process in response to Request for Qualification (RFQ) and Request for Proposal (RFP) to be invited by DoF subsequently.
(DoF reserves the right without any obligation or liability to accept or reject any or all the REOI's at any stage of the process, to cancel or modify the process or any part thereof or to vary any of the terms and conditions at any time, without assigning any reason.)

The REOI document can be downloaded from www.tenders.tn.gov.in / www.fisheries.tn.gov.in
In case of queries/clarifications on the project, please contact the contact details mentioned below:

<p>Proposal submission: The filled in proposal should reach The Commissioner of Fisheries, Department of Fisheries, Government of Tamil Nadu at the address specified on or before 26th October at 16:00 hrs.</p> <p>Proposal Meeting: A meeting will be conducted with the interested developers to clarify the queries / suggestion on 05 October at 11:30 hrs, Department of Fisheries at the address specified.</p>	<p>Office Address: The Commissioner of Fisheries ; Department of Fisheries, DNS complex, Teymampet, Chennai - 600 006. Web: www.fisheries.tn.gov.in Ph: +91-44-24338371, 24321827 / Fax: 24335985 E-Mail: 31000000100@gmail.com</p> <p style="text-align: right;">Commissioner of Fisheries</p>
---	---

Fig. 1.2: NEWS article about the tender by government of Tamilnadu

1.8 PURPOSE OF THE PROJECT

The proposal of world-class oceanarium at Mahabalipuram is initiated to increase the tourism at Mahabalipuram. To increase the standard of Mahabalipuram and increase the foreign tourists to the place.

CHAPTER 2: LITERATURE STUDY

2.1 FACTORS AFFECTING OCEANARIUM DESIGN

A more intricate site design is required for an oceanarium than for an aquarium. It's a complex that creates a fascinating environment in which visitors may see marine life in its native habitat while also seeing the entire underwater landscape.

2.1.1 PLANNING

Because there is a risk that the oceanarium may be busy, a well-designed oceanarium must include seamless facilitation of the process as well as fluid circulation of people. There are two types of areas:

1) *The public section*-This includes all of the exhibits as well as the recreational area, receives the most traffic.

2) *Services Area*-All areas essential for maintaining the exhibit area in order for the oceanarium to function properly. These regions should normally be hidden from the view of visitors.

2.1.2 CIRCULATION

Convenience, safety, and beauty are the major principles. When speed is needed, convenience suggests it. Various procedures run well, and medical checks ensure that the environment is free of aural and visual annoyances.

A properly designed Oceanarium must have enough space to allow for smooth circulation of the many processes involved in keeping things operating well, as well as enough ventilation and sound insulation. A scientifically conceived plan for arranging the tank in harmony with its surroundings in order to appeal to the visitor's sight.

- i. Various necessary operations, such as receiving specimens, medically examining them, and, if necessary, quarantining them, should be given special attention.
- ii. Other essential purposes include teaching knowledge about the specimen exhibited by arranging examples of the same type into useful themes.
- iii. It is critical that the exit be accessible to the public and does not open into an area that could cause them to become confused, nor does it open near the services area. In the event of an emergency, it should open onto open space.

2.2 WATER SUPPLY

There are 3 types of the water supply system:

- 1) Open Water System
- 2) Semi-Closed Water System
- 3) Closed Water System

2.2.1 OPEN WATER SYSTEM

Various necessary operations, such as receiving specimens, medically examining them, and, if necessary, quarantining them, should be given special attention. Other essential purposes include teaching knowledge about the specimen exhibited by arranging examples of the same type into useful themes.

It is critical that the exit be accessible to the public and does not open into an area that could cause them to become confused, nor does it open near the services area. In the event of an emergency, it should open onto open space.

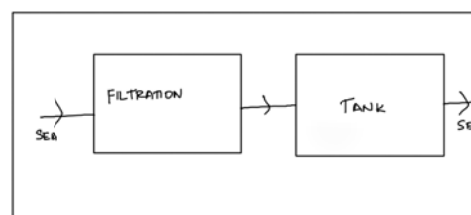


Fig.2.1 Open water system

2.2.2 SEMI-CLOSED WATER SYSTEM

Semi-closed systems are similar to closed systems with the exception that there is a constant connection to the water supply and the problem of dissolved wastes is controlled by the regular addition of new water. In terms of temperature control and pumping, this system is more cost-effective than the open type.

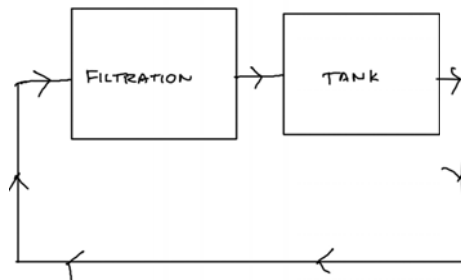


Fig.2.2 Semi closed water system

2.2.3 CLOSED WATER SYSTEM

In closed systems, water is continually recirculated and only replaced on a periodic basis. Because metabolic wastes are not continuously evacuated from the system, they must be handled. Ammonia must be quickly eliminated or changed since it is toxic even in extremely low quantities. This is a significant issue. The bacteria that convert ammonia to nitrite in the aquarium live mostly in the filter material, thus a slow sand filter with a high surface area is normally used to assure their abundance.

Plant growth in the aquarium, particularly in marine systems, is rarely adequate to use all of the nitrate created by bacteria from nitrite. Although some aquariums have worked for many years with little or no water replacement, it is usually necessary to replace 1 to 10% of the water each month to maintain a low nitrate level.

In both freshwater and ocean systems, the use of charcoal helps to slow the accumulation of nitrogenous wastes. The acidity of water is also increased by metabolic wastes. When water renewal is sporadic, carbonate compounds are typically utilized to maintain an ideal degree of acidity.

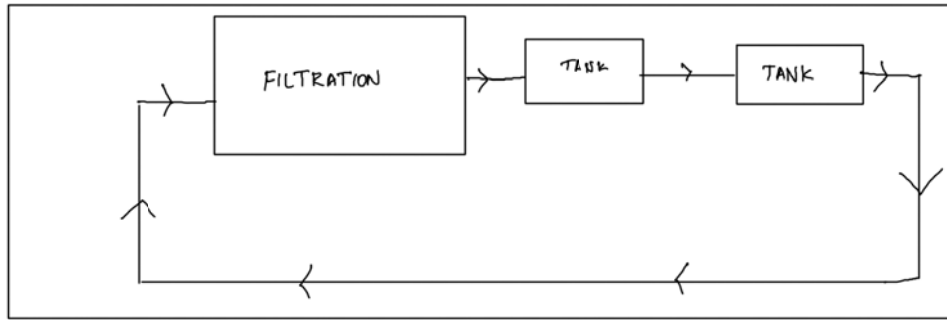


Fig.2.3 Closed water system

2.3 TYPES OF SEAWATER INTAKE

There are 2 types of seawater intake:

1. Open seawater intake
2. Subsurface seawater intake

2.3.1 OPEN SEAWATER INTAKE

Direct intake of seawater from the sea using pipelines and pumping to the shore and filtering the water for aquarium usage.

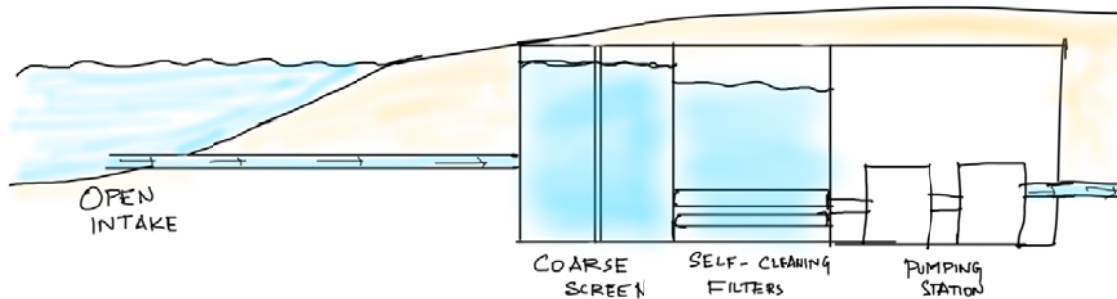


Fig. 2.4 Open water intake

2.3.2 SUBSURFACE WATER INTAKE

Pumping seawater from the underground and using that water for aquarium after filtering and disinfecting the water.

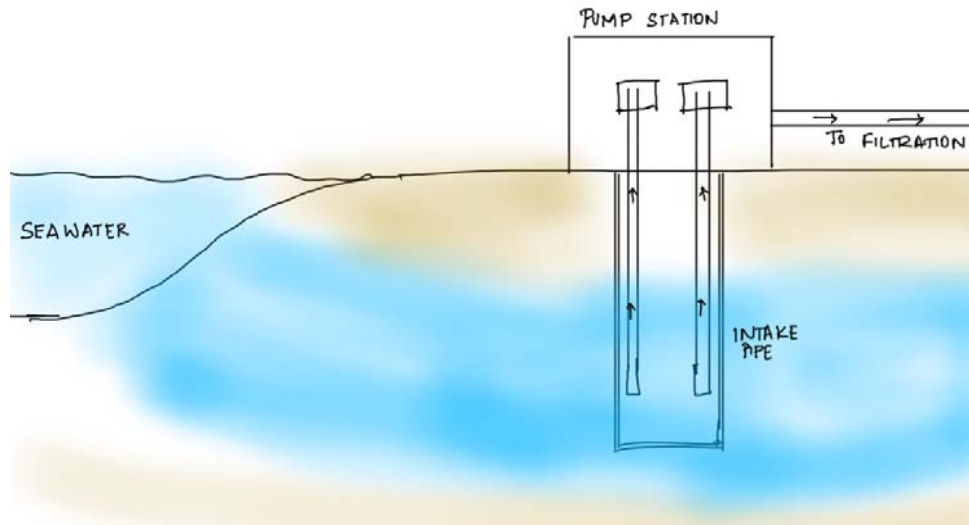


Fig2.5 Subsurface seawater intake

2.4 WATER CYCLE IN OCEANARIUM

SEA WATER → INLET PIPE → PUMP → FILTRATION → LIFE SUPPORT SYSTEM

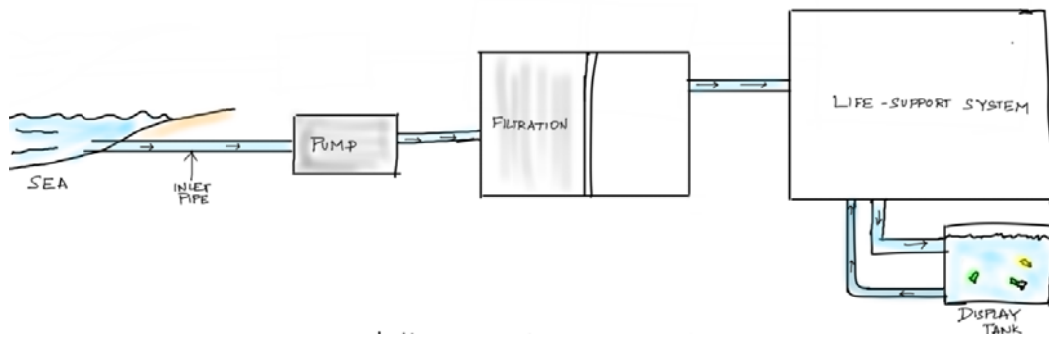


Fig. 2.6 Water cycle in oceanarium

2.5 LIFE SUPPORT SYSTEM

For marine life, Life Support Systems (LSS) provide a healthy and stable habitat. Aquarium life support systems should be positioned remotely inside the facility for aquariums larger than 350 gallons. The volume and complexity of certain aquarium applications determine the size of the Life Support System.

Biological, mechanical, and chemical filtration is required in all recirculated aquarium life support systems. For all saltwater applications, protein skimming is

deemed important. For bigger aquariums, the design features a remote filtration system. An open system is used in most remote aquarium life support systems, while a closed system is often used to offer additional water circulation. To maintain water temperature in the aquarium, most remote LSS will require a chiller and heater.

2.5.1 EQUIPMENTS USED IN LSS

1. Protein skimmers
2. Foam fractionators
3. Bag filters
4. Sand filters
5. UV filters
6. Ozone generators
7. Heat pumps

2.5.1.1 PROTEIN SKIMMERS

Protein Skimmer Filtration Systems remove 90% of dissolved organics, proteins, fish food residues, and colours from the water column physically. Fine particulate debris (40 microns) that have adhered to the foam is removed. Because the pressure sand filters are under less stress, they may filter at a faster rate. Increase the water's oxygen saturation by mixing and dissolving oxygen and ozone. As part of the water quality monitoring package, the ORP probe is used to control and monitor ozone dosing. Inner and outer tubes are both auto-washed.



Fig. 2.7 Protein skimmer

2.5.1.2 FOAM FRACTIONATORS

Purifying millions of liters of water with billions of tiny bubbles. Foam Fractionators effectively and efficiently remove microscopic organic compounds,

protein particles, amino acids, bacteria, water tints and other waterborne detritus from salt-water aquarium.

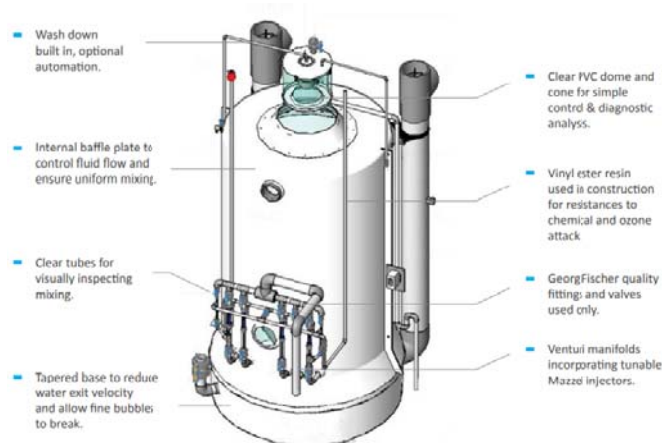


Fig. 2.8 Foam fractionators

2.5.1.3 BAG FILTERS

The Bag Filter is a versatile vessel that may be used for a variety of filtering and water treatment tasks. In small systems, this unidirectional pressure filter (working pressure 0-100 PSI) removes particulates, and it can also be utilized as a detritus filter in bigger systems. -trap for vacuuming exhibit tanks.

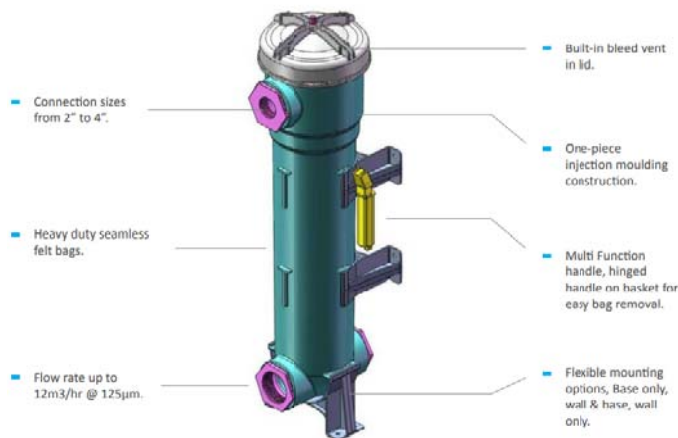


Fig. 2.9 Bag filters

2.5.1.4 SAND FILTERS

Day in and day out, year after year, sand filters provide filtering efficacy and high-quality water as easily as feasible. The design has been refined through years of research and development to produce a unit that is as easy to buy and operate as it is sturdy and long-lasting.



Fig. 2.10 Sand filters

2.5.1.5 UV FILTERS

Effective, cost-effective, and environmentally friendly. UVGI is a disinfection technology that uses short-wavelength ultraviolet (UV-C) light to kill or inactivate germs by breaking nucleic acids and altering DNA, rendering them unable to perform important physiological processes.

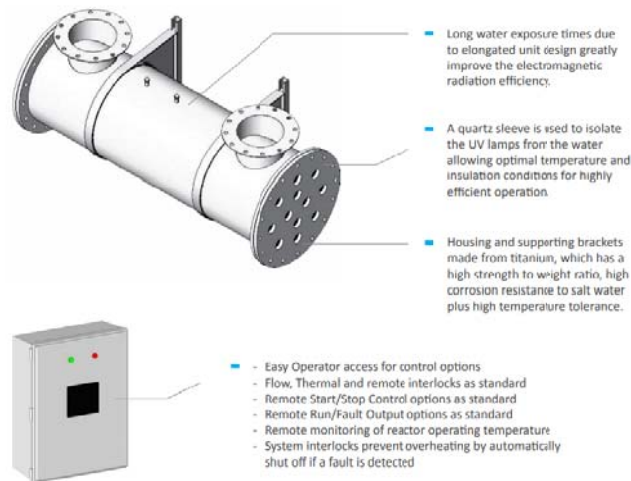


Fig. 2.11 UV filters

2.5.1.6 OZONE GENERATOR

Ozone (O₃) is a powerful oxidizer. When used correctly, ozone can efficiently remove organic contaminants and cleanse water through two processes:

- Flocculation
- Oxidation

Because ozone is an unstable gas with a short life span, it must be generated at the aquarium's point of use.



Fig. 2.12 Ozone generator

2.5.1.7 HEAT PUMP

Automatically maintain the ideal water temperature. Heat pumps with sensors maintain water temperatures by automatically cooling or heating. Temperature regulation is necessary for animal health, but heating and cooling systems are energy-intensive. As a result, it provides heat exchangers in a variety of sizes and refrigerants.



Fig. 2.13 Heat pump

2.6 TYPES OF DISPLAY TANKS

2.6.1 TOUCH POOLS

A fish tank that is kept for display as well the visitors can touch the live marine animals and experience their touch. The pools are kept open on the top so that one can easily access the marine animals.

2.6.2 CORAL REEF TANK

It's a massive tank that represents the entire reef ecosystem and houses a community of fish that live and thrive in coral reefs.

2.6.3 PREDATOR TANK

These are the aquarium's most interesting tanks, and they usually host a variety of sharks and rays.

2.6.4 TURTLE POOLS

These are small pool that contain turtle habitat.

2.6.5 FRESH WATER DISPLAY

Tropical colourful fresh water fishes from the pond and house aquariums, as well as an artificial pond and waterfall, are showcased here.

2.6.6 AQUATIC MUSEUM

It has an extensive collection of marine relics, ranging from shark teeth to bones. It also depicts the marine ecosystem's chronology.

2.7 TANK DIMENSION

2.7.1 TANK LENGTH

Thus, where L - Tank Length FL - Expected Maximum Fish Length for a single specimen

Peaceful fish peaceful tank-mates: $L = FL * 4$

Aggressive fish, good swimmers: $L = FL * 5 * 1.2$

Aggressive fish poor swimmers: $L = FL * 5$

Aggressive fish, cruise predators: $L = FL * 5 * 1.5$

Mild temperament, cruise predators: $L = FL * 5 * 1.3$

Pair of aggressive fish, cruise predators : $L = FL * 5 * 1.5 * 1.2t$

2.7.2 TANK WIDTH

For a single specimen, W - Tank width, FL - Expected maximum fish length

Fish body width < 5cm : $W = FL * 1.2$

5cm < Fish body width < 10 cm: $W = FL * 1.3$

10cm < Fish body width < 20cm: $W = FL * 1.4$

Fish body width - 40 cm: $W = FL * 1.7$

2.7.3 TANK HEIGHT

For a single specimen, H -Tank Height, FH-Expected maximum fish height

Fish body height < 5cm: $H = 20 \text{ cm} * s + (FH * 2.5)$

Fish body height > 5cm Fish: $H = 20 \text{ cm} * s + (FH * 3.5)$

For ray fish

Fish body height < 5cm: $H = 20 \text{ cm} * s + (FH * 2)$

Fish body height > 5cm: $H = 20 \text{ cm} * s + (FH * 2)$

CHAPTER 3: CASE STUDY

3.1 GEORGIA AQUARIUM

3.1.1 INRODUCTION

The Georgia Aquarium (Atlanta, Georgia) is the world's biggest aquarium, with 120,000 creatures representing 500 species housed in 8.5 million US gallons (32,000 m³) of marine and freshwater when it first opened in 2005. The site design comprises of a single structure on a 20-acre plot bordered on one side by a mixed landscape and with multilevel parking at the back of the building. It has touch pool tanks with rays and sharks, as well as displays on sea turtles and the fauna of Gray's Reef, a national marine reserve off the coast of Georgia.

3.1.2 LOCATION

Fig. 3.1 Georgia aquarium- Location map

3.1.3 SITE FEATURES

Fig. 3.2 Georgia aquarium- Site features

3.1.4 DISPLAY ZONES INSIDE AQUARIUM



Fig. 3.3 Georgia aquarium- Ground floor plan

The six different galleries:

1. Georgia explore,
2. tropical driver,
3. ocean voyager,
4. cold-water,
5. river scout,
6. dolphin tales

This exhibit is designed to feature the life of the Meso-american barrier reef system, and showcase the aquarium's whale sharks, as well as a 100 foot (30m) underwater tunnel and the world's second largest viewing window.

3.1.5 MOVEMENT INSIDE AQUARIUM



Fig. 3.4 Georgia aquarium- Ground movement plan

Central atrium is considered as the centre point building and circulation is unidirectional towards atrium.

3.1.5 ADDITIONAL FEATURES OF AQUARIUM

The magnificent Oceans Ballroom event area at the Aquarium is intended to host private parties that create a big impression. Oceans Ballroom may be customised to meet your exact event needs with up to 23,000 square feet of flexible space.

area: 16,400 sq ft (23,000 sq ft including pre-function)

dimension: 150x112ft

ceiling height: 19-21ft

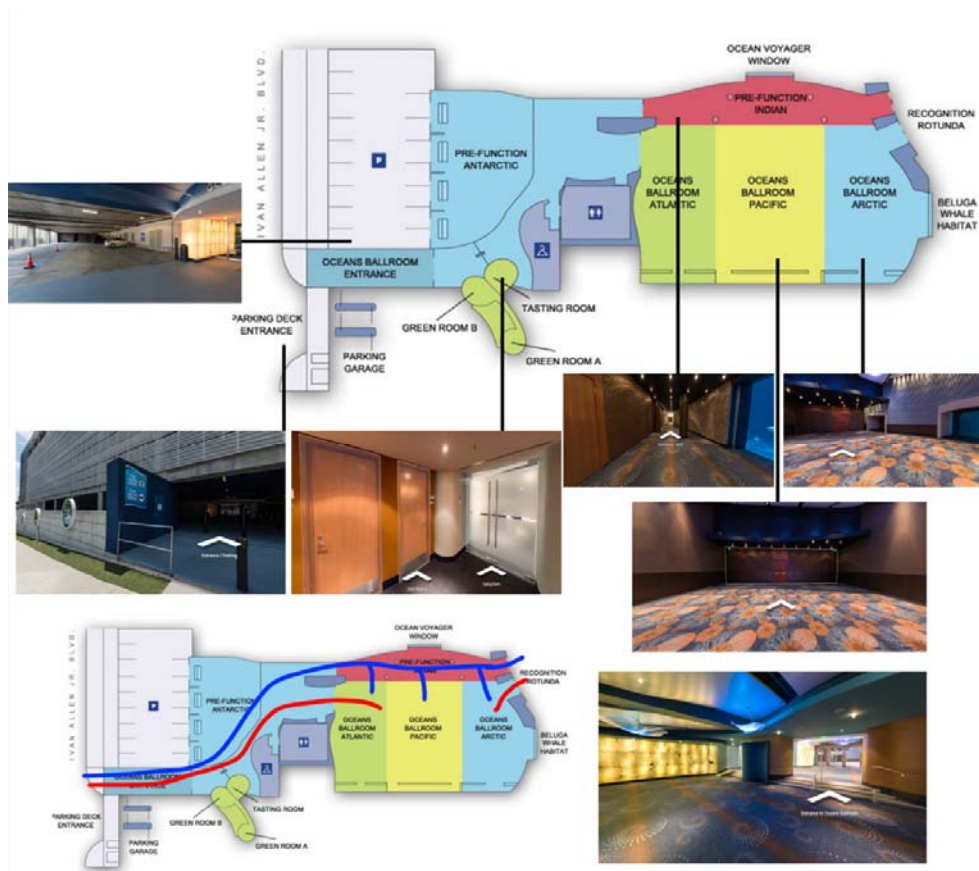


Fig. 3.5 Georgia aquarium- Ballroom plan

3.1.6 WORKING OF AQUARIUM

3.1.6.1 HVAC SYSTEM AT GEORGIA AQUARIUM

To ensure that all the aquatic animals are comfortable, It can make up to 9000 decisions per minute. It checks the air temperature and adjusts in favor of the animals in the water.

3.1.6.2 SALTWATER DISPLAYS

A temperature of 24 degrees is maintained. Dilution, Cleaning, and Filtering are required for the water. The life support system cleans, filters, and conditions the environment. It inspects the water's oxygen content, acidity, air and water pumps, and filters. A backup is available in the event of equipment failure.

3.1.6.3 FEEDING

In a special kitchen called husbandry commission, staffs prepare food for each tank. It has 20,000 pounds of food in the freezers and 6,000 pounds of food in the refrigerator. Food amounts vary by species.

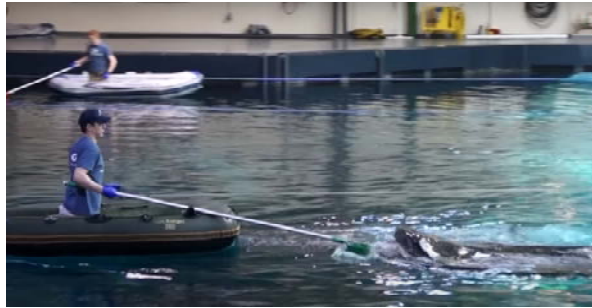


Fig. 3.6 Ocean voyager tank feeding

3.1.6.4 QUARANTINE LAB

Fish that have been captured from the sea are kept for 30 days. Each tank has a man like doll in it to allow the fish to adjust to the human crowd when on show. Newly arrived aquatic animals, sick animals, and breeding tanks are in quarantine tanks.



Fig. 3.7 Quarantine lab - Georgia aquarium

3.1.6.5 LIFE SUPPORT SYSTEM IN GEORGIA

- Pumps with 500 unique types
- 187 sand filters
- 70 protein skimmers

- 31 computers - monitoring 4500 analog and digital control points.

The ocean voyager tank receives 1,40,000 gallons of water in one minute from the life support system. 225 pumps with 5,000 horsepower run to complete this. Each week, the life support system's water quality is tested 5000 times on 100 habitats.

Life support system maintains.

- pH level.
- Alkalinity.
- Nutrient level.



*Fig. 3.8*Life support system - Georgia aquarium

3.1.6.6 CORAL MAINATANCE

A lab has been provided to breed and cultivate the coral reef. The lab has been designed to provide corals with a controlled environment. The tank has over 90 fish and 200 coral types. the water in the tank measures 1,64,000 gallons. The skylight has clear steerfire glass that allows up to 40% of the sun's uv rays to pass through. in addition, artificial light has been provided to assist in coral growth. To reproduce natural water movement, an artificial wave system has been provided at the top of the tank. 6000 gallons of water are pumped per cycle by the wave machine.

3.2 ANTALYA AQUARIUM

3.2.1 INTRODUCTION

Location: antalya, turkey

Site area: 10 acres

Build-up area:12,000 sq.m

Architect: bahadir kul

The main design decisions for the Antalya Aquarium project are based on the desire to create a unique experience for visitors. The main design decisions of Antalya Aquarium project are determined with desire of blending in with the topography and disappearing in silhouette vanishing in silhouette and creating harmony with topography. With the ground floor pushed back, a shaded public space is created to protect against the sun and benefit from the wind. Pulling back of the ground floor, a shaded public area is created to beware from sun and profit from wind.

The aquarium project's approach, gathering, and disseminating points are all located in this shaded public area. The information and fast-food areas, as well as the amphitheater and box office, are all defined by the curves and waves of this area's shell. This shaded public area is the point of approach, gather and diffusion of the aquarium project. Also the shell of this area determines the information and fast-food areas, amphitheater and box office with its curves and waves.

The public ramp leads to the public exhibition site, which includes the aquarium and snow world entrances. The journey begins with information about the aquarium and sea creatures. The journey begins with information about the aquarium and sea creatures. The travel path starts with aquarium information and sea fish. The path continues with cave fish, world rivers, jellyfish, Turkey fish, predatory fish, sharks, the main 5 million liters tank and finally with 131 m tunnel. The each stop in this path is designed with its own character.



Fig. 3.9 Antalya aquarium

3.2.2 SITE PLAN

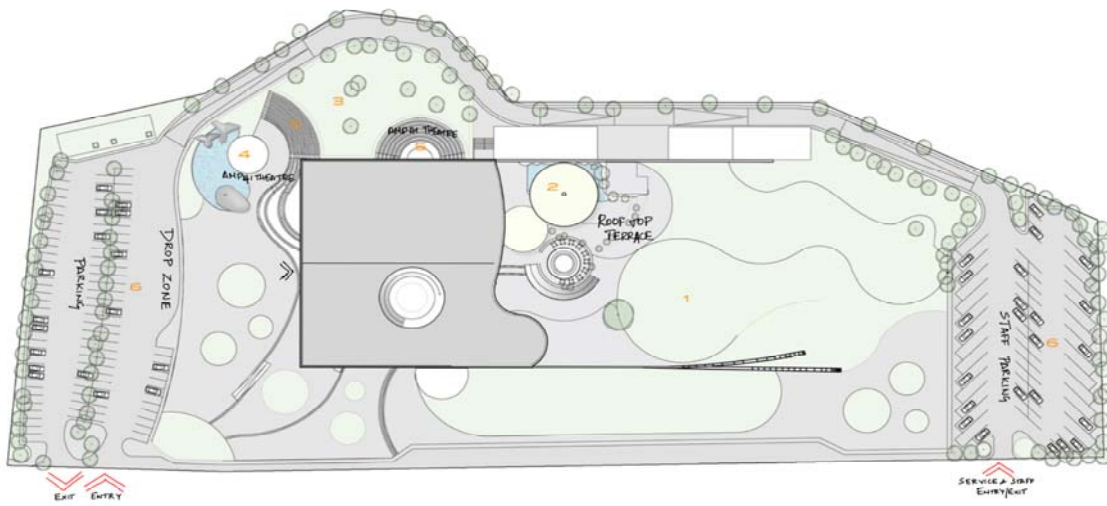


Fig. 3.10 Antalya aquarium- Site plan

3.2.3 MOVEMENT INSIDE AQUARIUM

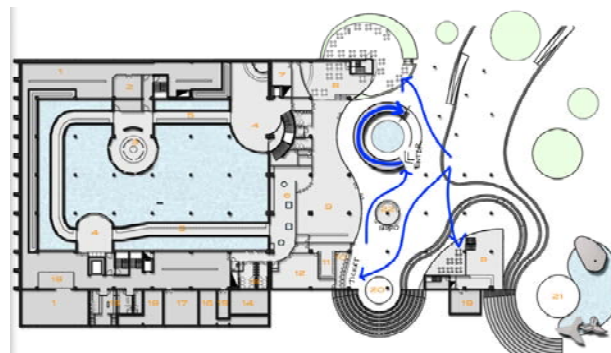


Fig. 3.11 Antalya aquarium- Visitor movement 1

From the ground floor, visitors will take the main ramp, which leads to the first floor, where Ice City and the main exhibits start.

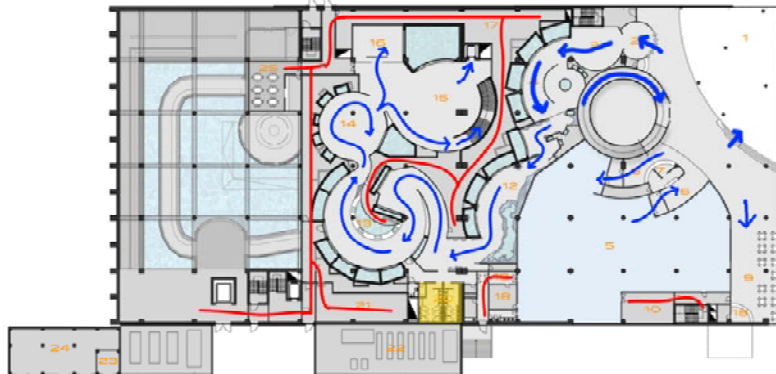


Fig. 3.12 Antalya aquarium- Visitor movement 2

The main exhibits start with a series of small tanks and some touch pools with various categories displayed. By the end of the first floor exhibits, it has a huge tank with a big viewport and a viewing zone. From there, visitors can take stairs or a lift to the ground floor.

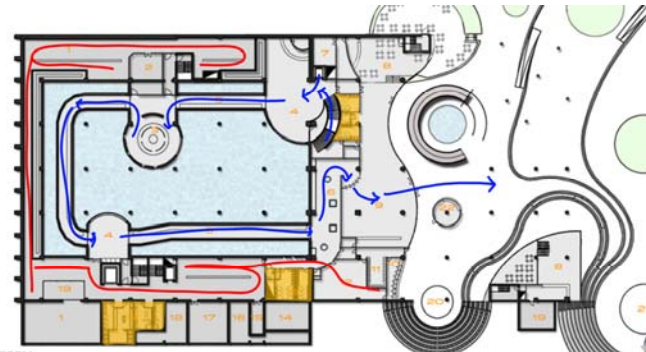
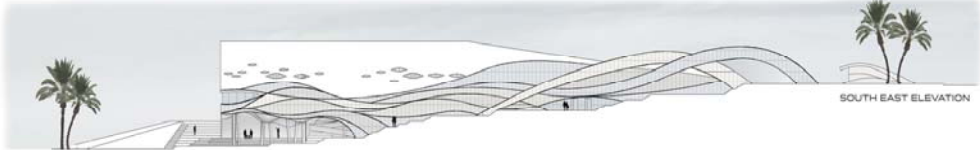


Fig. 3.13 Antalya aquarium- Visitor movement 3

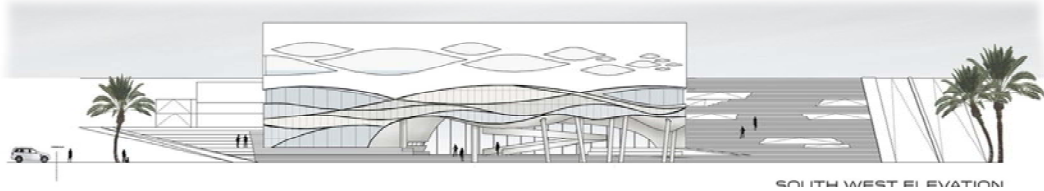
The ground floor has a huge tank of exhibits with deep-sea animals like sharks and stingrays, with a tunnel display where the visitors can experience a 270-degree view of the aquatic life. The tunnel is 200m long and leads to the main entrance lobby as an exit.

The circulation is well defined by the flow. It is achieved through the placement of different zones at various positions of the building.

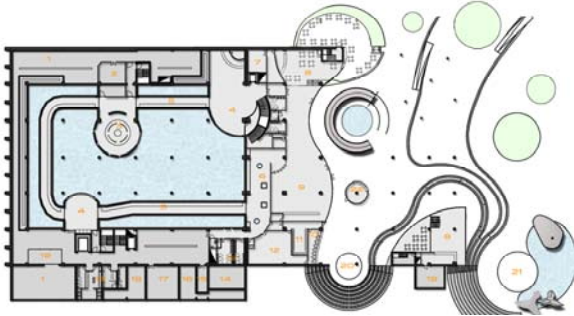
3.2.4 STRUCTURE OF THE AQUARIUM



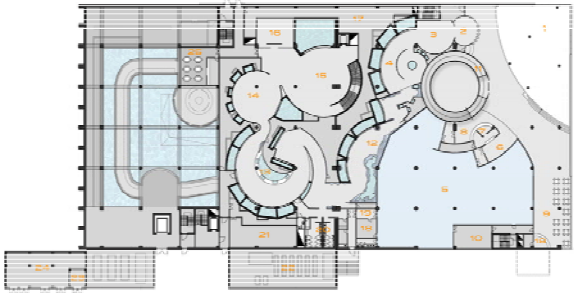
*Fig. 3.14*Antalya aquarium- South east elevation



*Fig. 3.15*Antalya aquarium- South west elevation



*Fig. 3.16*Antalya aquarium- Ground floor plan



*Fig. 3.17*Antalya aquarium- First floor plan

3.3 THE BLUE PLANET AQUARIUM

3.3.1 INTRODUCTION

The Blue Planet Aquarium is Europe's largest and most important aquarium, with a spectacular location on the Oresund shores, just eight kilometers from Copenhagen City Hall Square. Furthermore, motorways, Copenhagen Airport, the Oresund Bridge, Metro, and international trains are all within a few hundred meters of the aquarium in Taaenby Municipality. One of Denmark's top five tourist destinations is the Blue Planet. Blue Planet was named Denmark's best lighthouse project within the experience economy at the 2012 tourism conference "A New Way to Grow" because of its potential for growth, influence on regional development, innovation, realization, as well as uniqueness and reason to go'.

The aquarium, however, was kept active thanks to a valiant effort involving Danish and home-reared fish. The aquarium was in bad shape after the war, so the Knud Ho guard began extensive renovations. The structure underwent many changes over the next few decades.

Several modernizations and expansions have been made. The original building in Charlottenlund served as a venue for entertainment and education for people of all ages for over 73 years. The establishment, on the other hand, had been run down for a few years, and there had been a constant demand for expansion and high-end technologies.

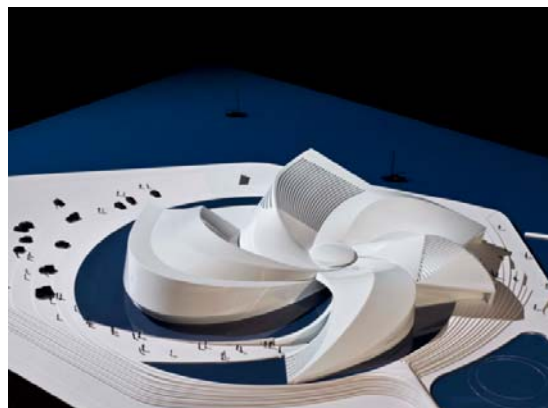


Fig. 3.18The blue planet aquarium

3.3.2 ZONES AND DISPLAY IN THE AQUARIUM

There are 5 main sections :

1. The Rainforest
2. The Great African Lakes
3. Evolution and Adaptation
4. Cold Water
5. The Warm Ocean

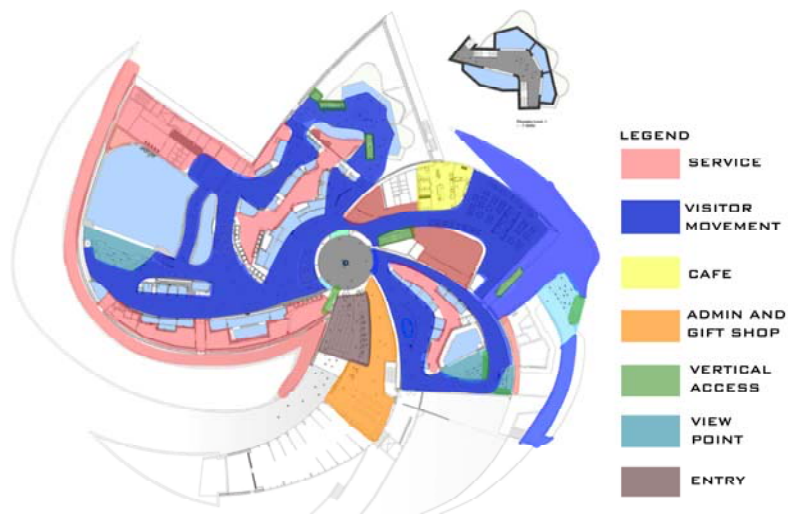


Fig. 3.19The blue planet aquarium - Zones

3.3.3 STRUCTURE OF THE AQUARIUM



Fig. 3.20The blue planet aquarium - Elevation 1



Fig. 3.21The blue planet aquarium - Elevation 2

3.3.4 MOVEMENT INSIDE AQUARIUM

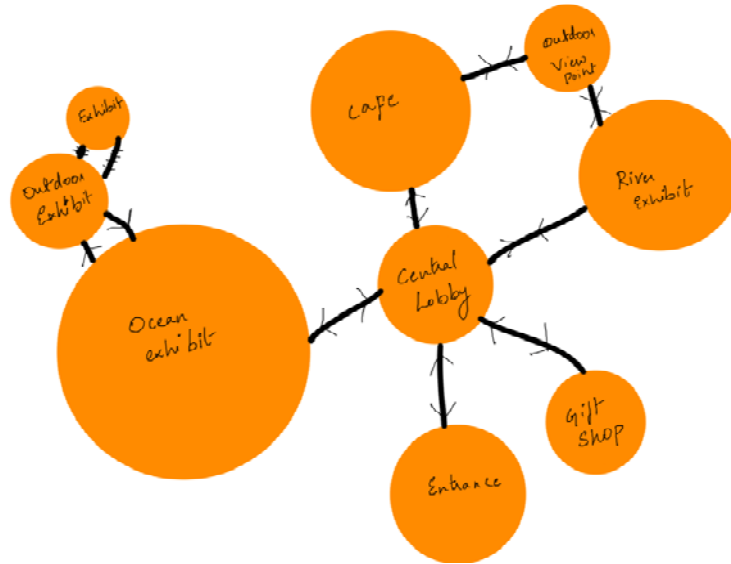


Fig. 3.22 The blue planet aquarium - Visitor movement

3.4 VGP MARINE KINGDOM

3.4.1 INTRODUCTION

The Marine Kingdom is the fourth of VGP's many kingdoms. This is India's first and largest walk-through aquarium, with a wide range of aquatic animals from small to large. To give you a larger-than-life experience, the animals are kept in life-size tanks and overhead aquariums.

Location: VGP Marine Kingdom East Coast Road, Chennai

Engineering works: Marine scape

Architects: Aquamarine projects

3.4.2 AREA AND STANDARDS

Built up area: $100\text{m} \times 60\text{m} = 6000\text{sq.m} = 1.5\text{ acres}$

Parking area: 50 car parking, 100 parking area = 1 acre

Plot area for marine kingdom building = 2.25 acres

Total built area with services = 3.2 acres

Achieved FSI=1.0 Ground floor

3.4.3 ZONES IN THE AQUARIUM

- Rainforest zone
- Gorge zone
- Mangrove zone
- Coastal zone
- Deep ocean zone

3.4.4 NUMBER FACTS

Total volume of the tanks = 4000 m³

Tunnel length = 80 m

Total number of exhibits =40

Total gallons of water = 89,90,876 gallons

3.4.5 AMENITIES IN THE AQUARIUM

- Scuba diving
- Live feeding zone
- Touch pool
- Exhibits
- Virtual reality
- Teaching lab
- Gift shop
- Restaurant
- Cafeteria
- Function hall
- Private dining

3.4.6 MOVEMENTS INSIDE AQUARIUM

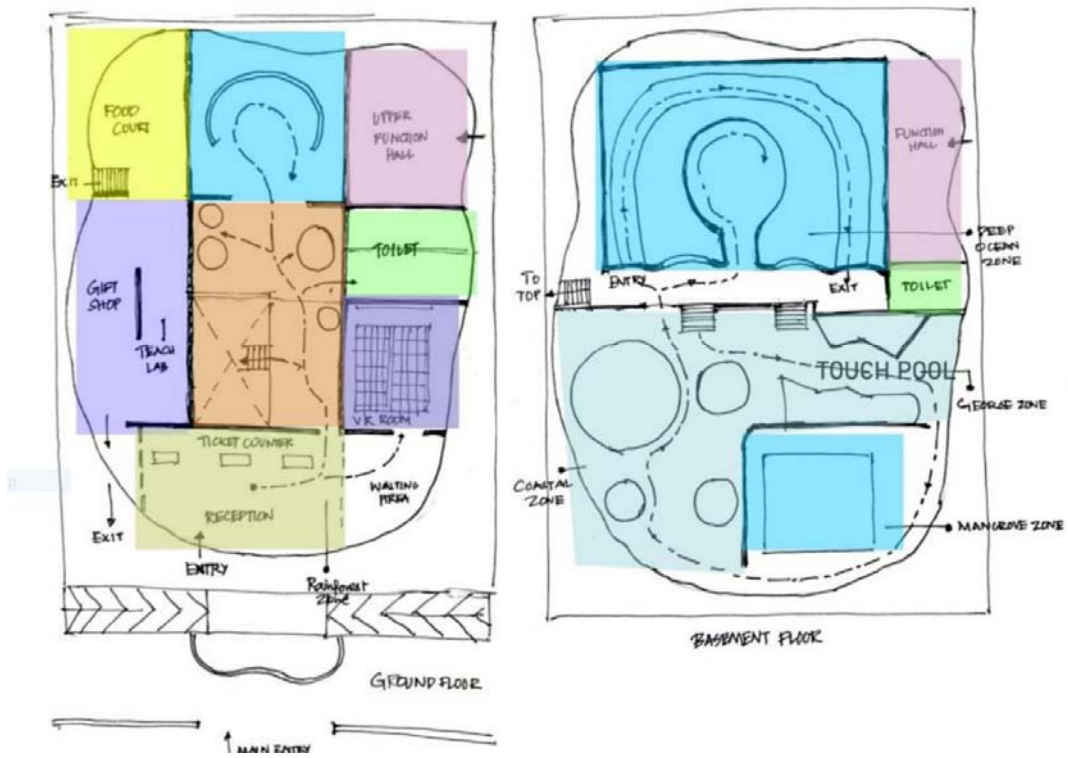


Fig. 3.23VGP Marine kingdom - Visitor movement

3.4.6 SPACIAL PLANNING AQUARIUM

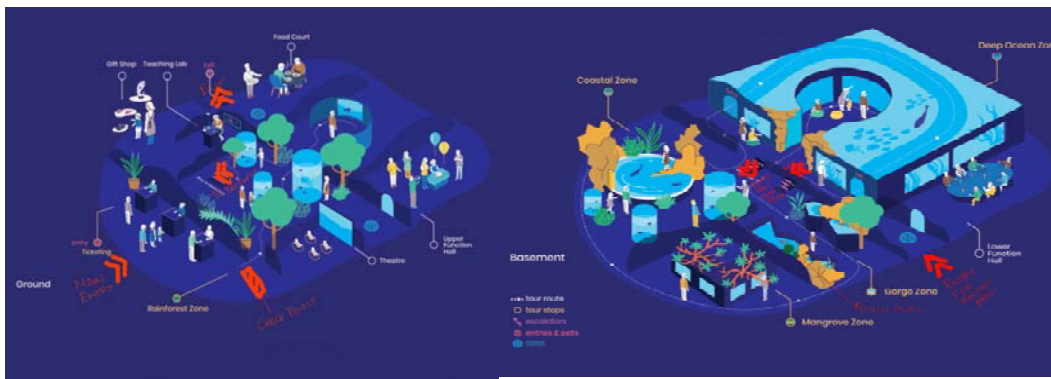


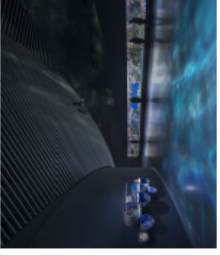






Fig. 3.24VGP Marine kingdom - Schematic isometric view

3.5 COMPARITIVE ANALYSIS OF CASE STUDIES

JARIUM ORGINA ,USA TAINBACK, VENTULETT	ANTALYA AQUARIUM ANTALYA, TURKEY BAHADIR KUL	THE BLU PLANET AQUARIUM KASTRUP, DENMARK 3XN ARCHITECTS	VGP MARINE KINGDOM CHENNAI, INDIA AQUAMARINE PROJECTS
	2012	2013	2019
	40,000 Sq.m	10,000 Sq.m	10,000 Sq.m
	30%	45%	50%
	IRREGULAR RECTANGLE	HEXAGONAL	RECTANGULAR
	2	2	2
THE ENTRANCE IS GRAND AND WELL	THE ENTRANCE IS SPACIOUS AND WIDE	THE ENTRANCE IS SPACIOUS AND GRAND	WIDE ENTRANCE WITH A GLASS DOOR
THE HARD SCAPES ARE USED MAINLY FOR RECREATIONAL	SOFT LANDSCAPE FEATURED IN THE SURROUNDINGS	SOFT LANDSCAPE FEATURES AROUND THE BUILDING	ONLY HARDSCAPE SURROUNDED BY ALL OTHER FEATURES
THE SITE IS SURROUNDED BY DENSE FOREST		SURROUNDED BY SEA ON 3 SIDES	
THE ATRIUM IS CUBOID, CIRCLES	CUBOID	GREAT WHIRLPOOL FORM WITH A COMMON CENTRAL AREA	SHELL STRUCTURE IN ROCK
THE ATRIUM IS TREATED WITH COLOURFUL LIGHTING, SHAPED FALSE CEILING IN ATRIUM	INTERIOR IS WELL DONE WITH GOOD AND COLOURFULL INTERIORS USING STEEL AND CONCRETE	INTERIOR HAS A GOOD LIGHTING	INTERIOR IS TREATED WITH SKYLIGHTING IN THE TOP OF BASEMENT WITH GOOD LIGHTING
			
THE ATRIUM IS TREATED WITH CONCRETE, STEEL AND ACRYLIC.	CONCRETE, STEEL AND ACRYLIC.	THE EXTERIOR IS COMPLETELY CONSTRUCTED USING STEEL FRAME.	POLY CARBONATE SHEET FOR ROOF STRUCTURE

RED AS AND JAL	CIRCULATION IS WELL DEFINED WITH THE FLOW. IT IS ACHIEVED THROUGH PLACEMENT OF DIFFERENT ZONES AT VARIOUS POSITIONS OF THE BUILDING		CIRCULATION IS FROM THE CENTRAL COMMON ATTRIUM WHERE USERS COULD ACCESS THE 2 ZONES OF THE EXHIBIT		CIRCULATION UNIDIRECTIONAL DIRECTIO THE EXHIBIT	
4	CAVE CONCEPT, SNOWROOM, DEEP OCEAN, SHARK ZONE	4	11	AFRICA LAKE, AMAZONIA, THE OCEAN, THE LIVING REEF, THE MEDITERRANEAN, FAERAE ISLAND, DENMARK SEA, EXOTIC AMPHIBIANS, NORTH AMERICA, SEA OTTERS	5	RAINFORTE GEORGE, MANGROV COASTAL DEEP OCE
	CLOSED WATER SYSTEM			CLOSED WATER SYSTEM		CLOSED WATER SYSTEM
	ONLY THROUGH FACADE AND TOP FLOOR			NIL		ONLY INT
NG	CENTRALIZED AIR CONDITIONING			CENTRALIZED AIR CONDITIONING		CENTRAL

CHAPTER 4: AREA STATEMENT

S.NO	SPACE	NO. OF UNITS	PER UNIT AREA	TOTAL AREA	TYOPOLOGY OF SPACE	SPACIAL ZONES
	ENTRANCE LOBBY					
1	TICKET COUNTER	1	40	40	SEMI OPEN / CLOSED	PUBLIC
2	RECEPTION	1	35	35	CLOSED	PUBLIC
3	WAITING SPACE	1	200	200	SEMI OPEN / CLOSED	PUBLIC
4	BAGGAGE ROOM	1	20	20	CLOSED	PUBLIC
	ADMIN SPACE					
1	DIRECTOR'S CABIN	1	30	30	CLOSED	PRIVATE
2	EXECUTIVE MANAGE CABIN	1	25	25	CLOSED	PRIVATE
3	CONFERENCE ROOM	2	40	80	CLOSED	PRIVATE
4	GENERAL MANAGER	1	30	30	CLOSED	PRIVATE
5	ACCONTANT'S CABIN	1	20	20	CLOSED	PRIVATE

6	CHEIF ENGINEER'S CABIN	1	25	25	CLOSED	PRIVATE
7	ASSISTANT ENGINEERS SPACE	1	25	25	CLOSED	PRIVATE
8	STORAGE	1	40	40	CLOSED	PRIVATE
9	CCTV ROOM	1	30	30	CLOSED	PRIVATE
	RESEARCH LAB					
1	LAB AND SURGICAL ROOM	1	70	70	CLOSED	PRIVATE
2	QUARANTINE TANK	5	100	100	CLOSED	PRIVATE
3	BREEDING TANK	10	120	120	CLOSED	PRIVATE
4	AQUARISTS	1	30	30	CLOSED	PRIVATE
5	BIOLOGISTS ROOM	1	40	40	CLOSED	PRIVATE
6	LECTURE ROOM	2	50	100	CLOSED	SEMI PUBLIC
7	SEMINAR ROOM	2	60	120	CLOSED	SEMI PUBLIC
8	CONFERENCE ROOM	1	35	35	CLOSED	PRIVATE
9	RESEARCH AND DEVELOPMENT	1	50	50	CLOSED	PRIVATE
10	LIBRARY	1	120	120	SEMI OPEN / CLOSED	SEMI PUBLIC
	FOOD					
1	GENERAL RESTAURENT	1	350	350	SEMI OPEN / CLOSED	PUBLIC
2	CAFE	1	150	150	SEMI OPEN / CLOSED	PUBLIC
3	UNDERWATER RESTAURENT	1	200	200	CLOSED	PUBLIC
4	GENERAL KITCHEN	2	150	300	CLOSED	PRIVATE
5	FISH KITCHEN	1	200	200	CLOSED	PRIVATE
6	STORAGE	1	70	70	CLOSED	PRIVATE
7	COLD STORAGE	1	75	75	CLOSED	PRIVATE
8	RESTROOMS				CLOSED	PUBLIC

	ACCOMODATION					
1	RECEPTION AND WAITING	1	40	40	CLOSED	SEMI PUBLIC
2	UNDERWATER ROOMS	6	50	300	CLOSED	PRIVATE
3	MAINTANANCE AND STORAGE	1	30	30	CLOSED	PRIVATE
	MAINTENANCE					
1	PATHELOGY LAB	1	30	30	CLOSED	PRIVATE
2	FISH HOSPITAL	1	40	40	CLOSED	PRIVATE
3	FOOD STORAGE	1	15	15	CLOSED	PRIVATE
4	COLD STORAGE	1	10	10	CLOSED	PRIVATE
5	BREEDING TANK	10	10	100	CLOSED	PRIVATE
6	STORAGE ROOM	2	30	60	CLOSED	PRIVATE
7	MEETING ROOM	1	40	40	CLOSED	PRIVATE
	THEATERS					
1	MULTIMEDIA THEATER (300 SEATING)	1	400	400	CLOSED	SEMI PUBLIC
2	EDUCATIONAL CLASS ROOM (100 SEATS)	1	150	150	CLOSED	SEMI PUBLIC
	OTHERS					
1	SOUVENIR SHOPS	2	100	200	SEMI OPEN / CLOSED	PUBLIC
2	FOOD COURT	1	400	400	SEMI OPEN / CLOSED	PUBLIC
	OUTDOOR AREA					
1	CULTURAL FOOD COURT	1	500	500	OPEN	PUBLIC
2	MUSICAL FOUNTAIN	1	300	300	OPEN	PUBLIC
3	TURTLE PARK	1	400	400	OPEN	PUBLIC
	EXHIBITS ZONE	EXHIBIT NO.	AREA			
1	RAINFOREST EXHIBIT	21	300	300	CLOSED	PUBLIC

2	RIVER EXHIBIT	21	350	350	CLOSED	PUBLIC
3	MANGROOVE EXHIBIT	10	350	350	CLOSED	PUBLIC
4	COASTAL EXHIBIT	21	450	450	CLOSED	PUBLIC
5	ANDAMANS EXHIBIT	11	400	400	CLOSED	PUBLIC
6	DEEP SEA EXHIBIT	3 + 150 m	1200	1200	CLOSED	PUBLIC
7	POLAR EXHIBIT	8	300	300	CLOSED	PUBLIC
	LIFE SUPPORT SYSTEM	NO.	AREA			
1	RAINFOREST EXHIBIT	1	120	120	CLOSED	PRIVATE
2	RIVER EXHIBIT	1	120	120	CLOSED	PRIVATE
3	MANGROOVE EXHIBIT	1	140	140	CLOSED	PRIVATE
4	COASTAL EXHIBIT	1	180	180	CLOSED	PRIVATE
5	ANDAMANS EXHIBIT	1	160	160	CLOSED	PRIVATE
6	DEEP SEA EXHIBIT	1	480	480	CLOSED	PRIVATE
7	POLAR EXHIBIT	1	120	120	CLOSED	PRIVATE

CHAPTER 5: SITE STUDY

5.1 SITE LOCATION

- Every tourist in Mahabalipuram predominantly visit shore temple and five rathas.
- The site that has chosen in between the 2 sites and the site is located in the main road connecting both of the heritage sites.
- Average visitor at Mahabalipuram is 2000-3000 people per day (before covid), 1000 people per day (during covid)
- Mahabalipuram has a large number of beach resorts that promotes the tourism.
- The site is approached by the main road this gives the oceanarium a quite no. Of population.
- The footfall can be of 1500 people as a floating population.
- The number of visitors keep increase by the evening of the day compared to morning.
- The site extends from the road to beach at the rear end, this gives an opportunity to develop a private beach facility to attract visitors to the oceanarium.

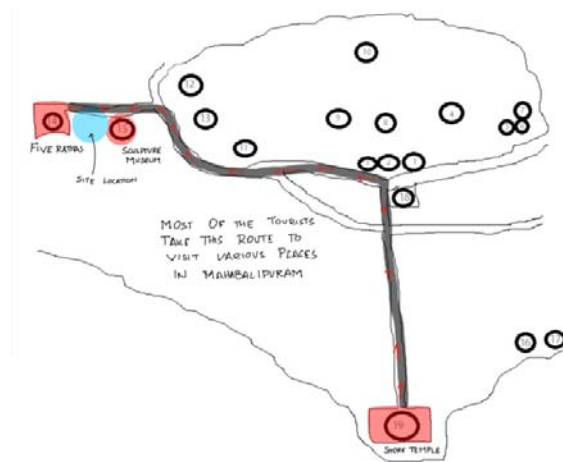


Fig. 5.1 Schematic representation of tourist spots at Mahabalipuram

5.3 SITE STUDY

SITE STUDY

LOCATION: MAHABALIPURAM, TAMILNADU

LATITUDE AND LONGITUDE: 12.611761 N, 80.190717 E

SITE EXTENT: 25 ACRES (1,01,505 SQ.M)

ROAD WIDTH: 20M

REGULATION FOLLOWED: CRZ-2



SITE HAS A BEACH ACCESS AT THE REAR END



EUCALYPTUS TREE IN THE FRONTAGE OF THE SITE.



SITE HAS NEM AND COCONUT TREES IN THE SITE



SOIL TYPE IS VEGETATION SPREAD AT FRONT AND SANDY AT THE REAR SIDE

LOCATION OF THE SITE:

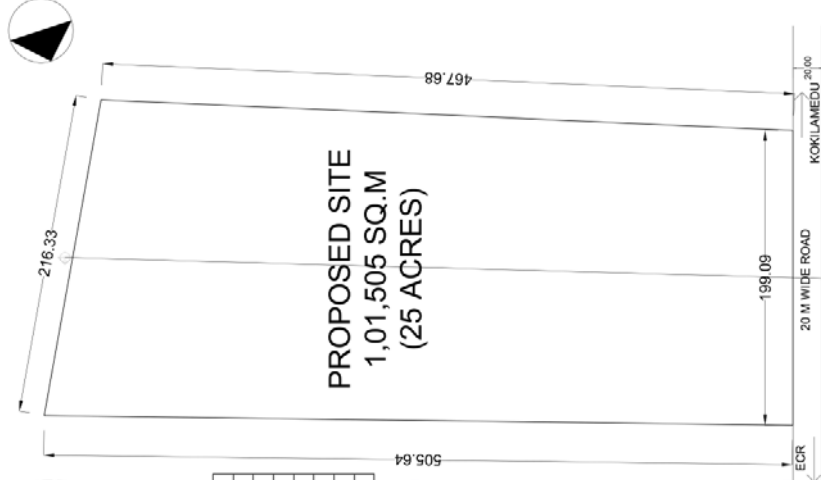


NEIGHBOURHOOD:

DESTINATION	DISTANCE
SHORE TEMPLE	950 m
FIVE RATHAS	300 m
BUS STAND	700 m
CHARIOT BEACH RESORT	600 m
SEA BREEZE BEACH RESORT	1 km
RADISSON BLU RESORT	1.5 km
EGR ROAD	2 km



SITE SECTION



PROPOSED SITE
1,01,505 SQ.M
(25 ACRES)

SITE PLAN

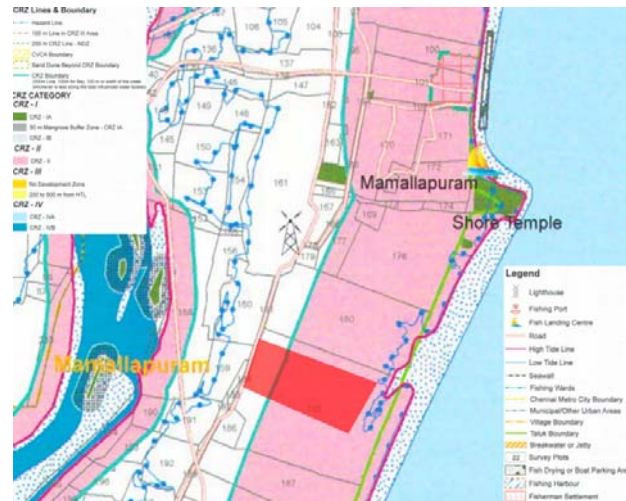


Fig. 5.2CRZ regulation map

The site falls under the category CRZ 2

5.3.1 CRZ REGULATIONS

- Buildings shall be permitted neither on the seaward side of the existing road(or roads proposed in the approved Coastal Zone Plane of the area) nor on the seaward side of the existing and proposed road. Existing authorized structures shall be subject to the existing local Town and Country Planning regulations including the existing norms of FSI/FAR
- Reconstruction of the authorized building to be permitted subject to the existing FSI/FAR norms and without change in the existing use.
- The design and construction of buildings shall be consistent with the surrounding landscape and architectural style.

5.3.2 OPPORTUNITIES OF THE SITE

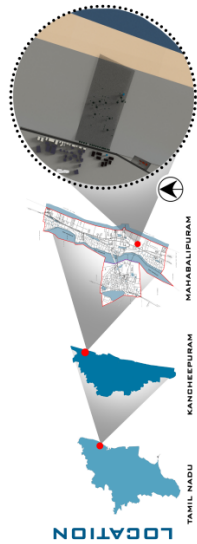
Creating a private beach facility to attract visitors. Creating an provision for hosting any event by the aqua exhibit or by the beach facility

A public building to attract all age group of people. Equal importance for indoor and outdoor spaces.

The export of aquatic organism for display can be easily transported through the shore. The site extents provide an opportunity for the future development

5.4 SITE ANALYSIS

SITE ANALYSIS



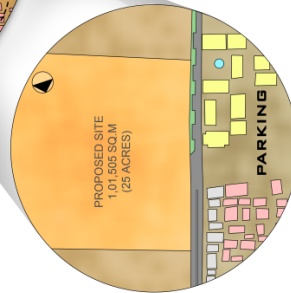
SITE SECTION



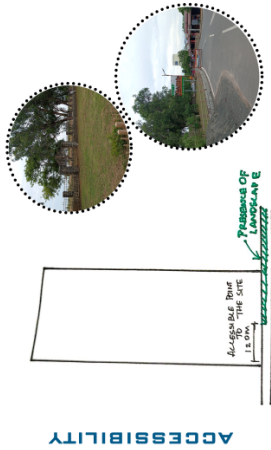
SITE DIMENSION



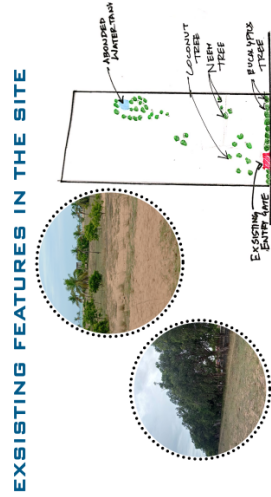
- COMERCIAL SPACES
- RESIDENTIAL ZONE
- HANDICRAFTS SHOP
- HERITAGE SITE
- WATER TANK
- SITE
- ROAD
- BEACH
- BAY OF BENGAL



NODE

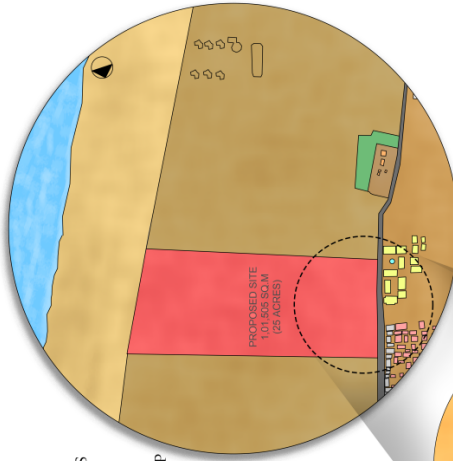


ACCESSIBILITY



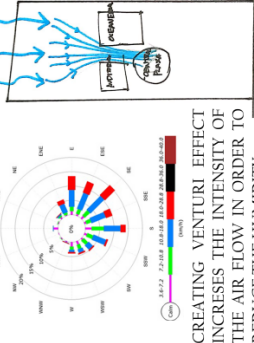
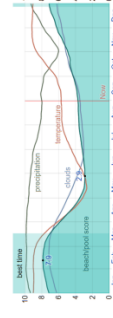
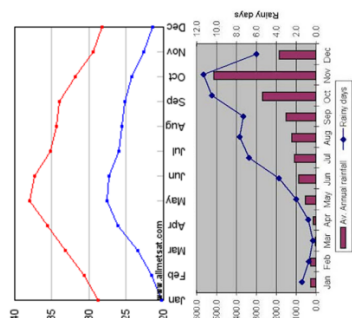
EXISTING FEATURES IN THE SITE

SITE AND THE SURROUNDINGS



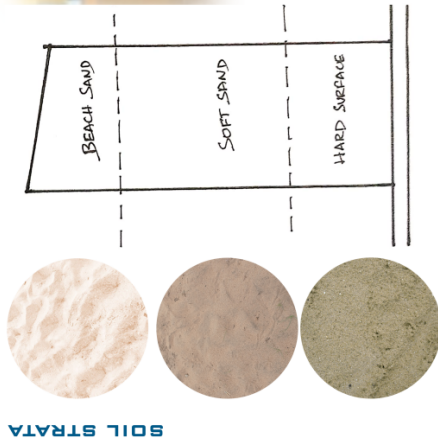
THE ACCESSIBILITY OF THE SITE HAS LESS OPPORTUNITIES, THE SPACES AROUND THE SITE CREATES CROWD AND TRAFFIC IN THE APPROACH ROAD. MAKE USE OF THE ACCESSIBLE SIDE OF THE SITE AND IT SHOULD BE RESPOSIVE TO THE TRAFFIC FLOW.

CLIMATIC ANALYSIS

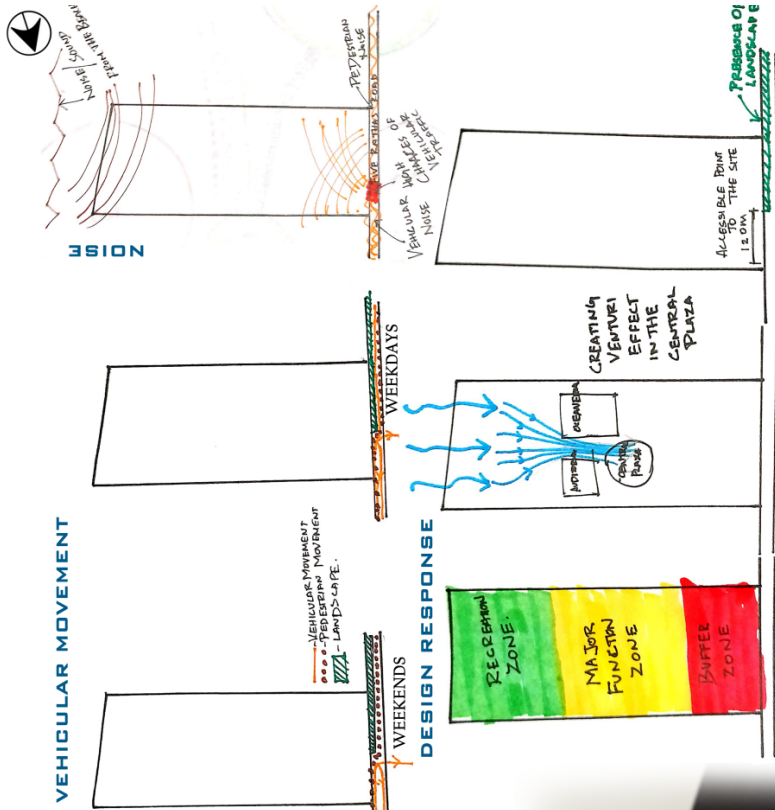


CREATING VENTURI EFFECT INCREASES THE INTENSITY OF THE AIR FLOW IN ORDER TO REDUCE THE HUMIDITY.

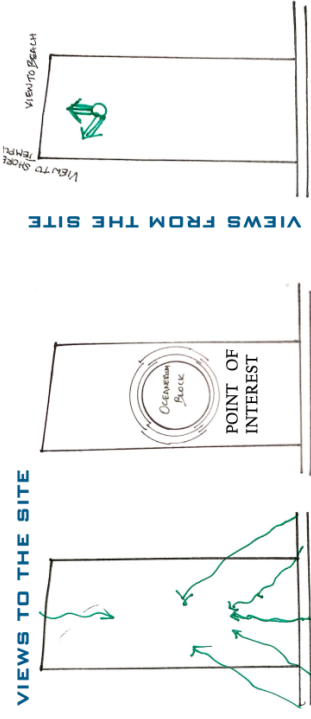
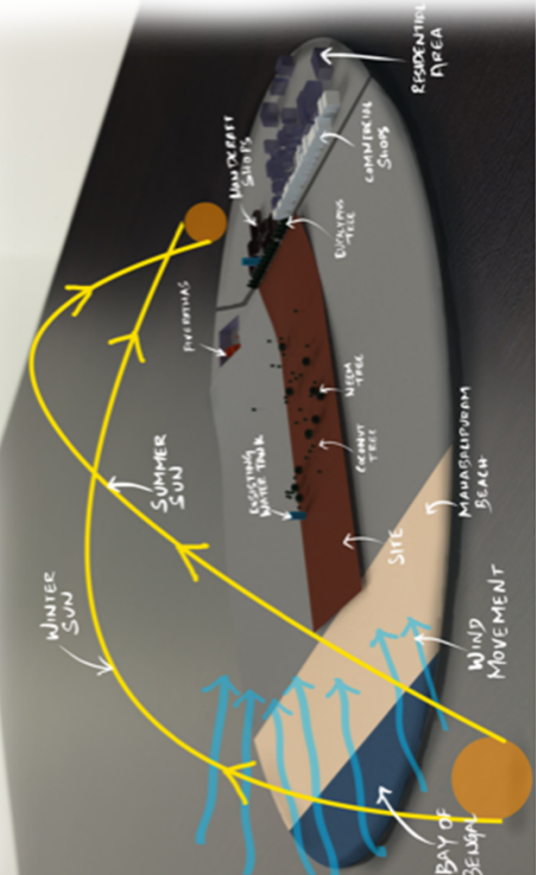
SITE ANALYSIS



SINCE THE SOIL TYPE ARE NATURALLY LOOSE, PILE FOUNDATION TO BE USED FOR THE STABILITY OF THE STRUCTURE



SOLAR, WIND MOVEMENT NEIGHBOURHOOD ANALYSIS



CHAPTER 6: ARCHITECTURAL DESIGN

6.1 SITE ZONING

SITE ZONING

ENTRY IS POSITIONED TO GET A CLEAR VIEW OF THE MAIN BLOCK. THIS MAINTAINS AN AXIS.

CENTRAL PLAZA IS POSITIONED AS THE CENTRAL FOCUS FROM THE ENTRY.

CENTRAL PLAZA CONNECTS TO ALL OTHER MAJOR ZONES

RADIAL CONNECTIVITY FOLLOWED IN ZONING THE SPACES.

ZONING AT THE REAR END ARE RECREATIONAL ZONE WHICH HAS A DIRECT CONTACT WITH THE BEACH.

SITE AREA: 101501 SQ.M

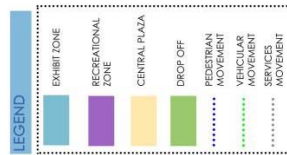
FSI: 2

TOTAL BUILDUP AREA: 203010 SQ.M

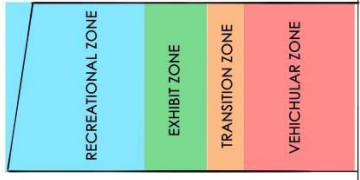
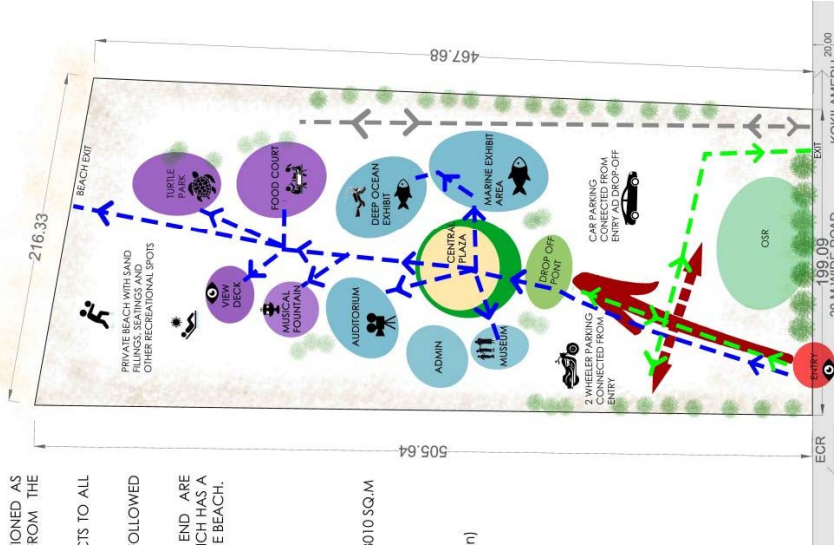
OSR: 10150 SQ.M (10%)

PLOT COVERAGE: 50%

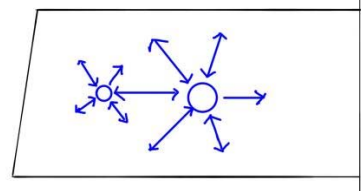
(as per TNCDDBR regulation)



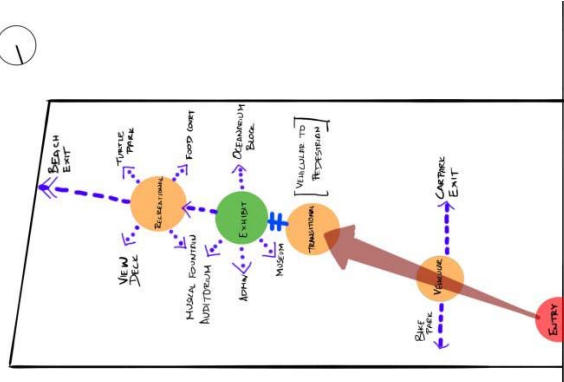
CRZ II REGULATED ZONE



TYPES OF ZONES



CIRCULATION PATTERN

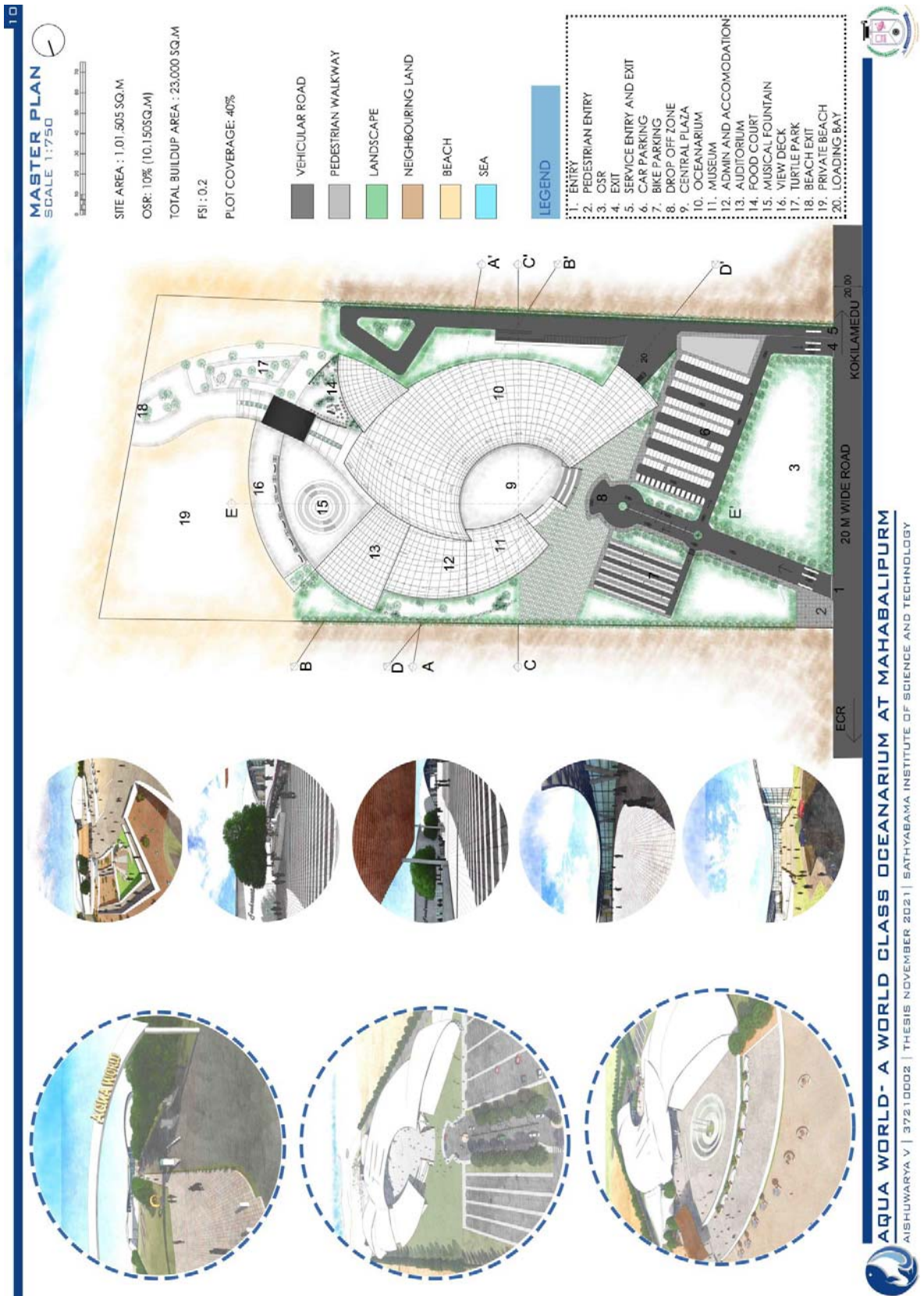


TYPES OF NODES

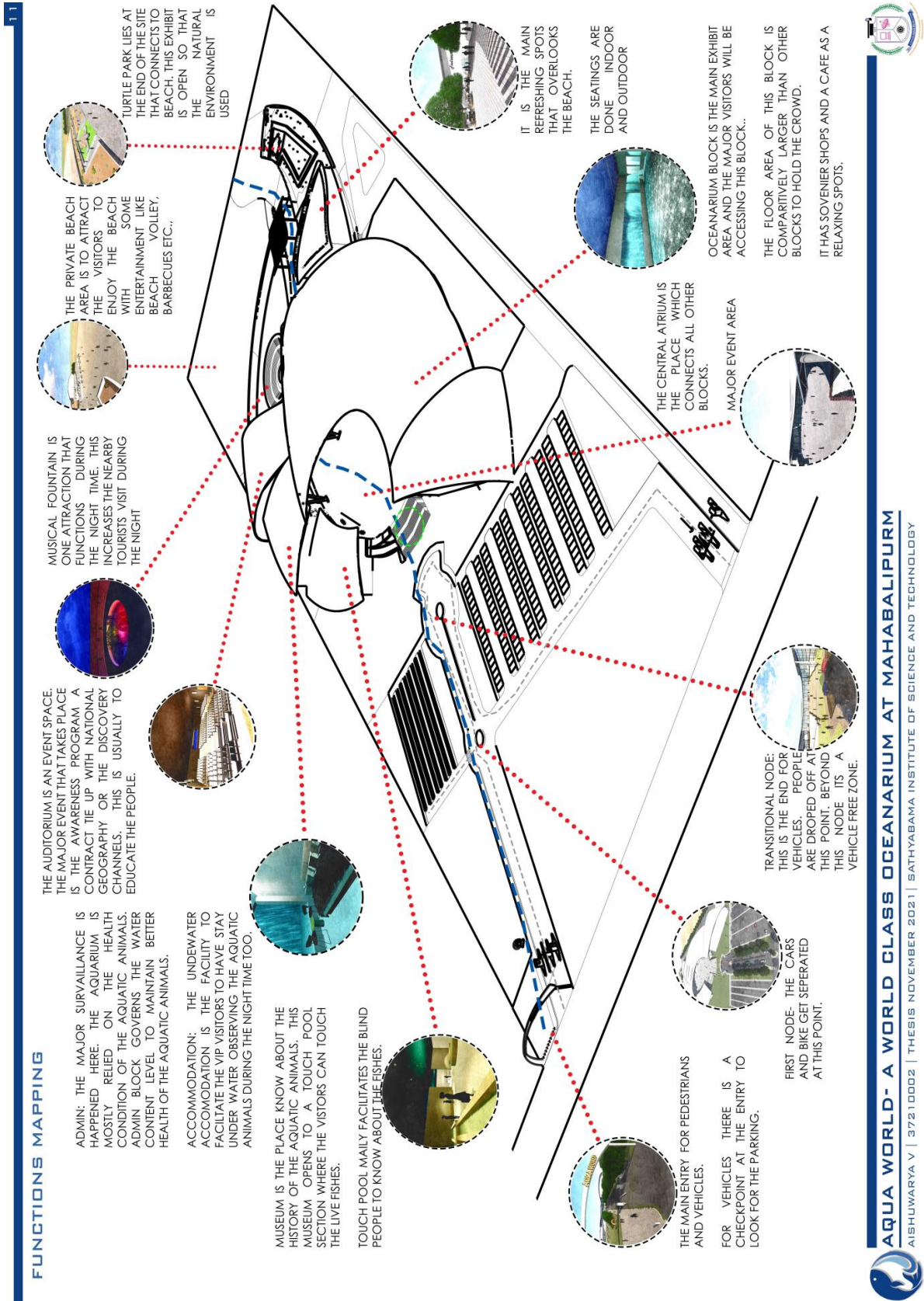
- NODE 1 [VEHICULAR NODE]:** THIS NODE IS THE PLACE WHERE THE CARS, BIKES AND RENTED VEHICLES ARE SPLITTED UP.
- NODE 2 [TRANSITIONAL NODE]:** IN THIS NODE THE VEHICULAR MOVEMENT COMES TO AN END AND PEDESTRIAN ZONE STARTS.
- NODE 3 [EXHIBIT NODE/ CENTRAL PLAZA]:** THIS NODE CONNECTS THE MAJOR EXHIBIT SPACES AND THIS IS THE MAIN NODE WHERE ALL THE ACTIVITIES CAN TAKE PLACE
- NODE 4 [RECREATIONAL NODE]:** THIS NODE IS DIRECTED FROM NODE 3 AND IT CONNECTS DIFFERENT RECREATIONAL SPOTS IN DIFFERENT LEVEL.

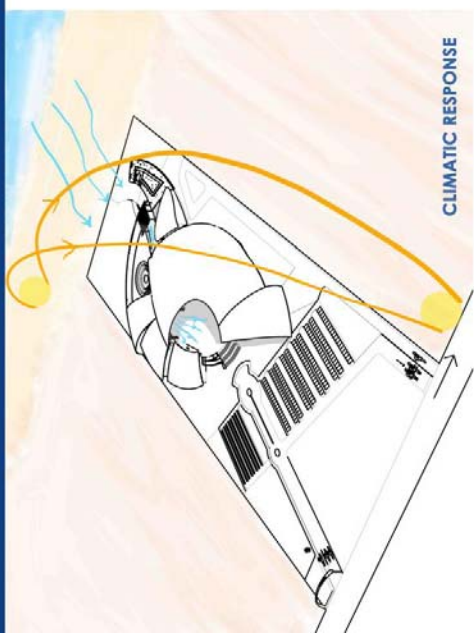


6.2 MASTER PLAN

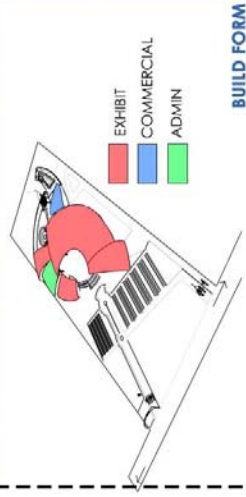


6.3 FUNCTIONS MAPPING





CLIMATIC RESPONSE



BUILD FORM

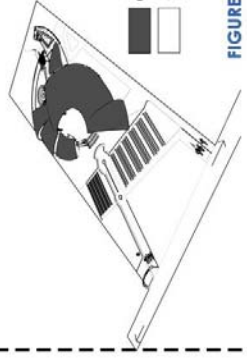
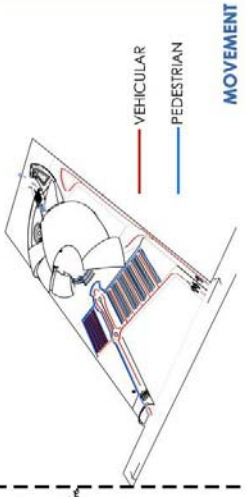
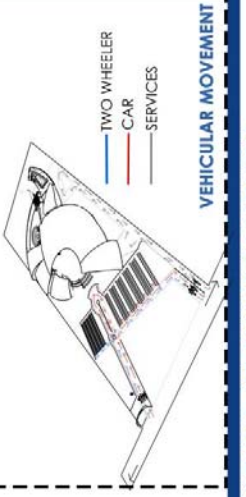


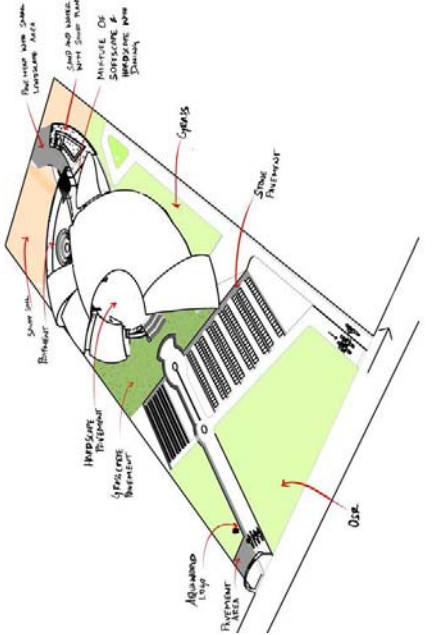
FIGURE AND GROUND



MOVEMENT



VEHICULAR MOVEMENT



LANDSCAPE

EXHIBIT SPACE IS A CLOSED STRUCTURE WITH PUBLIC MOVEMENT IN IT.
THE ADMIN AREA IS A PRIVATE SPACE WHERE ALL THE CONTROLLING HAPPENS.
FOOD COURT IS SAID TO BE THE COMMERCIAL AREA.

THE STRUCTURE IS PLACED AT THE POINT OF INTEREST WHERE IT HAS A CLEAR VIEW FROM THE APPROACH ROAD.
FRONT AND REAR SIDE OF THE SITE IS MERELY OPEN AND THE CENTER PART IS CLOSED.

THE VEHICULAR MOVEMENT HAPPENS ONLY IN THE FRONT PART OF THE SITE.
AFTER THE DROP OFF POINT IT IS ONLY A PEDESTRIAN ZONE.
PEDESTRIAN CAN ACCESS THE DIFFERENT SPACE WITHOUT THE HINDRANCE OF VEHICULAR MOVEMENT.

TWO- WHEELER MOVEMENT IS RESTRICTED IN THE FIRST NODAL LEVEL.
CAR MOVEMENT IS RESTRICTED TILL THE SECOND NODE.
THE SERVICE VEHICLES HAVE A SEPERATE ENTRY AND EXIT THAT HAS MINIMUM VISIBILITY TO THE PUBLIC



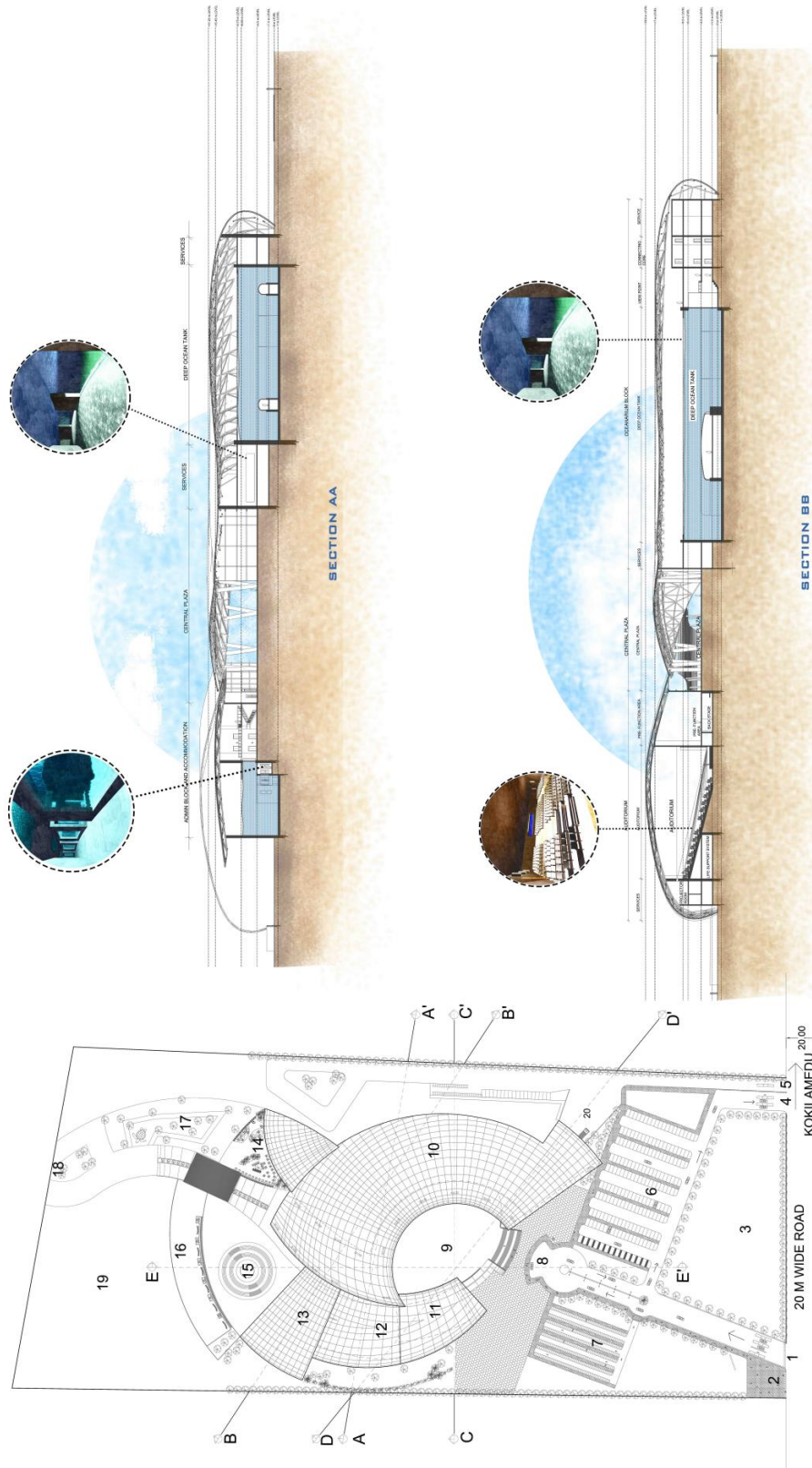
6.4 PLAN AT +5m LVL



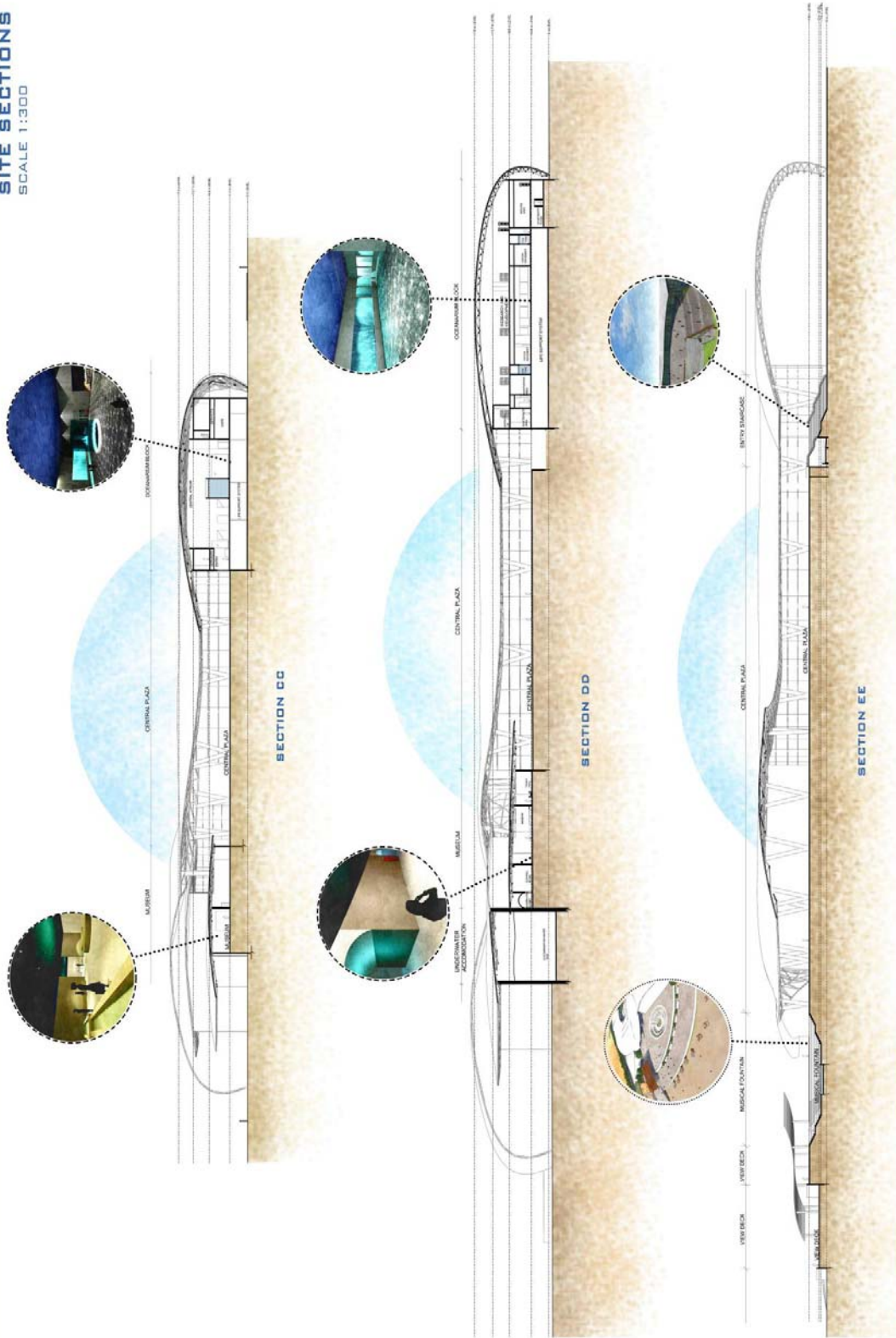
6.5 SITE SECTIONS

14

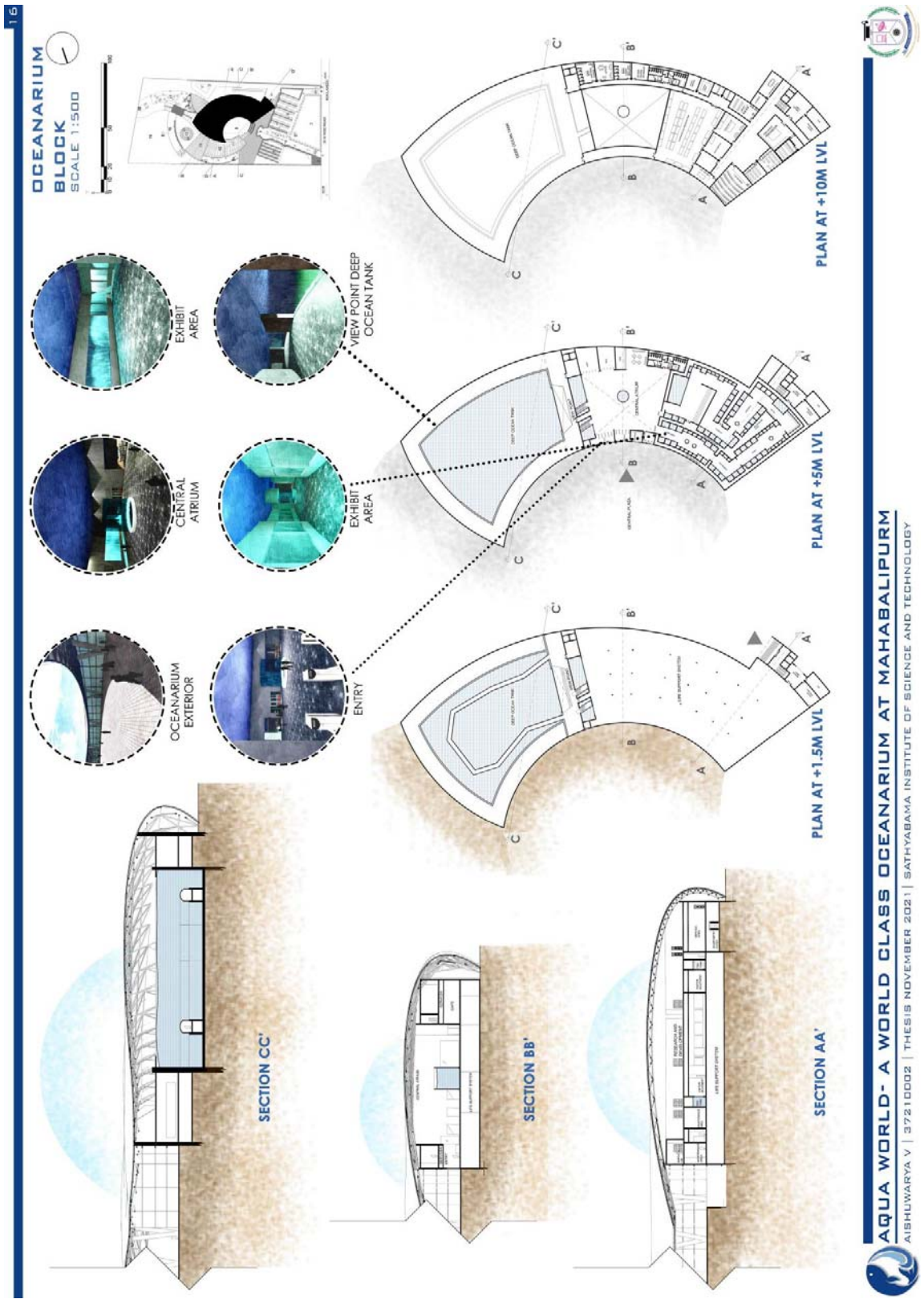
SITE SECTIONS
SCALE 1:300



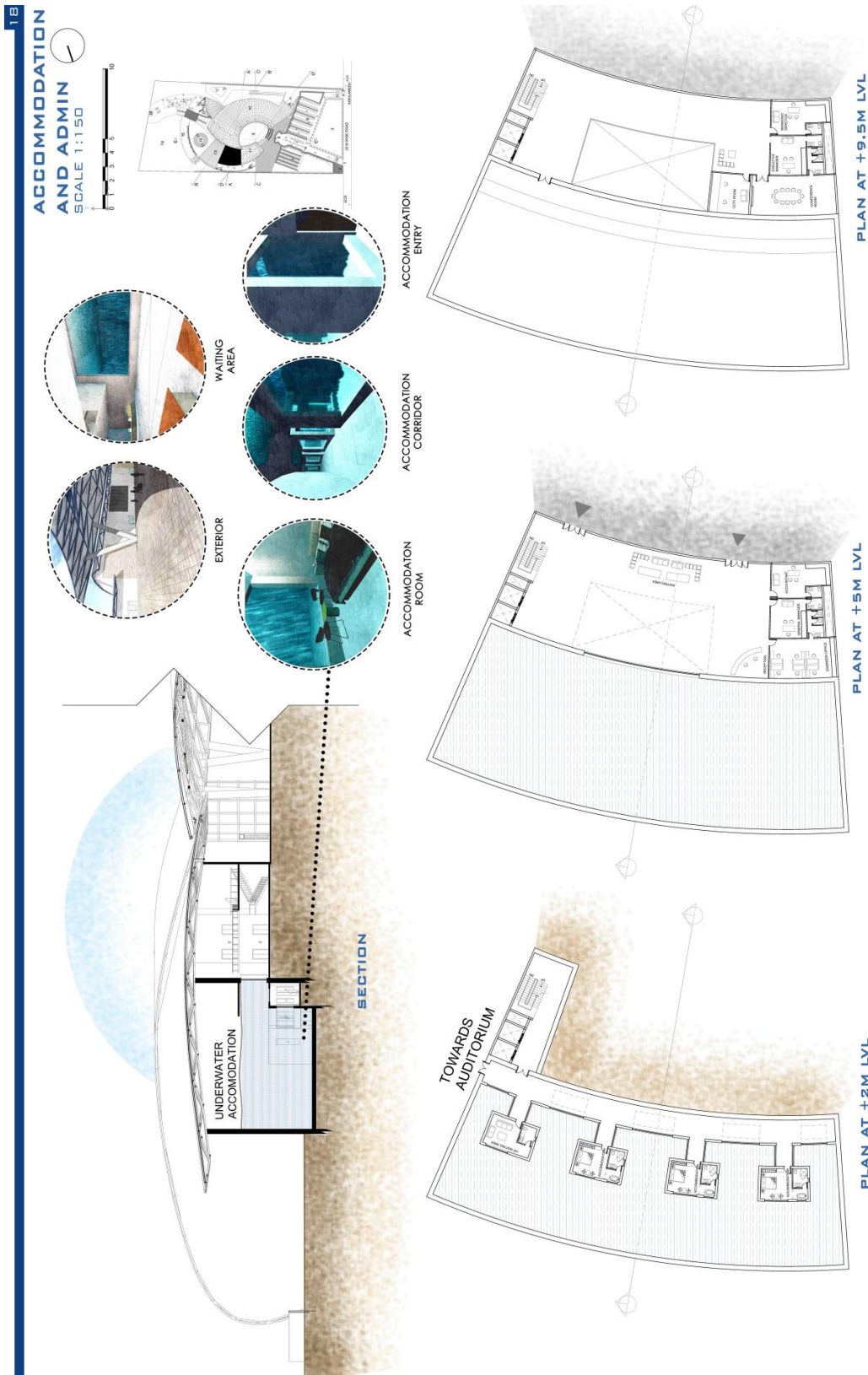
SITE SECTIONS
SCALE 1:300



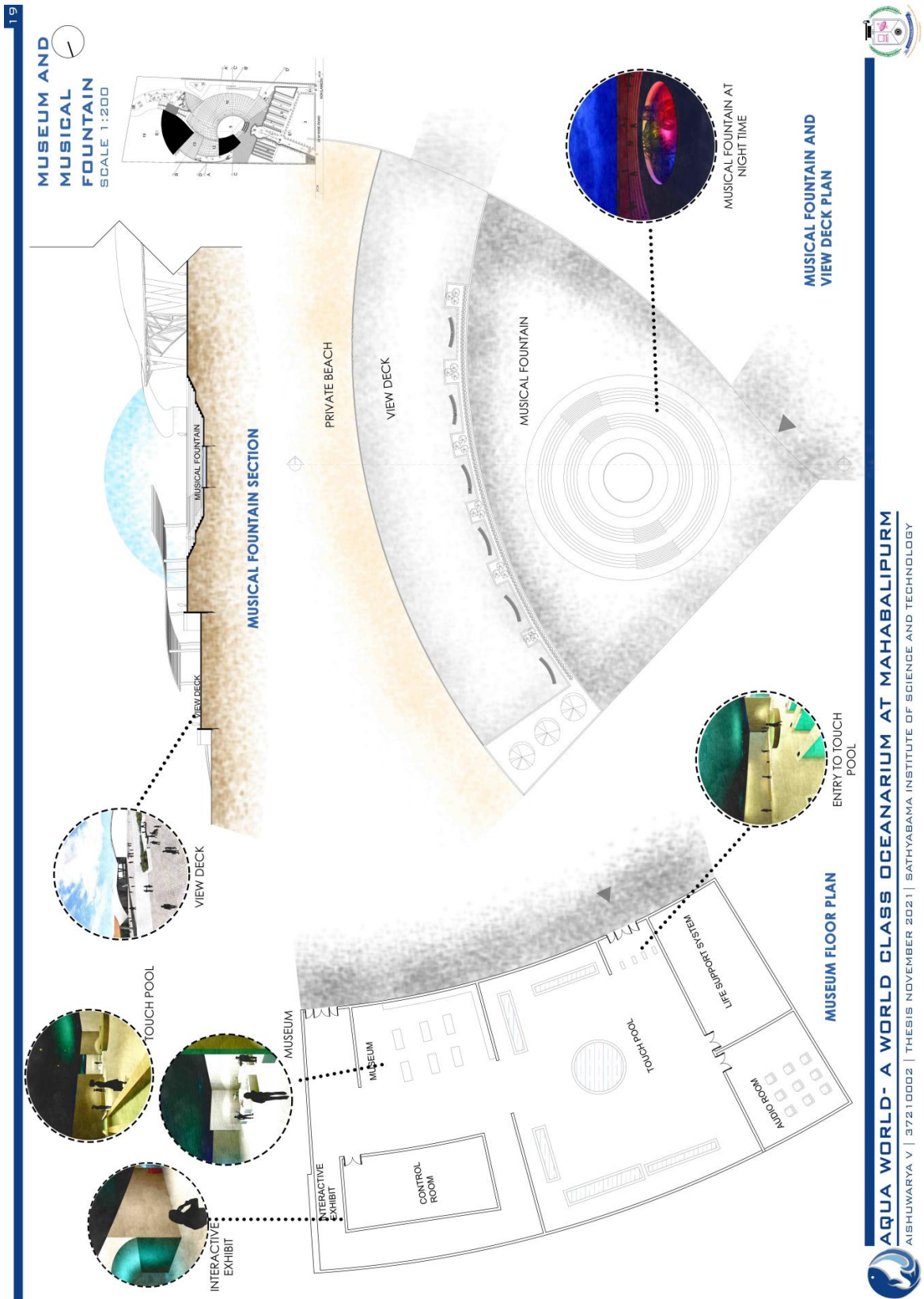
6.6 OCEANARIUM BLOCK



6.8 ADMIN AND UNDERWATER ACCOMMODATION



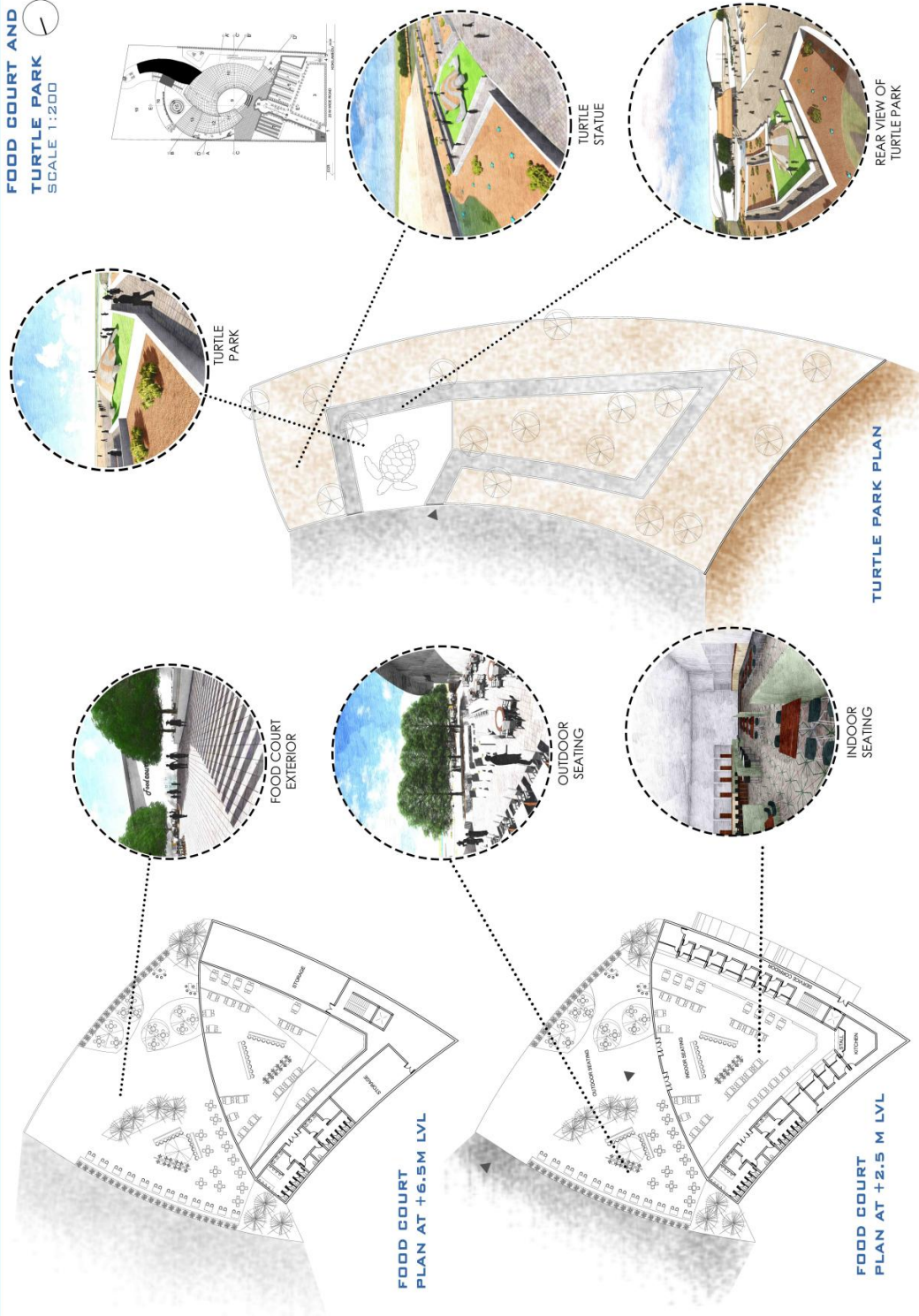
6.9 MUSEUM AND MUSICAL FOUNTAIN



6.10 FOOD COURT AND TURTLE PARK

20

FOOD COURT AND TURTLE PARK
SCALE 1:200



CHAPTER 7: REFERENCE

- "The Road to the World's Largest Nature Aquarium" - First shot: Digest.* (2015, March 19). YouTube. Retrieved July 25, 2021, from <https://www.youtube.com/watch?v=bo8flHCzxFo>
- 4K Shanghai Ocean Aquarium Full Tour 2021 上海海洋水族馆之全程游览|探索神秘多彩的海底世界 The Wonderful Underwater World.* (2021, May 27). YouTube. Retrieved July 8, 2021, from <https://www.youtube.com/watch?v=nOIN8RIX45g>
- Advanced Aquarium Technologies. (n.d.). *Advanced Aquarium Technologies | AAT Life Support Systems.* Retrieved July 2, 2021, from <https://www.advanced-aquariums.com/products/>
- Aguilar, C. (2020, November 16). *Antalya Aquarium / Bahadir Kul Architects.* ArchDaily. Retrieved July 1, 2021, from https://www.archdaily.com/477163/antalya-aquarium-bahadir-kul-architects?ad_medium=widget&ad_name=recommendation
- Behind the Scenes Look at the Georgia Aquarium!* (2019, June 18). YouTube. Retrieved July 28, 2021, from https://www.youtube.com/watch?v=_3M3wQY3k_c
- Behind the Scenes Tour at Georgia Aquarium.* (2014, April 16). YouTube. Retrieved July 28, 2021, from <https://www.youtube.com/watch?v=QrJAXgTpycM>
- Commercial & Residential Aquarium Projects - Tenji Inc.* (2019, June 28). Tenji Aquarium Design + Build. Retrieved July 2, 2021, from <https://www.tenji.com/projects/#filter=.public-aquarium-zoo>
- Commercial Aquariums from Start-to-Finish.* (2015, August 17). YouTube. Retrieved August 3, 2021, from https://www.youtube.com/watch?v=qnnZdg3_3Es
- danny hudson | designboom. (2014, May 13). *3XN: blue planet aquarium open to the public.* Designboom | Architecture & Design Magazine. Retrieved June 31, 2021,

from <https://www.designboom.com/architecture/3xn-blue-planet-aquarium-open-to-the-public/>

Dubai Mall Aquarium Construction - Aquarium and Underwater Sanctuary. (2012, August 8). YouTube. Retrieved July 29, 2021, from <https://www.youtube.com/watch?v=lfR1gi4GSjg>

Gintoff, V. (2019, December 3). *National Aquarium / Studio Gang.* ArchDaily. Retrieved July 5, 2021, from https://www.archdaily.com/787921/studio-gang-designs-the-national-aquarium-of-the-future-in-baltimore?ad_source=search&ad_medium=search_result_all

How The Georgia Aquarium Works. (2007, March 9). YouTube. Retrieved July 28, 2021, from <https://www.youtube.com/watch?v=NEen01VyY4ws>

Merlin, L. (2021, February 18). *Georgia Aquarium Expansion 2020: fostering a new understanding of sharks.* Blooloop. Retrieved July 1, 2021, from <https://blooloop.com/animals/in-depth/georgia-aquarium-expansion/>

Oversigtskort. (2021, June 14). Den Blå Planet. Retrieved July 7, 2021, from <https://denblaaplanet.dk/oplevelser/akvariet-rundt/>