Harnessing Energy and Water in The Salton Sea

(Segment I)

(System for Importing Seawater)

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Keywords

Geothermal Power, Hydro Power, Electricity, Importing Seawater, In-Line-Pump, In-Line-Generator, Solar Power, Renewable Energy, Heat Exchanger, Desalinization, Potable Water, Extraction of Lithium, Clean Environment, Wildlife Sanctuary, Tourism, Fishery.

ABSTRACT

The Salton Sea in California is a terminal lake with reduced inflow from the Colorado River because of the water transfers related to the Quantification Settlement Agreement (QSA). The Lake is shrinking and exposing the receding shoreline (toxic playa) to the elements and facing oncoming environmental disasters.

The presented proposal is a long-term solution for the restoration of the Salton Sea. It includes an architectural plan that harmoniously incorporates several patented technologies into a self-sustaining organism. The presented proposal includes several options based on the same concept: 1) Dividing the Lake into three sections; 2) Importing seawater from the Ocean; 3) Harnessing prevalent geothermal energy.

Dividing the lake into three sections (Central and two smaller Northern and Southern sections) and redirecting the New River and Alamo River back to Mexico – to stop pollution – and importing seawater into the central section of the lake - would provide a condition for tourism (exclusive real-estate, beaches, resorts, hotels, etc.), and vast wildlife sanctuary. The presented proposal also implements several breakthrough technologies such as a) harnessing solar energy in combination with a pipeline system; b) harnessing prevalent geothermal energy which is accessible in the Salton Sea area by using a completely closed-loop heat exchange system for the generation of electricity, desalinization of the lake and production of the potable water as a free

by-product; c) Providing a concentrated salty brine as a free by-product which is a source for extraction of lithium, and providing a safe depot for waste material after extraction of Lithium.

1. Introduction

1.1 Overview of the Salton Sea situation:

a) The Salton Sea in California is a terminal lake formed accidentally in 1905-1907 after levy at Colorado River has been breached after a storm. Recently, the inflow from the Colorado River has been reduced as a result of the water transfers related to the Quantification Settlement Agreement (QSA). The Lake is shrinking and exposing the receding shoreline (playa) to the elements precipitating higher salinity levels and facing oncoming environmental disaster, health issues of the nearby communities, as well as a serious threat to its multibillion-dollar tourist trade.

b) The lake is 35 miles long, 15 miles wide, and is located south of Palm Springs in a basin -220 feet below sea level.

c) The Earth's crust at the south end of the Salton Sea is relatively thin. The temperature in the Salton Sea Geothermal Field can reach 680 ºF (360 ºC) less than a mile below the surface. (See FIG. 1)

d) On the southern part of the Lake, there is a known geothermal reservoir.

e) The Salton Sea is California's largest lake and is presently over 50 % saltier than the Ocean. The Salton Sea is a "terminal lake," meaning that it has no outflow so that salts, nutrients, pesticides, and other contaminants have concentrated in the Lake. Water flows into Lake from several limited sources, but the only way water leaves the Lake is by evaporation.

f) Geothermal energy in the Salton Sea area is prevalent and topography is unique - the lake is 220 feet below the sea level and is located about 200 miles from the Ocean on both sides – the south of the Lake (San Felipe, Gulf of California) and the northwest of the Lake (Long Beach).

g) Under the terms of the Quantification Settlement Agreement (QSA) the Lake's decline is set to accelerate starting year, 2018. About the 1/3 of inflow water from the canal will be diverted to San Diego and Coachella Valley.

h) Runoff water from nearby agricultural fields which contains fertilizers, pesticides, and other pollutants such as partially treated sewer from Mexicali contaminate the Salton Sea and make it an undesirable tourist destination, especially for beachgoers.

i) There have been many studies and complaints about consequences for the nearby community if a solution for the Salton Sea is not found.

j) In several decades had been mentioned several proposals for the restoration of the Salton Sea proposing importing seawater, but they all failed to address: (i) salinity balance of the lake – proposing expensive processes such as reverse osmosis and distillers which require a substantial amount of electricity, maintenance of filters, etc.; (ii) not addressing continuation of pollution with pesticides and fertilizers from nearby farmland; (iii) practicality of the projects - proposing canals, tunnels, dozen pipelines - without addressing the practicality of its implementation -

extreme cost with difficulties attracting investors for such projects that cannot generate revenue to pay-off initial investment, therefore rightfully deemed unfeasible.

1.2 Six Phases of the Proposal for the Restoration of the Salton Sea:

Phase I - Connecting the Salton Sea with the Ocean with a pipeline 48" (5 pipelines on the uphill routes and 1 pipeline on downhill routes) for importing seawater into the central section of the Lake (Both of two preferable options for pipeline corridors are recommended and provided here (See FIG. 2 and 9);

Phase II - Dividing the lake into three sections by building two main dikes (several-lane roads) strategically positioned - to follow certain couture (depth of the lake) - and the borders of nearby farmland. One in northern and one in the southern part of the Salton Sea (See FIG. 4 - 8) to prevent contamination of the central part of the Lake with runoff waters from nearby farmland contaminated with fertilizers and pesticides, and to provide conditions for tourism and also for wildlife sanctuaries.

Phase III – Building irrigation pipeline system for farmlands located Southern and Northern of the Lake with control valves for controlling the inflow of the water into South Lake and North Lake. Also, building several recreational parks with smaller lakes and fisheries.

Phase IV - Building one power plant using a completely closed-loop heat exchange system (SCI-GHE system) at one of the selected sectors (See segments IV & V).

Phase V - Building several more power plants using the (SCI-GHE) system - one in each additionally selected sector; and

Phase VI – A continuing build-up of many additional power plants using the (SCI-GHE) system at each selected sector;

Each of the Phases I-V could start and finish at about the same time providing a self-sustaining functional Lake in about 5-6 years.

1.3 The key elements of the presented proposal are:

1) By dividing the lake into three sections (Central and two smaller Northern and Southern sections) and redirecting the New River and Alamo River back to Mexico – it would stop pollution of the Lake. Importing seawater into the central section of the lake would provide a condition for tourism (exclusive real-estate, beaches, resorts, hotels, etc.). It would also provide wildlife sanctuary in the smaller North Lake and South Lake. The water for the North Lake and South Lake and nearby farmlands can be supply from the Colorado River through the "All American Canal" and "Coachella Canal". We do not need to worry about the Central section of the Lake anymore (as currently, we do, because of limited inflow due to the Quantification Settlement Agreement) because now we can import seawater from the Ocean. NOTE: New River and Alamo River are contaminated with pesticides and fertilizers (runoff waters from nearby farmland), and with partially treated sewer from Mexicali, Mexico).

2) For Route #1 (Gulf of California, Mexico - Salton Sea, USA) - To negotiate a treaty through the "INTERNATIONAL BOUNDARY AND WATER COMMISSION" and their counterparts in Mexico about diverting the flow of the New River and Alamo River back to Mexico and in return getting corridor for a pipeline for importing seawater from the Gulf of California. The pipeline with maintenance road can have several underpasses to preserve the integrity of Mexico's territory. (Tips for negotiations with Mexico's officials – in summary: It is in the interest of Mexico to have the flow of New River and Alamo Rivers. It is in the interest of the US to have a corridor for importing seawater from the Gulf of California to save $50 million that we would otherwise need to pay for importing seawater (about 1 million acre-feet per year) from the Gulf of California.

3) For Route #2 (Long Beach – Whitewater - Salton Sea) – which I am proposing as a dual import of seawater - we do not need any treaty.

4) For importing seawater from the Ocean in the central section of the Lake – It is recommended to use the In-Line-Pump/Generator system which generates electricity in downhill routes which can be used as a supplement to the energy needed for horizontal and uphill routes. (See Segment II - FIG. 6 -8);

5) Generation of the electricity by using the pipelines as a foundation for solar panels assembly. Solar energy is prevalent in the area averaging 280 sunny days per year (See Segment III);

6) Implementing pipeline with sprinkler system for farmland (Northern and Southern area of the Lake) to conserve limited source of water from Colorado River, received through the "All-American Canal" and "Coachella Canal", and to prevent the formation of runoff waters from nearby farmland. (See FIG. 4 and 8); That pipeline system (about 870 miles) can also be used as a foundation for solar panels for the generation of additional electricity and increasing revenue for several hundred million dollars per year (See Segment III).

7) By redirecting the New River and Alamo River back to Mexico and implementing pipelines with sprinkler system for farmland (Northern and Southern areas of the Lake), to be used only as needed – would not be runoff waters anymore - it would stop pollution of the Lake. By using water from the "All American Canal" and "Coachella Canal" and sprinkler system for irrigation of nearby farmland it would provide the conditions for building several recreational parks with small circulating Lakes and fish farms with substantial financial benefits (See FIG. 12-15). NOTE: The part of this point (7) is added after filing of original papers in 2018. The essence of this point is that water from canals, before entering the irrigation system, can be used for the formation of recreational parks with smaller circulating Lakes (not ponds) and fisheries (See FIG. 4, 12-15).

8) Generation of electricity by harnessing prevalent geothermal sources with new technology using a completely closed-loop system that is not limited to a geothermal reservoir. (See Segments IV & V).

9) Desalinization of the lake by using gravity - pumping out higher salinity water - which tends to accumulate at the bottom of the lake (as higher density water) - and pumping it into the boilers of new Power Plants for generation of electricity and production of potable water as a free by-product. (See also Segments IV and V);

10) Providing a concentrated salty brine after generation of electricity which is a free by-product, and which is also a source for extraction of lithium. (See FIG. 16-18, also Segments IV & V); and providing a safe depot for waste material after extraction of Lithium. (See FIG. 5).

11) Providing vast wildlife sanctuary (See FIG. 4, 5, 7, and 8); and

12) Providing conditions for tourism - exclusive real-estate, beaches, resorts, hotels, etc. The surfing waves facility will be a tourist attraction the whole year round (See FIG. 8, 10-11).

1.4 Preliminary Estimate for Water Needed for Balancing Evaporation in the Salton Sea.

The necessary inflow of water to balance evaporation of the whole lake is about 1,200,000 acre-feet per year. The surface of the southern section of the Lake is about 10% of the whole Lake (See FIG. 4 and 5). Water needed to balance evaporation of the southern section of the Lake is about 120,000 acre-feet per year. Water needed for farmlands south of the lake is about 200,000 acre-feet per year. Water needed for balancing evaporation in the southern section of the Lake and for nearby farmland adds up to about 320,000 acre-feet per year.

The surface of the northern section of the Lake is about 5% of the whole Lake (See FIG. 4 and 8). Water needed to balance evaporation of the northern section of the Lake is about 60,000 acre-feet per year. Water needed for farmlands north of the lake is about 100,000 acre-feet per year.

Water needed for balancing evaporation in the Northern section of the Lake and for nearby farmland adds up to about 160,000 acre-feet per year.

Water needed for balancing evaporation in the Northern and Southern sections of the Lake and for nearby farmlands adds up to about 480,000 acre-feet per year.

It means that a functional Lake can be achieved with less than 500,000 acre-feet per year from the Colorado River through All-American Canal and Coachella canal, which means that this proposal is in harmony with restrictions from the Quantification Settlement Agreement (QSA) which allow about 750,000 acre-feet per year.

SUMMARY

<u>Importing Seawater and Harnessing Hydropower</u>

Phase II - Dividing the Lake into three sections by building two main dikes (4-lane roads) strategically positioned - One in the northern and one in the southern part of the Salton Sea. The rough cost estimate is around **$3.0 Billion. (**22 miles + 13 miles) x $82 Million = $2.87 Billion). The cost estimate for 6 piers is about $130 million (6 piers x $20 Million = $120 Millions).

<u>Route #1</u>

Pipeline cost estimate: $1,425,600,000.

Added about 20% for a new Product Development; Permits, Preliminary and Final design; Several Pumping stations; Several freeway Underpasses; Right-Of-Way permits; DELTA hydroelectric power plant.

$1,425,600,000 + (20% = $285,120,000) = $1,700,000,000.

- ⇨ Pipeline cost estimate **$1.7 Billion.**

The volume of water imported: **1,114,261** acre-feet per year.

Kinetic Energy generated: **27.3 MWh.**

Revenue generated: $14,348,880 per year.

Maintenance Expenses: **-$2,000,000.**

- ⇨ Revenue generated: **$12,348,880.**

<u>Route #2</u>

Pipeline cost estimate:

$2,138,400,000 + (20% = $427,680,000) = $2,566,080,000.

Purchase of Right-of-Way: $500,000,000.

- ⇨ Pipeline Cost Estimate: **$3,066,5080,000**.

The volume of water imported: **2,267,464** acre-feet per year.

Maintenance Expenses: **-$2,000,000.**

The Hydro energy generated: 710.5 MWh

Efficiency factor is used 20% => 710.5 MWh x 1.2 = 852.6 MWh.

Energy Net for Route # 2: 719.0 MWh – 852.6 MWh = **-142.1 MWh.**

142.1 MWh will be transferred from the solar-generated energy (See Segment (III)).

- ⇨ The Hydro energy generated: Deficit **-142.1 MWh.**

The Cost Estimate for Pipeline System for the Irrigation of the Farmland Southern Area of the Salton Sea:

Length of pipeline system: **870 Miles.**

The cost estimate to build it: **$2.7 Billion.**

Energy Generated: **2.73 MWh.**

Revenue generated: **$1,434,888 per year**.

Maintenance**: $2,000,000.**

Revenue generated: **$1,434,888** per year.

Cost Estimate for Pipeline System for the Irrigation of the Farmland Northern Area of the Salton Sea:

The farmland in the Northern area of the Salton Sea is approximately 50% of the farmland Southern Area of the Salton Sea. Here values are divided by 2. This area does not have enough drop to generate hydropower.

Length of pipeline system: **435 Miles.**

The cost estimate to build the pipeline system: **$1,378,080,000.**

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Maintenance: **$1,000,000.**

Harnessing Solar Energy

The Cost of TOC system for Route #1 (160 miles): ~ **$200,000,000**.

Maintenance of the TOS on Route #1: -$2,500,000.

The Cost of TOC system for Route #2 (200 miles): ~ **$250,000,000**.

Maintenance of the TOS on Route #2: **-$3,500,000.**

The Cost of the TOC system South of Salton Sea (870 miles): ~ **$1,200,000,000.**

Maintenance of the TOS system South of Salton Sea (870 miles): **$12.400,000.**

The Cost of TOC system for Northern of Salton Sea (430 miles): **~ $580,000,000.**

Maintenance of the TOS system of the Northern of Salton Sea (430 miles): **$6,200,000.**

- ⇨ **$2,254,600,000**

Energy Generated with TOS on Route #1: **423,52 MWh.**

Energy Generated with TOS on Route #2: **529.4 MWh.**

Energy Generated with TOS on Southern of Salton Sea (870 miles): **2,302.29 MWh.**

Energy Generated with TOS on Northern of Salton Sea (430 miles): **1,151.14 MWh.**

- ⇨ **4,406.35 MWh.**

Revenue Generated TOC system for Route #1 (160 miles): **$45,740,160** per year.

Revenue Generated TOC system for Route #2 (200 miles): **$57,175,200**

Revenue from the TOS on area Southern of Salton Sea (870 miles): **$248,647,320 per year**.

Revenue from the TOS on area Northern of Salton Sea (430 miles): **$124,323,660 per year**.

- ⇨ **$475,886,340**

  NOTE: Here are not calculated solar panels and dishes that can be set up on service roads near the pipelines and electric power lines, but that would double or triple the revenue of the area.

Harnessing Geothermal Energy

The Cost of One Geothermal Power Plant: **$418,000,000.**
The Cost of 3 Power Plant: **$1,254,000,000.**

(Estimate of Production Capacity of one (1) Geothermal Power Plant is about: **100 MW).**

Estimate of Production Capacity of three (3) Geothermal Power Plant is about: **300 MW**.

(Preliminary Estimate for Revenue of one (1) Geothermal Power Plant is about: **$50,457,600** per year)**.**

Preliminary Estimate for Revenue of three (3) Geothermal Power Plants is about: **$151,372,800** per year**.**

Harnessing Lithium

Salton Sea Facts:
Surface: 350 square miles (910 km^2).
Inflow: < 1,200,000 acre-feet (1.5km^3).
Depth: 43 feet (13 m).
Volume: 6,000,000 acre-feet (7.4 km^3).

Salinity: 56 grams per liter.
[Pacific Ocean is: 35 gm /L].
Salt concentration has been increasing per year 3%.
About 4,000,000 Tons of salt are deposited in the Valley (Salton Sea) each year with irrigation water.

1,000,000 acre-feet = 1,233,481,837.54 Kiloliters (Kl).

1,233,481,837.54 Kiloliters (Kl) = 1,213,746,128 Tons.

1,213,746,128 Tons ÷5,000,000 = 242.75 Tons of Lithium.

Import of 1,000,000 acre-feet of seawater from Route #1 (Gulf of California - San Felipe) brings about **242.75 Tons of Lithium per year.**

Import of 2,000,000 acre-feet of seawater from Route # 2 (Pacific Ocean - Long Beach brings about **485 Tons of Lithium per year.**

Import of 242.75 Tons of Lithium from Route #1 (+) 485 Tons of Lithium from Route #2 - it sums up to **727.75 Tons** of Lithium per year.

Since the water of the Salton Sea is about 50% saltier than the water from the Ocean it is realistic to expect that about **1000 Tons of Lithium per year** can be extracted from the Salton Sea.

Estimate for Extraction of Lithium from the water of the Salton Sea: $**13,000,000** per year as of 2021.

Recreational Parks

By using water from the "All-American Canal" and "Coachella Canal" and sprinkler system for irrigation of nearby farmland it would provide conditions for establishing several recreational parks with small circulating Lakes and fish farms with substantial financial benefits. The rough Cost Estimate for 6 Recreational Parks and 6 fish farms is about **$12 million.** (6 parks x $1 million = $6 million) + (6 fish farms x $1 million = $6 million). The Recreational Parks should be funded by the State. The fish farms should be for the private sector (investors) to participate.

Surfing Waves Facility

This proposal provides conditions for tourism - exclusive real estate, beaches, resorts, hotels, etc. The surfing waves facility will be a tourist attraction the whole year round. The rough Cost Estimate for the Surfing Waves Facility is about **$15 million.** (See FIG. 8, 10-11). It should be part of the hotel system nearby. Importing seawater provides the condition for tourism and the private sector (investors) to participate.

Summary of the Summary

Cost about **$15,395,040,000**

Revenue of about **$542,255,148**

The revenue of about $542,255,148 per year in my rough cost estimate is a very conservative number – the real revenue will be around **$1 billion per year.** That does not include revenue from other activities such as tourism that will bloom.

The presented preliminary Cost Estimate is based on standard available information. The final production design, based on the presented preliminary design, and final cost estimate will be available after cooperation with selected capable contractors – preferably selected by the State. Slight variations in the cost estimate might occur. As the author of the unique patented concept and several breakthrough technologies in the energy industry (hydro, solar, and geothermal) being used in the project, my involvement with selected capable companies (contractors) is necessary. Besides licensing, I would be glad to help in the finalization of the project as needed.

Preliminary Cost/Revenue Estimate - Spreadsheet

(System for Importing Seawater)

(Segment I)

Description	**Cost**	**Power**	**Revenue**
Phase II (Dividing the Lake into three sections by building two main dikes)	$3,000,000,000		
Route #1 (Pipeline – San Felipe – Salton Sea)	$1,710,720,000	27.3 MWh.	$14,348,880 per year
Maintenance - Route #1			-$2,000,000
Purchase of **“Right-Of-Way”** for the Route #2	$500,000,000		
Route #2 (Pipeline – Long Beach – Salton Sea)	$2,566,080,000	-142.1 MWh	-$74,687,760
Maintenance - Route #2			-$2.000,000
Cost Estimate for the **pipeline** system for the **irrigation** for farmland **Southern** of the Salton Sea:	$2,756,160,000	2.73 MWh.	$1,434,888 per year.
Maintenance pipeline system for irrigation for **Southern** of the Salton Sea:			-$2,000,000
Cost Estimate for the **pipeline sys**tem for the irrigation for farmland **Northern** of the Salton Sea:	$1,378,080,000.		$0

Maintenance for the **pipeline** for the irrigation for farmland **Northern** of the Salton Sea:			-$1,000,000.
Cost Estimate of the **Solar Panel** Assembly System assembled on the pipeline system 160 miles distance **- Route #1** (Pipeline – San Felipe – Salton Sea)	$200,000,000.	423.52 MWh	$45,740,160 per year.
Maintenance **Solar -** Route #1			-$2,500,000 per year.
Cost Estimate of the **Solar Panels** Assembly System assembled on the pipeline system 200 miles distance **- Route #2** (Pipeline – Long Beach – Salton Sea)	$250,000,000.	529.4 MWh	$57,175,200 per year.
Maintenance **Solar -** Route #2			-$3,500,000 per year.
Cost Estimate for the **Solar Panels** on the pipeline system for irrigation for farmland **Southern** of the Salton Sea:	$1,200,000,000	2,302.29 MWh	$248,647,320 per year
Maintenance **Solar** Southern of the Salton Sea:			-$12,400,000.
Cost Estimate for the **Solar Panels** on the pipeline system for	$580,000,000.	1,151.14 MWh	$124,323,660 per year

irrigation for farmland **Northern** of the Salton Sea:			
Maintenance **Solar Panels Northern** of the Salton Sea:			-$6,200,000.
Preliminary Cost Estimate for **three** Proposed Geothermal **Power Plant**s	$1,254,000,000	288 MWh	$151,372,800 per year
Maintenance for three Power Plants			-$7,500,000
∑	$15,395,040,000	4,582.28 MWh	$529,255,148

Preliminary Cost/Revenue Estimate – Spreadsheet

(Harnessing Lithium from the Salton Sea)

Description	**Tons**	**Price**	**Revenue**
Preliminary Estimate for Extraction of Lithium from water of the Salton Sea	1,000 per year	$13,000 per tone	$13,000,000 per year

Preliminary Cost/Revenue Estimate – Spreadsheet

(Summary)

Description	Cost	Power	Revenue
∑	**$15,395,040,000**	**4,582.28 MW**	**$542,255,148**

3. **Illustrations of the Segment (I) -** Importing Seawater for the Restoration of the Salton Sea.

Segment (I)

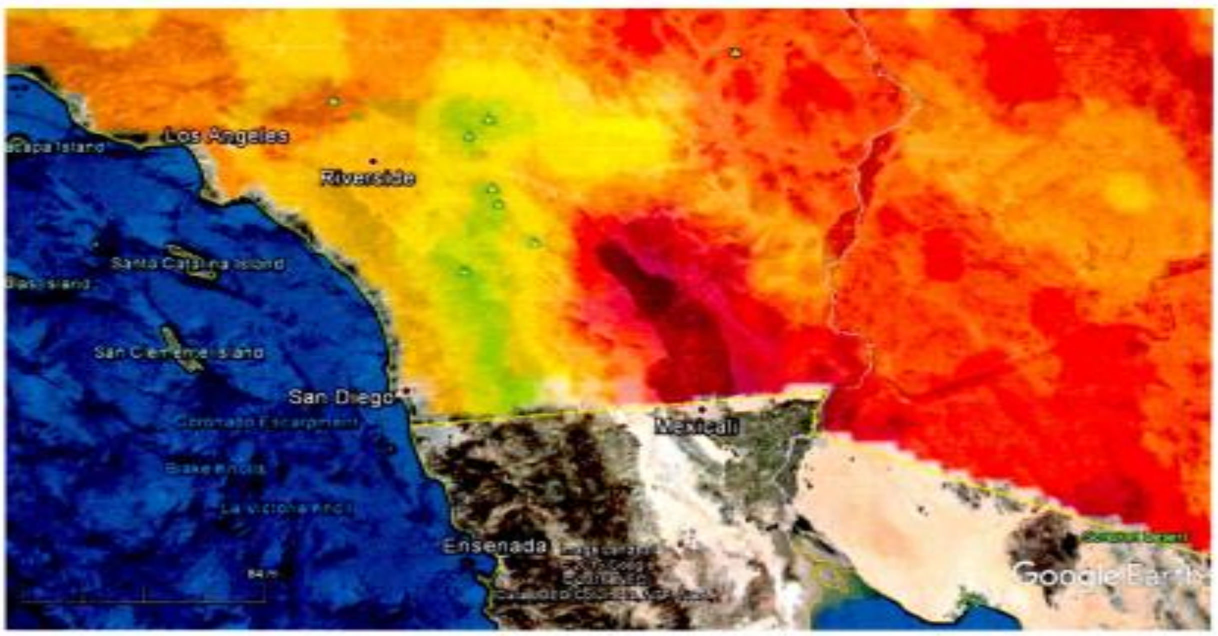


FIG. 1 – Map of Southern California – Temperatures at dept of 3.5 Km

Segment (I)

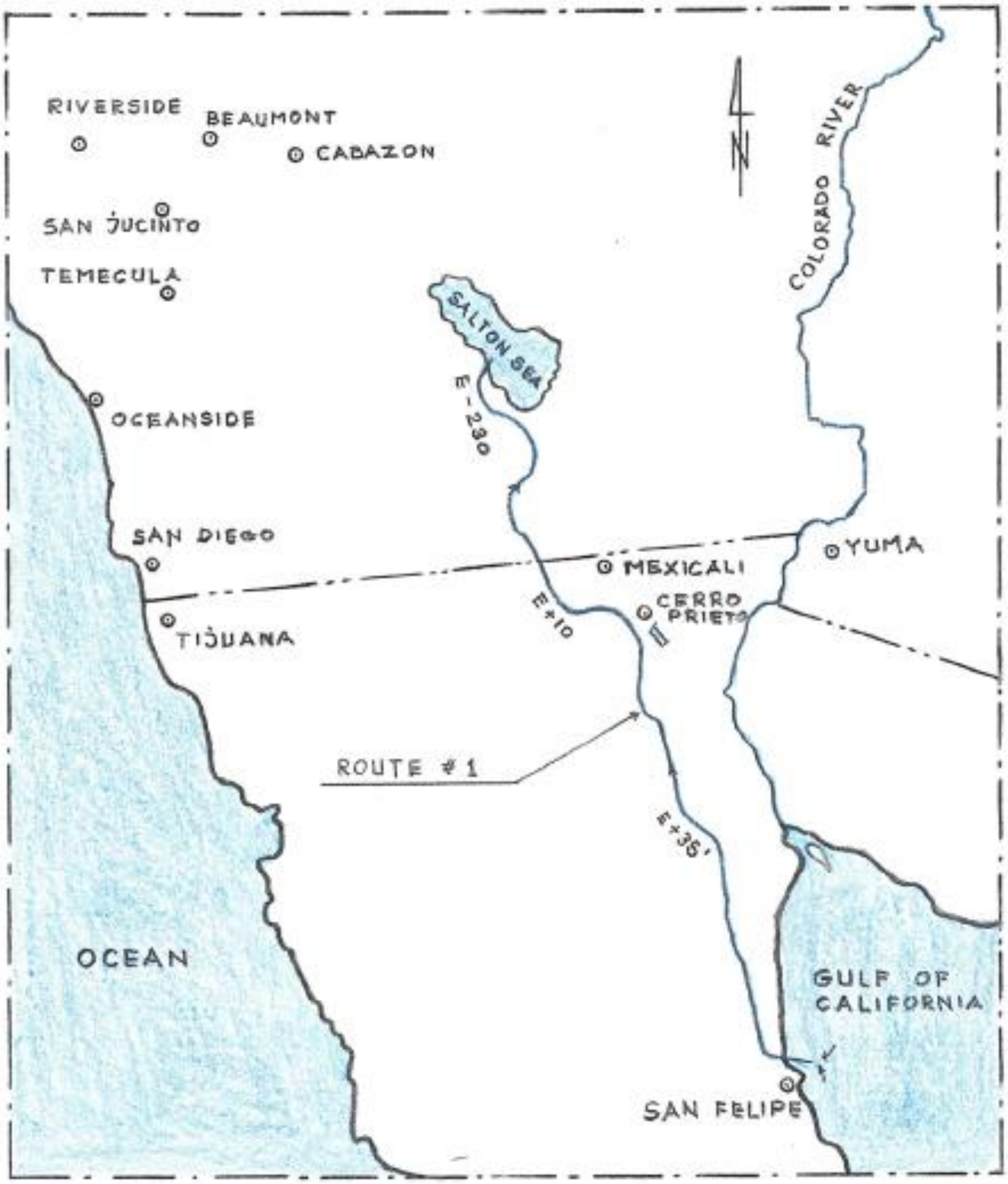


FIG. 2 – Map of the Route #1

Segment (I)

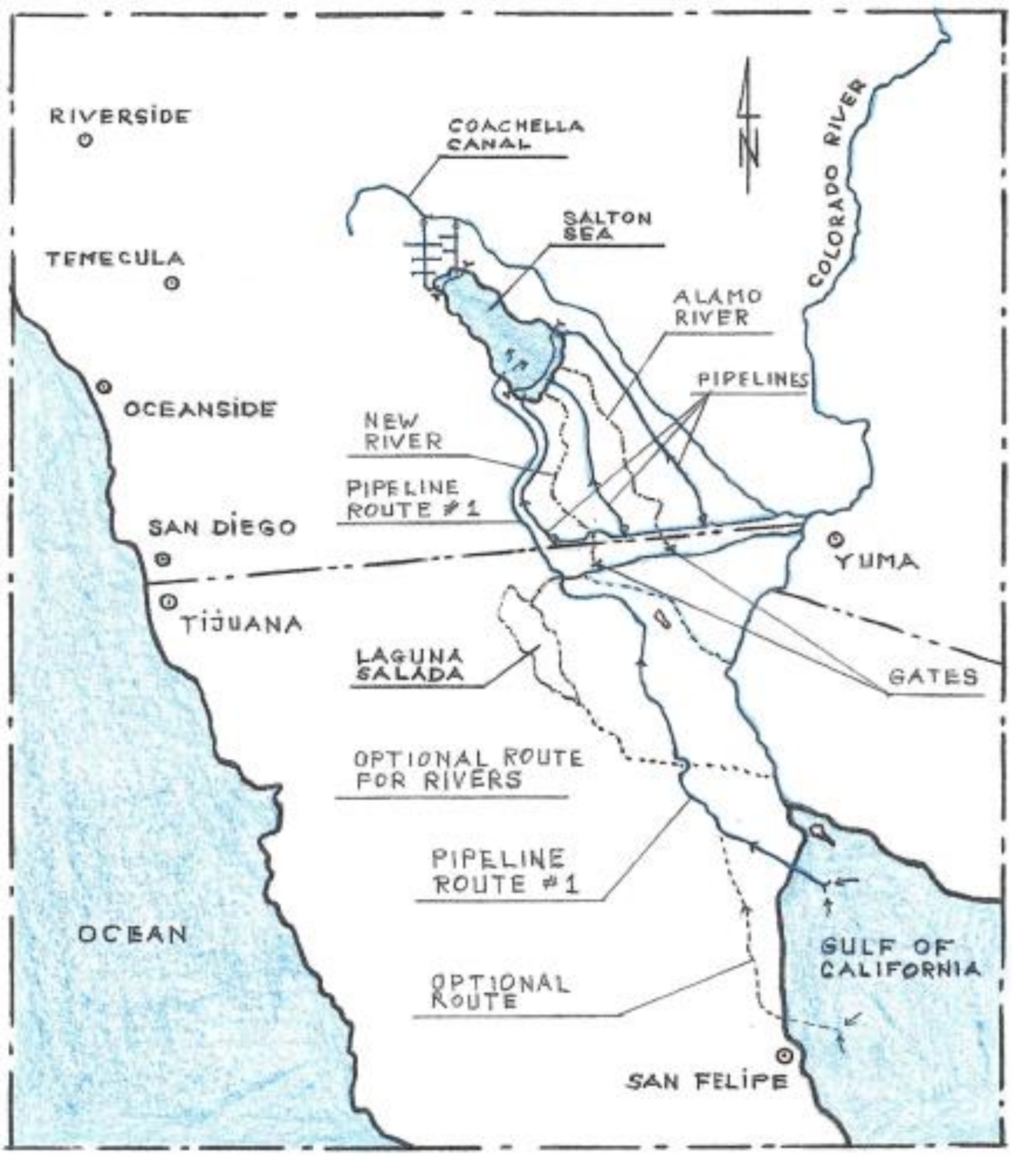


FIG. 3 – Map of redirecting New and Alamo Rivers

Segment (I)

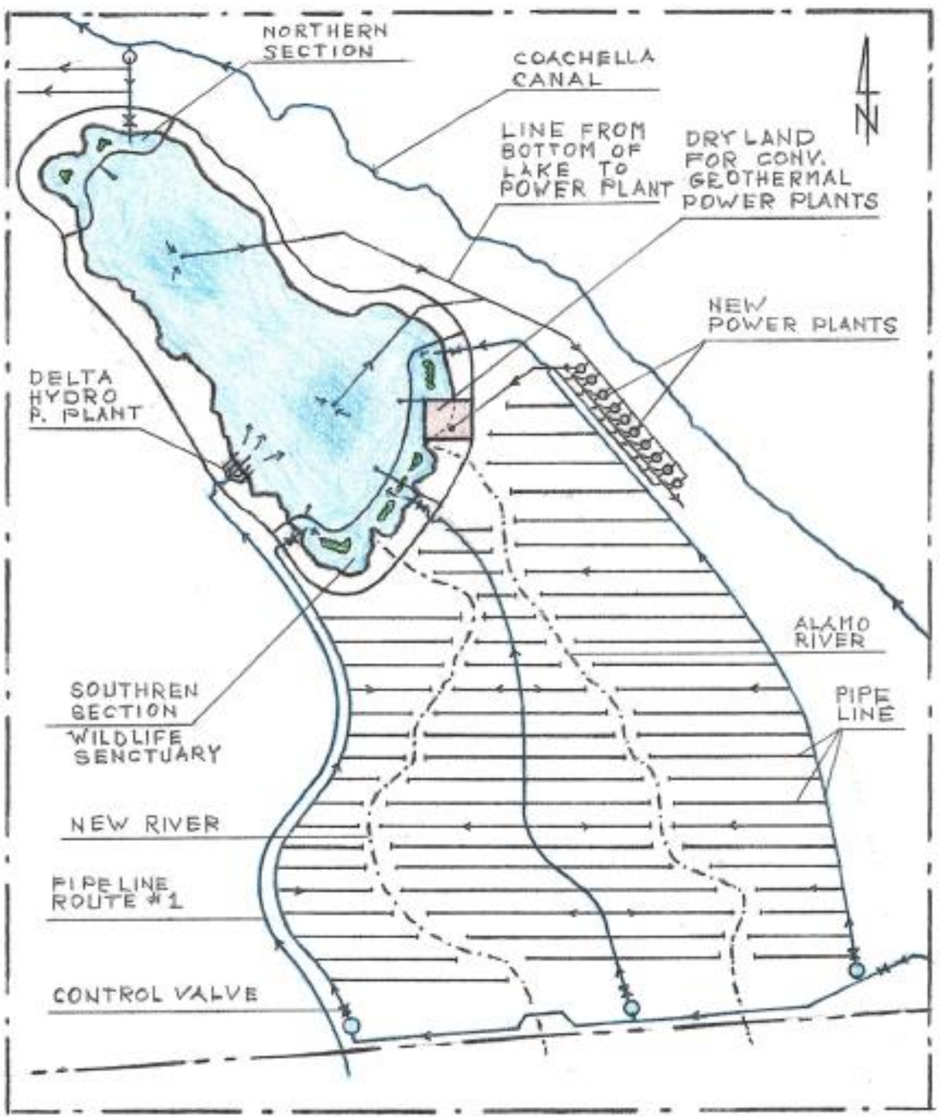


FIG. 4 – Map of redirecting New and Alamo Rivers – South of the Lake

Segment (I)

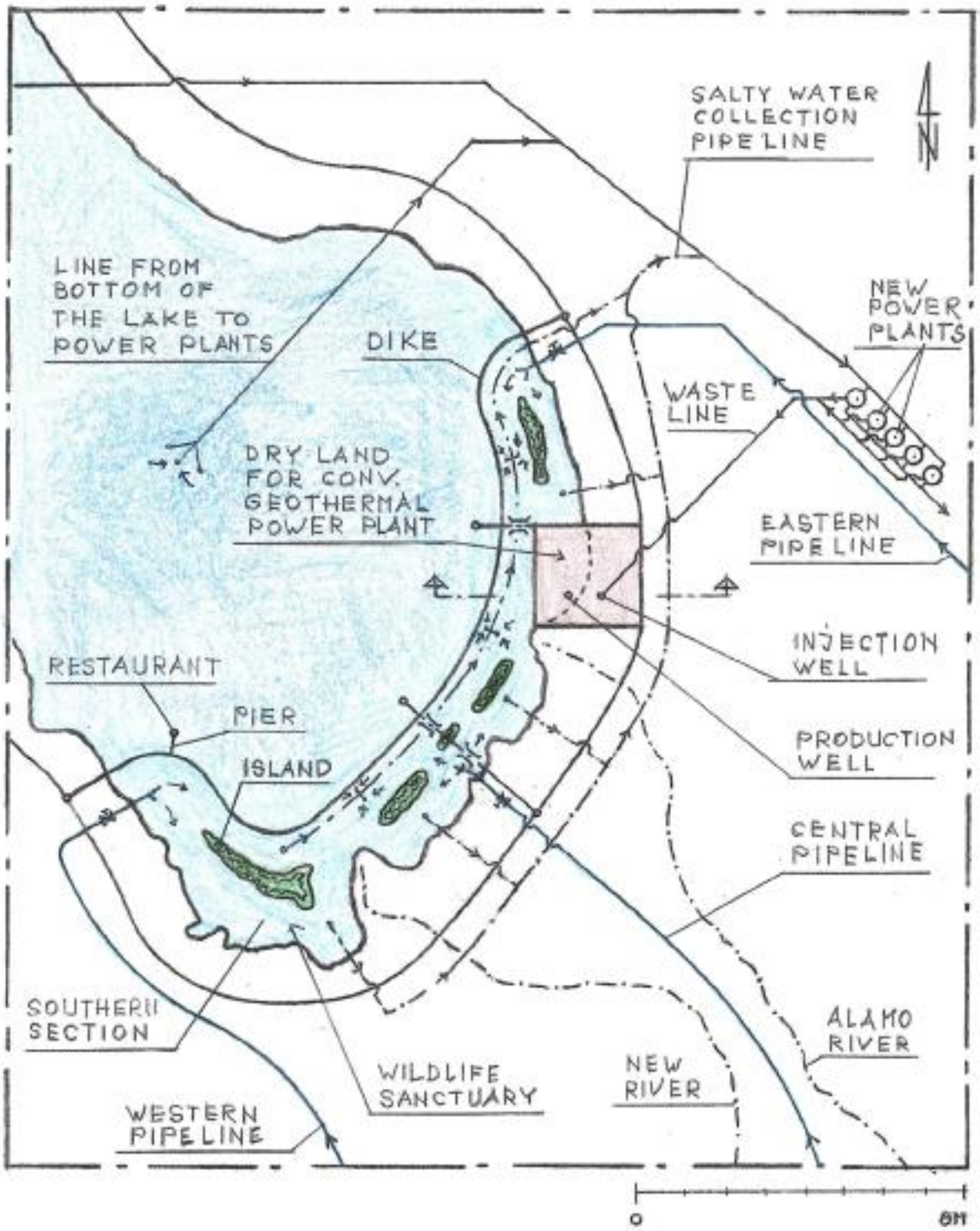


FIG. 5 – **Enlarged Southern Part of the Salton Sea – Wildlife Sanctuary**

Segment (I)

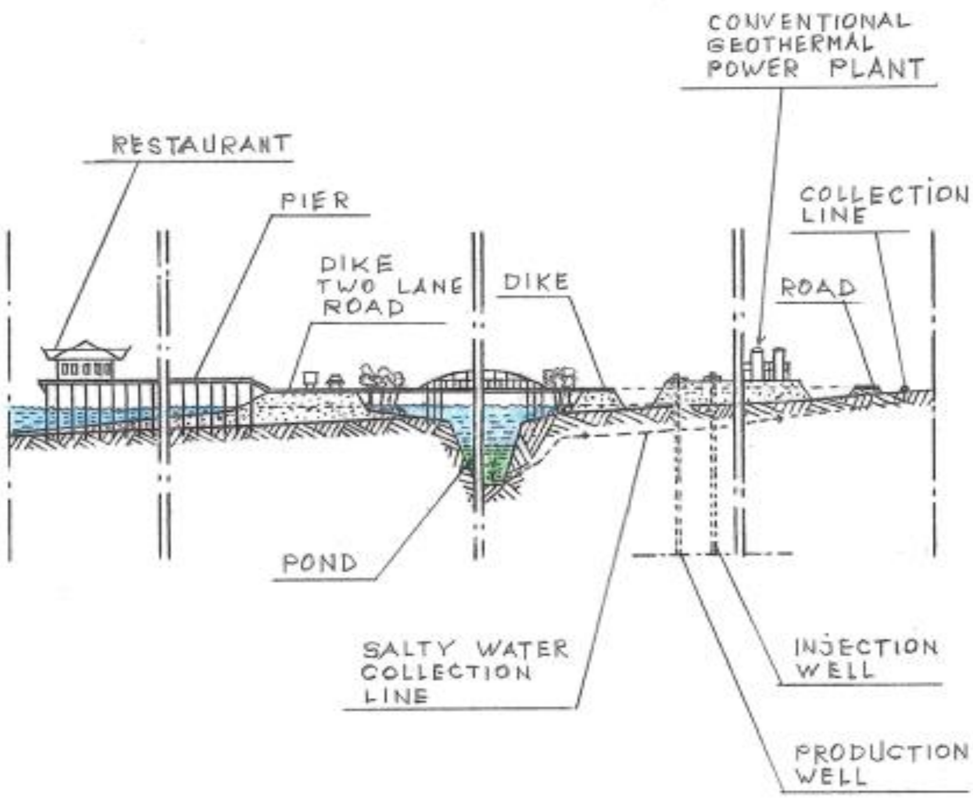


FIG. 6 – Cross-sectional view taken near a typical dike-pier intersection

Segment (I)

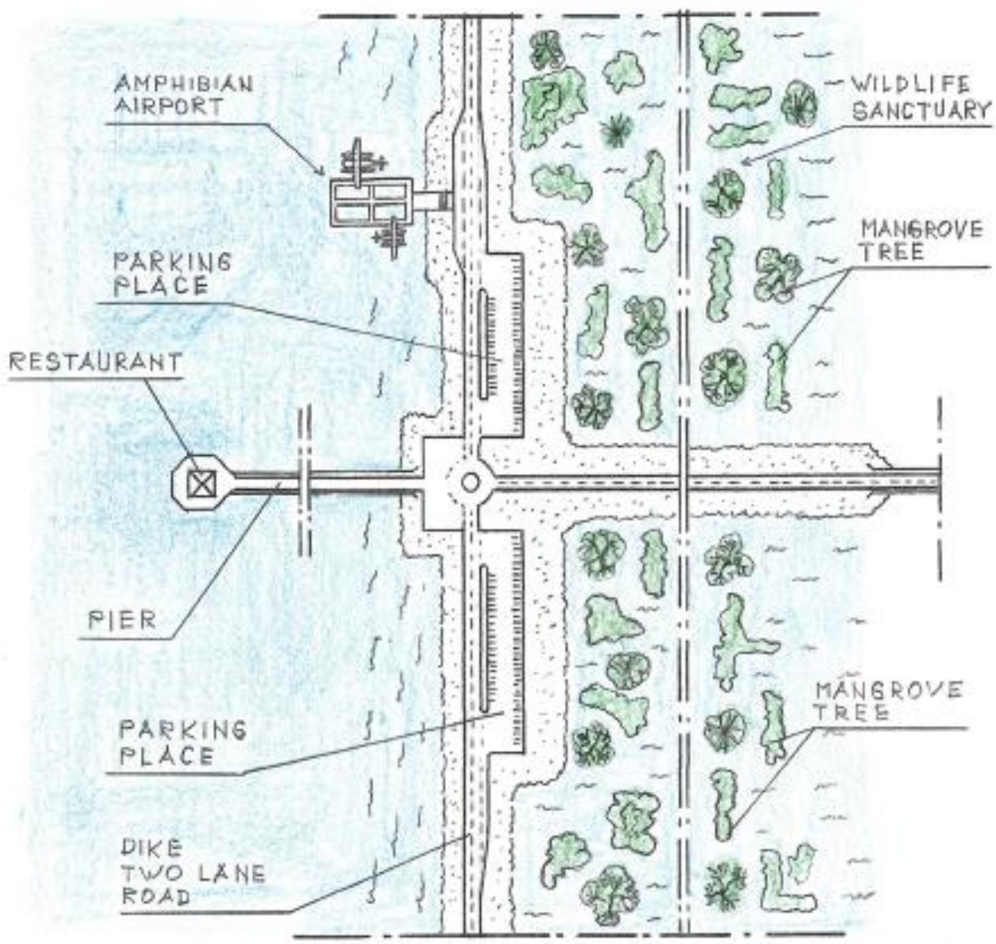


FIG. 7 – Plain view of a typical dike-pier intersection

Segment (I)

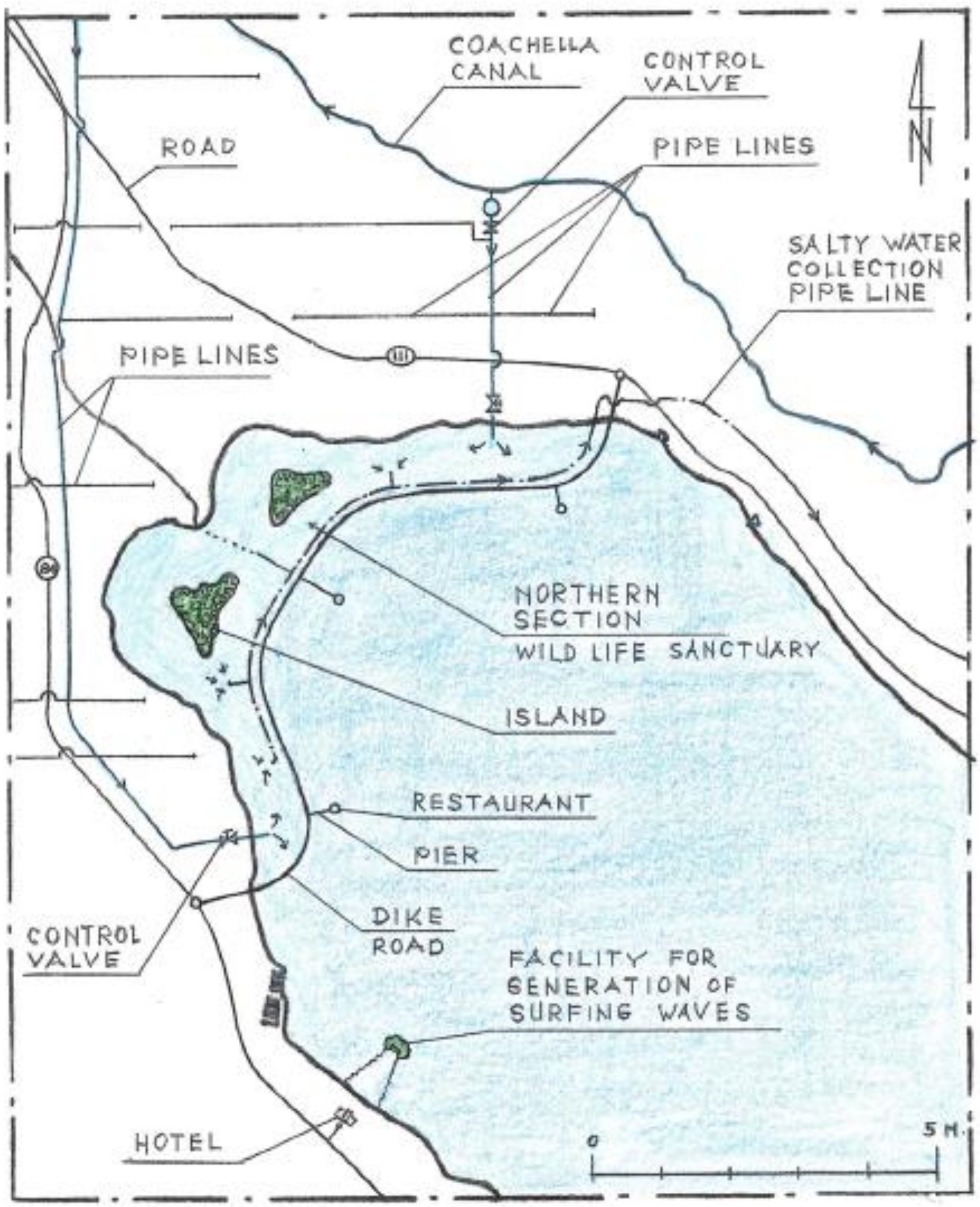


FIG. 8 – **Enlarged northern part of the Salton Sea – Wildlife Sanctuary -**

Segment (I)

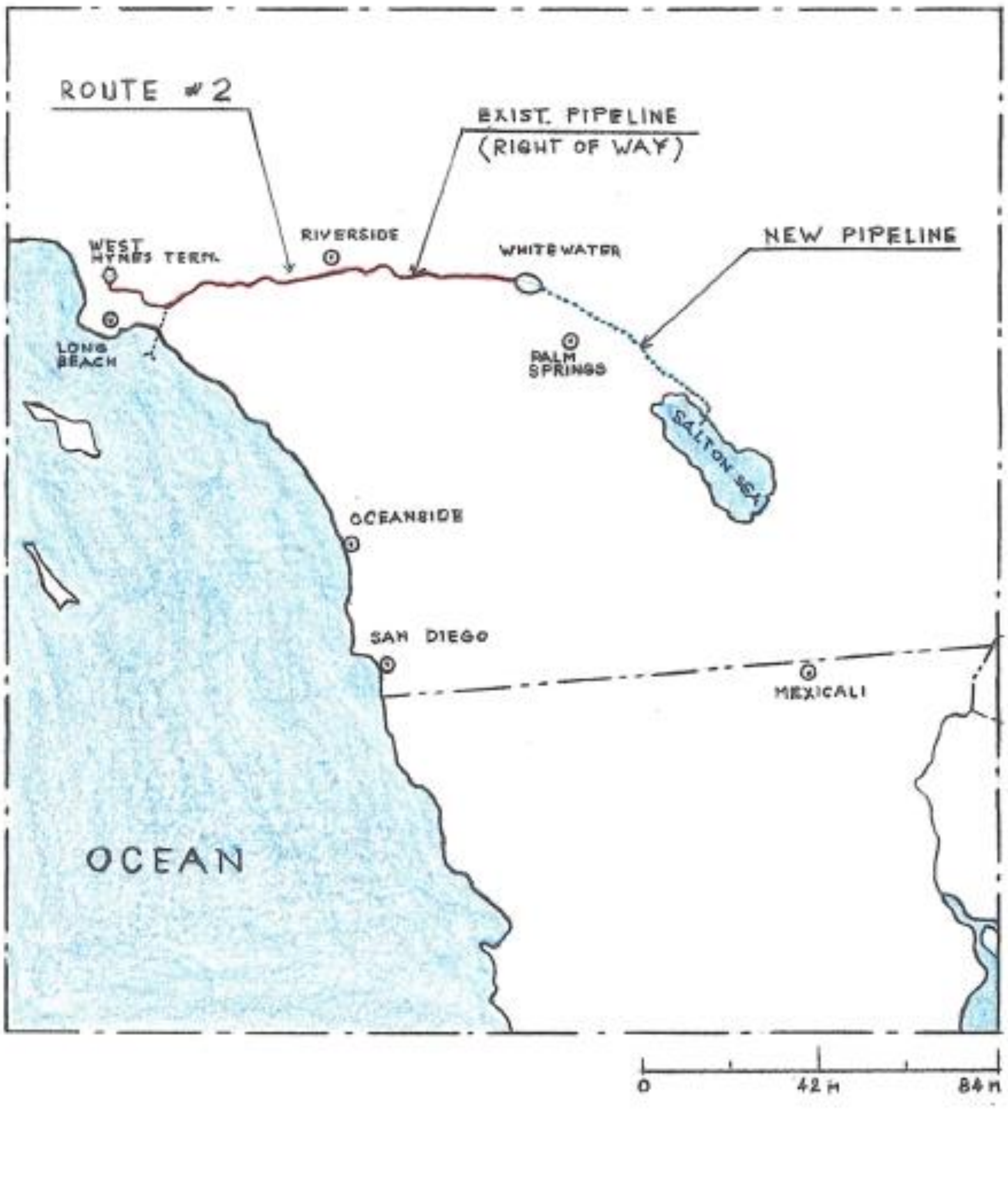


FIG. 9 – Map of the Route #2

Segment (I)

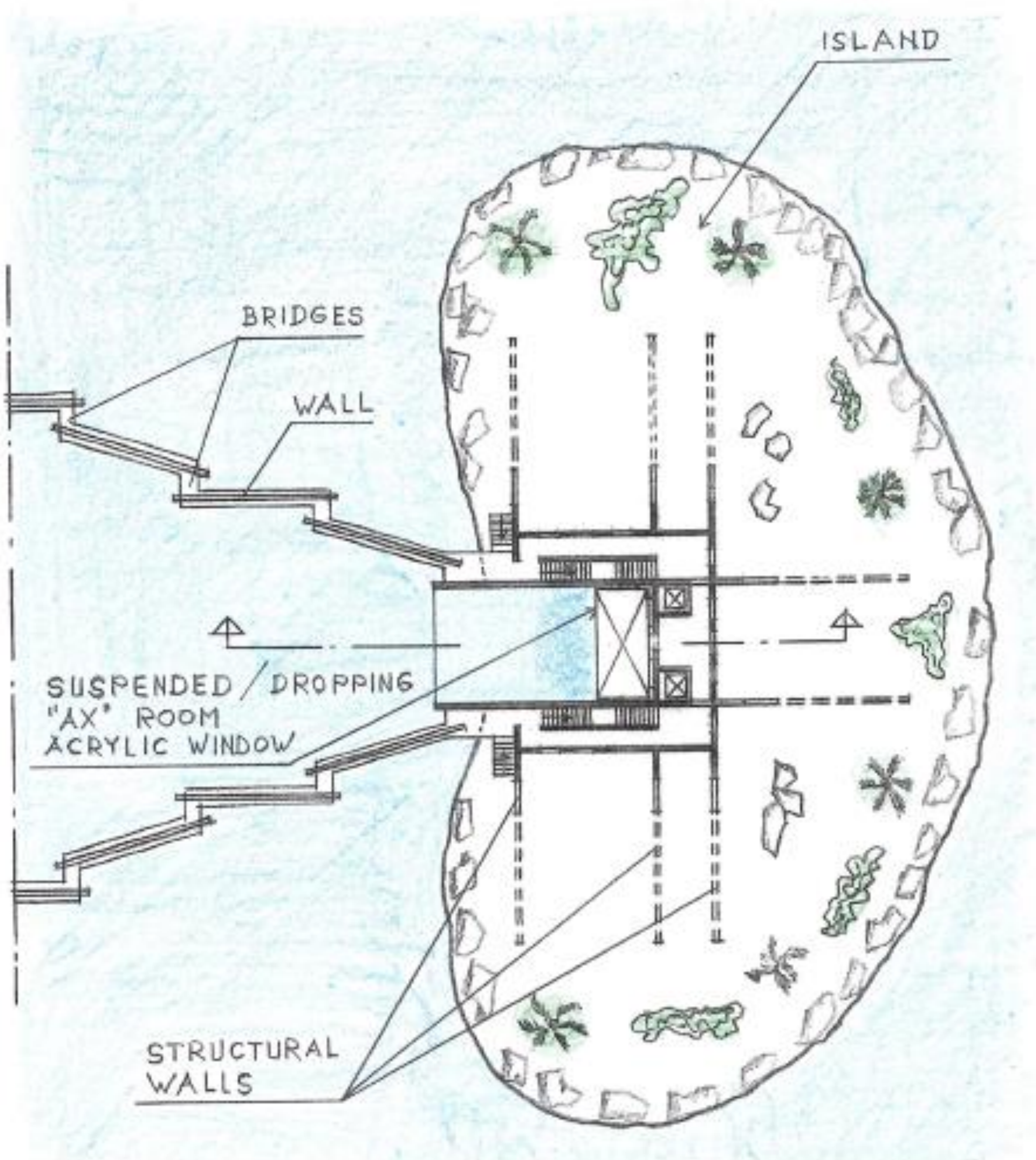


FIG. 10 – Plain cross-sectional view of a wave generation facility

Segment (I)

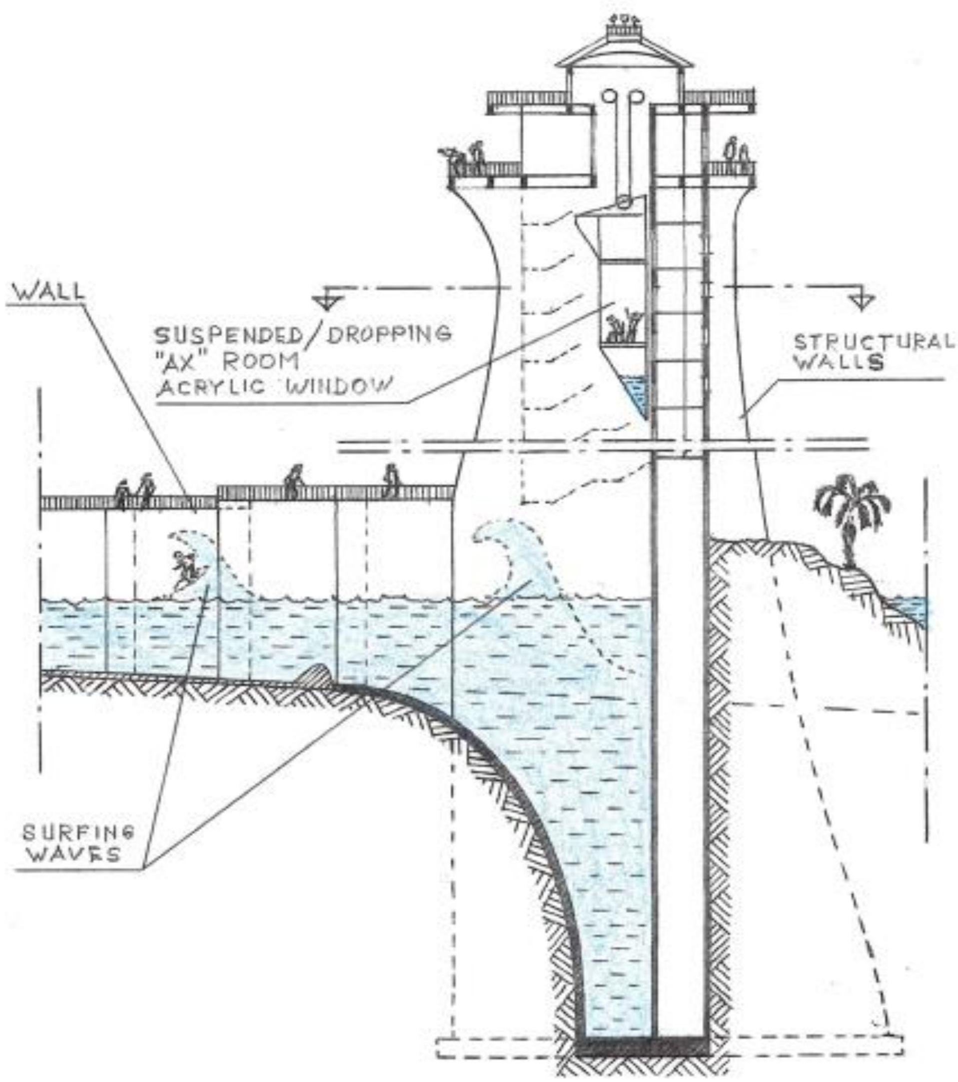


FIG. 11 – Cross-sectional view of a wave generation facility

Segment(I)

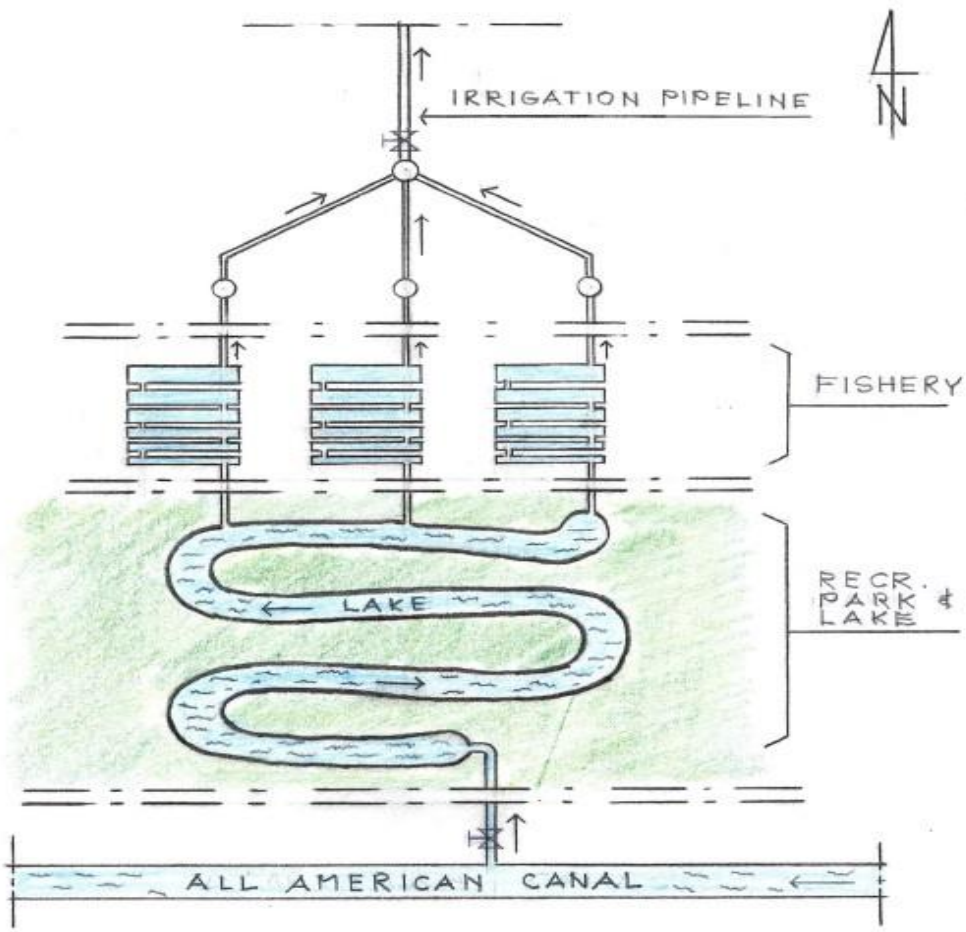


FIG. 12 – **Schematic Plain View of a Recreation Park with a Lake and Fishery**

Segment (I)

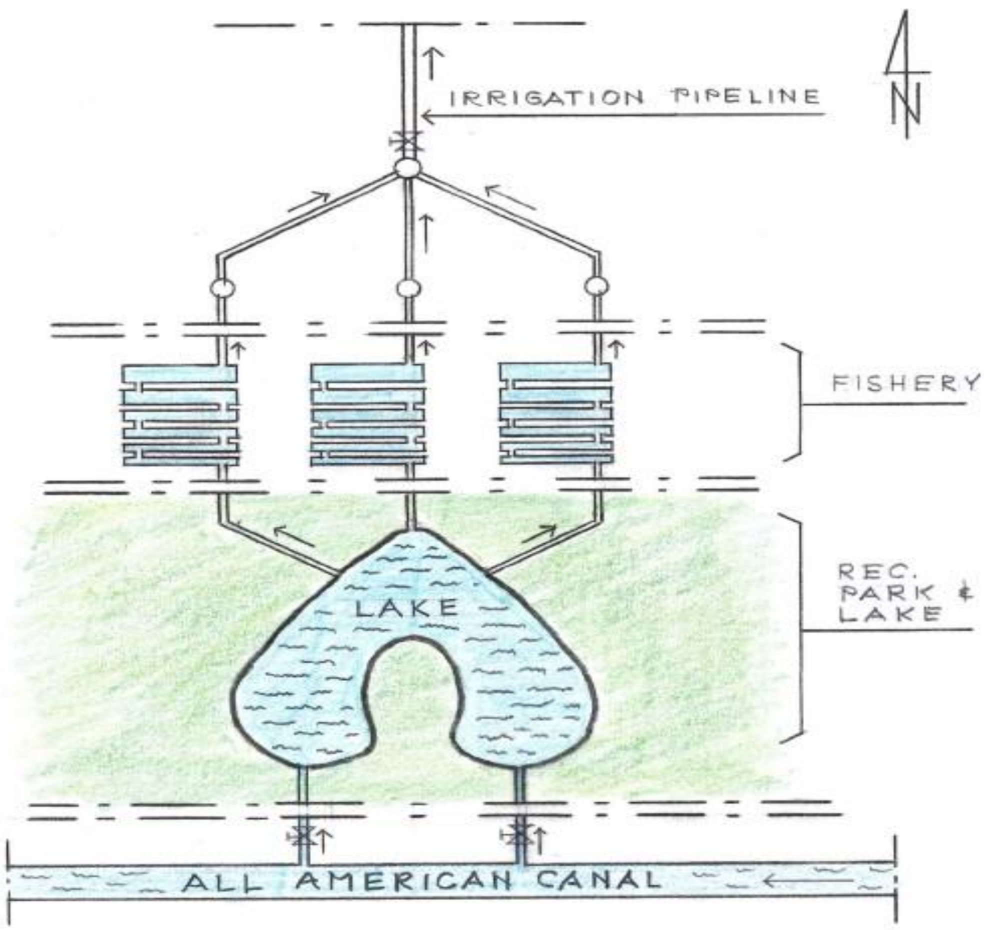
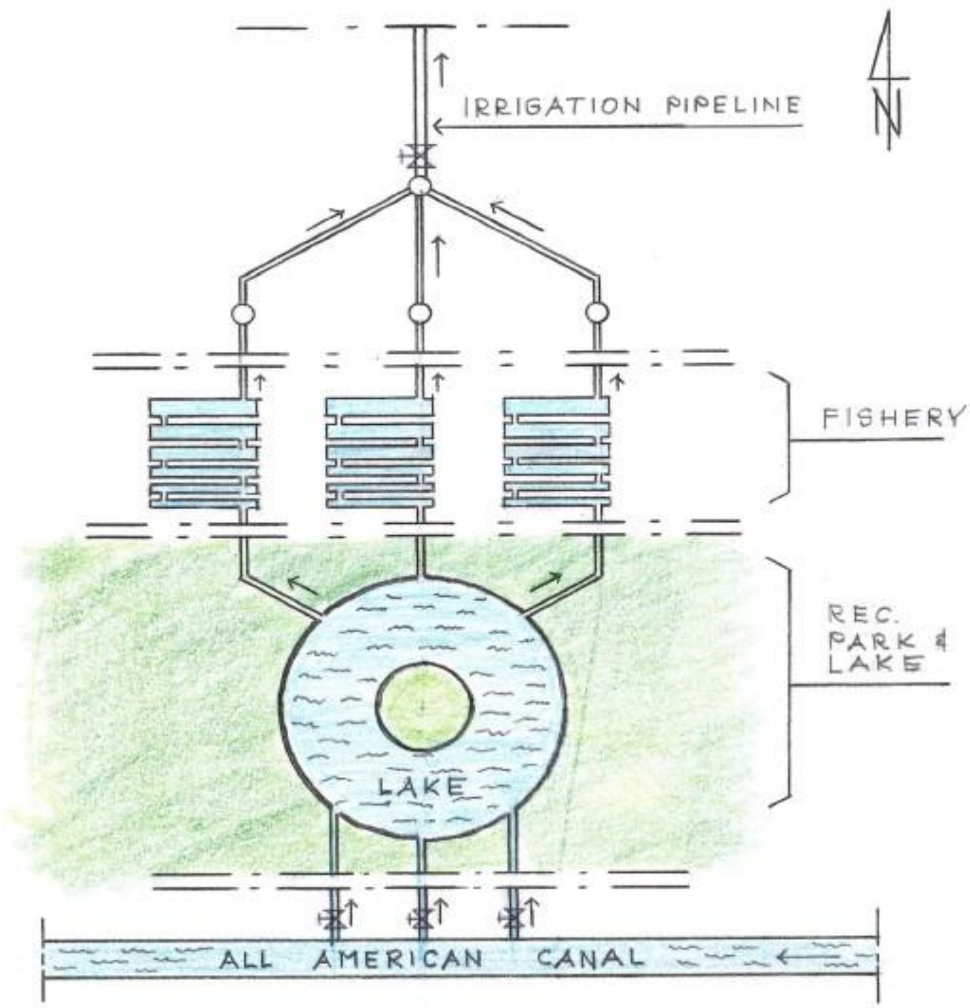


FIG. 13 – **Schematic Plain View of an alternative Recreational Park with a Lake and Fishery.**

Segment (I)



<u>FIG. 14</u> – **Schematic Plain View of an alternative Recreational Park with a Lake and Fishery.**

Segment (I)

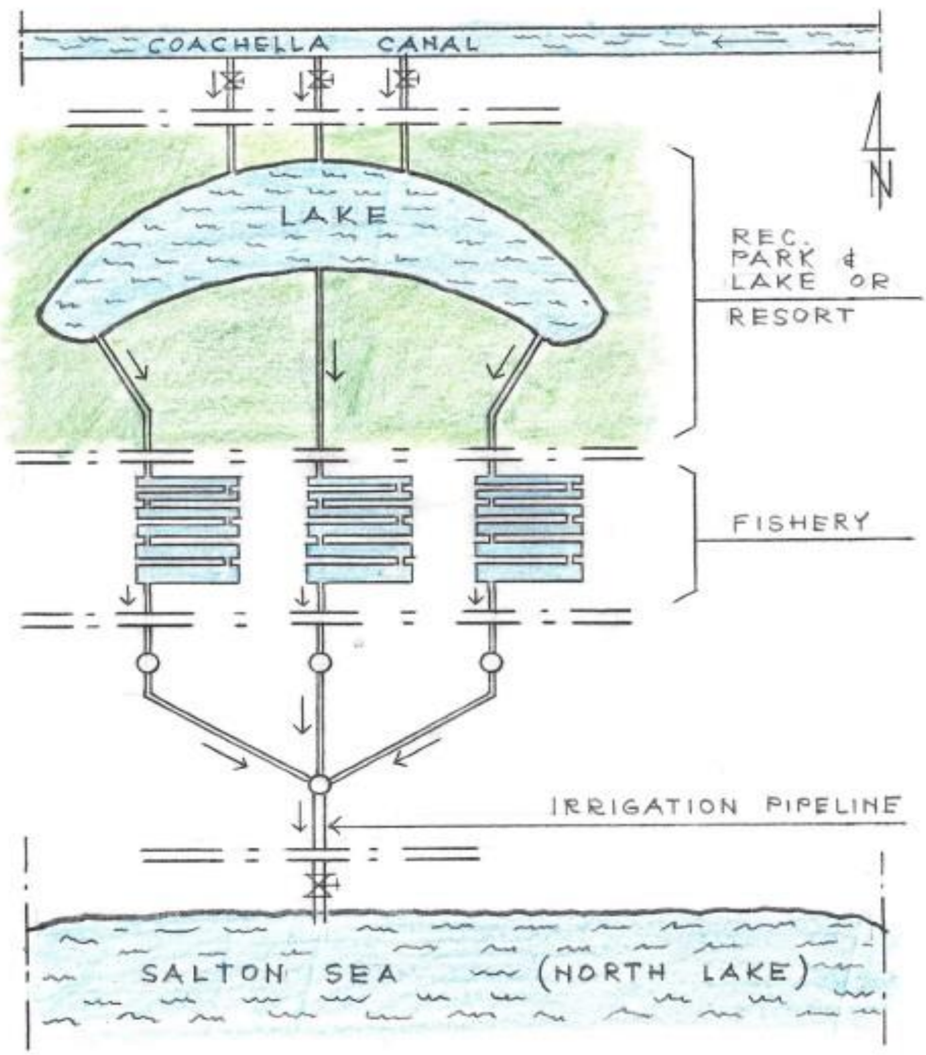
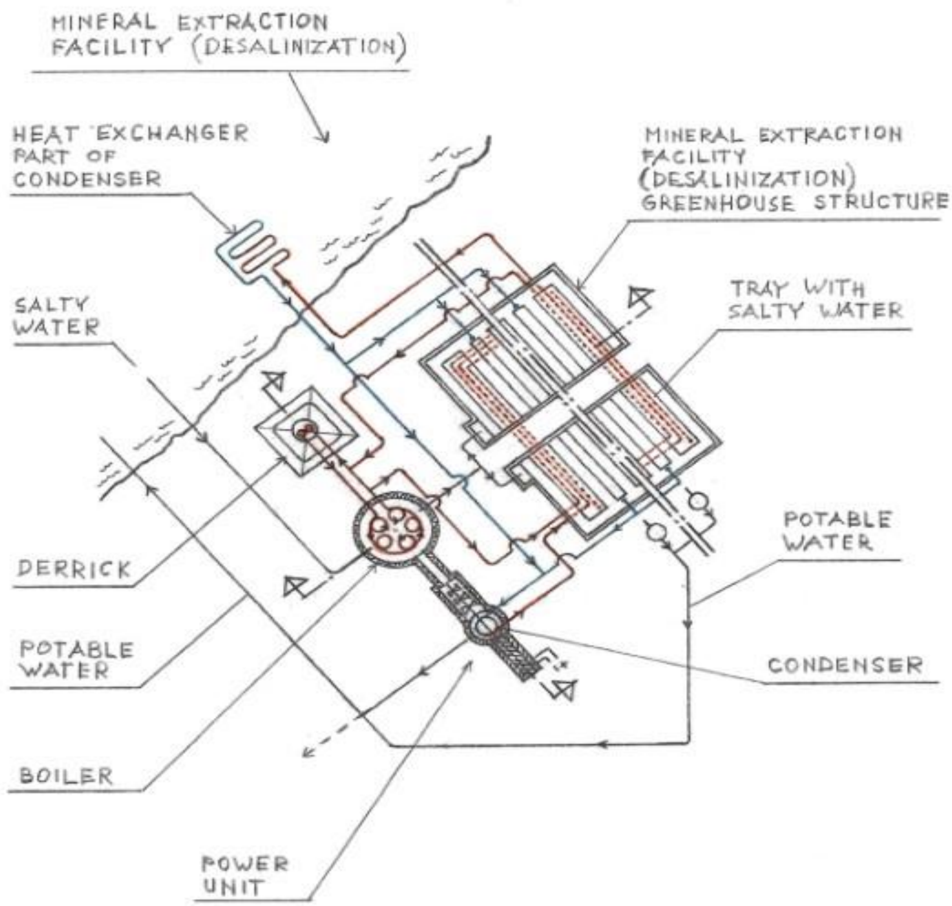


FIG. 15 – **Schematic Plain View of an alternative Recreational Park with a Lake and Fishery.**

Segment (I)



<u>FIG. 16</u> – Schematic Plain View of a Power Plant for Desalinization of the Salton Sea, Production of Electricity, Potable Water, and Lithium

Segment (I)

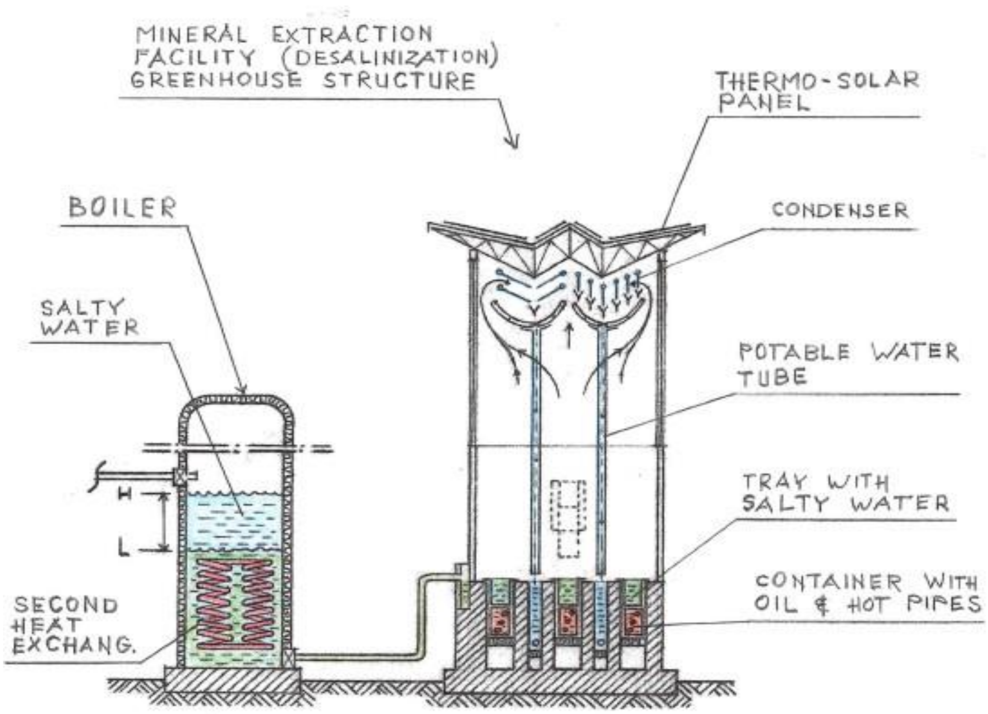
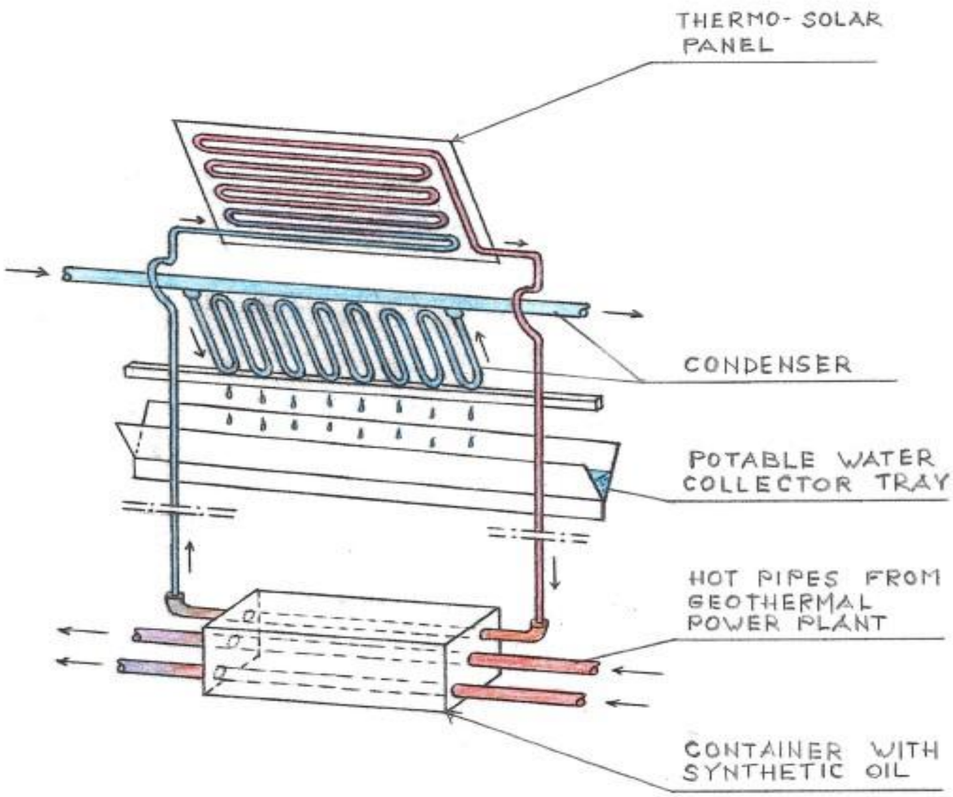


FIG. 17 – **Schematic Cross -sectional View of a Power Plant for Desalinization of the Salton Sea, Production of Electricity, Potable Water, and Lithium**

Segment (I)



<u>FIG. 18</u> – Perspective Cross-sectional View of an alternative Thermo-Solar System used in Desalinization Plant

3. Conclusion:

Importing seawater is a fundamental phase of the presented comprehensive proposal on which other phases depend. Also, importing seawater is an essential element in providing the necessary water for harnessing geothermal energy in the area and is an essential element for the restoration of the Salton Sea.

The presented pipeline with a diameter of only 48" through Route #1 can import about 1 million acre-feet per year which is enough for the balancing evaporation of the Lake. The pipeline through Route #2 also with a diameter of only 48" can import about 2 million acre-feet per year meaning that about 2 million acre-feet can be used for other purposes such as generation of potable water, which can be used for bottling, farmland, and/or generation of Hydrogen, or replenishing depleting geothermal reservoirs. An essential part of the import of seawater is to use salty water for the extraction of Lithium.

The presented proposal for the restoration of the Salton Sea is a long-term solution that includes an architectural plan that harmoniously implements several breakthrough technologies in the Energy Industry into a self-sustaining organism. Each of the segments (phases) is essential for the final result.

The presented proposal transforms the situation of the Salton Sea from the liability which would exceed $70 billion (environmental disaster – toxic dust storms, health issues, and economic fold) - to the tremendous assets (clean environment and hundreds of billions of dollars in revenue) – costing only about $15 billion for building it.

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