

A Thermal (SPA) Town in Turkey

KARAHAYIT



Municipality of Karahayit

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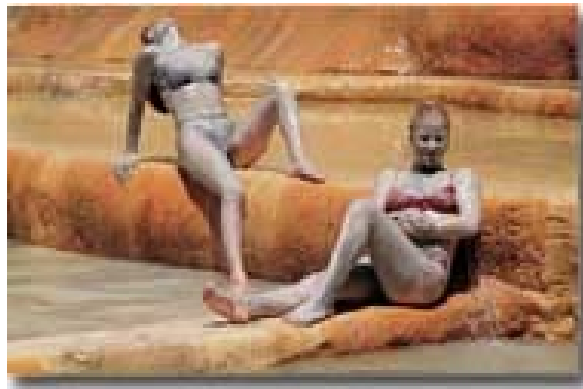
INTRODUCTION

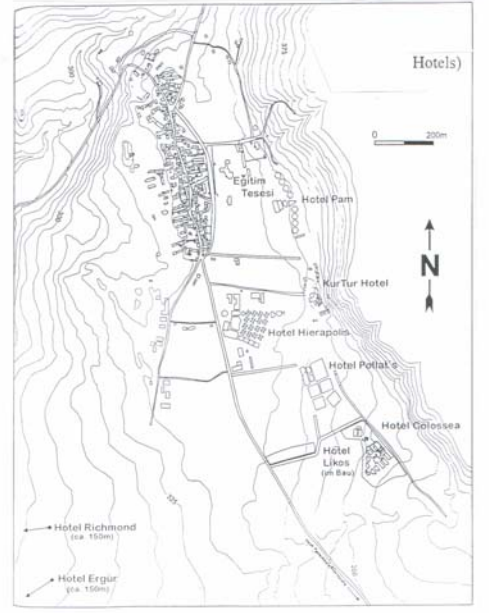
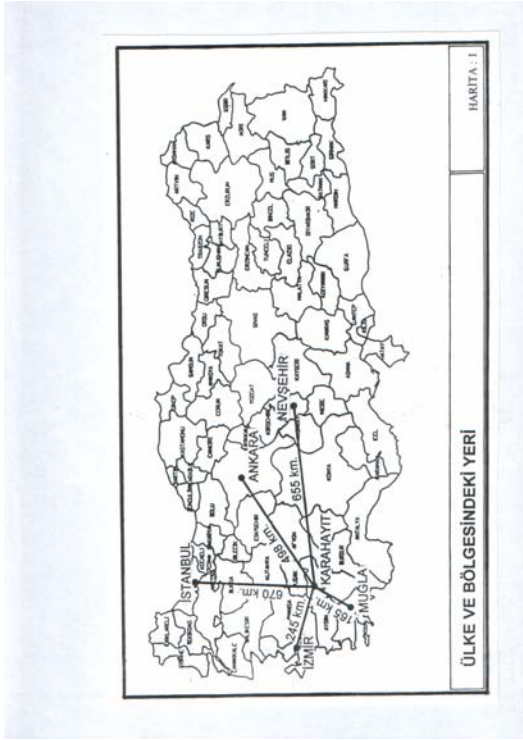
Karahayit district of Denizli province is a place having the population of 2,400 persons. Karahayit district is accessed through Pamukkale located 20 km in the north of Denizli City. Upon the approved development plan, the tourism area has been involved in the southern part and location area in the northeast of district. The southern border is consisting of 10 archeological areas under protection in the planning area and Denizli plain lies down on the western part. The forest areas surround the northeast part of location area. The areas where the development plan is to be executed are far 4-5 km from Pamukkale travertine.

The spring waters, which are the significant resources of Turkey, in Karahayit and Pamukkale occurred as a result of active geologic movements in Aegean Region. Pamukkale, archaic city of Hierapolis and thermal spa were taken under protection by UNESCO. In order to execute a regional management conforming to the world standards in the region involving Hierapolis and travertine, a "regional management" project is prepared in support of the World Bank.

The archaic city of Hierapolis, travertine and the high quality thermal spa are the factors that constitute the tourism potential of Pamukkale. The travertine that spread out in an area of 11 km² in Hieropolis and foots of the mountain paced among Pamukkale and Karahayit locations. The accommodation facilities in Karahayit serve the tourists in the region. Total bed capacity is about 8,000 including 4 and 5 stars hotels in Karahayit.

Karahayit has been taken under protection by the Special Environmental Protection Council (SEPC) in 1990.





Karahayit has also been dedicated as the region where the tourism facilities will be established in respect of the state decision for the buildings to be destructed in the region. The part of $\frac{3}{4}$ of location has been planned to separate as the tourism facilities. The construction prohibition was announced by Special Environmental Protection Council in the area at the southeast part outside the plan borders.

The climate conditions of Aegean, Central Anatolia and Mediterranean are seen clearly in Karahayit town. Summer season is sunny and draught, and winter season is warm and rainy. The average temperature is 15°C during the winter season. The climate of Pamukkale is more available to provide the thermal health services than the European countries. Mild climate conditions allow the health tourism spread to wide long period.

Tourism activities of Karahayit have developed as much as to change the economy of town based on agriculture during the last 15 years. Even if the thermal water has an important affection, the main factor is that the accommodation needs of local and foreign tourists who visit Pamukkale are met by the hotels in Karahayit. Pensions are usually serving to the domestic tourism. There are many requests from those who come from the neighbor provinces for the thermal water bath. Especially, the foreign tourists learn the thermal characteristics of Karahayit, when they visit this town.

While town is very crowded during the summer season, the tourism movement is seen during 8 months. Since the town is close to ancient city, Hiarapolis and Pamukkale and is at the center point of Antalya-İzmir-Ankara highway, this movement is accelerated.

There are totally 85 tourism facilities in Karahayit. 1 of them is 5 stars, 4 are 4 stars, 1 is 3 stars, 1 has the certificate from the municipality and 110 of them are pension and total bed capacity is around 8.000



Pamukkale 's white water and travertine near to project site about 5 kms away



Karahayit 's red water and travertine

THERMAL SPRINGS IN KARAHAYIT

Karahayit Geothermal Area

Thermal springs are located in Karahayit village which is 4-5 km away from Pamukkale. Mainly, it starts with the Paleozoic aged meander massive metamorphoses. Those are named as various schist. They are light colored, cornered, broken and with plenty of joints. They are formed by the waived extinguished quarts and albir crystals which are clamp structured with muskovir and kiyolit and lied down parallel to lineation on the foliation straighten. The re-crystallized lime stones are white-grey colored, with plenty of breaks, splits and dolomite in places and partially milonitic. With those characteristics, it is a very good reservoir rock for geothermal source.

Cenozoic in Kızılburun formation and Sazak formation come as discordance on this. Curvarterner aged travertine is the youngest rock units of the region. Eosin – Oligocene aged lithologies provide two models which are separated with Pliocene precipitations at the east of region. Bottom parts are formed by the conglomerate – sandstone and upper parts are formed by the sandstone – marl sequences. It is the composition of pebbles, meta-basic, limestone and marble. Sandstones are white-pink spotted, with mica and carbonate cemented. Entire western part of the region is formed by a lithology group which passes to porous limestone upward and which the bad dimensioned conglomerate-sandstone with skirt debris and carbonate cemented at bottom rules. Porous limestone has the travertine characteristic. The layer thicknesses are about 1 m in place. However, they provide the passage to the thin layered sandy limestone upward at the eastern part.



The springs of which their flows are 29 lt/s. (red water spring) and 5 lt/s. (Kortur water spring) during 1970s dried because of unauthorized opening of wells within the village. Its flow at 7 lt/s at 50.1°C of temperature became the Interoni spring. There is one more spring with 5 lt/s. of flow at 34°C temperature in Çürüksü plain and Yukarı Şanlı village. There are about 100 sounds which are opened without permission and their depths are about 20-250 m and temperatures are about 30-60°C within the region.

Formation and Treatment Characteristics of Karahayit Thermal Springs

Thermal springs in Karahayit are formed as a result of active geologic activities of Aegean region. Water spring is same as the thermal springs in Pamukkale. Due to the iron ions in the thermal waters in Karahayit, the red travertine is formed contrary to the Pamukkale travertine.

Thermal water's temperature is between 23.3 and 57.5°C. The chemical assay results of reservoir rocks support the idea that the waters are formed under the influences of rocks which cooled within the closed area and heated by the magma and of Paleozoic marbles.

Various institutions and individuals have executed many analyses on the thermal water and the results of analysis by the municipality are as follows.

IONS	mg/lt	CATIONS	mg/lt
Calcium	466,000	Bicarbonate	1,339,569
Sodium	114,950	Sulfate	830,000
Magnesium	131,344	Chloral	130,000
Potassium	32,833	Fluorine	2,280
Ferro	4,485	Hydro-phosphate	0,700
Aluminum	0,850	Meta-basic acid	6,640
Alpha Activity	183,140	Meta-silica acid	12,600
Beta Activity	77,200	Temperature	56°C
Electronic Conductivity	2,65 mS/cm ⁻¹ (20°C)	Vapor debris	2,206 mg/kg

The red color in the springs is explained as a result that it comes out by washing the iron in the clay schist. When those waters contact with the air on the surface, they release the CO₂ and H₂O inside them and leave the precipitations with CaCO₃, Fe⁺⁺, Mg⁺⁺, K⁺, Na⁺, SO₄⁻. The unit weigh of the porous travertine (30-40%) is 1.58 to 1.86 gr/cm³.

Assay results of some wells;

Name of Spring	Temperature (°C)	Flow (lt/s.)	pH	Conductivity (mmha/cm)
Hirepolis Hotel Sounding	57,5	5	6,3	3500
Pam Hotel Sounding	48,3	3,5	5,94	2440
Red Water Spring	51,2	2,5	6,22	3080
Colossea Hotel Sounding	30,7	1,5	5,99	2660
Spring within village	50,1	4	6,12	3020
Spring of Hanife Sirtı	27	0,7	6,9	--
La Fountain Motel Sounding	55,5	5	6,45	3310

When the thermal waters from the springs are used as the bath, they are especially good for circulation system and relevant diseases. The veins which are widen by the bath cause the relaxing of heart as reducing the blood pressure. On the other hand, it creates the positive sedative affect on the respiration system and in the asthma bronchial by the help of carbon dioxide. We may add the arthritis which acute period passed and became stabilized in the rheumatism diseases, hemorrhoid, varicose, gout, the skin diseases such as pustule, scabies, itching to them. Those who suffered from the acute joint rheumatism may also get benefit from the water under the doctor control.

THE PROJECT : Spa (Health Treatment Center)

General approaches to planning

- The project field is provided and plan is approved.
- Project field will be constructed on total 7,242 m² area on +0.00 elevations in the area which is determined with development plan of Karahayit region. Project field is located at the center point of the surrounding hotels.
- Project field may be seen from the linking road of Pamukkale-Karahayit and will be very functional, since its accession is very easy by both walking and vehicle.
- It is aimed that the project will have a scale which will be the attraction factor in the global manner as well as at the regional and country levels.
- The first targeted people in the project are the customers of hotels, accommodation facilities around and daily customers.
- The facility will attract the customers from the upper and medium-upper income levels in the big cities of Turkey and the users of similar facilities in Northern and Central European countries and for this reason, it is planned that the facility may compete with the similar facilities in Europe in respect of comfort, infrastructure and health conditions and location, architectural and environmental conditions.
- It is planned that daily water consumption is 22 lt/s. capacity with max. 2,200 m³ for thermal water utilization.
- It is planned that such facility will be constructed within 30 months.

Concept and Designation Criteria

The architectural characteristics which will form the main concept of the project will form a structure which supports the historical-regional architectural characteristics of modern construction materials by motives. There will be living center, transportation facility, park areas, plaza, treatment-rehabilitation, health-beauty center, sport and sportsman health center, thermal pool entertainment-food-beverage units in the Concept. In addition, it will consist of a swimming pool with Olympic size which is heated by partial thermal water as well as thermal and treatment purposed pools.

The functions in the facilities may be listed as follows:

- Physical treatment and rehabilitation center (includes 1,000 persons/day capacity, dry-wet treatment areas and support service areas)
- Sport center (aerobic, GYM hall, etc.)
- Beauty & restructuring center (anti-stress, anti-aging, acupuncture, psycho-therapy..)
- Sauna and Turkish Baths
- Dental clinic (orthodontic and peridontic)
- Shopping and social living center (cinema, fast-food, bank, tourism, shops ...)
- Thermal covered pools
- Restaurant cafeteria
- Open treatment-swimming pools
- Open resting and sun-bath areas
- Jogging and running racecourse
- Flower gardens, lawn playing and training fields



The Project Site of Spa Treatment Center