



**MERSİN WATER AND
SEWERAGE
ADMINISTRATIONS
(MESKI)
GENERAL
DIRECTORATE**

**MEZİTLİ WASTEWATER
TREATMENT PLANT PROJECT**

**FINAL ENVIRONMENTAL
IMPACT ASSESSMENT
(EIA) REPORT**

MERSİN PROVINCE, MEZİTLİ DISTRICT



COMPANY PREPARING EIA REPORT

MGS PROJE MÜŞAVİRLİK

MÜHENDİSLİK TİCARET LTD.ŞTİ.



EIA REPORT



FINAL EIA REPORT

ANKARA-2013

Project Owner	The General Directorate of Water and Sewage Administration of Mersin (MESKI)			
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Phone and Fax Number	0.324.337 08 41 0.324.336 02 77			
Project's Name	Mezitli Wastewater Treatment Plant			
Project's Total Budget	20.000.000 Euro			
Full Address of Project's Venue (City, County, Local Region)	Mersin City, Mezitli County			
Zone and Coordinates of Project's Venue	Coor. Orderı	: Up Right	Coor. Orderı	: Latitude,Longitude
	Datum	: ED-50	Datum	: WGS-84
	Type	: UTM	Type	: GEOGRAPHIC
	D.O.M.	: 33	D.O.M.	: --
	Zone	: 36	Zone	: --
	Scaling Factor.	: 6 degrees	Scaling Factor	: --
	633329,129	: 4066980,691	36,737560	: 34,492990
	633357,923	: 4066999,166	36,737722	: 34,493316
	633374,908	: 4066977,551	36,737525	: 34,493502
	633402,909	: 4066956,186	36,737329	: 34,493812
	633417,853	: 4066966,217	36,737417	: 34,493981
	633439,458	: 4066980,673	36,737544	: 34,494225
	633414,009	: 4067035,399	36,738041	: 34,493950
	633469,566	: 4067071,712	36,738360	: 34,494578
	633477,256	: 4067071,684	36,738359	: 34,494665
	633484,853	: 4067068,962	36,738333	: 34,494749
	633572,894	: 4067008,667	36,737778	: 34,495724
	633594,531	: 4067002,456	36,737719	: 34,495966
	633617,438	: 4067001,664	36,737708	: 34,496222
	633621,840	: 4066911,575	36,736896	: 34,496255
	633634,807	: 4066821,731	36,736084	: 34,496385
	633636,109	: 4066755,370	36,735486	: 34,496388
	633637,292	: 4066702,873	36,735013	: 34,496392
	633546,636	: 4066671,896	36,734746	: 34,495372
	633541,636	: 4066671,777	36,734746	: 34,495316
	633481,135	: 4066672,801	36,734764	: 34,494638
	633435,520	: 4066633,997	36,734421	: 34,494121
	633455,374	: 4066782,570	36,735757	: 34,494369
	633407,124	: 4066863,242	36,736490	: 34,493843

The place of project in EIA (Sector, Sub-sector)	According to the article 17 in upcoming projects lists which are stated in the Appendix-1 of EIA regulation no: 26939 and date: 17.08.2008
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	<i>"The treatment plants whose capacity is 150.000 employees equivalent and/or 30.000 meter cube/day"</i>
Name of the working group/ institution which prepares the EIA	MGS Proje Müşavirlik Mühendislik Ticaret Ltd. Şti.
Due date for EIA Presentation (DD, MM, YYYY)	Şehit Cevdet Özdemir Mahallesi, 1351. (203) Sokak, No:1/7, Çankaya-ANKARA Tel: 0.312.479 84 00 Faks: 0.312.479 84 99
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Appendix 1 Official Authorities

1. Written and dated 26.04.2010 of Ministry of Agriculture and Rural Affairs of Mülga and number 2036
2. Tapu Senedi
3. Public Welfare Decision
4. General Directorate of Spatial Planning dated 11.12.2013 and numbered 19220

Appendix 2 Maps and Plans

1. General Layout Plan
2. Detailed Drawings of Facility Units
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4. Mersin-Adana Planning Region 1 / 100.000 Scale Environmental Plan, Plan Notes and Legation
5. 1 / 100,000 Scale Environmental Plan
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7. 1 / 1.000 Scale Implementation Plan
8. 1 / 25.000 Scaled Geology Map
9. Active Fault Map
10. 1 / 25.000 Scale Land Asset Map
11. Topographic Map Showing Surface Water Resources and Settlement Units
12. General Protection Plan for Health Protection Band

Appendix 3 Geotechnical Survey Preliminary Survey Report

Appendix 4 Flora List

Appendix 5 Fauna List

Appendix 6 Meteorology Bulletins

1. Mersin Meteorology Station Long Years' Bulletin (1960-2012)
2. Highest Precipitation Values Observed in Standard Time
3. Repeat Curves
4. Excess Drugs

Appendix 7 Acoustic Report

Appendix 8 Personnel Table Committed to Operate within the Scope of Notification of Proficiency Certificate

ABBREVIATIONS

%	Percent
$^{\circ}\text{C}$	Santigrat degree
WWTP	Wastewater Treatment Plant
EU	European Union
ABPRS	Address Based Population Registration System
SS	Suspended Solid
BOD	Biochemical Oxygen Demand
Cd	Cadmium
CN^{-}	Cyanide
CO	Carbon monoxide
Cr^{+6}	Chrome
Cu	Copper
EIA	Environmental Impact Assessment
ESPAP	Environmental and Social Action Plan
EBRD	European Bank for Reconstruction and Development
EPA	Environmental Protection Agency
F^{-}	Fluoride
Fe	Iron
SW	Southwest
H_2SO_4	Sulfuric acid
ha	Hectare
Hg	Mercury
HNO_3	Nitric Acid
HSO_3	Sulfurous acid
UWTR	Urban Wastewater Treatment Regulation
NE	Northeast
km	Kilometer
km^2	Square kilometer
COD	Chemical Oxygen Demand
Lt	Liter
lt/sn	Litre/saniye
m	Meter
m^2	Square meter
m^3	Cubic meter
m^3/g	Cubic meter/gram
MBR	Membrane Bioreactor
MESKi	Mersin General Directorate of Water and Sewage
MF	Microfiltration
mg/l	Milligram/litre
mm	Millimeter
mm/m^2	Millimeter/square meter
MTA	General Directorate Of Mineral Research And Exploration
N	Nitrogen
NO_x	Nitrogenoxide
OIZ	Organized Industrial Zone
P	Phosphor
Pb	Lead
pH	- Log (H^{+} ionic concentration)
PM_{10}	Particular Matter
SKHKKY	Regulation on Control of Industrial Air Pollution
SKKY	Water Pollution Control Regulation
SO_2	Sulphur Dioxide

NON-TECHNICAL SUMMARY OF PROJECT

NON-TECHNICAL SUMMARY OF PROJECT

General Directorate of Water and Sewerage Administration of Mersin by the Municipality Law 5216 dated 10.07.2004, (Wastewater Treatment Plant (WWTP)) in order to serve, including Metropolitan Municipality (MESKI), Mezitli, Davultepe and Tece counties , the "public interest" in the western part of the city. The area of 76.600 m² owned by MESKI, which is located at the distance of 1.5 km from the shore, has been determined as the most suitable place for the mentioned facility area in Mezitli.

The western region of Mersin was developed as a residential and holiday region for the citizens who are above the average of the income, and in this sense is a settlement with further development potential. The most basic condition for this to happen is that the wastewater is regularly collected, treated and the purified water is removed to provide a constantly healthy environment in the service areas.

The Mezitli region is the only area in the Mersin Metropolitan area that has beaches that can be explored as far as possible. These beaches are currently unavailable due to the inadequate quality of the sea water. However, it is aimed that the quality of sea water will be improved and the local people will start to use these beaches by starting the treatment plant planned to be constructed in the near future. This situation is expected to revitalize tourism, which has not been developed yet. The Mezitli WWTP will contribute to the improvement of the sea water quality of the Mersin Gulf and thus of the Mediterranean.

In addition to the Mezitli WWTP, where mechanical, biological, advanced treatment (nitrogen and phosphorus removal) and sludge treatment (balancing, dewatering and drying) units are located, a pressurized promotion to the Mezitli WWTP from the Mezitli-Viranşehir Pump Station A separate project has been developed for the building of attractive lines that will carry the pipeline and treated water from the Mezitli WWTP to the deep sea discharge structure in Viranşehir. Deep sea discharge structure was built by Iller Bank between 2004-2005. The pumping stations and the sewage system that will be needed for the collection of wastewater in the Mezitli Basin will be constructed under another project parallel to this project.

Biological treatment will be carried out at the planned wastewater treatment plant, and the classical activated sludge system will be used which is pre-denitrification. The wastewater treatment plant, planned in 2 stages, will have a capacity of 384,000 persons by the year 2035 and until 2050 in the second phase
It will serve 556,000 people. The capacity of the plant is 55.000 m³ / day in the first stage and 80.000 m³ / day in the second stage. Nitrogen and phosphorus removal units are also planned in the biological treatment plant to ensure discharge water discharge limits.

Advanced treatment technologies used in western Europe will be used in the wastewater treatment plant. In addition to conventional mechanical and biological treatment techniques, tertiary treatment techniques for nitrogen and phosphorus removal will be used, thus achieving very low nitrogen and phosphorus parameters in the effluent. The sewage sludge produced will be stabilized by fermentation and dewatered to the solid waste storage area. On the other hand, taking hygienic factors into consideration, feasibility studies are being carried out so that the mud can be used directly or composted in agriculture.

The planned plant area covers an area of 76,600 m², which is in the MESKI property. The facility area is made up of agricultural land and the "General Agricultural Use" of the said land has been deemed appropriate by the General Directorate of Agricultural Production and Development of the Ministry of Agriculture and Rural Affairs.

According to feasibility studies, the lifetime of the concrete structure of the planned plant for 40 years, has been recognized as the lifetime of the mechanical and electrical equipment for

15 years. It is anticipated that the construction activities will take about 24 months.

The units of the planned installation are given below:

- Fine gratings, Sand retainer,
- Pre-settling pool, Anaerobic pools,
- Anoxic / Oxic ventilation pool,
- The recycle pump station,
- The last settling pool,
- The mechanical sludge concentration unit,
- The sludge disintegration unit,
- The gas storage,
- Anaerobic sludge digester,
- Sludge dewatering,
- The sludge drying unit,

The standard values of the Water Pollution Control Regulation (WCPR) standard values and the European Waste Water Treatment Regulation (KAY) standard published for the purpose of harmonizing the European Union (EU) Environmental Legislation with the national legislations have been taken into consideration in the feasibility studies of the planned installation, and the provisions of the said regulation will be complied with within the scope of the project .

The plant area is located in Mezitli District of Mersin Province. The distance to the coast of Mersin is about 15 km and the distance to the coast is about 1.5 km. The nearest settlement is the Esenbağlar Quarter 400 m (bird flight) and the Mediterranean Quarter 900 m (bee line).

The facility area is located in the 3rd degree earthquake zone according to the Turkey Seismicity Map, which was prepared by General Directorate of Disaster Affairs.

For the treatment and disposal of any waste material to be tested, the provisions of the relevant legislation shall be complied with and all necessary permits shall be taken prior to the commencement of the works.

The type of noise that may be caused by the equipment and vehicles that will operate in the construction and operation stages of the project and which may affect human and wildlife shall be kept within the limits of the applicable legislation on taking necessary measures.

CHAPTER I: DEFINITION AND PROPOSAL OF THE PROJECT

I.1 Definition and Purpose of the Project, Operation Period, Timetable, Flow Diagram, Service Purposes, Social and Economic Needs of the Project

The definition and purpose of the project

Mersin Metropolitan Municipality Water and Sewerage Administration (MESA) General Manager, Metropolitan Municipality Law No.5216 dated 10.07.2004 with Akdeniz, as well as the Davultepe and Teca district will be able to benefit; (WWTP) "in order to serve the" public interest "in the western part of the city. In order to meet this need; In 2007, expropriation procedures were initiated in the Mezitli District in accordance with the expropriation law numbered 2942 and the law numbered 4650 amended. An area of 66,821 m² was selected for the planned WWTP. However, with the expropriation studies carried out, only 8.665 m² of this area could be expropriated and the rest of the 58.156 m² multi-partner parcels had some difficulties in the expropriation process. The expropriation costs and the expense of expropriation have resulted in the expropriation of much more than the expense of expropriation and the expropriation of the expropriation. The selected area, the wastewater treatment plant has been abandoned.

During this period, MESKİ continued to search for alternative places for WWTP, which are required to be alive by observing the public interest, as a result of the detailed site selection studies made in Mezitli, about 1.5 km to the shore and belonging to MESKİ (See Appendix 1) Area of 76,600 m² has been determined as the most suitable place. The use of agricultural land in the new area determined by the Ministry of Agriculture and Rural Affairs General Directorate of Agricultural Production and Development for "non-agricultural purposes" was found appropriate (see Annex 1).

Selected new area;

- In terms of size, the need now and sufficient for future expansion. It is a cottage where the treated waters can reach the sea with charm.
- It is outside of settlement areas.
- Mezitli, Davultepe, Tece and Kuyuluk settlements.
- The planned facility is primarily designed for the treatment of domestic wastewater. However, the planned facilities, industrial development potential in the region which can apply the treatment of industrial wastewaters has been designed taking into consideration the 10% capacity.

Mechanical, biological, advanced treatment (nitrogen and phosphorus removal) and sludge treatment (stabilization, dewatering and drying) in addition to the anchorage Mezitli the unit WWTP beach, which were collected wastewater from Mezitli-Viranşehir pump station to transmit Mezitli WWTP pressure promoted A separate project has been developed for the building of attractive lines that will carry the pipeline and treated water from the Mezitli WWTP to the deep sea discharge structure in Viranşehir. Deep sea discharge structure was built by İller Bank between 2004-2005. It will be needed for the collection of wastewater in Akdeniz basins, pumping stations and sewage system will be constructed under this project in parallel with another project.

Biological treatment will be carried out at the planned wastewater treatment plant, and the classical activated sludge system will be used which is pre-denitrification. 2-stage as planned wastewater treatment plant, Ramada step 1 up to 384,000 people by 2035, while Phase 2 2050. It will serve 556,000 people. If the capacity of the plant in the first phase of 55,000 m³ / day at the second stage of 80,000 m³ / day was determined to be. Nitrogen to provide discharge water discharge limits and phosphorus removal units are planned in the biological treatment plant.

The aim of the project is to build a high quality wastewater treatment system that will serve the population living in the western region of Mersin in order to prevent the pollution of the Mediterranean. As mentioned above, the pumping stations and wastewater system necessary for the transmission of wastewater to the treatment plant to be constructed will be evaluated within a separate project.

The design parameters of the treatment plant are presented in **Table 1**.

Table 1 Design Parameters

Debt	Stage I (Year 2035)	II. Stage (2050 Year)
Domestic Waste Water Debt	46.000 m ³ /day	67.000 m ³ /day
Industrial Waste Water	4.600 m ³ /day	6.700 m ³ /day
Infiltration and Precipitation Water	4.600 m ³ /day	6.700 m ³ /day
Facility Capacity	55.000 m ³ /day	80.000 m ³ /day
Design Debacle	3.500 m ³ /day	5.000 m ³ /day

Advanced treatment technologies used in western Europe will be used in the wastewater treatment plant. In addition to conventional mechanical and biological treatment techniques, tertiary treatment techniques for nitrogen and phosphorus removal will be used, thus achieving very low nitrogen and phosphorus parameters in the effluent ($N \leq 10 \text{ mg / l}$, $P \leq 1 \text{ mg / l}$). The sewage sludge produced will be stabilized by fermentation and dewatered to the solid waste storage area.

On the other hand, considering the hygienic factors, the mud will be used either directly or composted so that it can be used in agriculture. A significant proportion of the electro-mechanical devices in the field will be produced by Western European countries, such as pipes, scraper bridges and so on. Made of stainless steel.

Timing Table

The schedule for the project is presented in Figure 1.

Years	Months	Work Item		
		Tender Process	Construction Process	Defect Liability Period
2013	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
2014	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
2015	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
2016	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
2017	1			

Figure 1 Timing Table

Flow diagram

The flow diagram of the project is presented in **Figure 2**.

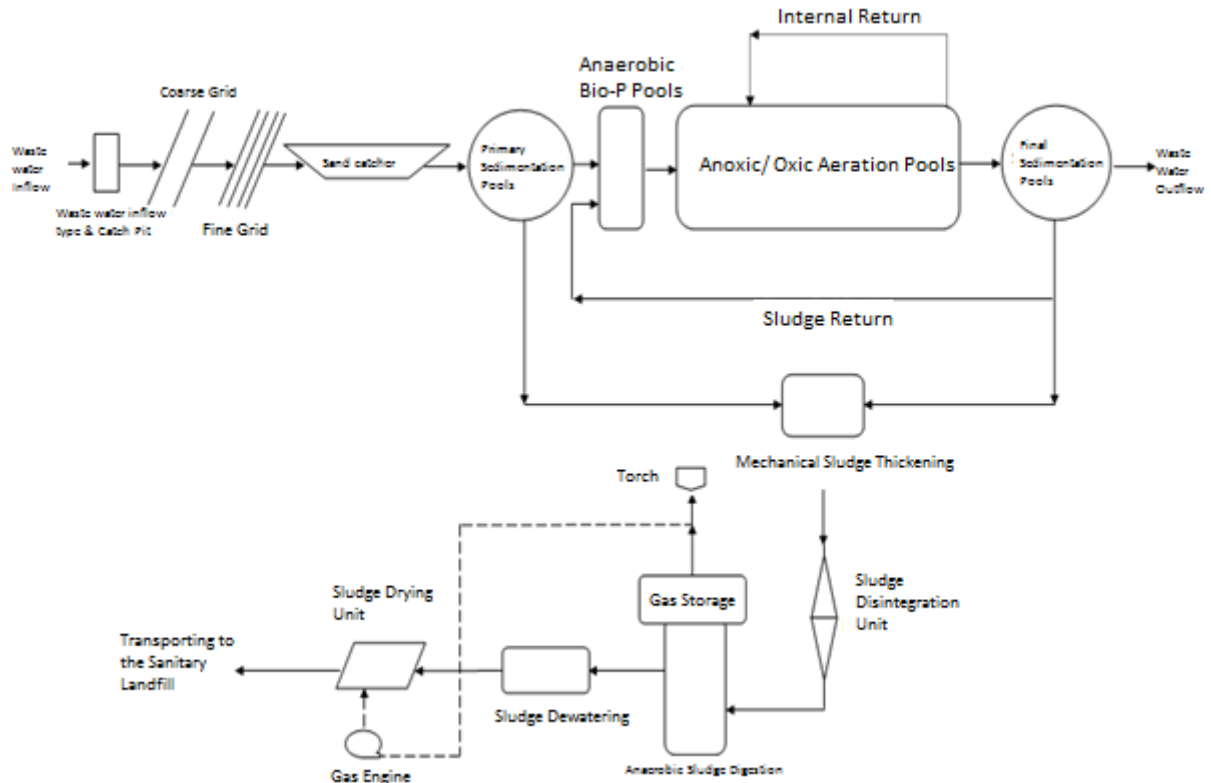


Figure 2 Flow Diagram

Service objectives of the project, social and economic necessity

Rapidly growing urban populations, economic activities concentrated in urban centers, pollute cities and the environment in unavoidable levels. The sewerage infrastructure that determines the social and economic development of the cities serves directly to the principle of protection of the environment which is an indispensable condition of sustainable development.

Infrastructure investments, which started with urbanization in our country, lagged behind the existing urbanization. As of 1998, sewer network service was provided to 78% of the urban population, and in 31% of the urban population, waste water was treated in the treatment facilities and received the buyer service. Worldwide, the utilization rate of any sewerage system rose from 55% (2.9 billion people) in 1990 to 60% (3.6 billion people) in 2000. As of 2000, 2.4 billion people can not benefit from sewerage services.

According to the sufficient sewerage level criterion set out in the Global Water Supply and Sewerage Assessment Report, this level of service was caught in 99% of our country. However, the systems included in the comparison are not considered to be sufficient for urban living except for the sewer network.

In recent years, the number of wastewater treatment plants in our country has increased steadily, yet it has not been sufficient to meet the increasing population needs in the cities. Currently, there are many municipalities in Turkey that do not have wastewater treatment facilities. The results of the studies conducted by the Turkish Statistical Institute (TURKSTAT) are given in **Table 2**

Table 2 Municipal Wastewater Basic Indicators (2010)

Municipal Wastewater Basic Indicators	Gösterge
Turkey population	73.722.988
Total number of municipalities	2.950
Total municipal population	61.571.332
Number of municipalities surveyed	2.950
Population of the municipality surveyed	61.571.332
Number of municipalities serviced by sewer network	2.235
Municipal population served by sewer network	54.017.052
Ratio of population served by sewer network to total population (%)	73
Ratio of population served by sewer network to total municipal population (%)	88
The amount of wastewater discharged from the network according to the receiving environment (thousand m ³ / year) overboard	3.582.131
<i>To sea</i>	<i>1.498.728</i>
<i>To lake</i>	<i>76.024</i>
<i>To river</i>	<i>1.741.078</i>
<i>To lands</i>	<i>35.091</i>
<i>To dam</i>	<i>130.224</i>
<i>To other environments</i>	<i>100.985</i>
Number of wastewater treatment plants	326
<i>Physical</i>	<i>39</i>
<i>Biological</i>	<i>199</i>
<i>Gelişmiş (İleri)</i>	<i>53</i>
<i>Doğal</i>	<i>35</i>
Atıksu arıtma tesisi kapasitesi (bin m ³ /yıl)	5.293.204
<i>Fiziksel</i>	<i>1.838.627</i>
<i>Biyolojik</i>	<i>1.732.674</i>
<i>Advanced</i>	<i>1.709.415</i>
<i>Natural</i>	<i>12.488</i>
Capacity of wastewater treatment plant (thousand m ³ / year)	2.719.151
<i>Fiziksel</i>	<i>751.101</i>
<i>Biyolojik</i>	<i>931.356</i>
<i>Advanced</i>	<i>1.031.616</i>
<i>Natural</i>	<i>5.079</i>
Number of municipalities served by wastewater treatment plant	438
Municipal population served by wastewater treatment plant	38.050.717
Ratio of the population served by the wastewater treatment plant to the total population (%)	52
Ratio of population served with wastewater treatment plant to total municipal population (%)	62
The amount of wastewater per person discharged in municipalities per day (liters per person-day)	182
Number of municipalities discharging deep sea	80

As it can be seen from **Table 2** that the 2,950 municipalities in the country, was formed in 2010 to 3.58 billion m³ of wastewater and the sewage 2.72 billion m³ (76%) of them were purified. The number of municipal wastewater treatment plants, which was 236 in 2008, reached to 2.72 billion m³ in 2010, with the addition of 90 new wastewater treatment plants and the wastewater treatment amounting to 2.25 billion m³ increased by 20% When the 2010

data is analyzed, it is observed that the number of biotechnological treatment plants is the first with 199 plants; It is also seen that the number of advanced biological treatment plants, which also includes phosphorus and nitrogen treatment, as envisaged by the EU Urban Wastewater Treatment Directive is 53. In our country, the number of facilities that make physical treatment is 39 and the number of facilities that purify with natural methods is 35.

According to the data presented in Table 2; The purified 2.72 billion in 2010 m³ wastewater 1 billion m³ (37.9%) patients with advanced biological methods, that shows that purified according to EU standards. The amount of wastewater treated by biological methods 931 million m³ (34.3%) of the amount of wastewater treated by physical methods 751 million m³ (27.6%) and the amount of wastewater treated by natural methods 5 million m³ (0.2%) is understood to be level.

Only 32 of the 326 municipal wastewater treatment plants in our country have the capacity to treat at EU standards, ie, 16%. Therefore, MESKI made a plant with wastewater treatment plant planned for Mezitli by to give owners and serve as many settlements as possible to international standards planned and starting in 2007. In this respect, studies the feasibility done up to now on the basis of this Environmental Impact Assessment (EIA) The subject of the report is planned to be WWTP. Said project from an environmental point of wastewater from sanitary and reliable in terms of the aims disposal.

According to the data presented in **Table 2**; It is seen that 1 billion out of 2.72 billion m³ of wastewater (37.9%) was treated by advanced biological methods as compliance with EU standards in 2010. It is understood that the amount of wastewater treated by biological methods is 931 million m³ (34,3%), the amount of wastewater treated by physical methods is 751 million m³ (27,6%) and the amount of wastewater treated by natural methods is 5 million m³ (0,2%).

Only 53 of the 326 urban wastewater treatment plants in our country, in other words, 16% has the capacity to carry out the treatment according to EU standards. For this reason, it was planned by MESKI to construct a wastewater treatment plant planned to be built in Mezitli with the international standards and to provide as many settlement services as possible. In this respect, the studies started in 2007 and based on the feasibility studies carried out until today, The subject of the herein Environmental Impact Assessment (EIA) is planned to be WWTP construction. The project aims to dispose the wastewater in an environmentally and sanitarily reliable way.

1.2 Design of all units within the scope of the project, Capacity, Flow Schematics, Input-Output and Process Waste, Treatment Plant and Deep Sea Discharge Design (All Design Basis, Automation Information, Tank, Pool Dimensions etc.) Processes Carried Out in Each Unit for Each Activity, Other Services in Other Units out of the Operation Units

The information in this section was compiled from the Mezitli Wastewater Treatment Plant Conceptual Design Project Process Report. The General Layout Plan of the units planned to be included in the facility and the detailed drawings of each unit are presented in Annex 2.

The wastewater will be delivered via two separate sewer lines from the Mezitli and Davultepe pumping stations. The wastewater from the sewerage will be combined networks in the collection tank located at the facility entrance and taken to the pre-treatment units. Taking into account the load losses determined by the plant's hydraulic profile, wastewater will be sent from the central pumping stations to the tanks to reach the elevation determined by the hydraulic profile to ensure the transfer of the wastewater by gravity within the facility.

The first unit of the wastewater treatment plant is a pre-treatment unit consisting of fine screens in which large-size materials can be damaged by biological treatment units. There is no need for coarse screens in the wastewater treatment plant since the wastewater will be

passed through the coarse screens at the Mezitli and Davultepe pumping stations. For this reason, the facility pre-treatment units do not have a coarse screens and the waters are passed through fine screens in the screen channel.

Fine screens have a channel width of 1.7 m and a bar spacing of 6 mm. For the first phase of the plant 3 pieces. For the stage II, a total of 4 fine screens are required. The screens are designed with mechanical cleaning. Collected screen waste will be conveyed to containers via conveyor.

After screens, the wastewater is transferred to grit and oil chamber unit. The first phase is for the year 2035 3, For phase II, 2050, 4 pieces of grid and oil chamber will be used. The total unit volume is 260 m³. The water elevation is 2,67 m. Air required for grit chamber will be provided with grit chamber blowers with capacity of 300 m³ / hour including 5 + 1 pieces. The wastewater passed through the grit chamber is transferred to pre-sedimentation tanks.

Preliminary settling tanks designed to reduce the solid matter and organic pollution load in the entrance wastewater are 3 for 2035 years in phase I, for the phase II was designed as 4 pieces for the year 2050. The tank diameter is 25 m and the water depth in the tank is 4 m. The hydraulic retention time in pre-precipitation is kept low to meet the carbon requirement for nitrogen removal of biological treatment units. With the pre-sedimentation tanks, the plant is pre-treated and transferred to the anaerobic biophosphorus tanks, the first step of the water biological treatment units.

The number of anaerobic tank is 3 for phase I, for stage II, It is designed to be 4 pieces biophosphorus tanks as. shape of Carousel have a total tank length of 33 m and a width of 8 m. After a waiting period of 42 minutes, the wastewater is delivered to the aeration tanks.

The aeration tanks, which are the second step of biological treatment, are designed as shape of carousel. 3 units for phase I, and for phase II, 4 aeration tanks are required. The tank dimensions are 119 mx24 m and the tank height is 6,5 m. Nitrification, denitrification and carbon removal occur simultaneously in the same reactor. Since phosphorus removal has the strictest standard in terms of discharge criteria, chemical phosphorus removal will be carried out from time to time. Thus, the discharge standard will be ensured in terms of the total phosphorus parameter.

Biological treatment; ATV is designed according to DWVK-131 E1 standards (ATV). Biological sludge stabilization will not be possible in aeration tanks due to low sludge age. Total sludge age of the system is 8.5 days. The oxygen required for aeration is 2 + 1 units for the first phase 2035, for phase II, 2050, will be provided with 3 + 1 units of 9,660 m³ / hour capacity blowers. The number of diffusers required is 4.800 for the 1st phase, For the 2nd phase is 6,400. Membrane disk diffuser will be used for aeration. Two low speed mixers are required for mixing in each tank.

Biological reactors are followed by active sedimentation tanks for the separation of wastewater treated with active biomass. Discharge of treated water via wastewater transmission line will be done by deep sea discharge in Mezitli Pump Station location. The final settling tank is designed as 3 pieces in phase I for 2035 and 4 pieces for the phase II. The final sedimentation tanks have a diameter of 31 m and a side water height of 3,65 m

The treated sludge separated in the final settling tanks will be returned to the biophosphorus tanks at 0.75 ratio, and the sludge age required by the system will be achieved.

Concentration will be performed primarily for the pre-sedimentation and biological

treatment sludge management. Concentration will be done separately for pre-precipitation and biological sludge. The pre-sedimentation sludge will be condensed with the gravity concentration tank and this tank will be designed as 1 piece in order to provide service both the first and second phase. The circular pool with a diameter of 12 m and a volume of 376 m³ is sufficient for concentration of the pre-sedimentation sludge. Concentration will increase the solids content of the pre-sedimentation sludge to about 5-6%, which is about 2% solids. The retention time in the thickener is 3.6 hours.

Some of the finished biological sludge will be transferred to the mechanical disintegration unit. By disintegration, the structure of the organic matter in the sludge will be deteriorated, and the digestion process will be easier and low sludge age. Disintegration unit does not have pre-sedimentation sludge because of low organic matter content. Biological sludge subjected to the disintegration process, biological sludge not entering the disintegration process and pre-sedimentation sludge coming from the the gravity concentration tank are mixed in the sludge mixing tank and conveyed to the anaerobic sludge digester. The sludge mixing tank will be made in a circular pond with a volume of 53 m³ and a diameter of 5 m. The sludge mixing process will be provided by 2 low speed mixers

¹ German ATV-DVWK Standards, Sizing Single Sided Activated Sludge Plants.

Since the sludge formed in the system is not stable due to low sludge age and can not be disposed of in this state, sludge stabilization process is needed. Stabilization of the treated sludge will be carried out with an anaerobic sludge digester. The sludge from the condenser will be conveyed through the anaerobic sludge digester via pump. Biogas produced by anaerobic sludge digestion can be converted to electricity by gas engine. In addition, waste heat recovered from the gas engine will provide some of the heat needed by the digester and the sludge drying system.

Mixing in the digester will be achieved by pumping the formed biogas in the system by means of a 2,000 m³ / hour compressor. The sludge circulation in the tank will be provided by two sludge pumps of 200 m³ / hour capacity. The total height of the anaerobic digester with a volume of 7.500 m³ is 16.3 m and is designed to be below 4.1 m in the ground. The digester diameter is 18 m. For biogas to be collected in the digester, a gas tank with 7.150 m³ volume is required and biogas must be delivered to the gas engine through the gas transmission line.

The retention time in the digester is 18 days for phase I, 15 days for the phase II. Since the disintegration application is performed before the sludge digestion process, the duration of the sludge digestion is kept low. At the end of the digestion process, the stabilized sludge will be transported to the decomposed sludge tank with a volume of 126 m³ for temporarily stored.

The decomposed sludge will be transferred to the sludge building.to dewater
Condensers and dewaterers are located in the same sludge building.

Since the sludge concentration during the stabilization will be lower due to anaerobic reaction, the solid content at the entrance of the dewatering will be around 3.5-4.5%. Dewatering process will be done by centrifugation decanter. After dewatering, a sludge with a solids content of 25% will be formed for dewatering. 50 m³ / h capacity centrifugation decanter will be used in the phase I and II. After dewatering the sludge will be transferred to the sludge dryer so that the solid concentration can be increased before final disposal. The sludge drying system is designed to provide a 90% solid ratio. While some of the heating needed for drying is provided by the waste heat to form in the gas motor, the remaining heating will be provided by natural gas. The drying process will be carried out at a temperature of 80-120 °C.

It is anticipated that odor treatment will be done by biofiltering for wastewater collection reservoir, screens and sludge building against the odor problem.

1. Physical Treatment Units

a. Fine Screen with Mechanical Cleaning

At the entrance of the wastewater treatment plant, it is cleaned from the solid materials by passing it through a fine screen. Thin grill is equipment used to perform physical treatment by holding floating, suspended and suspended solids before the wastewater is treated with biological treatment

Fine screen is equipment used to perform physical treatment by holding floating, settled and suspended solids before the wastewater is treated with biological treatment.

Type	: Automatic Fine Screen
Screen Channel Width	: 1,7 m
Bar Thickness	: 10 mm
Bar Interval	: 6 mm
Bar Number	: 106 adet
Bar Angle	: 70°
Flow Rate between the Bars	: <1,1 m/sn

b. Aerated Grit and Oil Chamber

The water passed through the screen is fed with aerated grit and oil chamber. It is used to prevent the deposits of inorganic substances such as grit, gravel, etc. in the wastewater which may easily precipitate, in conduits, pipelines and pumps.

Aerated sand and oil chamber are units operated by controlling the flow velocity in the direction of the length with the air supplied horizontally along the long side of the tank. Inorganic particles such as grit and silt contained in wastewater are precipitated by the influence of the spiral current created by the air given from the diffusers placed along the long side of the tank. Heavy particles, which collapse into the base, are transported to the sand collecting pit. There is an oil retainer compartment for holding oil and grease in the wastewater. There is a by-pass line that connects excess wastewater to the discharge channel in cases where the sand and oil retainer come to maximum.

Type	: Aerated Grit and Oil Chamber
Length (L)	: 30 m
Width (W)	: 4 m
(Grit Retainer Width = 2,7 m + Oil Channel Width = 1,3 m)	

Unit Surface Area ($A = L \times W$)	: $30 \times 4 = 120 \text{ m}^2$
Unit Volume ($V = A \times H_{\text{water}}$)	: $120 \times 2,17 = 261 \text{ m}^3$
Horizontal Velocity (m/sn)	: $0,05 < 0,2 \text{ m/sn}$
(Horizontal Water Velocity at Aerated Grit Chamber < 0,2 m/sn must be)	

Surface Loading ($\text{m}^3/\text{m}^2 \cdot \text{sWWTP}$)	: 19	1. Phase
	: 21	2. Phase (Surface Loading
Ratio at Aerated Grit Chamber < 25 m/hour must be)		

Hydraulic Retention Time (Q_{peak} , min)	: 10	1. Phase
Hydraulic Retention Time (Q_{avg} , min)	: 20	1. Phase
Hydraulic Retention Time (Q_{peak} , min)	: 10	2. Phase
Hydraulic Retention Time (Q_{avg} , min)	: 19	2. Phase

Unit Grit Amount trapped by Grit Chamber	: 15 l/m ³	
Unit Grit Amount trapped by Grit Chamber	: 0,2 m ³ /h	1. Phase
	: 0,24 m ³ /h	2. Phase
Unit Air Flow at Grit Chamber	: 1,30 Nm ³ /sa/m ³	
(Literature Value: 1,1-2,75 m ³ /m ³ .h)		
BlowerCapacity	: 300 m ³ /hour	
Blower Number	: 5 main + 1 back up	

c. Pre-Sedimentation Tank

Pre-sedimentation tanks are available to remove some of the solids load and organic matter pollution in the wastewater after the grit chamber.

Between the grit chamber and pre-sedimentation units the wastewater flow will be measured by means of an electromagnetic flowmeter. The removal of spontaneously precipitated particles in the wastewater is provided in the pre-sedimentation basin.

The water delivered to the pre-sedimentation distribution structure after the grit chamber is then sent to the pre-sedimentation tanks.

The hydraulic retention time of the wastewater from the pre-sedimentation tank and the efficiency of the contaminant removal due to this are kept low. This is because the amount of carbon required for the nitrification process in biological reactors can be maintained and no additional carbon need is generated.

Type	: Circular Pre-Sedimentation Tank
Tank diameter	: 25 m
Tank width	: 4 m

	1. Phase	2. Phase
Total Surface Area	: 1.473 m ²	1.963 m ²
Total Volume	: 5.890 m ³	7.854 m ³
Total Bottom Conic Volume	: 903 m ³	1.204 m ³
Base Floor	: 1/12	
Total Sludge Cone Volume	: 104 m ³	138 m ³
Total Volume	: 6.897 m ³	9.196 m ³

Amount of Pre-Sedimentation Sludge Determination

Pre-sedimentation provides 40% Suspended Solid (TSS) and approximately 20% organic matter removal. Accordingly, the amount of pre-sedimentation sludge to be formed is determined.

	1. Phase	2. Phase
Pre-Sedimentation Sludge Amount:	8.298 kg/day	12.000 kg/day
kg/day Sludge Solid Matter Ratio	: 20 kg/m ³	
Pre- Sedimentation Sludge Flow	: 415 m ³ /day	600 m ³ /day

2. Biological Treatment Units

a. Anaerobic Bio-phosphorus Tanks

The pre-sedimentation wastewater is delivered to the anaerobic reactors for biological phosphorus removal and is distributed by gravity.

The biological phosphorus tank is anaerobic. This tank is equipped with submersible mixers. The recycle for the purpose of protecting the mass balance in the biological treatment is also connected to this tank.

In water waited without air; The anaerobic environment is formed and the special microorganisms operating in this environment release the phosphorus from the bodies of this tank and then remove the phosphorus from the system by overfilling their bodies in the aerated environment.

Tank type	: Carousel
Minimum Required Hydraulic Retention Time	: 42 min-
0,7 hour Required Tank Volume/Number	: 1.125 m ³
Water Depth	: 5,5 m
Tank Depth	: 6 m
Tank Surface Area	: 205 m ²
Tank Width	: 8 m
Diameter of Circular Sections	: 8 m
Net Length	: 25 m
Total Tank Length	: 33 m, (L + Φ), L = 25 m, Φ = 8 m
Net Tank Volume	: 1.500 m ³
Mixer Type	: Slow Speed Mixer
Mixer Number	: 2 pieces/tank

b. Aeration Tanks

The basic principle in biological treatment is to convert dissolved carbonaceous organic materials into oxygenate-treated nitrogenous and phosphorus-containing materials in anaerobic / anoxic environment by microorganisms. In addition, anaerobic (mixed) tanks to be constructed before the aeration tanks will be provided with the airless conditions necessary for phosphorus removal to ensure the selection of organisms that achieve biological excess phosphorus removal.

After the anaerobic tank, the wastewater is divided into sections where the dissolved oxygen concentration in the inlet sections of the aeration tanks for the biological treatment is very low and the anoxic conditions are valid. This volume, which is planned to be formed in two different zones within the aeration tanks, constitutes about 35% of the total volume. There will be no oxygen supply to this region and nitrate will be used as an electron receiver in the removal of organic substances. This tank mix will also be made using a low speed submersible mixer. The microorganisms in this system will be provided by dissolved organics in the sludge coming from the recycle line with all the nutrients required for the activity.

The aim of the anoxic phase is to convert the nitrogen converted into ammonium oxide form by nitrification coming after aerobic conditions and then convert it into nitrogen gas by denitrification process at this phase and thus to provide nitrogen removal. In aerobic conditions, biomass growth occurs when microorganisms consume carbon that can not be removed under airless and anoxic conditions. In addition, excessive phosphorus uptake occurs at this phase. Thus, carbon, nitrogen and phosphorus removal is realized in the anaerobic tank and activated sludge tanks.

The basic unit of the biological treatment will be provided by passing water through the thin bubble membrane diffusers of the air supplied by the necessary oxygen blowers to the aeration tanks designed in parallel. The concentration of dissolved oxygen with this air is provided in the increasing pool, also in the required mixture. This mixture also provides the contact of the wastewater with microorganism mass. The values obtained by measuring the dissolved oxygen concentration in the tanks continuously with the dissolved oxygen measuring systems in the aeration tanks are automatically investigated. If necessary, energy can be saved by stopping some of the blowers providing oxygen to the system.

The design of the biological reactors was made according to ATV DVWK-131 E standards as mentioned before. In the first phase, 2035 years (55.000 m³ / day) for 3 units, II. Phase 2050 (80,000 m³ / day) requires 4 aeration tanks

Simultaneous chemical phosphorus removal will also be made in the aeration tanks in case the biological phosphorus removal is not sufficient. FeCl₃ will be used as coagulant for phosphorus removal. 3 units (2 original + 1 spare) iron chloride dosing pump with 0,08 m³ / hour capacity and one FeCl₃ storage tank will be used.

The necessary oxygen for aeration will be provided by 3 units (2 original + 1 spare) 9,660 m³ / hour capacitive root type blower. For Facility II, The number of blowers will be increased to 4 in total (3 original + 1 spare). The membrane to be placed in the aeration tank base will be made with diffusers. 4,800 in the first phase and for phase II A total of 6,400 membrane disk diffusers will suffice. The diffuser capacity should be a maximum of 8 m³ / h, which can give 2-6 m³ / hour of air.

6 low speed mixers will be sufficient to provide horizontal flow of water in phase I and for mixing, for phase II, The total number of mixers will be increased to 8 units. Oxygen meter, ORP (Oxidation Reduction Potential "Redox Potential") and pH meters will be placed in the aeration tanks and the system will be continuously monitored online.

Tank Type	: Carousel
Water Depth	: 5,5 m
Tank Depth	: 6,5 m
Tank Surface Area	: 2.732 m ²
Tank Width	: 24 m
Diameter of Circular Sections	: 24 m
Net Length	: 95 m
Total Tank Length	: 119 m , (L + Φ), L = 95 m, Φ = 24 m
Net Tank Volume	: 15.028 m ³
Mixer Type	: Slow Speed Mixer

	<u>1. Phase</u>	<u>2. Phase</u>
Number of Aeration Tanks	: 3 adet	4 adet
Total Required Aeration Volume	: 45.000 m ³	60.000 m ³
VD/V	: 0,35	0,35
Aerobic Volume	: 29.250 m ³	39.000 m ³
Anoxic Volume	: 15.750 m ³	21.000 m ³
Aerobic Sludge Age	: 5,5 gün	5,5 gün
Total Sludge Age	: 8,5 gün	8,5 gün
Hydraulic Retention Time	: 19,5 sa	18 sa Biomass
Concentration, MLSS (mg/L)	: 3.000 mg/L	3.200 mg/
Necessary Oxygen Amount	: 19.800 kg/day	28.600 kg/day
Excess Biological Sludge	: 15.900 kg/day	23.000 kg/day
Excess Biological Sludge Flow	: 2.000 m ³ /day	2.875 m ³ /day
Blower Type	: Roots	
Total Number of Blower	: 3 units	4 units
Number of Equipment in Operation	: 2 unit	3 units
Number of Back up Equipment	: 1 unit	1 unit
Capacity, Required	: 9.421 m ³ /hour	9.071 m ³ /hour
Capacity, Required	: 9.660 m ³ /hour	9.660 m ³ /hour

c. Final Pre-Sedimentation Tanks

The biomass, which is the result of the microorganism activity in aeration tank, is sedimented under the stagnant hydraulic conditions of the tank and is collected at the conical

part of the tank and stripped from the conical part by surface-deep scraper. (75%) of it is withdrawn by means of recycle pumps from here then sent to the anaerobic tanks. If too much sludge and foam, they are sent to mechanical sludge thickener with sludge pumps. Treated water that is collected on the base as its pollution is sludge leaves by over-flowing in the tank.

	<u>1. Phase</u>	<u>2. Phase</u>
Total Surface Area	:2.264 m ²	3.019 m ²
Volume	:10.189 m ³	13.586 m ³
Total Bottom Conic Volume,	:2.975 m ³	3.967 m ³
Base Slope	:1/12	
Total Conic of Sludge Volume	:245 m ³	327 m ³
Total Volume	:11.460 m ³	15.280 m ³

d. Sludge Management

75% of the biological sludge formed in the final sedimentation tank will be transferred back to the anaerobic bio-P tanks by sludge recycling. The excess activated sludge pumps and the recycled activated sludge pumps will be placed in the reverse cycle elevation center. These pumps will be selected from submersible pumps. For velocity control, each pump will have a frequency converter. Plant for recycling, 5 main+ 2 spare in phase I and in phase II, 7 main + 2 spare pumps with a capacity of 150 l / sec is required. In order to convey the excess sludge formed to thickener, 4 main + 1 spare submersible type pump with a capacity of 24 m³ / hour for the first phase and 5 original + 1 spare submersible type pump for phase II are required.

a. Sludge Thickener with Gravity

Concentration of the sludge formed in the pre-sedimentation tanks must be done with gravity sludge thickener. As the hydraulic retention time in the pre-sedimentation tanks is chosen as low, it is predicted that the rate of solid matter in the sludge is low. Thickener tank is designed as 1 unit so that it can serve in Phase I and II plant. Therefore, the rate of solid loading at phase I of plant was chosen to be lower. The concentrated sludge in the thickener tank with gravity will be transferred to the sludge mixing tank to be combined with the biological sludge.

	<u>1. Phase</u>	<u>2. Phase</u>
Pre-Sedimentation Sludge Amount	: 8.298 kg/day	12.000 kg/day
Sludge Concentration	: 20 kg/m ³	20 kg/m ³
Solid Material Concentration	: %2	%2
Sludge Flow	: 415 m ³ /day	600 m ³ /day
Chosen Surface Loading Ratio	: 75 kg KM/m ² /day	110 kg KM/m ² /day
Sludge Concentration	: 60 kg/m ³	60 kg/m ³
Solid Material Concentration	: %6	%6
Retention Time at Thickener	: 3,6 hour	3,6 hour
Solid Material Trapping Ratio	: %90	%90
Pre-sedimentation Sludge Amount	: 7.468 kg/day	10800 kg/day
Pre-sedimentation Sludge Flow	: 124 m ³ /day	180 m ³ /day
Pre-sedimentation Sludge Flow	: 5 m ³ /hour	8 m ³ /hour
For Feeding to the Sludge Mixing Tank	: 1 main + 1 spare	2 main + 1 spare
Chosen Pump Capacity	: 5 m ³ /hour	5 m ³ /hour
Filtrate Water Amount	: 290 m ³ /day	420 m ³ /day
Filtrate Water Amount	: 12 m ³ /hour	18 m ³ /hour
Filtrate Water Pump Number	: 1 main + 1 spare	1 main + 1 spare
Filtrate Water Pump Capacity	: 5 L/s	5 L/s

b. Mechanical Sludge Thickener

The waste biologically active sludge from the final sedimentation tanks will be sent to the mechanical sludge thickener. The mechanical sludge thickening process is designed to contain 5-6% solids after thickening via thickening decanters.

	<u>1. Phase</u>	<u>2. Phase</u>
Process Duration	: 7 day/week 24 hour/day	7 day/week 24 hour/day
Biological Excess Sludge Amount	: 15.992 kg/day	23.000 kg/day
Amount of Sludge Corrected for the Process Duration	: 666 kg/hour	958 kg/hour
Biological Sludge Flow, Entrance	: 2.000 m ³ /day 83 m ³ /hour	2.875 m ³ /day 120 m ³ /hour
Solid Retention Ratio	95%	95%
Sludge Concentration (After Thickening)	: 60 kg/m ³	60 kg/m ³
The Amount of Effluent Sludge Solid Matter	: %6	%6
The Amount of Biological Sludge (After Thickening)	: 15.192 kg/day	21.850 kg/day
Biological Sludge Flow (After Thickening)	: 253 m ³ /day	364 m ³ /day
Daily Filtrate Water Amount	: 1.746 m ³ /day	2.511 m ³ /day
Daily Filtrate Water Amount	: 73 m ³ /hour	105 m ³ /hour

c. Sludge Mixing Tank

The pre-sedimentation sludge, which is thickened, must be combined with the biological sludge before digester. A portion of the waste activated sludge coming from the final sedimentation tanks and completing the mechanical thickening process will first be transferred to the disintegration unit. With disintegration, the structure of the organic matter in the sludge will be deteriorated and the degradation performance can be increased. The remaining biological sludge will be directly conveyed to the sludge mixing tank before the digestion. Biological sludge whose disintegration process is completed, will be transferred to the mixing tank.

Type	: Circular Sludge Mixing Tank
Tank Diameter	:5 m
Tank Surface Area	:19,6 m ²
Retention Time	:1hour
Sludge Height in the Tank	:2,3 m
Tank Height	:2,7 m
Tank Volume	:53 m ³

d. Anaerobic Sludge Digester

Stabilization must be carried out before the effluent waste treated sludge as a final disposal is transmitted to the regular storage. Stabilization of the treatment sludge will be done with anaerobic digester.

The basic principle of anaerobic sludge stabilization is to keep microorganisms in the airless environment without nutrients and to stabilize them by passing endogen² phase in this process. At the end of the anaerobic digestion process, carbon dioxide (CO₂) and methane gas (CH₄) predominant biogas formation are the final products. The burning of the obtained biogas in the gas engine will provide the electric field. The obtained electricity will be used in the operation of the plant. In addition, the waste heat that will be released during the operation of the gas engine will be used to heat the anaerobic digester and the drying system. The anaerobic digester is in the form of a cylinder and the mixing of the system will be ensured by the biogas being reintroduced into the system via the compressor.

Anaerobic digestion is designed to be able to serve in I and II phase of plant. Since the disintegration process was applied before the digester, the sludge age of the system was chosen to be low.

	<u>1. Aşama</u>	<u>2. Aşama</u>
Sludge Retention Time	: 18 days	15 days
Digester Number	: 1 unit	1 unit
Anaerobic Digester Volume	: 7.535 m ³	
Diameter	: 18 m	
Total Cylindrical Height	: 16,3 m	
Height above Ground	: 12,2 m	
Height below Ground	: 4,1 m	
Side Wall Area above Ground	: 691 m ²	
Side Wall Area below Ground	: 230 m ²	
Surface area (for bottom and top)	: 254 m ²	
The hemisphere area where the gas is collected	: 1.017 m ²	
Total Digester Area	: 2.488 m ²	
Bottom Concrete Thickness	: 0,9 m	
Side Wall Concrete Thickness	: 0,6 m	
Glass Wool Thickness	: 0,1 m	
Aluminum Coating Thickness	: 0,001 m	

Mixing

Amount of Biogas Required for Mixing	: 0,27 m ³ /h
Required Compressor Capacity	: 2,034 m ³ /h
Number of Compressors	: 1 unit
Basınç	: 3.00 bar
Compressor Operation Time	: 12 h/day
Number of Gas Pumping Pipes	: 16 units

² Internal source, the material produced by the system itself.

Biogas Generation	<u>1. Phase</u>	<u>2. Phase</u>
The amount of pre-sedimentation sludge (Digester Input)	: 7.468 kg/day	10.800 kg/day
Sludge Volatile Solid Material Ratio	: %74	%74
Pre-Sedimentation Sludge Volatile Solid Material Amount (Digester Input)	: 5.526 kg/day	7.992 kg/day
The Expected Volatile Solid Material by Digestion Removal Rate	45%	45%
The Volatile Solid Material Removal in the Pre-Sedimentation Sludge	: 2.487 kg/day	3.569
Unit Biogas Production from Pre-Sedimentation Sludge	: 940 L/kg	940 L/day
Biogas Amount from Pre-sedimentation Sludge	: 2.338 m ³ /day 2.420 m ³ /day	3.381 m ³ /day 3.500 m ³ /day
Amount of Biological Sludge (Digester Input)	: 15.192 kg/day	21.850 kg/day
Sludge Volatile Solid Material Ratio	: %74	%74
Biological Sludge Volatile Solid Material Amount	: 11.242 kg/day	16.169 kg/day
The Expected Volatile Solid Material Removal rate by Digestion	: %50	%50
Removal of Volatile Solid Material in Biological Sludge	: 5.621 kg/day	8.085 kg/day
Unit Biogas Production in Biological Sludge	: 940 L/kg	940 L/kg
Biogas Amount from Biological Sludge	: 5.284 m ³ /day	7.600 m ³ /day
Total Biogas Amount	: 7.622 m ³ /day	10.980 m ³ /day
Digester Operation Time	: 24 h/day	
Calorific Value of Biogas	: 6,28 kWh/m ³ 5.400 kcal/m ³	
Total Energy Available from Biogas	: 47.865 kWh/day 1.994 kWh/h 1,99 MW/h	68.955 kWh/day 2.873 kWh/h 2,87 MW/h
Gas Storage -DYSTOR		
Required Gas Storage Volume	: 6.391 m ³	
Number of Selected Gas Storage	: 1 unit	
Selected Gas Storage Volume	: 7.150 m ³	
Torch – Flyer		
Number of Selected Flyer	: 1 unit	
Flyer Capacity	: 580 m ³ /h	
Stabilized Sludge Temporary Storage		
Tank Volume Required	: 126 m ³	
Tank Number	: 1 unit	
Tank Height	: 4 m	

i. Sludge Disintegration Unit

The application of sludge disintegration is recommended as pre-treatment before anaerobic digestion. Sludge disintegration results in the acceleration of the rate-limiting hydrolysis step in the anaerobic digestion process and the increase in the amount of biogas formed at the end of digestion. The disintegration of the treatment sludge is defined as the deformation of the sludge structure by applying external stresses³. Disintegration breaks the sludge flock structure and destroys the microbial cell wall.

The type of disintegration that is supposed to be applied to the plant is the mechanical sludge disintegration. Mechanical disintegration is preferred because it does not require heat energy or chemical addition and operating costs are less than other disintegration methods. Homogenization of the mechanical disintegration of the treatment sludge under high pressure seems appropriate.

The process of disintegration is essentially the deformation of the cell wall of microorganisms in the sludge. For this reason, it is not necessary to treat the non-biodegradable pre-sedimentation sludge containing a high proportion of inorganic matter by disintegration. It will suffice to pass a certain proportion of the biological sludge through the disintegration unit. This ratio can vary between %25 and %100 of the biological sludge after sludge thickening. While disintegration of the cell wall of a certain portion is achieved by sludge disintegration, this biological disruption continues when the chain is combined with a biological sludge which is not subjected to disintegration in the form of a reaction, and facilitates the digestion process. Thus, in anaerobic digestion, lower sludge age and volume are needed, and the amount of biogas formed by digestion increases. It has been experimentally determined that the amount of methane gas generated at the end of the digestion is increased by %30 and the amount of mineralized sludge can be reduced by %23 by the disintegration process based on presumed pressure homogenization applied in Mezitli WWTP.

In the disintegration process, biological sludge (thickening process is completed and %5-6 solid material ratio) will be passed first through the grinder to reduce the particle size. After grinding, the sludge is taken to the balancing tank and mixed slowly. Homogenization is then carried out by mixing at high speed and the process is completed under high pressure in the disintegration unit.

The biological sludge whose disintegration process is finished is combined with biological sludge which is not taken into the disintegration unit and is conveyed to the sludge mixing tank to be combined with the pre-sedimentation sludge before the digestion process.

e. Cogeneration Unit

The conversion of the biogas formed as a result of the anaerobic sludge digestion process to heat and electric energy will be provided in the cogeneration unit. Thus, the plant's energy needs and at the same time some of the thermal energy needs of the drying unit will be available. The energy will be supplied by a gas engine, and thermal energy will also be utilized with heat exchangers. This system is especially advantageous in places where it is required to obtain high thermal energy against the electric energy produced (drying, digestive heating etc.).

The heat energy released in the cogeneration unit will first be used to heat the anaerobic digester, and the remaining energy will be transferred to the drying system. Quantities of electricity and heat energy that can be obtained by biogas cogeneration system have been determined.

3 Filibeli, A., and Kaynak, G., 2006. Preliminary operations to reduce the amount of treated sludge and improve its properties, ITU Review, Vol: 16, No: 1-3, 3-12, 2006.

	<u>1. Phase</u>	<u>2. Phase</u>
Total Biogas Amount Produced	: 7.622 m ³ /day 7.892 kg/day	10.980 m ³ /day 11.369 kg/day
Calorific Value of Biogas	: 628 kWh/m ³ 5.400 kcal/m ³	
Total Energy provided by Biogas	: 1.715.000 kcal/h 47.850 kWh/day 1.994 kWh/h 1,99 MW/h	2.470.000 kcal/h 68.950 kWh/day 2.870 kWh/h 2,87 MW/h
Biogas Ratio converted to Electricity	: %38	
Biogas Ratio converted to Heat Energy	: %40	
Recovered Electricity Energy	: 18.000 kWh/day	26.000 kWh/day
Electric Generator Capacity, Total	: 760 kW	1100 kW
Recovered Heat Energy	: 19.000 kWh/day	27.500 kWh/day
Digester Total Heat Requirement	: 12.000 kWh/day	14.500 kWh/day

f. Sludge Dewatering

The stabilized sludge from the anaerobic sludge digester is transferred to the sludge dewatering unit. The sludge dewatering process is designed to contain 20-25% solids after dewatering by means of decanter centrifuges. Since drying is carried out after sludge dewatering, it is seemed appropriate to perform dewatering for 24 hours.

Produced Sludge Amounts (Dewatering Input)

	<u>1. Phase</u>	<u>2. Phase</u>
Decanter Operation Time	: 7 day/week 24 hour/day	7 day/week 24 hour/day
Amount of Mixed Sludge Solid Material	: 14.553 kg/day	20.969 kg/day
Mixed Sludge Solid Material Ratio	: %3,5	%4,2
Density	: 1.030 kg/m ³	1.030 kg/m ³
Sludge Flow of the Dewatering Influent	: 400 m ³ /day	487 m ³ /day
Amount of Sludge after Dewatering	: %25	%25
Effluent Sludge Flow, Daily	: 55 m ³ /day	80 m ³ /day
Effluent Sludge Flow, Hourly	: 2 m ³ /h	3 m ³ /h
Sludge Amount	: 57 ton/day	82 ton/day
Daily Filtrate Water Amount	: 345 m ³ /day 14 m ³ /h	407 m ³ /day 17 m ³ /h
After Thickening and Dewatering	: 2.390 m ³ /day	3.340 m ³ /day
Total Filtrate Water Amount		
Required Filtrate Water Pump Number	: 2 main + 1 spare	3 main + 1 spare
Pomp Capacity	: 15 l/sec	15 l/sec

Dewatering Required

	<u>1. Phase</u>	<u>2. Phase</u>
Decanter Capacity	: 50 m ³ /hour	50 m ³ /hour
Required Decanter Number	: 1 unit	1 unit

g. Sludge Drying

After the dewatering process, sludge drying will be carried out in order to obtain the solid content of the sludge before the final disposal. The sludge drying process will be carried out by the band type thermal drying system because of low area requirement and high operating efficiency. The band type drying system is preferred because it is a system that can be used for the drying process of the waste heat to be formed in the gas motor. The remainder of the heat required for drying will be provided by natural gas. It is predicted that the amount of sludge solid material after drying will be 90%. The drying efficiency of the system is such that it can provide different outlet solid material concentrations and, if desired, lower sludge solid material ratios can be achieved.

When the damp sludge cake dries out of the dewatering decanter and has a solid concentration of 20-25% solids, it is first pressurized to 15 barg and fed to the granulation section of the unit. In order to facilitate drying in the granulation unit, the feed sludge is broken up into smaller granules. The granules are dispensed on the belt drying system. The band runs on the sludge drying section and the hot air is passed through the sludge bed in the drying section so that the water in the sludge is evaporated and the sludge is dried. At least 50% of the hot air is reused in the drying zone.

It is possible to adjust the plant parameters according to operating conditions and to change the drying rate. Thus, if the sludge is sent to regular storage for final disposal, it will be possible to achieve a solid material concentration of 50% and optionally 90%.

The drying unit is a two-band system and the sludge passes twice through the drying tunnel by means of two belt conveyors placed on top of each other. In order to obtain a homogenous sludge effluent, when the sludge is in the middle of the lower band and it is inverted and mixed with the mixing system. Sludge whose drying process is completed by passing drying section is taken by using sludge conveyor and delivered to trucks for regular storage.

Drying Temperature	: 90-150°C	
Band Width	: 4.000 mm	
Drying Type	: Belt Dryer with Double conveyor	
Length	: 8 m	
Heat Source	: Waste Heat and Natural Gas	
Dryer Effluent SM Ratio	: %50	
	<u>1. Phase</u>	<u>2. Phase</u>
Evaporation Capacity	: 1.200 kg H ₂ O/hour	1.700 kg H ₂ O/h
Heat Energy Required	: 1.000 kWh	1.500 kWh
Waste heat generated in the gas engine energy	: 290 kWh	545 kWh
Amount of Natural Gas Required	: 1.800 Nm ³ /day	2.300 Nm ³ /day
Dryer Effluent SM Ratio	: %90	
	<u>1. Phase</u>	<u>2. Phase</u>
Evaporation Capacity	: 1.700 kg H ₂ O/h	2.500 kg H ₂ O/h
Heat Energy Required	: 1.500 kWh	2.000 kWh
Waste heat generated in the gas engine energy	: 290 kWh	545 kWh
Amount of Natural Gas Required	: 2.950 Nm ³ /day	3.900 Nm ³ /day

h. Odor Control

Biological odor removal will be done to prevent odor problems that can occur in the sludge compartment containing pre-treatment (screens) at the entrance and sludge thickeners and dewaterers. Odor removal will be carried out by biofiltering and the most cost effective and efficient system will be used to provide odor treatment in the treatment plants. Dirty air in the units will be collected by the vacuum system and transmitted to the biofilter unit.

The odor will be absorbed by the axial type fans from the screen building containing entrance collection tank and fine screens in the plant. The sludge building where the thickening and dewatering processes are carried out is designed as reinforced concrete and covered. The odor removal unit is designed separately for the screen building and the sludge building due to the difference in distance between them.

Biological Odor Removal Unit Design Criteria

Contact Time	: 30-60 sec
Surface Loading	: 10-200 m ³ /m ² -h
Biomedia Bed Depth	: 1-1,25 m
H ₂ S Removal Velocity	: 80-130 g/m ³ -h
Biofilter Operation Temperature	: 15-40°C

Screen Channel Biofiltration Unit

Influent Peak H ₂ S Concentration	: 500 ppm
Removal Efficiency	: %99
Effluent H ₂ S Concentration	: 5 ppm
H ₂ S Molecular Weight	: 34 g/mol
1 Mole Gas Volume at 20°C and 1 atm	: 24,1 L
Influent Peak H ₂ S Concentration	: 0,7 g/m ³
Effluent H ₂ S Concentration	: 0,007 g/m ³
H ₂ S Removal Velocity	: 80 g/m ³ -h
Biomedia Amount Required	: $(0,7-0,007) \times 4.400 / 80 = 38 \text{ m}^3$
Surface Loading	: 125 m ³ /m ² -h
Surface Area Required	: 35 m ²
Biological Odor Removal Unit	3
Required Surface Area for Beaker Unit	: 12 m ²
Unit Type	: Horizontal Cylindrical Type Biological Odor Removal Unit
Dimensions	: 8 m length; 1,5 m diameter
Bed Height Required	: 1,1 m
Contact Time	: $38 \text{ m}^3 / 4.400 \text{ m}^3/\text{h} \times 3.600 \text{ sec}/\text{h} = 32 \text{ sec}$

Sludge Building Biofiltration Unit

Influent Peak H ₂ S Concentration	: 750 ppm
Removal Efficiency	: %99
Effluent H ₂ S Concentration	: 7,5 ppm
H ₂ S Molecular Weight	: 34g/mol
1 Mole Gas Volume at 20 °C and 1 atm	: 24,1 L
Influent Peak H ₂ S Concentration	: 1,06 g/m ³
Effluent H ₂ S Concentration	: 0,01 g/m ³
H ₂ S Removal Velocity	: 80 g/m ³ -h
Biomedia Amount Required	: $(1,68 - 0,01) \times 8.400 / 80 = 110 \text{ m}^3$
Surface Loading	: 125 m ³ /m ² -h
Surface Area Required	: 67 m ²

Biological Odor Removal Unit	2
Required Surface Area for Beaker Unit	: 34 m ²
Unit Type	: Horizontal Cylindrical Type Biological Odor Removal Unit
Dimensions	: 13 m length; 2,6 m diameter
Bed Height Required	: 1,1 m
Contact Time	: $110 \text{ m}^3 / 8.400 \text{ m}^3/\text{h} * 3.600 \text{ sec}/\text{h} = 47 \text{ sec}$

Required Equipment for Odor Removal Unit

Odor Removal Unit Tanks	: Total 5 units (3+2)
Biomedia Bed Material	: Sentetic, HDPE
Required Fan Number	: 4 units, (AISI 316axle type fan, 4.500 m ³ /h @ 700 kPA)
Accessories	: Tank drainage system, drip-nozzle spray system, biomedical bed transport system
Automation	: Continuous pH and humidity controlled PLC

I.3 Municipalities, Villages which use WWTP, Their Populations, Population Projections, Which Criteria used for Projection Calculation, If Exist, Industrial Types Whose Wastewater will Accept to WWTP, Wastewater Resources Accepting WWTP. Wastewater Features, Quantaties

Population Estimation

The target year for Mezitli WWTP design capacity is 2035. At the end of Address-based Population Registration System (ADNKS) in 2007, the rate of annual population growth was 2%. In the past, although the rate of population growth in Mersin province varied widely, it was thought that the rate of population growth of 2% was a realistic rate of increase for both Mersin and Mezitli Basin (see Table 3 and Figure 3).

Table 3 Population Estimation in Mezitli Basin

Mezitli Basin	2035 Population Census	2050 Year Population Estimation
Population	384.000	556.000

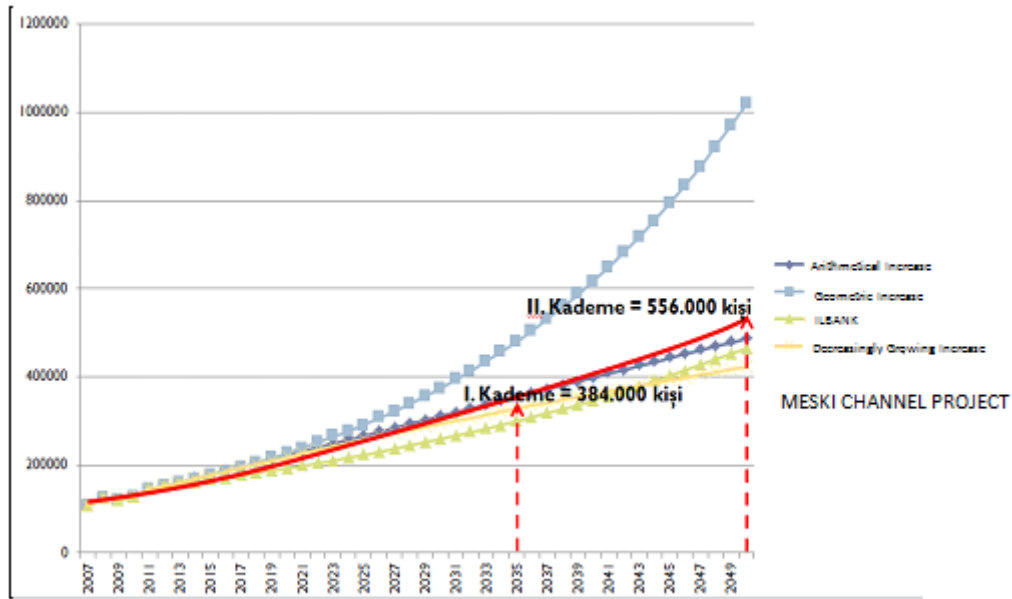


Figure 3 Population Projection

Design based on equivalent population data

Industrial and Commercial Wastewater

Only about 10 hectares (ha) of industrial area are located in Mezitli. The estimated effluent for this area is approximately 1.0 l / s, corresponding to 250 equivalent populations. Wastewater from commercial establishments (petrol stations, workshops, dry cleaners, etc.) is estimated by area. The total commercial area of Mezitli, Davultepe and Tece is 46 ha. The biological oxygen demand (BOD) / chemical oxygen demand (COD) loading corresponds to 7.066 equivalent population. Total industrial and commercial wastewater equivalent population for the year 2035 is 384,000 and 556,000 equivalent population for the year 2050.

Specific amount of wastewater

Domestic Wastewater: Daily water use per person is accepted as 120 lt. This amount is also the amount of domestic wastewater, assuming that all of the used water has become wastewater.

Industrial Wastewater: The wastewater from industrial and commercial activities corresponds to 384,000 equivalent population for 2035 and 556,000 equivalent for 2050. It is assumed that 120 liters of wastewater will be generated per equivalent population in the calculations.

Infiltration water

The majority of the existing wastewater network is on the sea level. Infiltration rates in new settlements are gradually falling compared to the Mersin center, which has the old network. For this reason, the infiltration rate for Mezitli was assumed to be 35% in the projections made.

Storm Water

It is assumed that the amount of wastewater will increase by 36% in rainy weather. It is accepted that stormwater lines can not be connected to the wastewater network when this rate is taken.

Design Parameters for 2035 and 2050 years

For some of the above-explained assumptions, the total equivalent population with which it is linked is taken as 384,000 for 2035 and 556,000 for 2050.

The effluent parameters are presented in **Table 4**.

Table 4 Mezitli WWTP Design Parameters for 2035 and 2050 years

Parameter	I. Phase (2035 Year)	II. Phase (2050 Year)
Pollutant Loads	kg/day	kg/day
Biological Oxygen Demand (BOD)	20.746	30.012
Chemical Oxygen Demand (COD)	34.576	50.020
Suspended Solid Material (SSM)	20.746	30.012
Total Kjeldahl Nitrogen	3.688	5.335
Total Phosphorus	553	800
Pollutant Concentration	mg/L	mg/L
Biological Oxygen Demand (BOD)	375	375
Chemical Oxygen Demand (COD)	625	625
Suspended Solid Material (SSM)	375	375
Total Kjeldahl Nitrogen	67	67
Total Phosphorus	10	10

I.4 Which System Wastewater will collect

In addition to the Mezitli WWTP, where mechanical, biological, advanced treatment (nitrogen and phosphorus removal) and sludge treatment (balancing, dewatering and drying) units are located, for a pressurized elevation line to the Mezitli WWTP from the Mezitli-Viranşehir Pump Station and construction of the gravity line which will transport treated water from the Mezitli WWTP to the deep sea discharge in Viranşehir. A separate project has been developed construction of Deep sea discharge structure was built by Province Bank between 2004-2005.

Pumping stations and sewerage systems needed for the collection of wastewater in the Mediterranean basin will be built under another project in parallel with this project.

The wastewater will be delivered via two separate sewer lines from the Mezitli and Davultepe pumping stations. The wastewater from the sewerage networks in the collection tank located at the facility entrance will be combined and taken to the pre-treatment units. Taking into account the load losses determined by the plant's hydraulic profile, wastewater will be sent from the central pumping stations to the tanks to reach the elevation determined by the hydraulic profiler to ensure the transfer of the wastewater by gravity within the facility.

I.5 Units and Features of Machine and Equipment to be used in Units and Operation & Maintenance Works

The machines and equipment to be used in the units under the project are presented in **Table 5**.

Table 5 Machine and Equipment List to be used within the scope of the facility

Unit Name	Unit	
	1.Phase	2.Phase
Fine Screens	3	4
Grit and Oil Chamber	3	4
Pre-Sedimentation Tank	3	4
Anaerobic Tank	3	4
Aeration Tank	3	4
Final Sedimentation Tank	3	4

Source: Mezitli Wastewater Treatment Plant Conceptual Design Project Process Report, 2013.

I.6 Economic Social and Infrastructure Activities Planned in the Scope of the Project

The Mezitli region is the only area in the Mersin Metropolitan area that has beaches that can be taken to sea whenever possible. These beaches can not be used due to the lack of sea water quality. However, the quality of sea water is expected to improve with the start of the treatment plant in the near future. With the passing of the planned facility, tourism, which has not been developed sufficiently yet, will also revive. The Mezitli WWTP will contribute together with the Doğu WWTP in the Karaduvar to improve the quality of the sea water of the Mersin Gulf and thus the Mediterranean.

MESKI applied to the European Bank for Reconstruction and Development (EBRD) for the financing of the project. The project is under "B category" under the EBRD's environmental and social policies. In this context, an environmental and social situation assessment study has been carried out for the project under the Environmental and Social Action Plan (ESAP). In this study, the measures and actions related to the positive and negative environmental and social effects that will occur during the implementation of the project have been investigated. In addition, it includes environmental and social impacts of the project, measures to avoid these effects, or actions to reduce adverse impacts on the environment and the community, if these effects can not be avoided.

Within the scope of the project, approximately 60 persons will be employed in the construction phase and 12 personnel will be employed in the operation phase. The personnel to be employed within the scope of the project will be trained on occupational health and safety issues.

I.7 Studies on Project and Site Alternatives and Explaining the Reasons for Selection of the Project / Site in the EIA Report, Evaluation of Technology Alternatives

Location Selection

In 2006, MESKI took action for the construction of a treatment plant in Mezitli parallel to Karaduvar WWTP, but due to the fact that the area located in Mezitli for the treatment plant is a very common personal landmark, the expropriation efforts did not result in positive direction. On top of this, a new research has been initiated and a new area belonging to the public sector has been identified.

Province Bank has built a facility consisting of a sand-holding pumping station and a sea discharge pump station, which collected only the wastewater of Mezitli on the Mezitli coast in 2004-2005. However, taking the Mezitli into Mersin Metropolitan boundaries, this one which is not suitable for capacity and design from one side and which is at the sea side from the other side has been abandoned. As a result, a new place was searched, where there was no problem for the environmental impacts and the living, and the subject of this EIA Report was found.

Comparison of Technology Alternatives

Three different alternatives have been studied for the disposal of and treatment sludge and technology in Mezitli WWTP design works.

- i. Technology alternatives;
 - ✓ Conventional activated sludge,
 - ✓ Long aerated activated sludge,
 - ✓ Membrane bioreactor.
- ii. Alternatives to disposal of treatment sludge;
 - ✓ Storage on landfills,
 - ✓ Sending and burning to cement plant,
 - ✓ Compostable and usable as fertilizer in agriculture sector.

i. Comparison of technology alternatives

Conventional activated sludge:

In this treatment system, pre-treated wastewater is taken to the aeration tanks. These tanks are supplied with oxygen from the outside (with surface aerators or diffuser aerators) to ensure that the aerobic microorganisms dissolve in the wastewater and decompose the colloidal organic matter. Disinfection of the wastewater from the aeration tank in the final sedimentation tank, that is, separation of the microorganisms in the treated water from the system is necessary. In addition, sedimentation sludge (microorganisms) from the final settling tank must be recycled to the top of the aeration tank to provide a certain concentration of microorganisms in the aeration tank. The excess sludge to be formed in the system should be removed from the system and subjected to sludge treatment (see **Photo 1** and **Figure 4**).

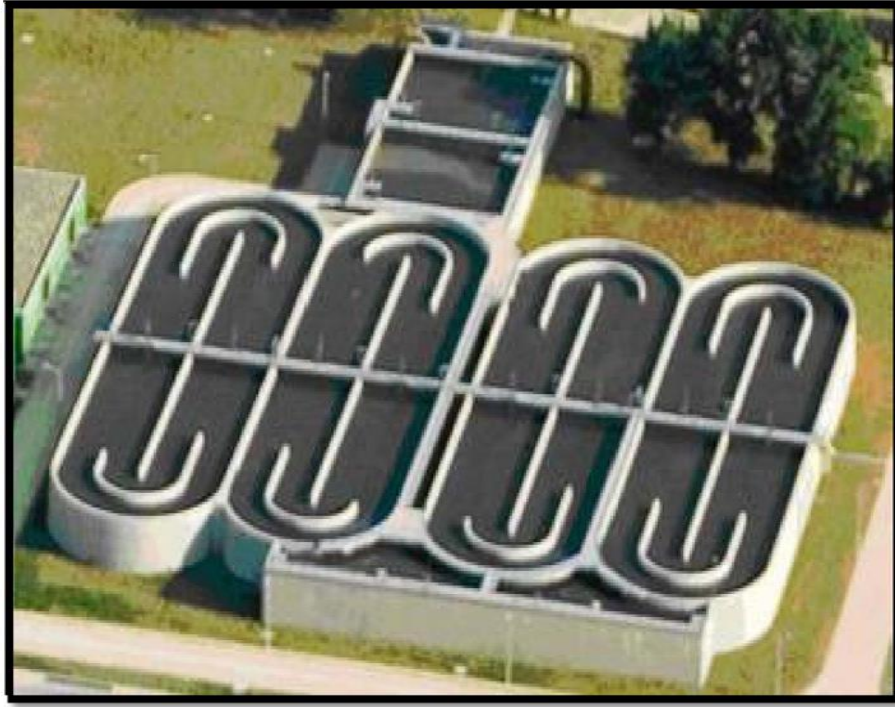


Photo 1 Example of Classical Activated Sludge System

Source: Mezitli Wastewater Treatment Plant Conceptual Design Document, 2013.

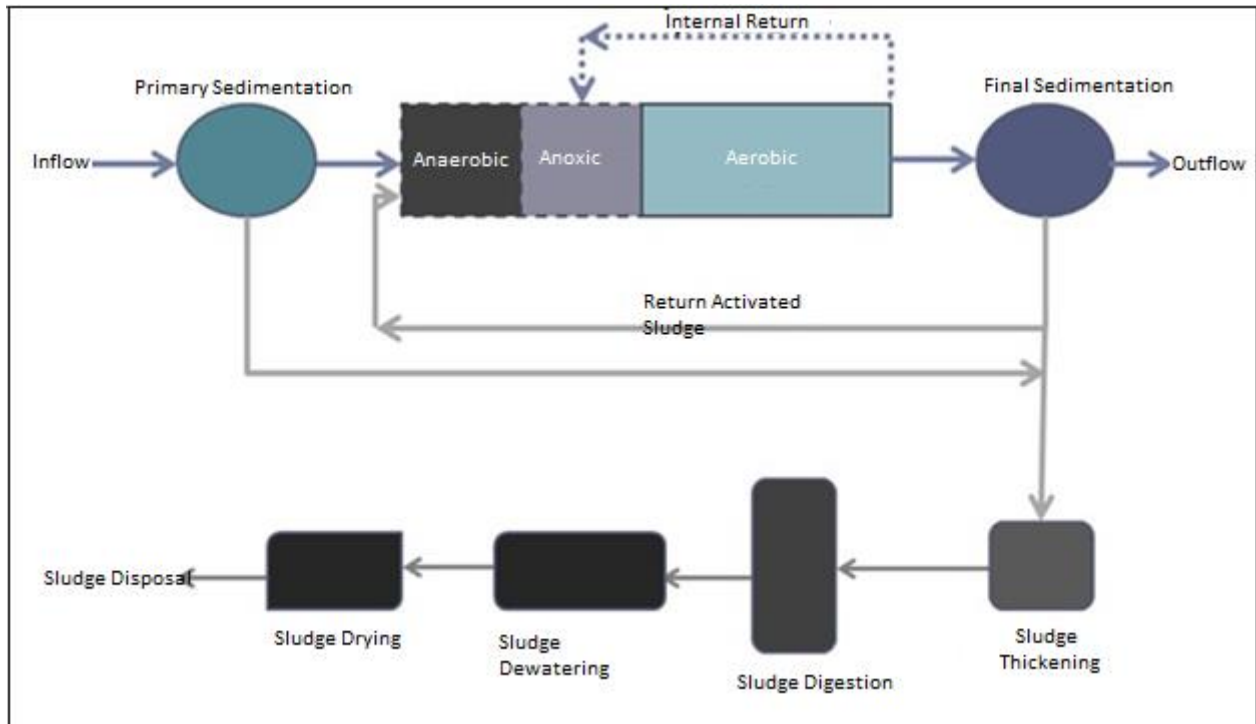


Figure 4 Work Flow Chart of the Classic Activated Sludge System

Source: Mezitli Wastewater Treatment Plant Conceptual Design Document, 2013.

Activated sludge with long Aeration:

In this system, organic matter removal and sludge digestion are carried out in the same tank. Nitrogen and phosphorus removal is provided by circulation of anaerobic, anoxic and oxic areas of biomass that provides wastewater and treatment (see **Photo 2** and **Figure 5**).



Photo 2 Example of Long Aerated Activated Sludge System

Source: Mezitli Wastewater Treatment Plant Conceptual Design Document, 2013.

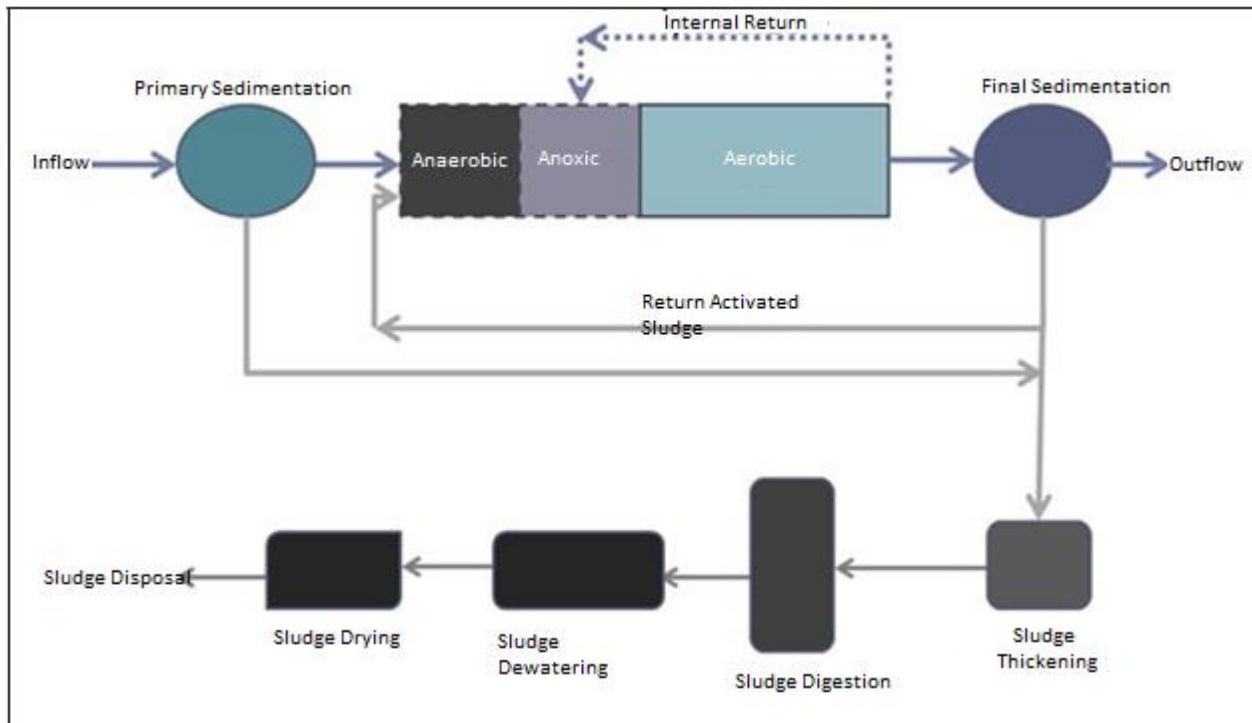


Figure 5 Work Flow Chart of Long Aerated Activated Sludge System

Source: Mezitli Wastewater Treatment Plant Conceptual Design Document, 2013.

Membrane bioreactor (MBR): The improved form of conventional activated sludge systems is the combined state of biological reactors and membrane technology. After biological treatment, solid / liquid separation is performed using ultrafiltration (UF) or microfiltration (MF) membranes instead of the sedimentation tank (see **Photo 3** and **Figure 6**).



Photo 3 Example of Membrane Bioreactor System

Source: Mezitli Wastewater Treatment Plant Conceptual Design Document, 2013.

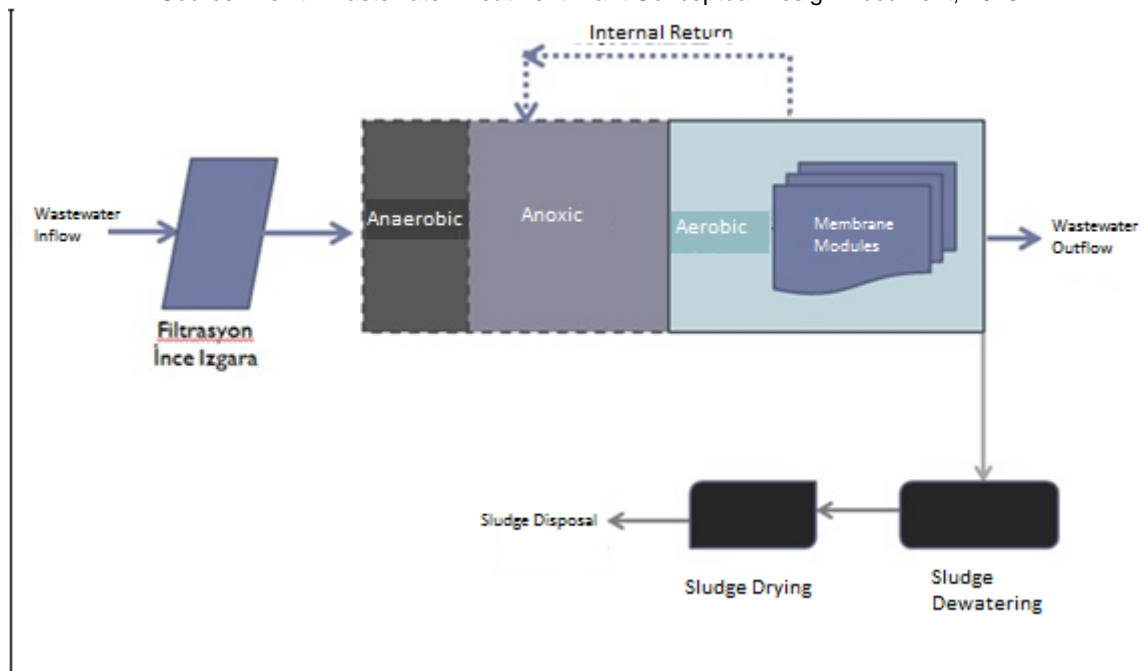


Figure 6 Work Flow Diagram Based on Membrane Bioreactor System

Source: Mezitli Wastewater Treatment Plant Conceptual Design Document, 2013.

As a result of the engineering and design studies;

- ✓ Biogas power and electricity production can be provided,
- ✓ The low amount of energy required for sludge drying,
- ✓ Operational simplicity,
- ✓ Need for less space,
- ✓ Lower initial investment cost,
- ✓ Less aeration and electricity consumption,
- ✓ Lower sludge formation and cost of sludge disposal

WWTP which is planned to be done in Mezitli due to reasons such as; It has been decided to install it according to "Conventional activated sludge system pre-denitrification" (See Table 6).

Table 6 Comparison of Alternatives

Concept	Priority Degree	Long Aerated Activated Sludge	MBR Process	Conventional Activated Sludge System
To be able to provide discharge standards	4	4	5	4
Difficulties in operation and maintenance	3	4	2	3
Land requirements	2	2	5	3
Operation and maintenance costs	3	4	1	4
Investment costs	2	4	2	3
Flexibility to flow and load changes	1	4	2	3
Sludge management and disposal	2	4	5	4
Energy field	2	0	0	5
Resistance to toxic substances	1	4	3	3
Total (weighted score)	5	3,4	2,9	3,75

Source: Mezitli Wastewater Treatment Plant Conceptual Design Document, 2013.

ii. Comparison of alternatives to treatment sludge disposal

The alternatives that can be applied for the final disposal of treatment sludge (pre-sedimentation sludge and waste biological sludge) to be formed are listed below;

- ✓ Landfill storage (see **Photo 4**),
- ✓ Burning by sending to cement plants (see **Photo 5**),
- ✓ Compostable and usable as fertilizer in agriculture sector.

As a result of the evaluations made; It is planned that the sludge to be generated from the planned plant will be "sent to the regular storage sites" because the calorific value is about 90% of the solid material content in the sludge so that the treatment sludge can be burned and the sludge transport has to be met by the producer



Source: Mezitli Wastewater Treatment Plant Conceptual Design Document, 2013.
Photo 4 Example of Storing Treatment Sludge in Regular Storage Areas



Photo 5 Example of the Disposal Method Carried to the Cement Plant by Incineration

Source: Mezitli Wastewater Treatment Plant Conceptual Design Document, 2013.

I.8 Definition of the Land Amount and Land to be Used in the Construction and Operation Phase of the Project, Geographical Shape of the Area

Mezitli WWTP, Mersin Province, Mezitli District, registered in the parcel no 2745, shall be installed in the area of 76.600 m² owned by MESKI, located at a distance of 1.5 km to the coast (See Annex 1).

Despite the fact that the project is agricultural land, there is no agricultural activity. Regarding the issue, the "non-agricultural use" of the plant area was deemed appropriate, as stated by the Ministry of Agriculture and Rural Affairs General Directorate of Agricultural Production and Development's Annex 1.

The plant area is located within the borders of Mezitli District. The nearest settlement is the Esenbağlar Quarter 400 m (bird flight) and the Mediterranean Quarter 900 m (bird flight).

Access to the facility area is made from the Mersin-Silifke (D400) highway. The existing roads will be used within the scope of the project and there is no need for connection roads. Only service routes will be provided for transportation to the units within the facility area.

The topographic map of 1 / 25.000 scale showing the plant area is presented in Annex 2.

The parcel No. 2745 to be installed by Mezitli WWTP has been marked as "Urban Development Area" in Mersin-Adana Planning Area 1 / 100.000 scale Environment Plan (See Appendix 2). The opinion of the General Directorate of Spatial Planning on the subject is presented in Annex 1. In addition to this, the mentioned facility area is marked as "Wastewater Treatment Plant Area" by the decision of Mersin Metropolitan Municipality Assembly dated 15.10.2010 and numbered 1 / 5.000 and 1 / 1.000 scale (See Annex 2).

Coordinates of the facility area are given in **Table 7**.

Table 7 Facility Coordinates

Coor. Order: Right Value, Up Value in Clockwise			Coor. Order: Latitude, Longitude Clockwise: Grade		
Element Order: Right (Y): Up (X)			Elements Order: Latitude: Longitude		
Datum : ED-50			Datum : WGS-84		
Type : UTM			Type: GEOGRAPHY		
D.O.M. 33			D.O.M. :-		
Z.O.N 36			Z.O.N :-		
Scale Fac. : 6 degrees			Scale Fac. : 6 degrees		
1	633329,129	4066980,691	1	36,737560	34,492990
2	633357,923	4066999,166	2	36,737722	34,493316
3	633374,908	4066977,551	3	36,737525	34,493502
4	633402,909	4066956,186	4	36,737329	34,493812
5	633417,853	4066966,217	5	36,737417	34,493981
6	633439,458	4066980,673	6	36,737544	34,494225
7	633414,009	4067035,399	7	36,738041	34,493950
8	633469,566	4067071,712	8	36,738360	34,494578
9	633477,256	4067071,684	9	36,738359	34,494665
10	633484,853	4067068,962	10	36,738333	34,494749
11	633572,894	4067008,667	11	36,737778	34,495724
12	633594,531	4067002,456	12	36,737719	34,495966
13	633617,438	4067001,664	13	36,737708	34,496222
14	633621,840	4066911,575	14	36,736896	34,496255
15	633634,807	4066821,731	15	36,736084	34,496385
16	633636,109	4066755,370	16	36,735486	34,496388
17	633637,292	4066702,873	17	36,735013	34,496392
18	633546,636	4066671,896	18	36,734746	34,495372
19	633541,636	4066671,777	19	36,734746	34,495316
20	633481,135	4066672,801	20	36,734764	34,494638
21	633435,520	4066633,997	21	36,734421	34,494121

Coor. Order: Right Value, Up Value in Clockwise			Coor. Order: Latitude, Longitude Clockwise: Grade		
Element Order: Right (Y): Up (X)			Elements Order: Latitude: Longitude		
Datum : ED-50			Datum : WGS-84		
Type : UTM			Type: GEOGRAPHY		
D.O.M. 33			D.O.M. : -		
Z.O.N 36			Z.O.N : -		
Scale Fac. : 6 degrees			Scale Fac. : 6 degrees		
22	633455,374	4066782,570	22	36,735757	34,494369
23	633407,124	4066863,242	23	36,736490	34,493843

I.9 Brief Explanation of the Works and Transactions Carried Out Up to this Stage Related to the Project, Permits Obtained and Received

MESKI, Metropolitan Municipality Law No. 5216 dated 10.07.2004 and Mezitli, Davultepe and Tece provinces the way that can be benefited; (WWTP) "in order to serve the" public interest "in the western part of the city. In order to meet this need; In 2007, the expropriation procedures were initiated in the Mezitli District in accordance with the expropriation law numbered 2942 and the revised law numbered 4650. However, due to the formation of multi-shareholder parcels of the planned land area, some difficulties were experienced during the expropriation process and finally the assigned area was abandoned, The subject area is determined. In this direction, the expropriation studies for the newly determined area have been completed and the land has been transferred to MESKI property (See Appendix 1). In this context, the General Directorate of Agricultural Production and Development of the Ministry of Agriculture and Rural Affairs has applied for the "agricultural use" of the agricultural land in the area, and the "agricultural use" of the agricultural land in question has been found appropriate (see Annex 1). In addition, there is a "Public Benefit" decision of the General Directorate of Local Authorities of the Ministry of the Interior for the mentioned facility (See Appendix 1).

Feasibility studies of the facility have been started after completion of the land related procedures. The capacity and design parameters of the plant have been determined by making population projections.

Mezitli WWTP facility area was treated as "Wastewater Treatment Plant Area" in Mersin Metropolitan Municipality Assembly decision in 2010 with sub-scale plans (See Appendix 2).

As mentioned in Section I.6, MESKI applied to the EBRD for the financing of the project and conducted an environmental and social situation assessment study under the ESAP for the project in question.

If the plant is in the process of design, construction and operation, Permits requiring to be taken involve completion of the EIA process, obtaining a work permit and license, obtaining a discharge permit, obtaining a building permit and building permission document, obtaining a location document, obtaining an operational document and obtaining a building permit.

CHAPTER II

SELECTED LOCATION FOR THE PROJECT

CHAPTER II: Selected Location for the Project

II.1 Project Location; Marked on the Decentralized Environmental Plan, the Master Plan, the Implementation Plan (1/5000 and / or 1/1000 Scale Plans), which have been approved by the relevant Governor's Office or the Municipality, including Legend and Plan Notes. Display of Project Site and Nearby Area on 1 / 25.000 Scale, Legendary Topographic Map, Displaying Industry and Settlements Surrounding the Project Site on the Map and Specifying the Distances

Location of the facility area

Facility area is located in Mezitli District, Mersin Province. The distance of the facility to Mersin is about 15 km and the distance to the coast is about 1.5 km. The location map showing the facility area is shown in **Figure 7** and the topographic map with 1 / 25.000 scale is presented in Annex 2. Coordinates of the plant area are presented in **Table 7** in **Chapter I.8**.

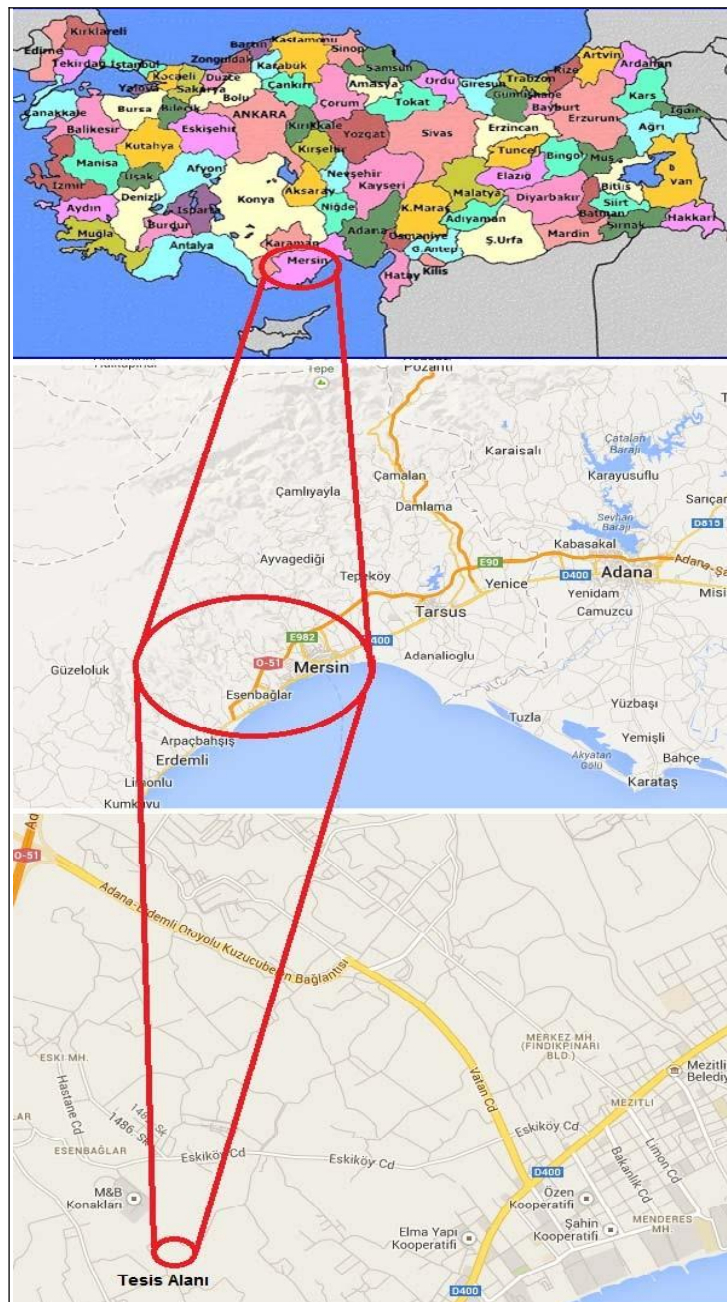


Figure 7 Location finder map

The plant area is located within the borders of Mezitli District. The closest settlement to the facility is Esenbağlar Mahallesi at 400 m (bird flight) and Akdeniz Mahallesi at 900 m (bird flight) (See Figure 8 and Figure 9).



Location of the facility area on the perimeter plan

Mezitli WWTP The parcel number 2745 to be installed by Mezitli WWTP was processed as "Wastewater Treatment Plant Area" to the 1 / 1.000 and 1 / 5.000 scale development plans with the resolution of Mersin Metropolitan Municipality Assembly dated 15.10.2010 and numbered 344 (See Annex 2)

Display of the facility area on the map

A 1 / 25.000 scale topographic map showing the plant area is presented in Figure 10 Annex 2.



Figure 10 Topographic Map Showing Facility Area

Photos of the facility area

The photographs of the site are given as below: (See Photo 6, Photo 7 and Photo 8)



Photo 6 Image of Facility Area-1



Photo 7 Image of Facility Area-2



Photo 8 Image of Facility Area-3

II.2 Other areas that continue to operate in the immediate vicinity of the activity area and the vicinity of the activity area and the surrounding environment with the aim of evaluating the existing land use, groundwater, earthquake zones, geological structure, village resident areas, transportation network, power transmission lines, Processing of Information Displaying Data on the Usage of the Information on 1 / 25.000 Scaled Maps

The Land Use Map showing the land use in the facility area and its vicinity, the Fault Map showing the active faults, the geological map showing the geological structure of the region, the topographic map showing residential areas and surface water resources are presented in Annex 2.

II.3 Position of the operational units within the scope of the project (Display of all Administrative and Social Units, Technical Infrastructure Units, Floor Units and Elevations of the Designated Indoor and Outdoor Size Buildings of the Units of the Other Units in the Project Area)

In Annex 2, General Settlement Plan of Facility is presented and the envisaged areas of the units are presented in Table 8.

Table 8 Estimated Sizes of Units

Unit	Dimensions
Fine Grilles	Channel width 1,7 m Bar range 6 mm Bar thickness 10 mm
Sand and oil holder	Length 30 m Up to 4 m Area 1.250 m ² Volume 261 m ³
Pre-Settling Pool	
Biophosphorus Pools	Tank length 33 m Width 8 m Depth 8 m Volume 1.125 m ³
Ventilation Tanks	Depth 6,6 m Area 2.732 m ² Width 24 m Diameter 24 m
Final Settling Tanks	Diameter 31 m Area 3.019 m ² Volume 12,586 m ³
Pre-Sedimentation Sludge Condensation Pool	Diameter 12 m Height 3.7 m Volume 376 m ³
Mud Mixing Tank	Volume 53 m ³ Area 19,6 m ² Height 2.7 m Diameter 5 m
Anaerobic digestion	Height 16.3 m (4.1 m below ground) Diameter 18 m Area 254 m ²

Source: Mezitli Wastewater Treatment Plant Conceptual Design Project Process Report

CHAPTER III

PRESENT ENVIRONMENTAL PROPERTIES OF THE PROJECT PLACE AND IMPACT

CHAPTER III:

PRESENT ENVIRONMENTAL PROPERTIES OF THE PROJECT PLACE AND IMPACT AREA

III.1 Geological Features (General Geological Map of 1 / 500.000 Or 1 / 100.000 Scale Zone, Stratigraphic Section, Ground Species, Explanation of Project Site Showing 1 / 25.000 Scale Geological Map, Geological and Soil Information)

Regional geology

According to the studies made by General Directorate of Mineral Research and Exploration (MTA); Mersin Province is generally located on Paleozoic, Mesozoic and Eocene rocks. The transgression of the sea began in the Middle Miocene. An upper Miocene, which is detected by fossils in the region, is encountered. Pliocene age; Rocks in conglomeratic limestone and loose limestone lithology. On top; Partly along the Göksu Valley and alluvium covering the entire Silifke Plain.

There are Paleozoic and some Mesozoic and Eocene rocks which are the bases of Miocene basin. On top of all these are the Middle Miocene unconformity. The stratigraphic sequence is completed with alluvium covering the Pliocene unconformity with Silifke and surrounding Miocene in the vicinity of the sahara.

Geological units exposed in the Mersin borders; It is in the form of slope rubble, Alluvium, Kalis, Handere Formation, Kuzgun Formation, Güvenç Formation, Karaisalı Formation, Kaplankaya Formation, Gildirli Formation, Ophiolitic Melange, Karahamzuşağı Formation (see Figure 11 and Figure 12).

Tectonic Structure

Mersin is located in the Central Taurus, which is between the two main strike-slip faults such as the right-handed Kırkkavak Fault in geography and the left-handed Ecemi Fay in the east. Since the Middle Taurus is between these two faults, it moves more south than the West-East Taurus.

More researches have been done on the Central Taurus since it shows better characteristics of the Taurus giraffe. As a result of these investigations, due to its stratigraphic, structural and metamorphic properties, it was found that the Middle Taurides have many tectono- stratigraphic rock associations (Blumenthal, 1947; Özgül, 1971). These rock units were mutually interlaced with horizontal movements that gave the complex nappe structure of the Central Taurus along the entire Senonian and Lutetian. These tectonostratigraphic units are; Geyikdağı, Aladağ, Bolkar Mountain, Bozkir, Antalya and Alanya unions.

During the Upper Cretaceous, ophiolite thrusts over all of the Taurus, which resulted in the closure of Tethys. The southern Ophiolite in the study area was overlain by older units from Upper Cretaceous.

The other units, the Geyikdagi Union at the bottom, have made bindings on each other. NE-SW trending anticlines and synclines developed in the formation due to compression tectonics of the Taurids. These folds could be mapped around the Bolkardağları, Büyükeceli.

⁴ The information in this section is compiled from the Mersin Environmental Situation Report 2011.

ORTU KAYALARI									
Paleo-Oktken Örtü Kayaları									
Neo Oktken Örtü Kayaları									
SENOZOYİK (Cz)									
TERSIYER (Tt)									
KUNATERNER									
Holosen									
Pleistosen									
Pliosen									
Noolen (Ng)									
Miyosen									
Alt									
Orta									
Üst									
OLIGOSEN									
Paleojem (Pg)									
Eosen									
Alt									
Orta									
Üst									
Paleosen									
Alt									
Orta									
Üst									
ZAMAN SİSTEMİ									
SERİ									

ALANYA BİRLİĞİ	ANTALYA BİRLİĞİ	GEYİKDAĞI BİRLİĞİ	ALADAĞ BİRLİĞİ	BOLKARADAĞI BİRLİĞİ	BOZKOR BİRLİĞİ
Kreta	Karaçular Fm.	Krph	Krta	Krta	Krta
Jura		Jkt	Jkr	Kra	Kra
Triyas	Trq	Jy	Jkb	Tr Jb	Tr Jb
(Tr)	Trq	Trk	Tr Jg	Trg	Trg
Perm	Pmp	Pmp	Pd	Pmd	Pmd
Yeni (P)	Pba	Pba	Cph	Cph	Cph
Karbo		Ci	Ck	Da	Da
Nifer		Ck	Da	Db	Da
Dev		Da	Db	Da	Da
Niyen		Da	Da	Da	Da
(D)		Da	Da	Da	Da
Silüri		Da	Da	Da	Da
Yeni (S)		Da	Da	Da	Da
Ordo		Da	Da	Da	Da
Visi		Da	Da	Da	Da
Yeni (V)		Da	Da	Da	Da
Kam		Da	Da	Da	Da
Br		Da	Da	Da	Da
Yeni (E)		Da	Da	Da	Da

Source: Mersin Provincial Environment and Situation Report, 2011.



III.2 Earthquake, Ground Safety Stress, Disaster Situation in the Report of Large Scale Fault Map Incorporating Activity Seismicity

According to the Turkish Earthquake Map which the General Directorate of Disaster Affairs has prepared, The site is located in the third degree earthquake zone (see Figure 13). The map showing the faults in the facility area and its vicinity is presented in Annex 2.)

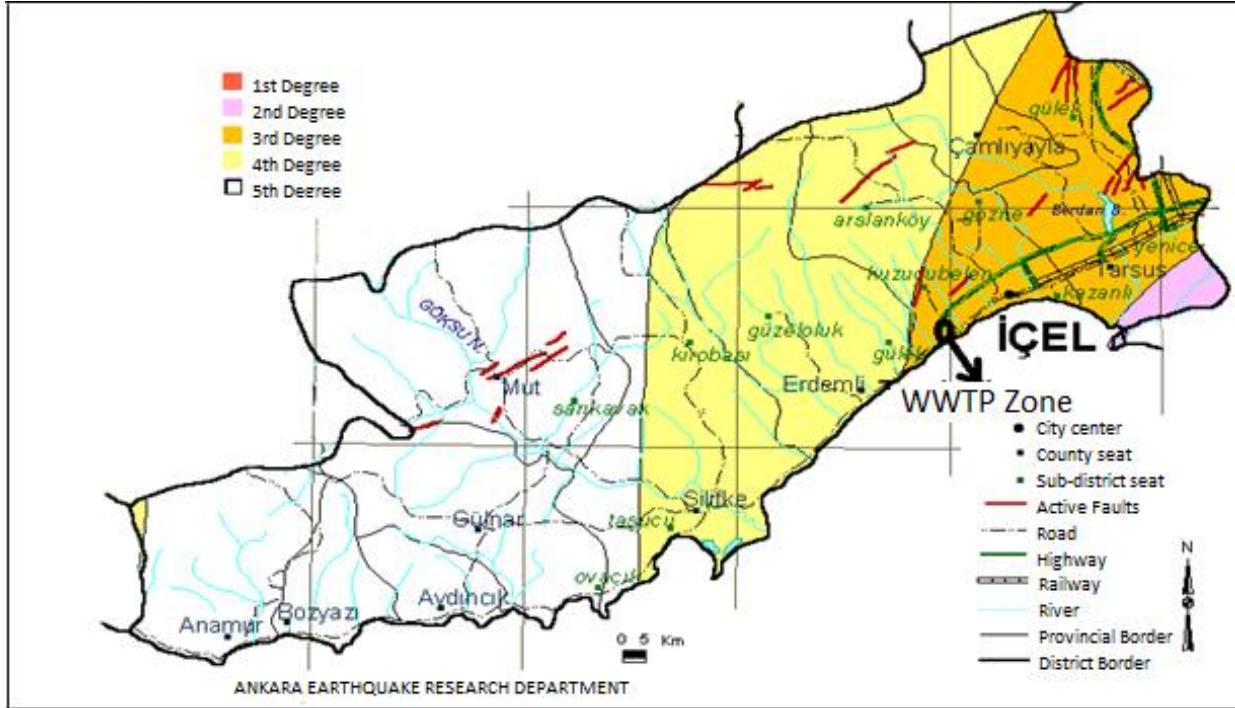


Figure 13 Mersin Earthquake Map

All kinds of buildings to be constructed within the scope of the project; "Regulation on Buildings to be Made in Earthquake Regions" published in the Official Gazette dated 06.03.2007 and numbered 26454, "Implementing Regulation on the Amendment of the Regulation on the Buildings to be Built in Earthquake Regions" published in the Official Gazette dated 03.05.2007 and numbered 26511 and Shall be in accordance with the provisions of the "Regulation on Buildings to be Performed in Disaster Areas" published in the Official Gazette dated 14.07.2007 and numbered 26582.

The Middle Toroslar region, which contains Mersin and its provinces, is bordered by the Kırıkkavak Fault Zone located to the north of Antalya in the west and the Ecemiş Fault Zone located to the north of Tarsus in the left lateral direction.

From the north, the geological evolution of the Central Taurus, which is surrounded by the Bolkar Mountains, the Akçalı Mountains, the Evlek Mountains and the Geyik Mountains from the west, has been shaped by the opening and closing of the Neotethys Ocean.

For Mersin and nearby regions, the most important danger in terms of earthquake is active faults in the region and distances to these faults.

It is possible to see the youngest traces of the fault in the north-east alluvial fan of Pınarbasi, NE-SW direction in the north, Ecemiş Fay. It is a left-handed strike-slip effect according to the morphological units affected by the Karaisalı-Karsayi Faay Zone, which is composed of numerous fractures, developed in different lengths and directions between Karaisalı and Karsanti Provinces.

Karataş Fault with NE-GD direction, left direction Yumurtalık Fault with 62 km length and NE-SW direction with 67 km length and Karataş Fault with directional strike are also located in Bolklar Mountains and approximately 20 km long Fault is located between Yeşildere-Aslanköy and D-B direction.

Located near Mut District, Mut Faay Zone is about 17 km long with D-B line. According to Observatory and Earthquake Research Institute, Boğaziçi University Kandilli large scale and devastating earthquakes are not expected due to the fact that the earthquakes that occurred in Mersin in the last century are smaller than 5,5, mostly concentrated in size 3-4 and the faults are small and small.

The part of the Central Anatolian Fault System extending between Gülek Boğazı and Anamur is defined as Namrun Fault Zone. The Namrun Fault Zone, which can most affect Mersin and nearby regions, starts from the Gülek Bosphorus in the west and passes through Namrun (Çamlıyayla), Arslanköy, Sorgun north, Kurtuyu Deresi, Göksu River and Demirözü respectively. In addition, there are many smaller fractures in the area between the Namrun Fault and the Mersin-Anamur coastal strip (see Figure 14).

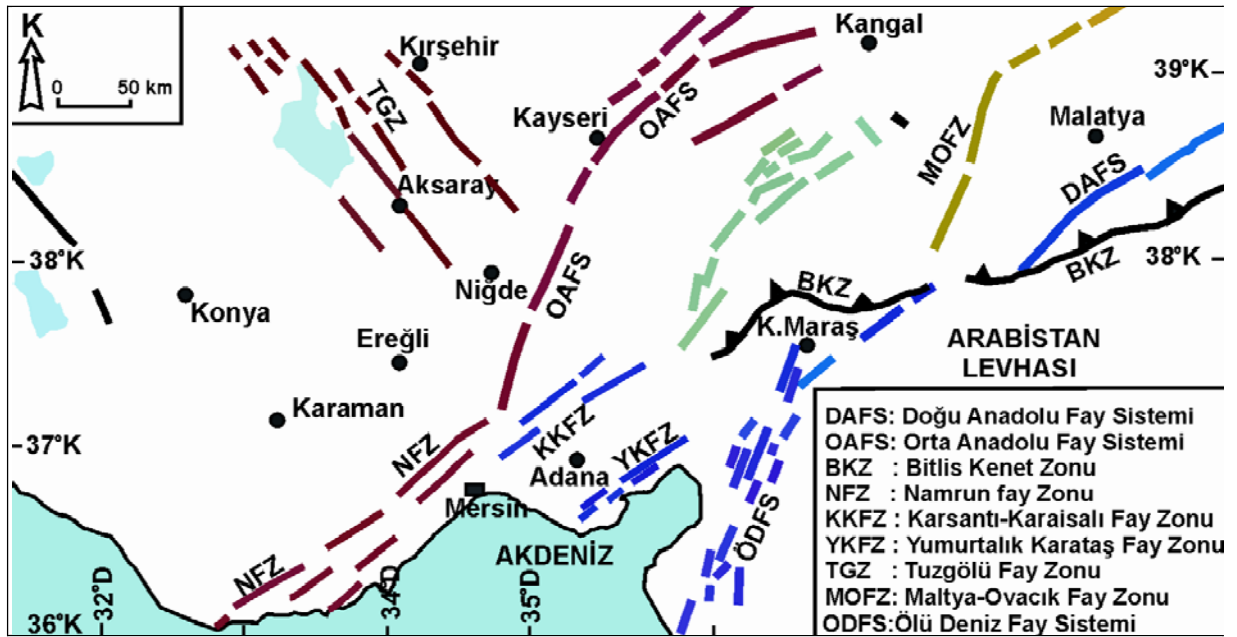


Figure 14 Active Fault Systems in Mersin and Near Region (İnan, 2008)

Apart from these, the Ovacık Fault extending between Mut Fault and Ovacık-Silifke around Mut corresponds to important fracture lines. (Şaroğlu ve and others, 1992). According to statistics of the earthquakes of Bogazici University, Kandilli Observatory and Earthquake Research Institute, the magnitude of the magnitudes of the magnitudes of Mersin and nearby provinces from 1900 to the present day in Mersin and nearby provinces have been statistically analyzed. A total of 55 earthquakes were recorded, 16 of which were 4,0-4,9 and 3 of which were 5,0-5,9. The locations of earthquakes with a magnitude.

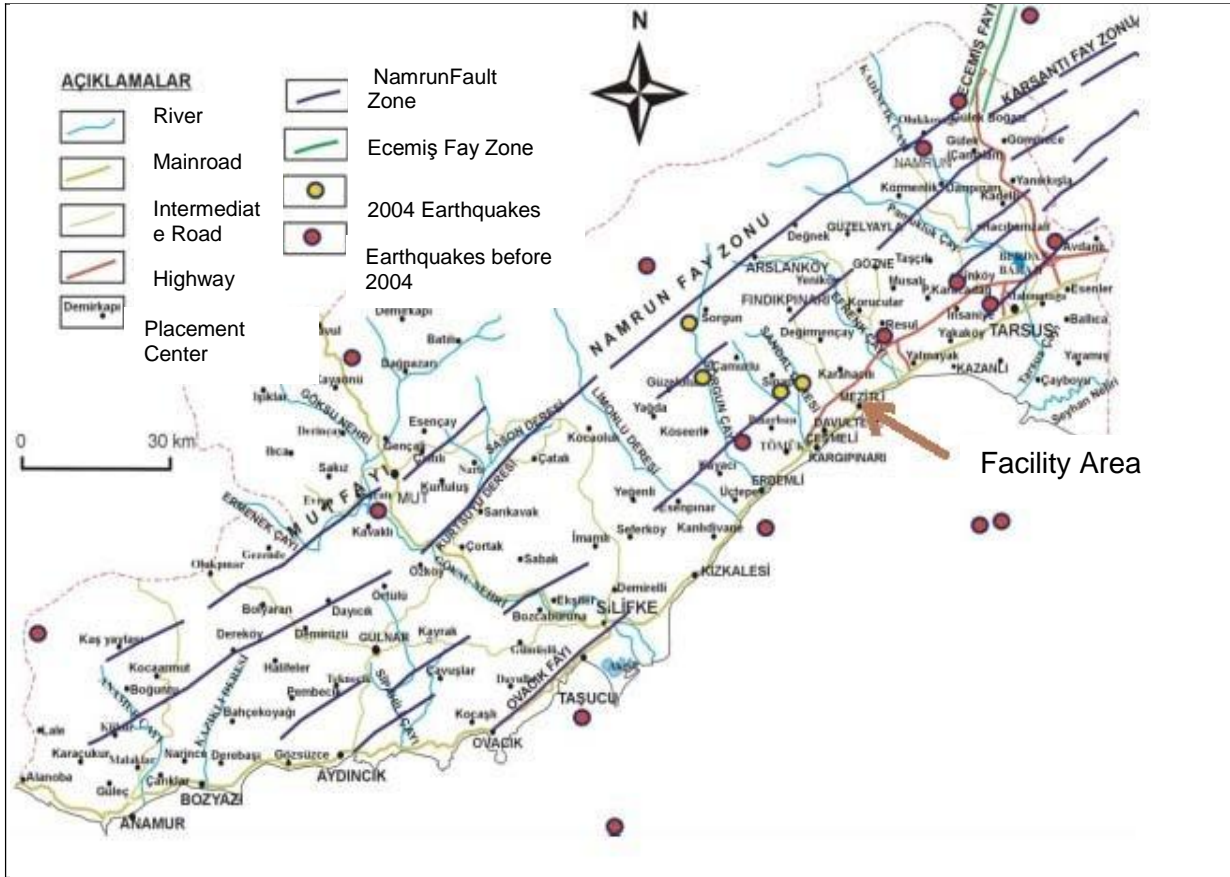


Figure 15 Active Fault Systems in Mersin and Near Region (Inan, 2008)

In summary, the Ecemiş Fault; Namrun Fault and Mut Fault, located in the north and forming the continuation of the Ecemiş Fault to the west; Ovacık Fault located in the south; Numerous small scale faults between Silifke and Mersin coastline and Namrun Fault correspond to active faults that produce earthquakes in the north and east and east of Tarsus.

However, since the earthquakes that occurred in the last century are small and mostly concentrated in size of 3,0-4,0 and the faults are small and small, these faults should not be expected to produce earthquakes as large and destructive as they are in North Anatolia.

Naturel Disaster Stiuation

Erosion: Superficial and eroded erosion is caused by excessive rainfall on the slopes where vegetation coverage is low or not at all. As a result, the bedlands topography is dominant in the clayey areas around Mut. There are also erosions that result from lateral erosion of some river beds and small debris.

Landslides: The landslides that occur due to the nature and character of Kayac are formed in ophiolitic melange and Miocene shales.

Rockfall: It is common to see rocks in the cornices of limestones belonging to the Karaisalı Formation located on the steep coast between Silifke-Anamur and on the edges of deeply opened valleys (<http://www.afad.gov.tr/>).

Flooding: In Mersin, the maximum amount of precipitation was determined as 199.5 mm / m² on 26 December 1968 during a 50-year observation period. Due to this rainfall, many of the cultivated areas in and around the city center are under water, causing considerable material damage. Apart from this, daily maximum rainfall amount was 175.4 mm / m² on 03.12.2001 day and important damages came to the scene (<http://www.afad.gov.tr/>)

Avalanche danger: Karboğazı Location, which is close to the Adana border and located on the Taurus Mountain belt, and all the mountainous areas around it are under the threat of big avalanches (<http://www.afad.gov.tr/>)

III.3 Hydrogeological Features and Existing and Planned Usage of Groundwater Sources, Distances and Debates in the Fields of These Sources, Demonstration on the Map

The drainage area of Mersin Province is 2,571 km². The height of the ovine is 0-30 m above sea level. Mersin has a Mediterranean climate, the summers are hot and dry, and the winters are warm and rainy. The average annual precipitation is 617.4 mm.

Sedimentary and metamorphic rocks are present in the region. Sedimentary rocks cover the whole area to the north of the ovary. These are composed of Miocene Tortonian limestone, marl, clay and sandstone units. The metamorphic rocks are outcropping in the north of Tarsus-Namrun asphalt in the east of Visiting Dağ. The plain is a delta plain that has collapsed due to the general character and is filled with alluvial material by the rivers..

The formation giving water to the region is only the quartz pebbly levels of Quaternary. The thickness of this formation is about 200 m in the Berdan section, the part from the lower part of the forested area in the south of Tarsus to the north is free and the part to the south is the pressure aquifer on several levels towards the beach. The formation, which gives water on the Deliçay plain, is 100 m thick and free. On the acrobatic level, it is 10-80 m thick, more widely spread on the left bank. Some water is taken from the calicones which confine the plain with caisson well.

Feeding groundwater in the oval is caused by precipitation from the precipitation and superficial flow. There is also nutrition in Berdan River, which lies between the regulator and the highway bridge.

Table 9 Mersin Province's underground water potential.

Bas Name	Province	Plain/District Name	Drinking-Industrial-Use		Irrigation	
			Document Number	Allocation made (hm ³ /year)	Document Number	Allocation Made (hm ³ /year)
Doğu Akdeniz Basın	Mersin	Merkez	1	0	12	0
		Tarsus	8	0	48	0
		Erdemli	2	0	34	0
		Silifke	4	0	63	0
		Bozyazı	-	-	9	0
		Anamur	-	-	20	0
		Gülınar	-	-	20	0
		Mut	-	-	10	0
		Yenişehi	2	0	8	0
		Akdeniz	8	0	18	0
		Toroslar	1	0	16	0
		Mezitli	1	0	13	0

Source : Adana SHW 6th Regional Directorate

Akquifers: Berdan-Efrenk Ovası; Is a delta ovary that has been formed by the gathering of various alluvial materials brought by the streams flowing in the north-south direction. The rivers that bring this delta ovale to the fountain; Berdan River and Deliçay, Efrenk

Streams. The thickest aquifer level is Karabucak forest area and south of Tarsus. In the middle of the plain and in the shore the right material is thinning and the clay rate is increasing. Limestone, sandstone, marl, clay, Middle Miocene formations were observed in the Cam Sanayi, Sapandere, Kızılkuyu and Yeniköy wells, which are located between the Berdan and Deliçay faults and the north side, after 10-20 m. Representations of surface water resources on the topographic map of the region are presented in Annex 2.

Within the scope of the geological survey studies, no groundwater was found on the site (see Annex 2).

Within the scope of the project works, the provisions of the Law on Groundwater No 167 shall be complied with and necessary precautions shall be taken so that groundwater shall not be affected by the planned foundation.

III.4 Hydrological Features and Existing and Planned Usage of Surface Water Resources, Features, Distances and Debates in the Field of These Sources, Demonstration on the Map

Mersin coastline summers are hot and arid, winters are warm and rainy. There are differences of up to 10-15 ° C from the coastline to the northern part. Especially in the winter months, as you move away from the sea shore, this temperature change comes out to great value.

Microclima regions defined as differences from the meteorological direction are seen in many sections due to the topographical structure of the province. During the summer and winter months, there is a noticeable difference in temperature and humidity between the coastal section and the interior and plateau sections. Temperature and humidity are lower in plateau sections. The most important sources of underground and surface water resources in Mersin are rain and snow waters.

The water resources of the Mersin Province are the rivers and the dams on it. Drinking water of Mersin and Tarsus Districts is supplied from Berdan Dam on Berdan River. The rivers in the province; Göksu River, Berdan Stream, Anamur (Dragon) Stream, Lamas Stream, Efrenk Stream. The annual potential of these streams is presented in Table 10.

Table 10 Annual Potential of Streams

Surface Water Source	Yearly Potential (hm³/year)
Göksu River	3.400
Berdan Stream	1.200
Anamur Stream	760
Lamas Stream	165
Efrenk Stream	80
Other streams	895
Total	6.500

Source: Adana SHW 6th Regional Directorate

The water regimes of the rivers in Mersin are generally irregular because some parts of the mountains and plat- forms are not covered by forest cover. Despite their high mileage, rivers show good irrigation characteristics.

The closest surface water source to the facility area is the drainage channels of DSI. In order to prevent the irrigation canals from being damaged, all kinds of impermeability measures shall be taken. In addition, if the planned project is conflicting with any project undertaken by DSI, DSI 6th Regional Directorate will be applied.

Within the scope of the project, there will be no intervention of the existing decks beds, no flow of water will be prevented, no pasa material, solid and liquid waste, The material will not be discarded. All kinds of measures will be taken in order to prevent the environmental pollution that may come to the fair.

In addition, the provisions specified in the Prime Ministry Circular No. 2006/27 published by the name of Creek Beds and Floods No: 26284 dated 09.09.2006

III.5 Flora and Fauna [Project area and Flora species in the area of impact, species in the vicinity to be affected, the period in which these studies were carried out, the types of rare and endangered species that have been protected by national and international agreements, their living environments and danger categories Examination according to Book, Establishment of Flora Table, Examination of Hunting Animals in Activity According to the Decisions of the Central Hunting Commission in Action, Determination and Effect of the Prohibited Scenery on the Project Area, Proper Formation of the Fauna, Determination of the Species Under the Berne Convention, Granting in the Tables, Protective Measures to be Taken for the Living Things to be Affected) During Construction and Operation]

In order to determine the flora and fauna of the plant area and its surroundings, field studies have been conducted and also publications of previous studies in the field have been screened with various literature.

FLORA

The site is located on the C5 and is located within the boundaries of the Mediterranean Regions when examined in terms of Davis Grid system (Flora of Turkey and the East Aegen Islands). Figure 16 shows Davis's grid system.

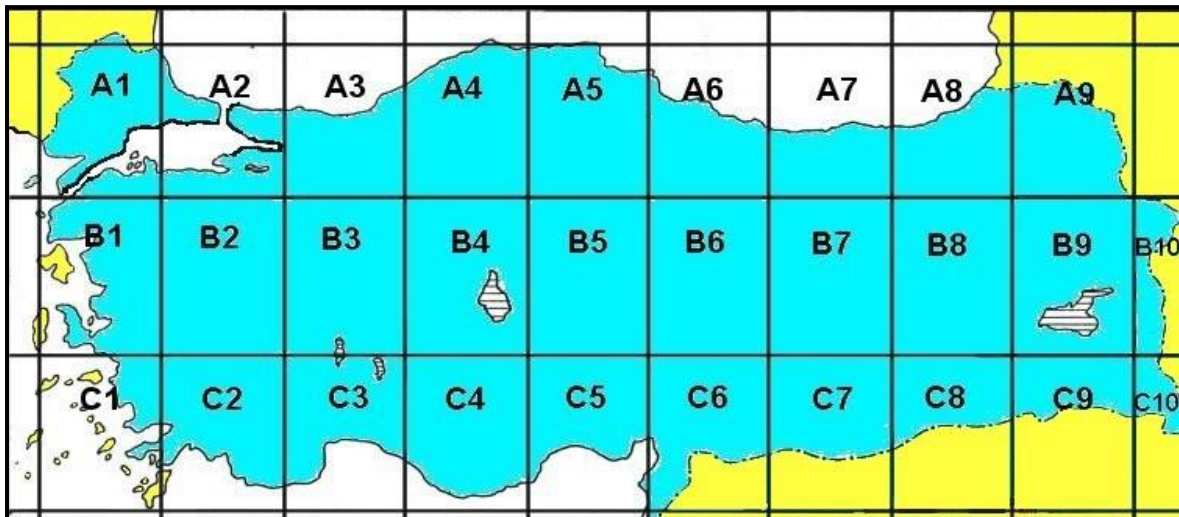


Figure 16 Davis's Grid System (Grids of Davis)

Climate and Vegetation

Mersin and its surroundings are dominated by typical warm and temperate sub-tropical climate. The winters are warm and rainy while the summers are hot and arid.

The plantation area has a perennial woody vegetation consisting of agricultural areas and citrus gardens under the influence of climate. There are also grass formations on the edges of the roads and at the end of the vineyard (See Photo 9).

The plant area is shown on the Turkish Vegetation Map, which is approximately shown in **Figure 17**. The plant area is seen as a " damp eastern Mediterranean zone " according to the vegetation map.



Photo 9 Facility Area Example Vegetation View

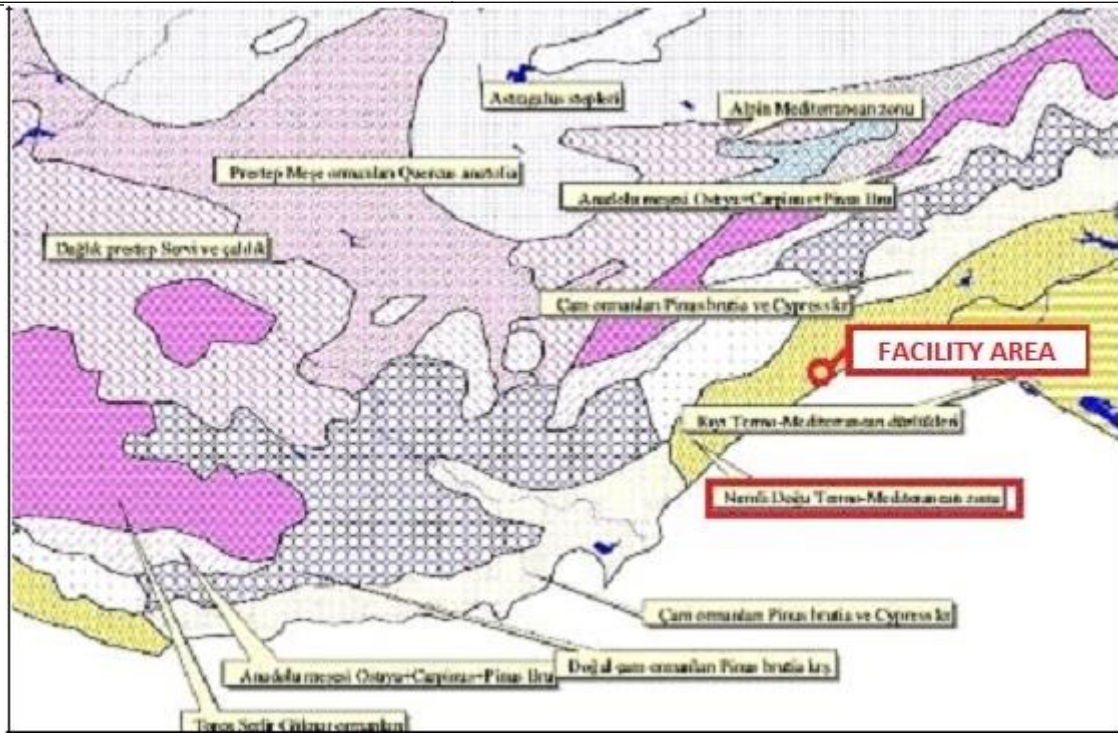


Figure 17 Mersin Province Vegetation Formations Map

Phytogeographical Region

Turkey is under the influence of 3 floristic regions due to the difference of topographic structure and climate characteristics. As can be seen from **Figure 18**, there are MED.-Mediterran (Mediterranean), IR-TUR Iran-Turan (Iran-Turan) and EUR-SIB-Euro-Siberia (Europe-Siberia) regions. When the project area is examined phytosociologically, MED.-Mediterran (Mediterranean) is under the influence of phytogeographical region.

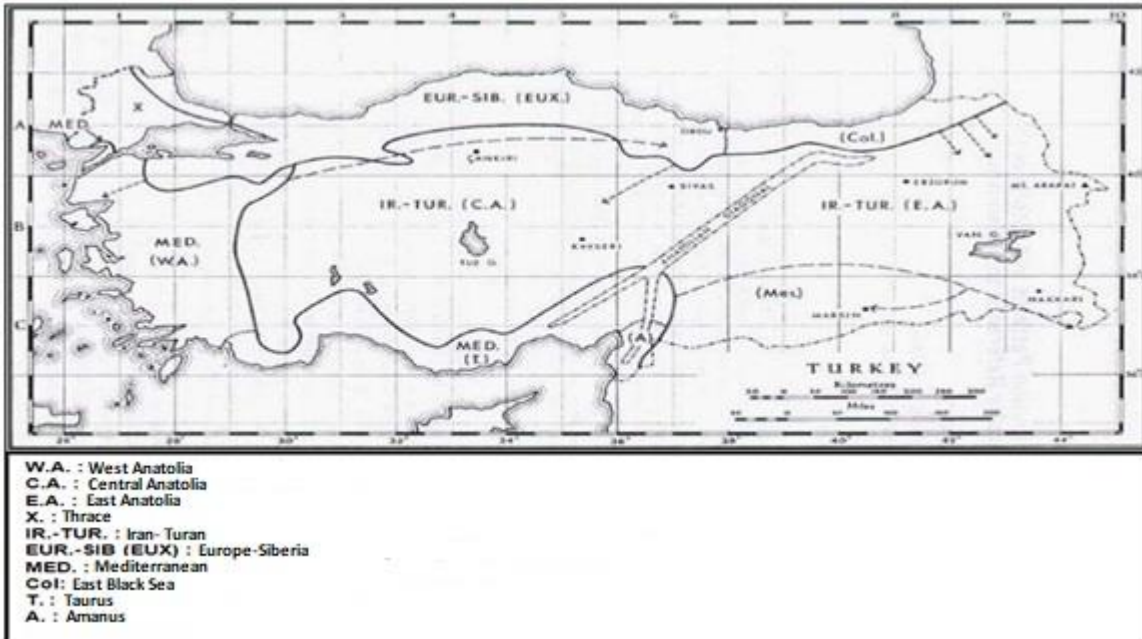


Figure 18 Turkey Phytogeographical Regions Map

IUCN - Hazard classes

The categories and explanations determined in the Red Book of Turkish Vapors of Taxa are given in **Table 11**. The endemic plant species identified were assessed according to these categories.

Table 11 Hazard Classes and Explanations

EX	Extinct	There is no doubt that the last individual has died.
EW	Extinct In Wild	The taxa could not be found in the environment in which it could be found and at different times of the year. In other words, it is still living in a form that is lost in nature and cultured alone.
CR	Critically Endangered	Taxons found under the risk of extinction in the very near future.
EN	Endangered	Taxons that are under very high risk and are in danger of extinction in the near future.
VU	Vulnerable	Taxa that are highly threatened in the mid-term in the future.
LR	Lower Risk	The populations are quite good and the taxa known at least 5 locals. There are 3 subcategories that can be ranked in terms of future threats.
(cd)	Conservation Dependent	Taxons that can enter one of the above categories within 5 years. They require special protection status in terms of species and habitat.
(nt)	Near Threatened	Taxa that are not placed in the previous group but close to the VU category.
(lc)	Least Concern	They do not require any protection and are not under threat.
DD	Data Deficient	Information about distribution and abundance is inadequate taxa.
NE	Not Evaluated	Those who are not judged by any criterion.

Some criteria accepted for inclusion in the CR, EN and VU Categories are;

For CR Category; In a very short time in the nature, plants that are at risk of disappearance can be decided according to the following criteria:

- A. If the population is reducing as a result of the following threats:
Possible loss of 80% in the population in 10 years due to the following reasons
 - a. The change of habitat property and the reduction of the degree of coverage of the specie;
 - b. To be under the threat of current and potential collection;
 - c. Infestation threat of another taxon and under the influence of hybridization, disease, seed binding, pollution, competitors and parasites;
- B. If the plant has a total spreading area of less than 100 km² and the single spreading area is less than 10 km² or known from a very fragmented or single location.

For EN Category; Under the high risk of the above-mentioned hazards, the population will be reduced by 50% in the last 10 years or 3 generations; the distribution area is 5,000 km² or a single area 500 km²; if the number of individuals is less than 2,500 or known at most 5 locations.

For VU Category; Over the last 10 years or 3 generations against the above mentioned threats, it is thought that there will be a decrease of 20% in the population; species with a distribution area of no more than 10 locations, a distribution area of a total of 20,000 km², a number of mature individuals of less than 10,000 or a 10% reduction in populations within 100 years during field studies.

Endemism

Turkey is very rich in endemic plants because of its geological and geomorphological resources. 30% of the total plant species detected in our country are endemic plant species. When literature reviews and previous studies in the field are examined, there is no endemic type of possibility in the vicinity of the facility and its surroundings.

There are no IUCN categories for species likely to be found / available in the field. Construction works will be carried out in a way that will cause the least damage to natural flora and the personnel to work on this issue will be raised awareness.

Overlap (Abundance) Ratings:

The quantities of plant species to be surveyed are considered as overlapping grades. According to this; numerical values ranging from 1 (very rare) to 5 (forming a very abundant or pure population) are given. The corresponding explanations for the figures are given below.

1. Very Rare
2. Rare
3. Intermediate Abundance
4. Abundant
5. Very abundant or producing pure population

Evaluation of Facility Area in Terms of International Contracts

Convention on the Conservation of European Wildlife and Natural Habitats (BERN)

The purpose of the Bern Convention; preservation of wild flora, fauna and their habitat, especially by international cooperation. Protected species of flora are given in

Table 12 BERN Convention Annex-1

Annex-1	Certainly protected flora types
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Species identified in the work carried out in the plant area are not on the Annex-1 list of the Bern Convention.

CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora

The CITES Convention is a convention on the international trade of endangered species of wild animals and plants. The wild animals and plant species, which are regulated at different levels of trade, are listed in three separate lists. Accordingly, from the additional lists,

- Annex 1 list includes the types of species face with extinction threat, therefore these the types of trade that are subject to stringent legislation and which must be allowed only in exceptional circumstances.
- Although the Annex-2 list generations are not certainly threatened with extinction, they include species that are linked to certain bases of trade in order to prevent incompatible uses for their continuity.
- The Annex-3 list covers all the types that any state parties are subject to regulation within their jurisdiction and that they need cooperation with other parties in the controlling of trade to prevent or restrict excessive use.

Flora studies carried out within the scope of the project did not reveal the plant species found in the CITES Convention annexes.

Diagnosis was made with the field studies carried out in and around the facility area. Literature surveys and previously conducted studies on the field and the publications of these studies have been reviewed and the species identified in the site area and in the immediate vicinity are given in the Flora list in **Table 13** and **Annex 4**. In this study, which phytogeographic region elements are species, endemism status, Red Data Book Hazard classes, habitats, and presence rates are given.

TÜBİVES (Turkish Plants Data Service) for the determination of species and "Turkish Plant Names Dictionary" for Turkish equivalents of plants are used. The species in the project area have been examined in accordance with the Bern Convention, which is the European Convention on the Conservation of European Wildlife and Natural Habitats.

Table 13 Types of Flora Detected in Facility Area

FAMILY	GENUS	SPECIES	Turkish Name	END	IUCN	CITES	BERN	Abundance					Habitat	FCB	Identification
								1	2	3	4	5			
APIACEAE	Scandix	Scandix iberica BIEB.	Atkışnek Otu							X			Step, oak or juniper bushes, grassy slopes, cultivated areas		L
	Scandix	Scandix australis								X			Granite, serpentine or limestone slopes, step, field and road sides		L,F
	Malabaila	Malabaila secacul	Koyun Ekmeği						X				Rocky slopes, cliffs, oak bottoms		L
ASTERACEAE	Senecio	Senecio vernalis WALDST. ET KIT.	Kanarya Otu							X			Sandy and empty fields, farm, rocky slope		L
	Anthemis	Anthemis cretica L.	Papatya						X				Limestone bushes, juniperus or cedrus		L
		Anthemis cotula L.	Köpek Papatyası					X					Pasture, roadside, empty area, sandy soil		L
	Jurinea	Jurinea consanguinea DC.							X				Step, fallow field, cultivated field, rocks,		L,F
	Crepis	Crepis alpina L.						X					Forest, basalt rock, slope, step		L
		Crepis sancta (L.) BABCOCK							X				Rocky volcanic slope, rocky limestone slope, artemisia -step, lush grassy slope		L
BRASSICACEAE	Sinapis	Sinapis arvensis L.	Hardal Otu						X				Road edge, free space		L,F
	Lepidium	Lepidium perfoliatum L.							X				Crop area, free space, Rocky slope		L
	Isatis	Isatis buschiana SCHISCHKIN							X				Dry bare field		L
	Alyssum	Alyssum strigosum BANKS ET SOL								X			Bad area		L

FAMILY	GENUS	SPECIES	Turkish Name	END	IUCN	CITES	BERN	Abundance					Habitat	FCB	Identification
								1	2	3	4	5			
CARYOPHYLLACEAE	Silene	Silene italica (L.) PERS.	Salkım Çiçeği						X				Open places, mostly open places of Pinus nigra		L,F
		Silene otites (L.) WIBEL	Sinek Kapan						X				Step, fields, sand dunes		L
CAMPANULACEAE	Campanula	Campanula phrygia JAUB. ET SPACH							X				Wet grassy places		L
	Asyneuma	Asyneuma rigidum (W							X				Forests, maki, step, rocky slopes		L
ELAEAGNACEAE	Elaeagnus	Elaeagnus angustifolia L.	İğde						X				Rivers and river banks (cultured in Turkey)		L,A
FABACEAE	Calicotome	Calicotome villosa	Keçiboğan						X				Scrub, in dry rocky terrain		L
	Anagyris	Anagyris foetida L.	Katırkuyruğu						X				Rocky slope and non-evergreen trees		L
	Genista	Genista albida WILLD.							X				Rocky, generally calcareous slopes, Pinus brutia forest		L
	Ononis	Ononis adenotricha BOISS.							X				Rocky slopes, oak shrubs, pine groves	East Mediterranean	L,F
	Trifolium	Trifolium angustifolium L.								X			Fallow fields, step, sandy places		L
		Trifolium purpureum LOIS.							X				Fields, stoned places, road edges		L
	Medicago	Medicago orbicularis (L.) BART.	Yonca							X			Heavy soils, rocky patches, cultivated and fallow fields		L
	Coronilla	Coronilla scorpioides (L.) KOCH							X				Sown and destroyed places		L
	Alhagi	Alhagi pseudalhagi (BIEB.) DESV	Deve Dikeni						X				Trench edges, barren		L

FAMILY	GENUS	SPECIES	Turkish Name	END	IUCN	CITES	BERN	Abundance					Habitat	FCB	Identification
								1	2	3	4	5			
LAMIALES	Sideritis	Sideritis montana L.	Dağ Çayı						X				Cultivated and fallow fields, step, arid slopes, quercus bushes, pinus forests, etc.	Mediterranean	L
	Melissa	Melissa officinalis L.	Oğul Otu							X			Open forests, shrubs, shrubs, rock slopes and crevices, creek borders, barren places, roads	Mediterranean	L,F
	Prunella	Prunella vulgaris L.							X				Fields, cores, roadsides and wet edges, streams	Europe-Siberia	L
	Micromeria	Micromeria myrtifolia BOISS. ET HOHEN.	Taş Nanesi						X				Rocky slopes and crevices (usually limestone), Pinus brutia forest clearance, maki, frig	East Mediterranean	L
	Salvia	Salvia pinnata L.	Adaçayı						X				Cereals and fallow fields, dry meadows	Mediterranean	L
		Salvia napifolia JACQ.	Adaçayı						X				Rocky hills, quercus coccifera maki, pottery firigana, road sides	East Mediterranean	L,F
	Stachys	Stachys lavandulifolia VAHL							X				Calcareous volcanic rock slopes and bushes	Iran - Turan	L
POACEAE	Brachypodium	Brachypodium sylvaticum							X				Forest slopes (pinus, abies, picea, fagus etc.) hazelnuts, calcareous slope and passage	Europe-Siberia	
	Aegilops	Aegilops speltoides TAUSCH								X			Oak foliage, rocky calcareous hills, plains, unfilled fields, corn fields edge		
		Aegilops speltoides TAUSCH							X				Oak foliage, plains, cultivated land side, coastal sand		

FAMILY	GENUS	SPECIES	Turkish Name	END	IUCN	CITES	BERN	Abundance					Habitat	FCB	Identification
								1	2	3	4	5			
	Hordeum	Hordeum geniculatum ALL.								X			Damp stream beds in the hills, mountain pastures, step, seashore, salt marsh road	Europe-Siberia	
	Taeniatherum	Taeniatherum caput-medusae							X				Step, grassy mountain slopes, stoned slopes, mountain shrubs, sandy plains		
	Arrhenatherum	Arrhenatherum palaestinum BOISS.							X				Limestone cliffs, volcanic cliffs, oak and dry grasses	East Mediterranean	
	Avena	Avena sativa L.								X			Cultivated land		
	Psilurus	Psilurus incurvus							X				Oak shrubs, stone slopes, fallow fields, dump sites		
	Brachiaria	Brachiaria eruciformis								X			Weeds, especially in shadows and moist		
	Piptatherum	Piptatherum coerulescens (DESF.) P. BEAUV.							X				Steep hills, limestone slopes, serpentine rocks (on rivers and slopes) oak and reddish grass		
PINACEAE	Pinus	Pinus nigra J. F. ARNOLD	Kara Çam					X					Forest		L,F
PAPAVERACEAE	Papaver	Papaver rhoeas L.	Gelincik						X				Field, empty space		L
	Fumaria	Fumaria cilicica HAUSSKN.						X					Free space, road edge		L
RANUNCULACEAE	Clematis	Clematis vitalba L.	Akasma					X					Shrub, forest		L
	Adonis	Adonis annua L.	Kanavcı Otu						X				Field	Mediterranean	L
	Ranunculus	Ranunculus arvensis L.							X				Cultivated land, cultivated field		L
RUTACEAE	Citrus	Citrus limon	Limon									X	Culture forms are cultivated		L,F
		Citrus sinensis	Portakal							X			Culture forms are cultivated		L,F
		Citrus reticulata	Mandalina							X			Culture forms		L,F

FAMILY	GENUS	SPECIES	Turkish Name	END	IUCN	CITES	BERN	Abundance					Habitat	FCB	Identification
								1	2	3	4	5			
													are cultivated		
MALVACEAE	Lavatera	Lavatera punctata ALL.	Pamuk Çiçeği						X				Seashore, fields, cliffs		L
	Malva	Malva nicaeensis ALL.								X			Fields near sea level		L,F
SCROPHULARIACEAE	Linaria	Linaria simplex (WILLD.) DC.							X				Sparse maquis, rocky and stone places, fallow fields		L
		Linaria genistifolia (L.) MILLER								X			Forests, bushes, shrubs, rocks, ground slopes, road edges		L,F
	Euphrasia	Euphrasia pectinata TEN.								X			Grove edges, stubble, alpine pastures		L,F

*END: Endemism

*Identification: F-Result of field study L-Result of literature research

Resources: Red Data Book Of Turkish Plants 'Türkiye Tabiatı Koruma Derneği ve Van 100. Yıl Üniversitesi 2000', Davis, P.H. Flora Of Turkey 1-8, Josef Donner Linz, Türkiye Bitkileri Veri Servisi <http://turkherb.ibu.edu.tr/index.php>, Türk Dil Kurumu Yayını 'Türkçe Bitki Adları Sözlüğü,

FAUNA

Extensive literature studies have been conducted besides the field study to determine the faunas of the facility area and the surrounding area. Fauna studies were studied under 4 classes:

Amphibia, Reptilia, Aves, Mamalia.

For the search of literature in the detection of amphibia, reptilia and mamalia; Professor Dr. Ali Demirsoy's Turkish Vertebrates, Amphibias-Reptiles-Mammals Volumes and The Basic Principles of Life Omurgalılar are used.

The Red Data Book categories were identified using the works of Turkish Vertebrates. In addition, 'IUCN Red List of the Threatened Species', the official website of IUCN has also used.

In the evaluation of the fauna species found in our country, while the Red Data Book categories of mammal, reptile and amphibian species were written, Prof. Dr. Ali Demirsoy's hazard classification was used. Together with the categories of IUCN and Demirsoy in order to provide comparability, the explanations are given in **Table 14** and **Table 15**.

Table 14 Red Data Book Categories for Protected Species According to IUCN

EX (Extinct)	A taxon that has been extinct
EW (Extinct in the wild)	A taxa that has disappeared in the wild
CR (Critically Endangered)	Critically endangered taxa
EN (Endangered)	Taxa is under threat
VU (Vulnerable)	A taxa with a high risk of extinction in the nature
NT (Near Threatened)	May get under threat
LC (Least concern)	Wide spread and high population taxa
DD (Data deficient)	Because there is not enough information, it is not possible to make an assessment of the risk of exhaustion by looking at the spread and population
NE (Not Evaluated)	Unrecognized taxon

Table 15 Equivalent Categories in IUCN Red Data Book for Species that are Under Protection According to Professor Dr. Ali Demirsoy

E(endangered)	In danger; the relative taxon is in danger of extinction; factors leading to the extinction.
Ex (extinct)	Exhausted; the relevant taxon no longer lives in the area mentioned or falls below the number that can be renewed.
I (in determinate)	Unknown; The status of taxa is unknown.

K (insufficient known)	Insufficient known; due to lack of knowledge, it is not known which category will be introduced.
nt	Common; abundant
O (out of danger)	It is not dangerous; species recovered by precautionary measures while in danger.
R (rare)	Rare; those who are in small populations are not at risk, but there is no specific observation that they are in danger, but they are
V (vulnerable)	Under threat; may be harmed; taxon's lineage is in danger. If the causative factors continue, the future can be exhausted.

Field observations are done for determination of the bird species in facility area and in the vicinity. In addition, R. F. Porter, S. Christensen, P. Schiermacker-Hansen used Birds of the Turkey and Middle East-Land Guide (2009) in the identification of bird species that are likely to be observable in this area. In addition to this, Prof. Dr. İlhami Kızıroğlu's Red List of Turkish Birds (2008) was used for determination of the hazard classes. Explanations are given below together with the hazard classes used.

İ. Explanation of Hazard Classes Used by İ. Kızıroğlu

Birds hatching in Turkey; in other words, birds belong the category 'A' are either full-year bird species and indigenous; or summer migratory species, i.e. migratory species that leave Turkey after the incubation.

A.1.0: Species that disappear certainly and are no longer seen in natural life.

A.1.1: The species which their natural populations are depleted, are continuing their lives with human support and protection.

A.1.2: Species whose population is very low in Turkey. They are the species that are absolutely necessary to be protected because the generations are under threat excessively.

A.2: Species under threat of extreme depletion.

A.3: Species that are susceptible to exhaustion and are at high risk of extinction in natural life.

A.3.1: Population of the species is decreasing compared to the old records.

A.4: Species that are locally reduced in their population and close to being under threat of extinction over time.

A.5: Species that do not have a threat of reducing and depletion in the populations of these species.

A.6: Species that have not been sufficiently explored and have no exact data about them.

A.7: It is not possible to make an assessment of these species at this time because the records of these species in Turkey are not fully healthy and safe.

The species in group 'B' are either winter visitors or transit immigrants. These species are also under threat of extreme depletion and will be subject to the group 'A' assessment. For the species in group 'B', therefore, the criteria in steps B.1.0 to B.7 are used.

Bern Convention

The Bern Convention, the Convention on the Conservation of European Wildlife and Natural Habitats was examined and the status of the fauna species given in the tables was specified according to this convention. According to this contract, protected species are mentioned. **Table 16** lists the annexes and explanations related to the fauna types of the Bern Convention.

Table 16 Bern Convention Annexes

Annex 2	Types of fauna that are under strict protection
Annex 3	Protected species of fauna

Central Hunting Commission Decisions

According to the decision of the Central Hunting Commission of the General Directorate of Nature Conservation and National Parks in 2013-2014 Hunting Period, the categories shown in **Table 17** are categorized:

Table 17 Central Hunting Commission Decisions Annex List (2013-2014)

Annex List -I	Wild animals protected by the Ministry
Annex List -II	Game animals protected by The Central Hunting Commission
Annex List -III	Game animals permitted by The Central Hunting Commission for hunting for a certain time

Species in the protection lists of the 2013-2014 Hunting Period prepared in line with the decisions of the Central Hunting Commission of the General Directorate of Nature Conservation and National Parks shall be in compliance with the protection measures stated in these commission decisions. During the construction phase, Central Hunting Commission's 2013-2014 decisions will be respected and illegal hunting will be prevented.

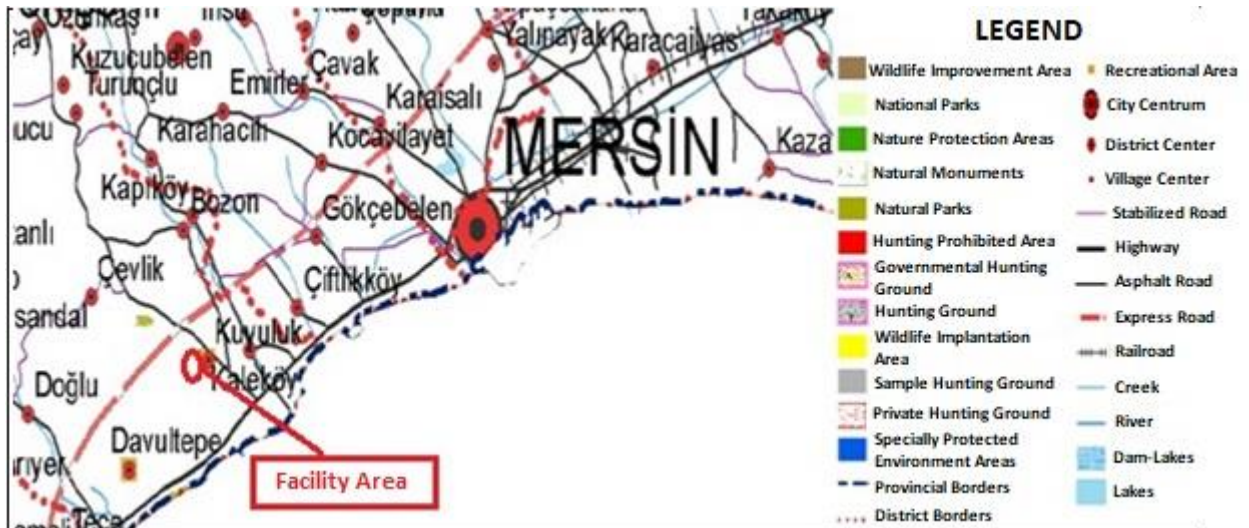


Figure 19 Project Area Centrak Hunt Map

The fauna species in the facility area and its vicinity are presented in **Table 18**, **Table 19**, **Table 20**, **Table 21** and **Annex 5**.

Table 18 Fauna Table (Amphibia)

Latin Name	Turkish Name	END	IUCN	CITES	BERN Convention	MAK (2013-2014)	Habitat	Identification
AMPHIBIA	İKİ YAŞAMLILAR							
Fam: BUFONIDAE								
Bufo viridis	Gece Kurbağası		nt	-	Annex -II	-	It is found in large area, under ground and under	L
Bufo bufo	Kara Kurbağası		nt	-	Annex -II	-	It is found in arid areas, under stone and soil.	L

Table 19 Fauna Table (Reptilia)

Latin Name	Turkish Name	END	IUCN	CITES	BERN Convention	MAK (2013-2014)	Habitat	Identification
REPTİLIA	SÜRÜNGENLER							
TESTUDİNİDAE	TOSBAĞAGİLLER							
Testudo graeca	Tosbağa		nt	Annex-2	Annex -II	Annex List-I	Sandy, stony, dry land, sometimes in vineyards and	L
SCINCIDAE	KELERLER							
Mabuya vittata	Şeritli Kertenkele		nt	-	-	Annex List-I	Open land, under bushes.	L
LACERTİDAE	KERTENKELELER							
Lacerta trilineata	Büyük Yeşil Kertenkele		nt	-	-	Annex List-I	In open field, bushes, in vineyards and gardens.	L
Ophisops elegans basoglui	Tarla Kertenkelesi		nt	-	-	Annex List-I	They live in steps, vineyards and agricultural lands in gardens.	L
TYPHLOPIDAE	KÖR YILANLAR							
Typhlops vermiculas	Kör Yılan		nt	-	-	-	They live in moist, soft soil.	L
COLUBRİDAE	YILANLAR							
Eirenis modestus	Uysal yılan		nt	-	-	Annex List I	In the sparse areas of vegetation, in the gardens.	L
Coluber caspius	Hazer Yılanı		nt	-	-	Annex List I	The edges of the stream	L
Coluber najadum	Ok Yılanı		nt	-	-	Annex List I	They are found in stony area, bushes, vineyards and gardens.	L

Table 20 Fauna Table (Aves)

Latin Name	Turkish Name	RED DATA BOOK (i.KIZIROĞLU)	CITES	IUCN	END	BERN Convention	M.A.K	Identification
AVES	KUŞLAR							
CICONIIDAE	LEYLEKGİLLER							
Ciconia ciconia	Ak Leylek	A.3.1	-	LC	-	Annex -II	Annex List I	O
ACCIPITRIDAE	YIRTICIKUŞLAR							
Accipiter nisus	Atmaca	A.3	EK-2	LC	-	Annex -II	Annex List I	L
Falco tinnunculus	Kerkenez	A.2	EK-2	LC	-	Annex -II	Annex List I	L
Buteo rufinus	Kızıl Şahin	A.3	EK-2	LC	-	Annex -II	Annex List I	L
LARIDAE	MARTILAR							
Larus melanocephalus	Gümüş Martı	A.4	-	LC	-	Annex -II	Annex List I	L
CUCULIDAE	GUGUK KUŞUGİLLER							
Cuculus canorus	Guguk	A.2	-	LC	-	Annex -II	Annex List I	L
MEROPIDAE	ARIKUŞUGİLLER							
Merops apiaster	Arı Kuşu	A.3.1	-	LC	-	Annex -II	Annex List II	L
PHASIANIDAE	TAVUKSULAR							
Alectoris chukar	Kıvalı Keklik	A.2	-	LC	-	Annex -III	Annex List III	L
Coturnix coturnix	Bıldırcın	A.3	-	LC	-	Annex -III	Annex List III	L
BURHINIDAE	KOCAGÖZGİLLER							
Burhus oedicephalus	Kocagöz	A.2	-	LC	-	Annex -II	Annex List I	L
APODIDAE	EBABİLGİLLER							
Apus apus	Ebabil	A.3.1	-	LC	-	Annex -II	Annex List I	L
COLUMBIDAE	GÜVERCİNGİLLER							
Columba palumbus	Tahtalı Güvercin	A.4	-	LC	-	Annex -II	Annex List III	O
Streptopelia decaocta	Kumru	A.5	-	LC	-	Annex -II	Annex List II	O
Streptopelia turtur	Üveyik	A.3.1	-	LC	-	Annex -II	Annex List III	L
SITTIDAE	SIVACIKUŞUGİLLER							
Sitta europea	Sıvacıkuşu	A.3	-	LC	-	Annex -II	Annex List I	L
ALAUDIDAE	TARLAKUŞUGİLLER							
Glerida cristata	Tepeli Toygar	A.3	-	LC	-	Annex -II	Annex List II	L
Lullula arborea	Orman Toygarı	A.3	-	LC	-	Annex -II	Annex List I	L
STRIGIDAE	BAYKUŞGİLLER							
Athene noctua	Kukumav	A.2	EK-2	LC	-	Annex -II	Annex List I	L
PICIDAE	AĞAÇKAKANGİLLER							
Dendrocopos syriacus	Alaca Ağaçkakan	A.2	-	LC	-	Annex -II	Annex List I	L
HIRUNDINIDAE	KIRLANGIÇGİLLER							
Hirundo rustica	Kır Kırlangıcı	A.5	-	LC	-	Annex -II	Annex List I	O
Ptyonoprogne rupestris	Kaya Kırlangıcı	A.5	-	LC	-	Annex -II	Annex List I	L

Latin Name	Turkish Name	RED DATA BOOK (i.KIZIROĞLU)	CITES	IUCN	END	BERN Convention	M.A.K	Identification
AVES	KUŞLAR							
Delichon urbica	Ev Kırangıcı	A.3	-	LC	-	Annex -II	Annex List I	O
MOTACHILLIDAE	KUYRUKSALLAYANGI							
Motacilla flava	Sarı Kuyruksallayan	A.3.1	-	LC	-	Annex -II	Annex List I	O
CORVIDAE	KARGAGİLLER							
Pica pica	Saksağan	A.5	-	LC	-	Annex -II	Annex List III	O
Corvus corone	Gri Leş Kargası	A.5	-	LC	-	Annex -II	Annex List III	L
STURNIDAE	SIĞIRCIKİLLER							
Sturnus vulgaris	Siğircik	A.5	-	LC	-	Annex -III	Annex List II	L
PASSERIDAE	SERÇEGİLLER							
Passer montanus	Ağaç Serçesi	A.3	-	LC	-	Annex -II	Annex List III	O
Passer hispaniolensis	Söğüt Serçesi	A.3	-	LC	-	Annex -II	Annex List III	L
Passer domesticus	Serçe	A.5	-	LC	-	Annex -III	Annex List III	O
EMBERIZIDAE	KIRAZKUŞUGİLLER							
Emberiza hortulana	Kirazkuşu	A.3	-	LC	-	Annex -II	Annex List II	L
Emberiza melanocephala	Karabaşlı Kirazkuşu	A.4	-	LC	-	Annex -II	Annex List I	L
Miliaria calandra	Tarla Kirazkuşu	A.4	-	LC	-	Annex -II	Annex List II	L
TURDIDAE	ARDIÇKUŞUGİLLER							
Turdus philomelos	Öter Ardiç	A.2	-	LC	-	Annex -II	Annex List II	L
Oenanthe oenanthe	Kuyrukkakan	A.3	-	LC	-	Annex -II	Annex List I	L
Oenanthe hispanica	Karakulaklı	A.2	-	LC	-	Annex -II	Annex List I	L
Luscinia megarhynchos	Bülbül	A.2	-	LC	-	Annex -II	Annex List I	O
SYLVIDAE	ÖTLEĞENGİLLER							
Regulus regulus	Çalikuşu	A.1.2	-	LC	-	Annex -II	Annex List I	L
Phylloscopus collybita	Çıvgın	A.3.1	-	LC	-	Annex -II	Annex List I	L
Phylloscopus trochilus	Söğütbülbülü	A.3.1	-	LC	-	Annex -II	Annex List I	L
PARIDAE	BAŞTANKARAGİLLER							
Parus major	Büyük Baştankara	A.3.1	-	LC	-	Annex -II	Annex List I	L
LANIIDAE	ÖRÜMCEKKUŞUGİLLER							
Lanius minor	Karaalınlı	A.3	-	LC	-	Annex -II	Annex List I	L
Lanius senator	Kızbaşı Örümcekkuşu	A.2	-	LC	-	Annex -II	Annex List I	L
PYCNONOTIDAE	GRI BÜLBÜLGİLLER							
Pycnonotus xanthopygos	Arap Bülbülü	A.2	-	LC	-	Annex -II	Annex List I	O
FRINGILLIDAE	İSPİNOZGİLLER							
Fringilla coelebs	İspinoz	A.4	-	LC	-	Annex -II	Annex List I	L
Carduelis chloris	Florya	A.3	-	LC	-	Annex -II	Annex List I	L
Carduelis carduelis	Saka	A.3	-	LC	-	Annex -II	Annex List I	L

Table 21 Fauna Table (Mamalia)

Latin Name	Turkish Name	END	IUCN	CITES	BERN Convention	MAK(2013-2014)	Habitat	Identification
MAMALIA	MEMELİLER							
ERLNAELDAE	KİRPİLER							
Erinaceus concolor	Kirpi	-	nt	-	Annex -III	Annex List I	Shrubs and bushes	L
CROCIDURINAE	SİVRİ FARELER							
Crocidura leucodon	Sivri Burunlu Tarla	-	nt	-	-	-	Open and bush land	L
RHINOLOPHIDAE	NALBURUNLU							
Rhinolophus ferrumequinum	Büyük Nalburunlu	-	V		Annex -III	Annex List I	Forest, woodland and bush	L
Rhinolophus hipposideris	Küçük Nalburunlu	-	V	-	Annex -III	Annex List I	Forest, woodland and bush	L
VESPERTIOLINIDAE	DÜZBURUN							
Pipistrellus pipistrellus	Cüce Yarasa	-	V	-	Annex -II	-	Forest, open land, culture areas, parks	L
LEPORIDAE	TAVŞANLAR							
Lepus europaeus	Yabani Tavşan	-	nt	-	Annex -III	Annex List III	In all kinds of environments	L
CRICETIDAE	HAMSTERLAR							
Microtus nivalis	Kar Faresi	-	nt	-	Annex -III	-	Grasslands.	L
SCIURIDAE	SİNCAPLAR							
Citellus xanthophrymnus	Tarla Sincabı	-	nt	-	Annex -III	Annex List I	Forest, fruit farms where the trees are abundant	L
MURIDAE	FARELER +							
Rattus rattus	Ev Sıçanı	-	nt	-	-	-	Soft soil areas, in the galleries	L
Mus musculus	Doğu Faresi	-	nt	-	-	-	It lives in farms and open spaces	L
Apodemus sylvaticus	Orman Faresi	-	nt	-	-	-	Near the settlements where edge of forests	L
CANIDEA	KURTLAR+KÖPEKLE							
Canis familiaris	Evcil Köpek	-	nt	-	-	-	They live in all areas suitable for them.	O

*END : Endemic

*MAK : Central Hunting Commission Decisions (2013-2014)

* Identification: O: Observation L: Literature

In the tables given above, the possible types of birds, mammals, reptiles and amphibians found in the site area are given according to various conventions as well as the IUCN categories.

According to Ali Demirsoy, other species, other than a bat species of mammalian, reptile and amphibian species, they are in the "nt" category. The "nt" category is used for abundant and non-endangered species commonly found in our country. Rhinolophus hipposideros, Rhinolophus ferrumequinum and Pipistrellus pipistrellus among the mammal species are classified according to IUCN as "LC" (least concern) and according to Demirsoy "V" (under threat, damage can be seen) category. Rhinolophus hipposideros, Rhinolophus ferrumequinum and Pipistrellus pipistrellus, which are likely to be found on the site, are located in forested areas, in rural areas and near water sides. Winter shelters are caves as well as tree caves and in summers are they mostly found under the roofs. There are a variety of alternative habitats suitable for the specie in the vicinity and there is not a habitat destruction. During the construction phase, species are expected to move to similar wooded areas in the vicinity and habitats in nearby villages. Once the construction phase is completed, it is expected that the old habitats will be re-spread.

Because the species that are detected during the construction phase are moving forms, they can be moved away from the environment due to reasons such as noise and they can move to existing alternative habitats in the nearby environment. Once the construction phase is completed, the species are expected to return to their former habitat. Therefore, it is not foreseen that the generations of the species will be in danger during the construction phase and after the construction is completed.

Possible Impacts and Measures

The flora and fauna species determined within the scope of the project are generally species with wide spreads in our country. Endemic species that are likely to be in the area are in the LC category, and in the near future it is not expected that their generation will be in danger. As a result, it is not foreseen that flora fauna species in the area will be affected in the negative from the project.

Effects on vegetation cover;

- Complete loss of vegetation cover in the construction site (in areas where permanent structures exist)
- Deterioration of vegetation cover due to roads and other small structures
- Vegetation deterioration due to emissions and discharges released during construction

Possible effects on wildlife;

- Loss of living space,
- Deterioration of living spaces,
- Effects of noise, emissions and discharges on wildlife.

The measures to be taken to prevent or minimize these effects are given below;

- Access to the facility area will be made on the existing roads as far as possible.
- Temporary roads during construction will be as narrow and short as possible.
- It will be ensured that going to the natural areas outside the facility area are banned or as low as possible.
- = The work area will be regularly irrigated to prevent dust emissions due to work and operations. The roads to be used will be irrigated regularly in order to prevent dusting during the transportation of the excavation, and the excavation soil will be dampened during excavation. This type of dust will be tried to be minimized.
- If it is deemed necessary in the incubation / reproduction period of the construction season, it will be taken care to reduce the noise to minimum.
- Workers who will work during construction and operation will be trained and illegal hunting will be prevented.
- = Wherever possible, people will move within the facility area and transportation routes and will be prevented from going out of the defined routes.

Species listed in 2013-2014 Hunting Period protection lists which are prepared by Nature Conservation and National Parks General Directorate Central Hunting Commission, will be protected in accordance with the decided protection measures. Within the scope of the project, the provisions of the Land Hunting Law No. 4915 dated 01.07.2003 and the "Regulation on the Procedures and Principles for the Detection, Registration and Approval of Protected Areas" shall be complied with. The provisions of the BERN Convention and the CITES Convention will also be respected.

III.6 Meteorological and Climatic Characteristics (General Climate Conditions of the Region, Pressure Distribution of the Region, (Drawing of the Graph), Temperature Distribution of the Region, (Drawing of the Graph), Moisture Distribution of the Zone (Drawing of the Graph) Evaporation State of the Region (Drawing of the Graph), Distribution of Number of Days in the Region (Foggy, Snowy, Snow Covered, Maximum Snow Cover Thickness), Wind Distribution in the Region (Annual, Seasonal, Monthly Wind Direction Distribution, Wind Speed by Directions, Monthly Average Wind Speed Distribution, Fastest Winding Wind Direction and Speed, Stormy and Strong Windy Day), Largest Rainfall Values Observed in Standard Times, Reported as an Updated and Long Years Value of Meteorological Data)

General Climate Conditions

Mediterranean climate prevails in Mersin. As you go inward from the coast, the continental climate will begin dominant. In coast, climate is warm and dry in summer, warm and rainy in winter, in high altitudes, climate is cool and dry in summer and cold and snowy in the winter. The Long Years Bulletin (1960-1912) belonging to Mersin Meteorology Station has been used in the project (**See Appendix 6**).

Pressure

i. **Average Pressure:** According to the observation records of Mersin Meteorology Station, the annual average pressure is 1.012,2 hPa (**see Table 22 and Figure 20**).

ii. **Maximum Pressure:** According to Mersin Meteorology Station observation records, the maximum pressure measured was realized in January with 1.033,8 hPa (**See Table 22 and Figure 20**).

iii. **Minimum Pressure:** The minimum pressure measured according to Mersin Meteorological Station observation records was realized in December with 990,1 hPa (**see Table 22 and Figure 20**).

Table 22 Mersin Meteorology Stations Pressure Values

Pressure	Average Pressure (hPa)	Maximum Pressure (hPa)	Minimum Pressure (hPa)
January	1.017,4	1.033,8	993,8
February	1.015,7	1.032,3	993,3
March	1.013,9	1.030,6	990,6
April	1.011,8	1.025,6	991,7
May	1.010,9	1.021,9	998,0
June	1.008,1	1.016,9	996,9
July	1.004,9	1.011,6	995,5
August	1.005,7	1.011,9	998,6
September	1.009,9	1.020,5	1.001,6
October	1.013,9	1.024,5	1.002,4
November	1.016,9	1.029,3	995,4
December	1.017,6	1.031,8	990,1
Annual	1.012,2	1.033,8	990,1

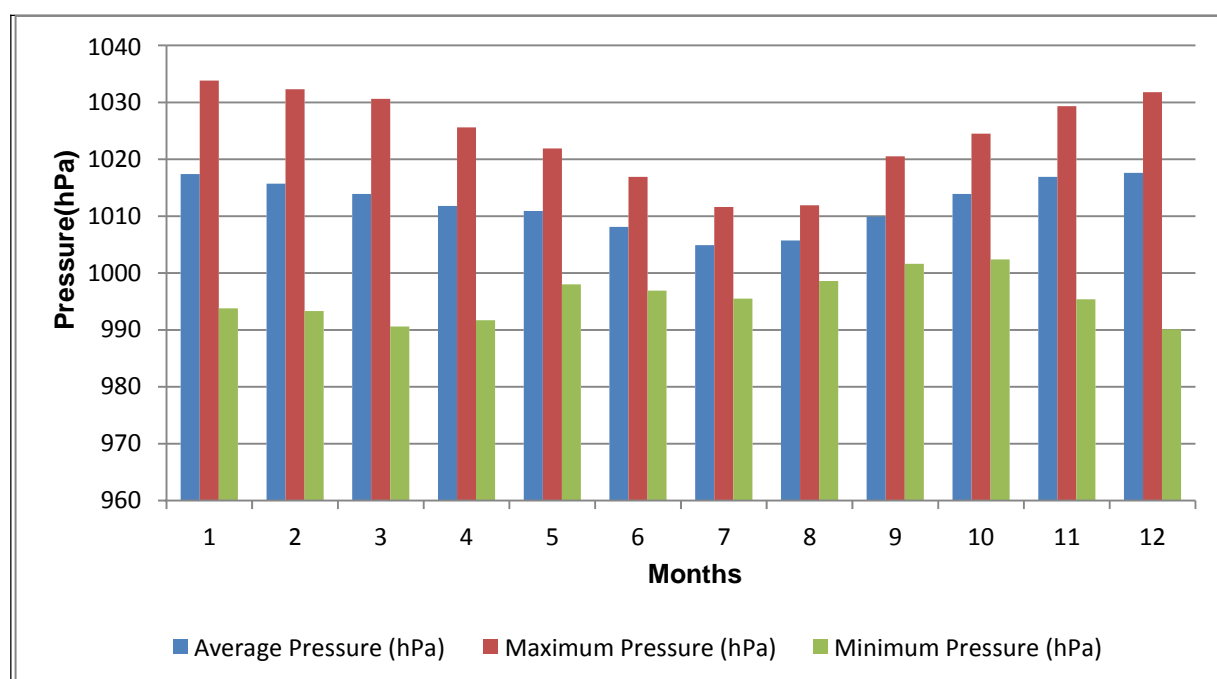


Figure 20 Mersin Meteorological Stations Pressure Graph

Temperature

i. **Average Temperature:** According to Mersin Meteorology Station observation records, the average annual temperature is 19.10°C (see Table 23 and Figure 21).

ii. **Maximum Temperature:** According to observation records of Mersin Meteorology Station, the maximum temperature was measured as 39.8°C on 26 August 1962 (See Table 23 and Figure 21).

iii. **Minimum Temperature:** According to observations records of Mersin Meteorology Station, the minimum temperature was measured as -6.30 C on 20 January 1964 (See Table 23 and Figure 21).

Table 23 Mersin Meteorology Station Temperature Values

Temperature	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Average Temperature (°C)	10,2	10,9	13,7	17,5	21,4	25,2	27,9	28,3	25,5	21,2	15,7	11,7	19,1
Average of Maximum Temperatures (°C)	14,8	15,5	18,2	21,5	24,8	28,1	30,7	31,4	30	26,8	21,5	16,5	-
Average of Minimum Temperatures (°C)	6,3	6,8	9,3	13	16,8	20,8	24	24,2	20,9	16,5	11,4	7,9	-
Extreme Maximum Temperature (°C)	25,2	26,5	29,8	34,7	35,8	38,2	37,3	39,8	38,5	36,4	31	27	39,8
Extreme Maximum Temperature Day	8	16	24	13	7	4	19	26	30	9	2	4	8
Extreme Maximum Temperature Year	1971	1960	2008	1970	2007	1969	2012	1962	1999	1994	1966	2010	1978
Extreme Minimum Temperature (°C)	-6,3	-3,6	-2,2	0,6	7	5,3	16,1	15	11	2,7	-0,8	-3	-6,3
Extreme Minimum Temperature Day	20	13	8	4	1	4	7	25	25	29	23	26	3
Extreme Minimum Temperature Year	1964	1971	1963	1965	1964	1976	1966	1960	1961	1965	1961	1972	1985

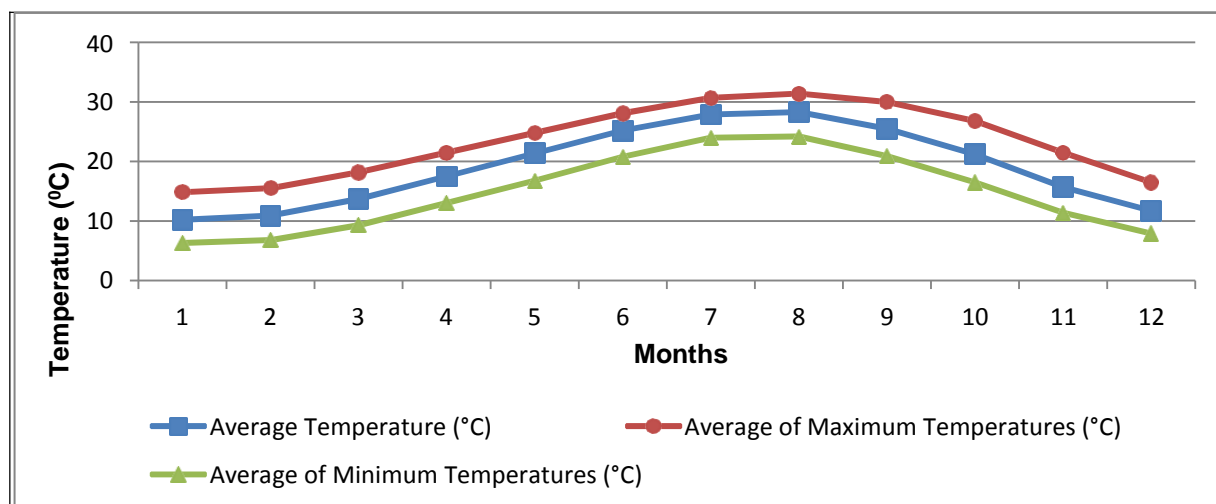


Figure 21 Mersin Meteorology Stations Temperature Graph

Precipitation

i. **Total Average Precipitation:** According to Mersin Meteorological Station observation records, the annual average total precipitation amount was 594.7 mm (**See Table 24 and Figure 22**).

ii. **Daily Maximum Precipitation Amount:** According to observation records of Mersin Meteorology Station, the maximum daily precipitation amount was 199.5 mm in December (**See Table 24 and Figure 22**).

Table 24 . Mersin Meteorology Station Precipitation Values

Precipitation	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Total Average Precipitation (mm)	109,8	83,5	55,3	36	22,5	8,5	7,9	4	7,2	39,4	80,2	140,4	594,7

Precipitation	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Maximum Precipitation (mm)	109	102	80,8	48,9	49,4	29,7	58,8	30,3	41,2	50,1	99,6	199,5	199,5

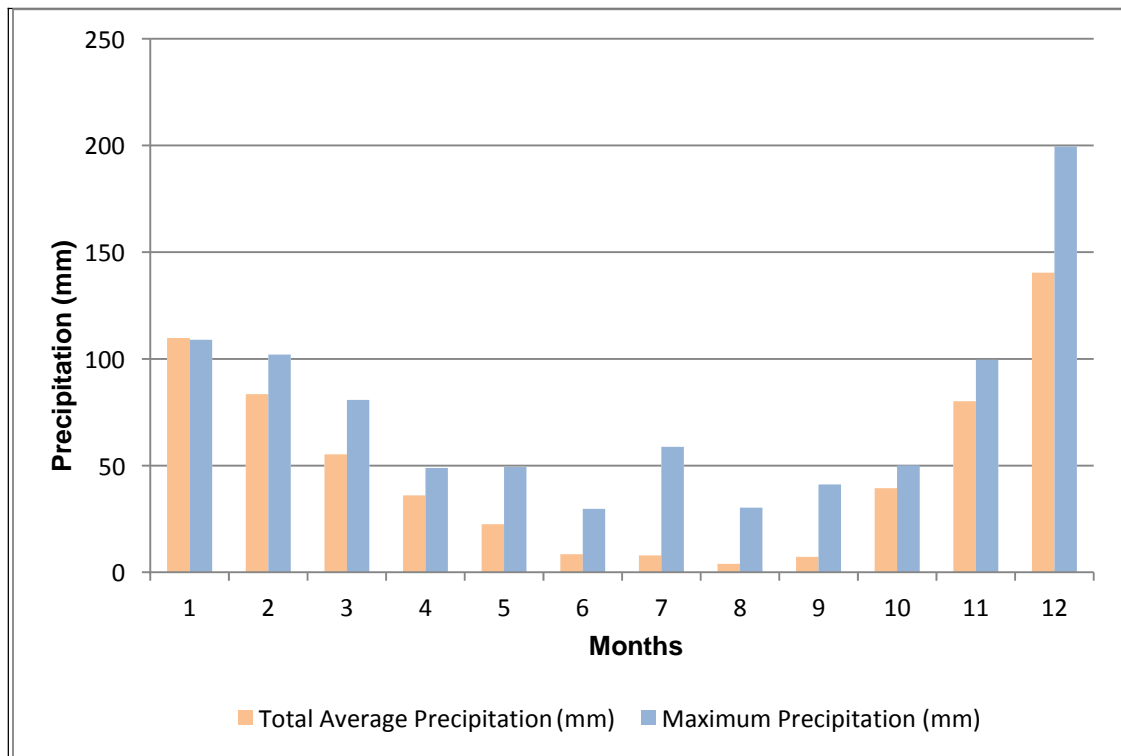


Figure 22 Mersin Meteorology Stations Precipitation Graph

Humidity Distrubition

According to Mersin meteorological station observation records, annual average relative humidity is 70,2% and minimum humidity is 10% **(See Table 25 and Figure 23).**

Table 25 Mersin Meteorology Stations Average Humidity Values

Humidity	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Average Humidity(%)	67,6	68,6	70	72,4	73,7	74,7	75,9	73,9	68	64,7	65,4	68	70,2
Minimum Humidity (%)	10	13	14	13	16	16	25	20	12	11	12	13	10

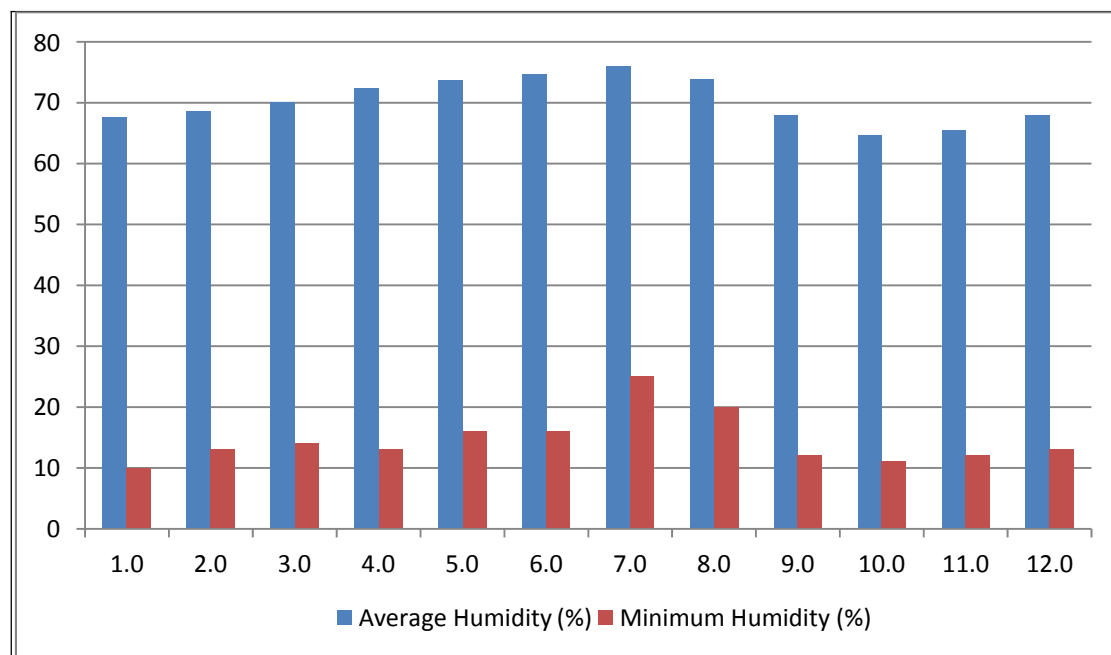


Figure 23 Mersin Meteorology Stations Average Humidity Graph

Evaporation

Average Open Surface Evaporation: Mersin According to Mersin Meteorology Station observation records, annual average surface evaporation is 1,198.6 mm. The highest monthly average open surface evaporation occurred in July with 173.8 mm (**See Table 26 and Figure 24**).

i. **Daily Highest Open Surface Evaporation:** According to Mersin Meteorology Station observation records, the highest daily surface evaporation was observed in September with 13,2 mm (**See Table 26 and Figure 24**).

Table 26 Mersin Meteorology Stations Evaporation Values

Evaporation	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Average Total Surface Area Evaporation (mm)	39,6	45,3	71	91,1	124,5	153,9	173,8	165,4	137,3	99,6	58	39,1	1.198,6
Daily Maximum Open Surface Evaporation (mm)	5	8,8	6,6	8	10,6	12,4	12	10,3	13,2	8,6	6,1	6	13,2

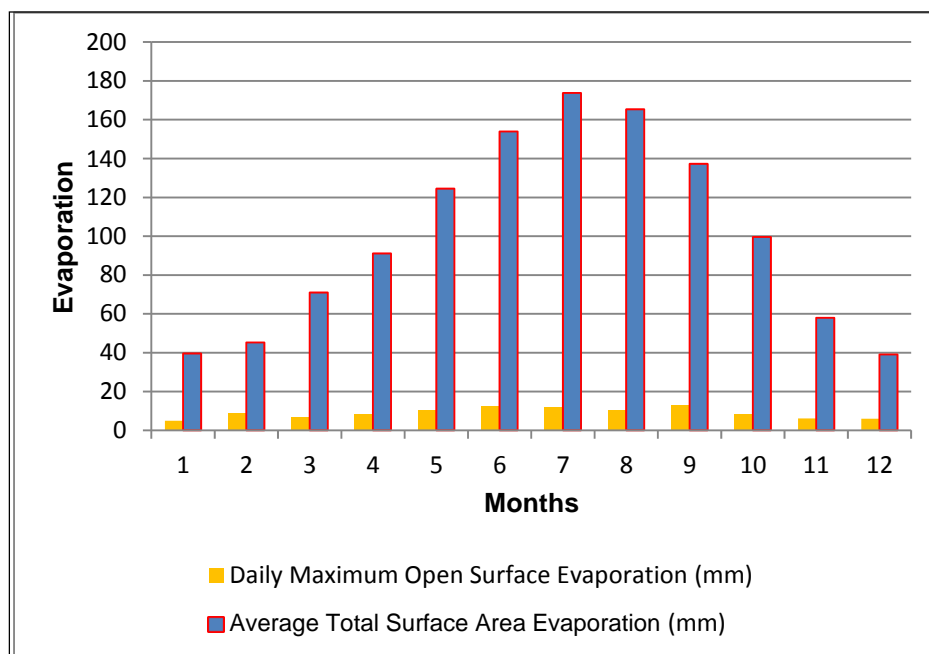


Figure 24 Mersin Meteorology Stations Evaporation Graph

Number of Days

i. **Number of Snowy Days:** According to the observations records of Mersin Meteorology Station, the average number of snowy days per year is 0,3 (See Table 27 and Figure 25).

ii. **Number of Days Covered by Snow:** There are no data on the average number of days covered with snow in Mersin Meteorology Station observation records (See Table 27 and Figure 25).

iii. **Number of Foggy Days:** According to the observation records of Mersin Meteorology Station, the average number of foggy days per year is 1,7 (See Table 27 and Figure 25).

iv. **Average Number of Days with Hail:** According to the observation records of Mersin Meteorology Station, the average number of days with hail is 1.5 (See Table 27 and Figure 25).

v. **Average Number of Days with Hoarfrost:** According to the observation records of Mersin Meteorology Station, the average number of days with hoarfrost is 7.7 (see Table 27 and Figure 25).

vi. **Average Number of Days with Thunderstorm:** According to observation records of Mersin Meteorology Station, the average number of days with thunderstorm is 32.3 (See Table 27 and Figure 25).

Table 27 Mersin Meteorology Stations Number of Days Table

Number of Days	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Number of Snowy Days	0,2	0,1	0	-	-	-	-	-	-	-	-	-	0,3
Number of Days Covered by Snow	-	-	-	-	-	-	-	-	-	-	-	-	-
Number of Foggy Days	0,1	0,1	0,2	0,5	0,4	0,2	0,1	0	0	0	0,1	0	1,7
Number of Days with Hail	0,2	0,3	0,2	0,1	0,1	0	-	0	-	0,2	0,1	0,3	1,5
Number of Days with Hoarfrost	3,5	2,1	0,4	-	-	-	-	-	-	-	0,2	1,5	7,7
Number of Days with Thunderstorm	2,3	2,6	2,9	3,2	3,2	2,2	0,9	1	2,3	4,9	3,3	3,5	32,3

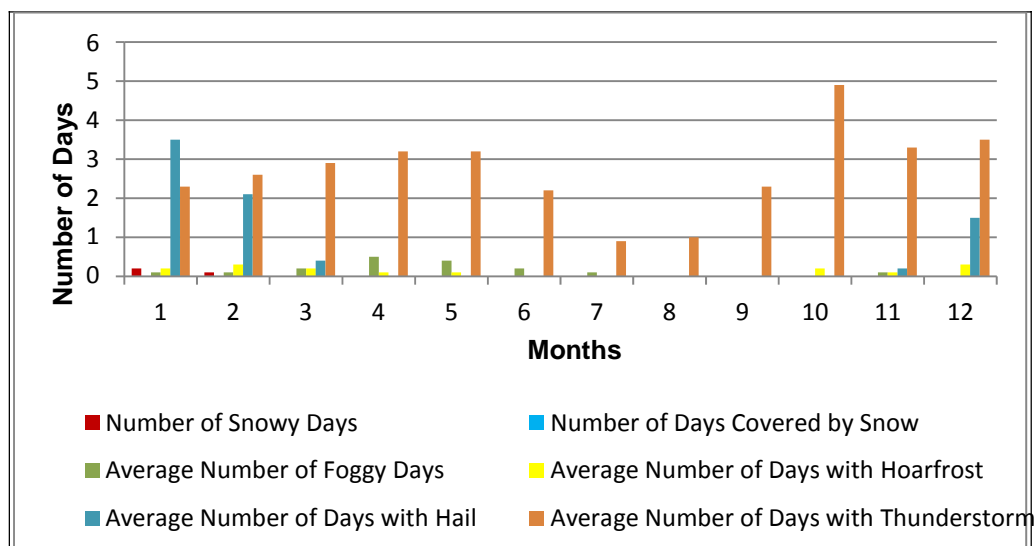


Figure 25 Mersin Meteorology Station Number of Days Graph

According to Mersin Meteorology Station data, there is not any data about maximum snow thickness between 1960-2012.

Wind

a. Annual, Seasonal, Monthly Wind Direction

Number of Winds by Direction: According to the observation records of Mersin Meteorology Station, the total wind numbers of winds are given in **Table 28**.

Table 28 Mersin Meteorology Station Number of Winds by Direction

Direction	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
N	5.827	4.615	4.394	3.830	3.166	2.338	2.323	2.963	4.443	5.219	5.503	6049	50.670
NNE	6.211	4.521	3.817	3.329	2.918	2.856	2.679	2.747	2.860	3.449	4.396	5827	45.610
NE	3.762	3.242	2.586	2.137	2.259	1.975	1.906	1.571	1.378	1.715	2.365	3739	28.635
ENE	2.587	2.317	1.740	1.491	1.439	1.361	1.132	823	762	1.287	1.833	2342	19.114
E	1.306	1.142	994	936	925	796	656	496	455	661	860	1155	10.382
ESE	1.777	1.885	1.953	1.699	1.897	1.874	1.826	1.549	1.442	1.661	1.657	1641	20.861
SE	1.004	1.141	1.388	1.193	1.249	1.463	1.620	1.240	1.048	1.032	1.028	764	14.170
SSE	725	1.113	1.647	1.750	2.203	2.865	3.336	2.795	1.957	1.527	999	687	21.604
S	608	900	1.684	2.051	2.771	3.488	4.378	3.468	2.475	1.646	856	470	24.795
SSW	768	1.217	2.635	3.844	5.283	6.135	7.241	7.250	4.975	2.694	1.191	633	43.866
SW	519	843	2.227	3.244	4.306	4.553	4.576	4.538	3.453	2.448	1.131	497	32.335
WSW	662	1.010	1.996	2.213	2.374	1.779	1.404	1.811	2.047	1.946	1.091	590	18.923
W	343	477	798	820	818	613	574	805	928	896	584	342	7.998
WNW	1.424	1.445	1.600	1.365	1.102	739	647	902	1.289	1.559	1.541	1366	14.979
NW	3.628	3.525	3.402	2.741	1.924	1.261	1.219	1.653	2.520	3.794	4.017	3974	33.658
NNW	7.956	6.428	6.250	5.156	4.396	3.760	3.509	4.241	5.752	7.454	8.399	8937	72.238

According to observations of Mersin Meteorology Station, the dominant wind direction is NNW (North North West) firstly, N (North) is the dominant wind direction secondly and NNE (North North East) is the dominant wind direction at the third level. (See Figure 26).

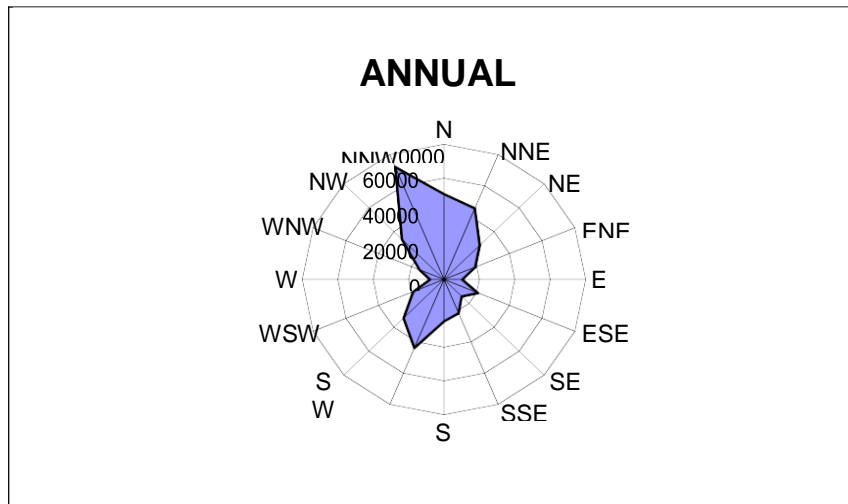


Figure 26 Mersin Meteorology Station Annual Wind Chart According to Wind Numbers

Table 29 Mersin Meteorology Station Number of Winds in Spring and Summer

Spring	March	April	May	Seasonal	Summer	June	July	August	Seasonal
N	4.394	3.830	3.166	11.390	N	2.338	2.323	2.963	7.624
NNE	3.817	3.329	2.918	10.064	NNE	2.856	2.679	2.747	8.282
NE	2.586	2.137	2.259	6.982	NE	1.975	1.906	1.571	5.452
ENE	1.740	1.491	1.439	4.670	ENE	1.361	1.132	823	3.316
E	994	936	925	2.855	E	796	656	496	1.948
ESE	1.953	1.699	1.897	5.549	ESE	1.874	1.826	1.549	5.249
SE	1.388	1.193	1.249	3.830	SE	1.463	1.620	1.240	4.323
SSE	1.647	1.750	2.203	5.600	SSE	2.865	3.336	2.795	8.996
S	1.684	2.051	2.771	6.506	S	3.488	4.378	3.468	11.334
SSW	2.635	3.844	5.283	11.762	SSW	6.135	7.241	7.250	20.626
SW	2.227	3.244	4.306	9.777	SW	4.553	4.576	4.538	13.667
WSW	1.996	2.213	2.374	6.583	WSW	1.779	1.404	1.811	4.994
W	798	820	818	2.436	W	613	574	805	1.992
WNW	1.600	1.365	1.102	4.067	WNW	739	647	902	2.288
NW	3.402	2.741	1.924	8.067	NW	1.261	1.219	1.653	4.133
NNW	6.250	5.156	4.396	15.802	NNW	3.760	3.509	4.241	11.510

Table 30 Mersin Meteorology Station Number of Winds in Autumn and Winter

Autumn	September	October	November	Seasonal	Winter	December	January	February	Seasonal
N	4.443	5.219	5.503	15.165	N	6049	5.827	4.615	16.491
NNE	2.860	3.449	4.396	10.705	NNE	5827	6.211	4.521	16.559
NE	1.378	1.715	2.365	5.458	NE	3739	3.762	3.242	10.743
ENE	762	1.287	1.833	3.882	ENE	2342	2.587	2.317	7.246
E	455	661	860	1.976	E	1155	1.306	1.142	3.603
ESE	1.442	1.661	1.657	4.760	ESE	1641	1.777	1.885	5.303

Autum	September	October	November	Seasonal	Winter	December	January	February	Seasonal
SSE	1.957	1.527	999	4.483	SSE	687	725	1.113	2.525
S	2.475	1.646	856	4.977	S	470	608	900	1.978
SSW	4.975	2.694	1.191	8.860	SSW	633	768	1.217	2.618
SW	3.453	2.448	1.131	7.032	SW	497	519	843	1.859
WSW	2.047	1.946	1.091	5.084	WSW	590	662	1.010	2.262
W	928	896	584	2.408	W	342	343	477	1.162
WNW	1.289	1.559	1.541	4.389	WNW	1366	1.424	1.445	4.235
NW	2.520	3.794	4.017	10.331	NW	3974	3.628	3.525	11.127
NNW	5.752	7.454	8.399	21.605	NNW	8937	7.956	6.428	23.321

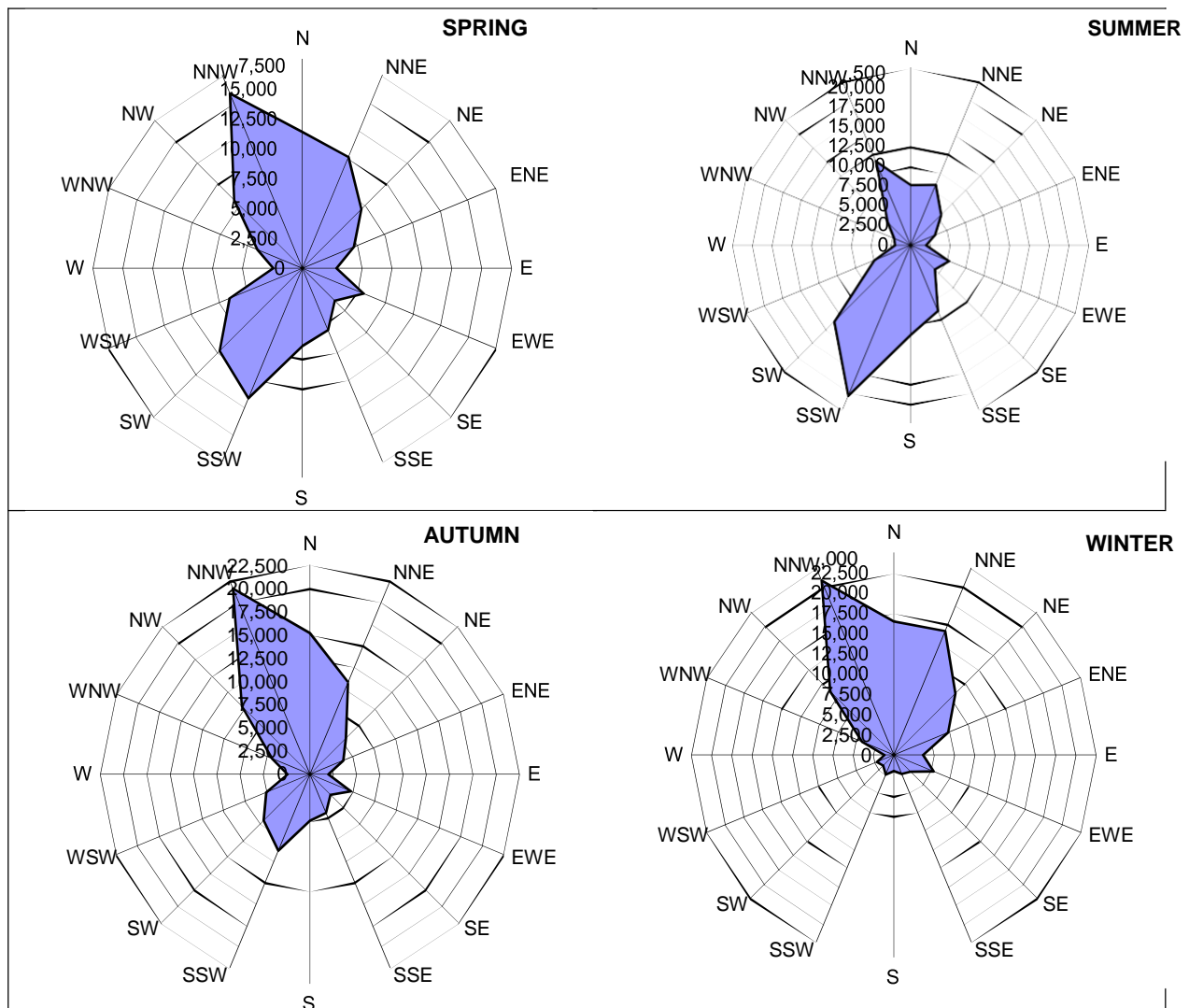


Figure 27 Mersin Meteorology Station Seasonal Wind Chart According to Wind Numbers

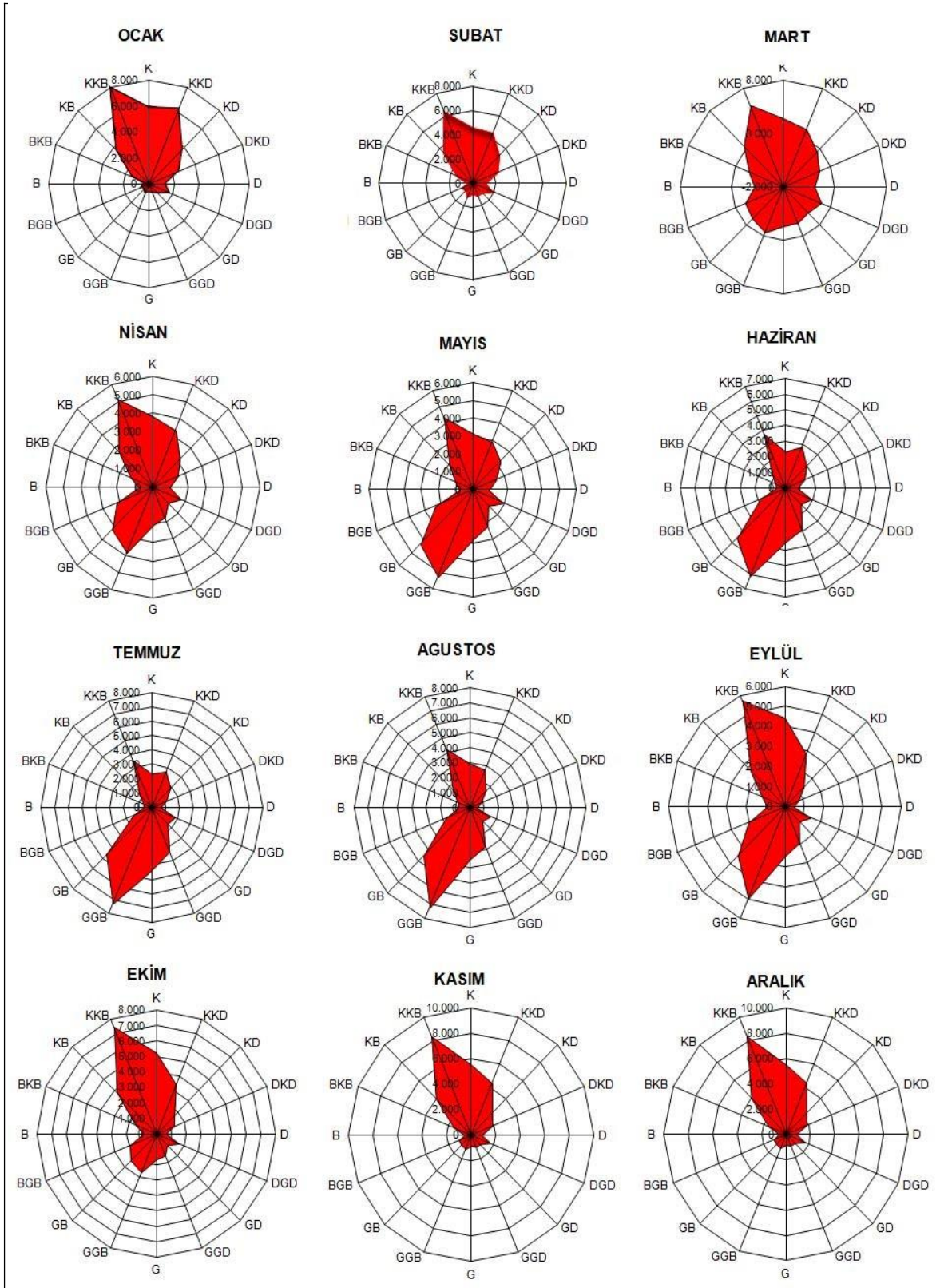


Figure 28 Mersin Meteorology Station Monthly Wind Chart According to Wind Numbers

b. Speed by Direction

According to observations records of Mersin Meteorology Station, average wind speeds according to directions are given in **Table 31** and **Figure 29**.

Table 31 Average Wind Speed Values By Directions

Directions	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
N	1,7	1,6	1,5	1,5	1,5	1,4	1,3	1,3	1,4	1,5	1,5	1,6	1,5
NNE	1,7	1,7	1,6	1,6	1,5	1,5	1,5	1,4	1,5	1,5	1,6	1,7	1,6
NE	2,2	2,1	2,1	2,2	1,9	1,8	1,7	1,7	1,8	1,7	1,8	2,1	1,9
ENE	2,3	2,4	2,3	2,2	2	1,9	1,8	1,7	1,9	1,9	2,1	2,2	2,1
E	2,6	2,6	2,6	2,5	2,2	2,1	1,8	2	2,2	2,3	2,3	2,3	2,3
ESE	2,3	2,5	2,6	2,6	2,5	2,4	2,2	2,3	2,5	2,4	2,3	2,2	2,4
SE	2,1	2,5	2,7	2,6	2,6	2,6	2,5	2,5	2,6	2,3	2,1	2	2,4
SSE	2	2,3	2,4	2,7	2,7	2,8	2,8	2,8	2,7	2,3	1,9	1,8	2,4
S	2,6	2,5	2,9	3,1	3,3	3,4	3,4	3,4	3,4	2,8	2,2	2,3	2,9
SSW	2,3	2,4	3,1	3,4	3,5	3,9	4	4,2	3,9	2,9	2,2	2,1	3,2
SW	2,5	2,7	3,4	3,6	3,6	4	4,2	4,2	4,1	3,1	2,2	2,1	3,3
WSW	2	2,1	2,4	2,4	2,4	2,6	2,6	2,7	2,7	2,3	1,9	1,6	2,3
W	1,9	1,8	2,1	1,9	1,8	2	1,8	1,8	2,1	1,9	1,7	1,6	1,9
WNW	1,3	1,3	1,4	1,3	1,2	1,2	1,1	1,1	1,3	1,4	1,3	1,2	1,3
NW	1,4	1,4	1,4	1,3	1,2	1,1	1	1,1	1,2	1,3	1,4	1,4	1,3
NNW	1,4	1,4	1,4	1,3	1,2	1,1	1,1	1,1	1,2	1,4	1,4	1,5	1,3

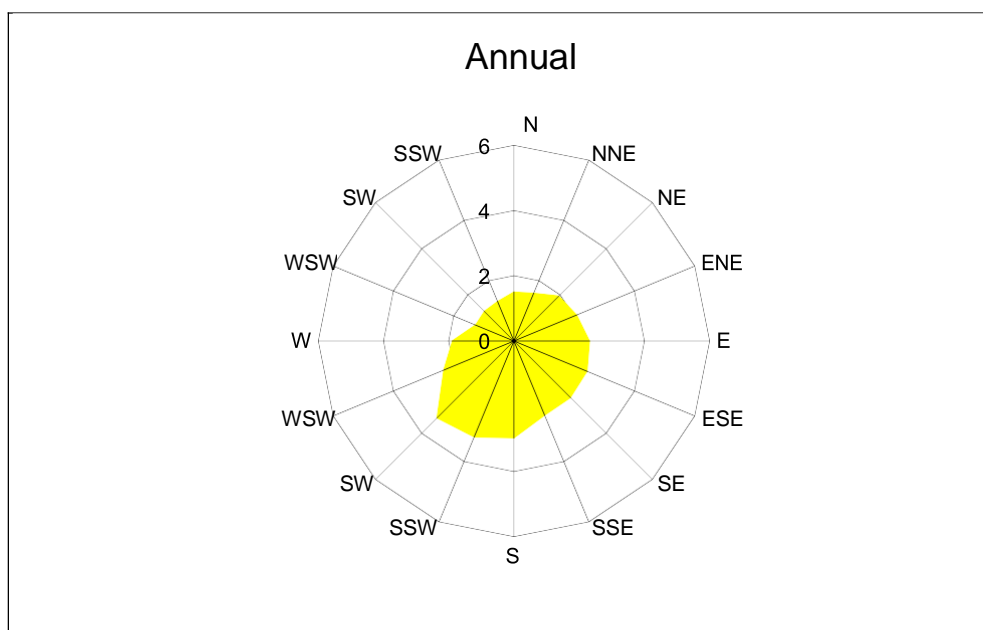


Figure 29 Mersin Meteorology Station Annual Wind Chart According to Average Wind Speed

c. Average Wind Speed Distribution

According to Mersin Meteorological Station observation records, the annual average wind speed is 2.3 m/s (See Table 32 and Figure 30).

d. Fastest Wind Direction and Speed

According to observations records of Mersin Meteorology Station, the maximum wind direction is WSW (West South West) and the maximum wind speed is 34.2 m/s in February (See Table 32 and Figure 31).

Table 32 Mersin Meteorology Station Average Wind Speed, Maximum Wind Speed and Wind Direction

Wind Speed	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Average Wind Speed (m/s)	2,1	2,2	2,2	2,3	2,5	2,7	2,7	2,7	2,4	2,0	1,8	2,0	2,3
Maximum Wind Speed (m/s) and Direction	29,7 S	34,2 WSW	26,4 SW	25,0 SW	25,3 SW	28,2 NNW	26,2 NW	20,2 NNE	25,0 SSW	27,9 SSW	25,7 SSW	30,2 S	34,2 WSW

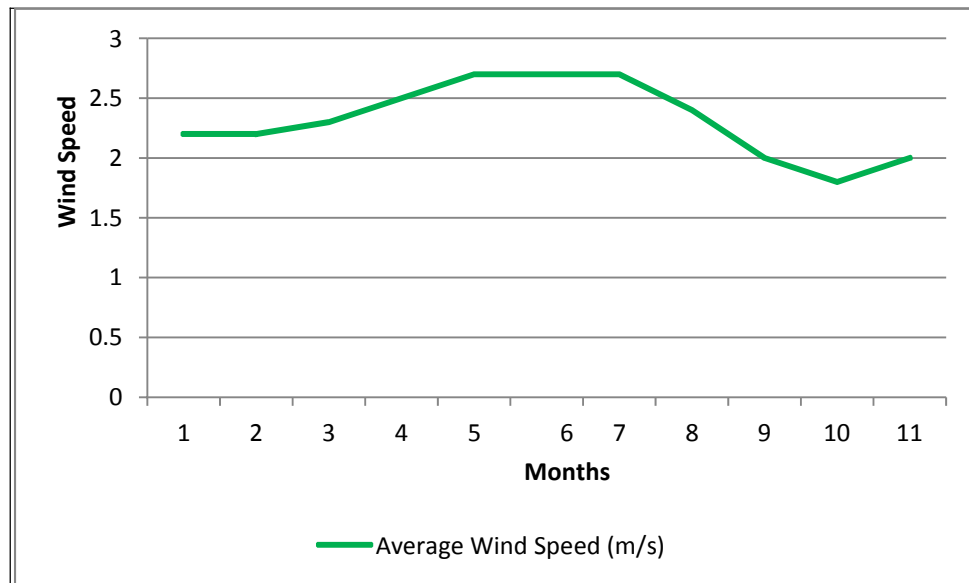


Figure 30 Mersin Meteorology Station Average Wind Speed Graph

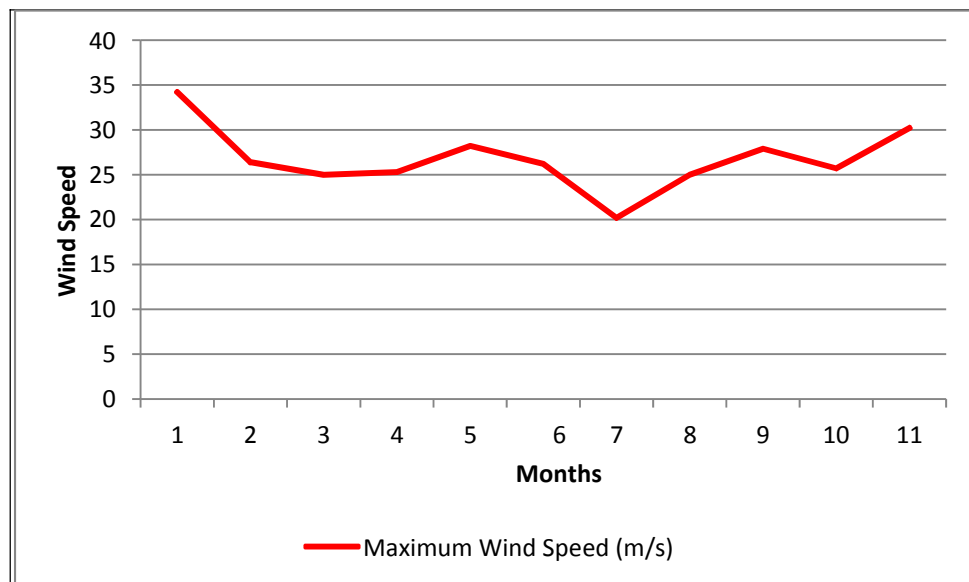


Figure 31 Mersin Meteorology Station Maximum Wind Speed Graph

e. Average Number of Stormy Days

According to observation records of Mersin Meteorology Station, the annual average number of stormy days is 4.8 (See Table 33 and Figure 32).

f. Average Number of Days with Strong Winds

According to Mersin Meteorological Station observation records, the annual average number of strong windy days is 29.1 (**See Table 33 and Figure 32**).

Table 33 Average Number of Stormy Days and Strong Windy Days

Days	Months												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Average Number of Stormy Days	0,7	0,5	0,8	0,5	0,3	0,2	0	0,1	0,2	0,4	0,5	0,6	4,8
Average Number of Strong Windy Days	3	3,2	3,8	3,7	2,6	1,7	1,3	1,6	1,8	2	1,9	2,5	29,1

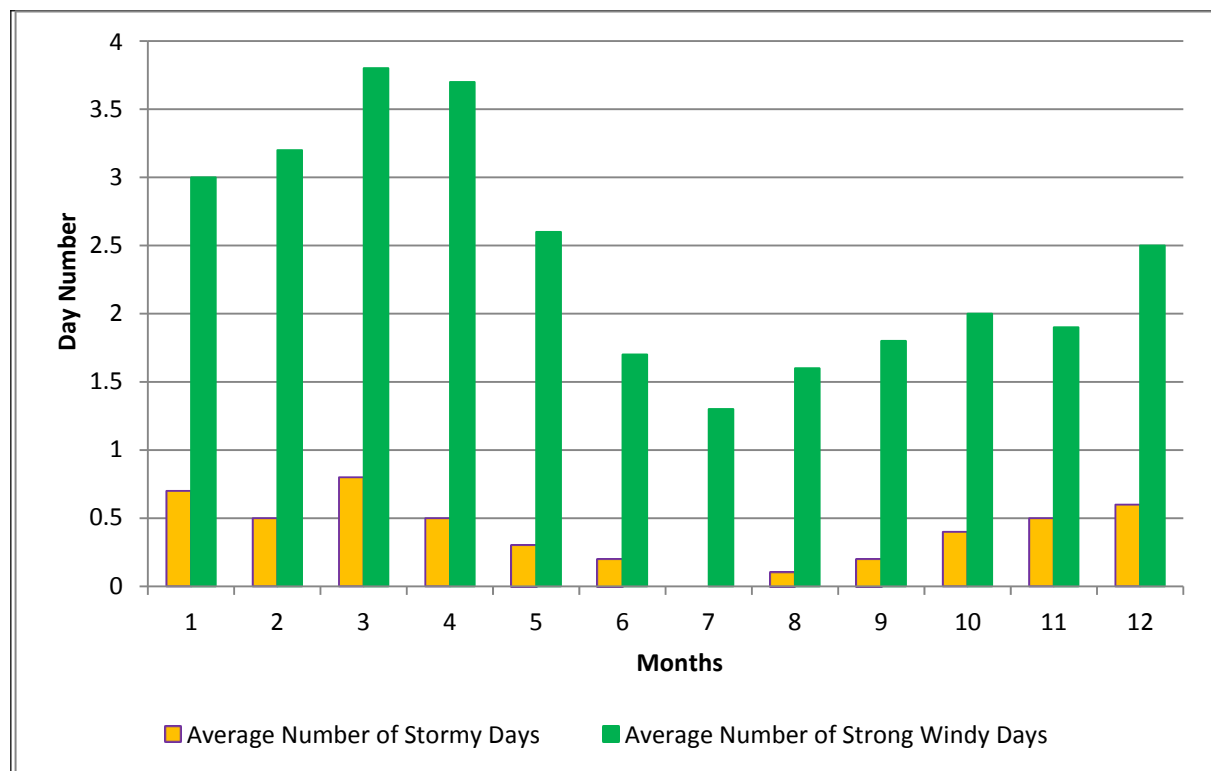


Figure 32 . Mersin Meteorology Station Average Stormy and Strong Windy Days Graph

Largest Precipitation Values and Recurrence Graphs Observed in Standard Time

The maximum amount of precipitation in a 24-hour period of 100 years, measured in standard times, is 211.6 mm. The largest precipitation values observed during the standard times of Mersin Meteorology Station and rainfall intensity-time-recurrence curves are given in **Annex 6**.

Within the scope of the project, the highest precipitation values observed at standard times recorded by Mersin Meteorology Station by the General Directorate of Meteorology will be utilized in the design of the necessary drainage systems.

Climate Events

The climate events that have taken place in the region are given in **Table 34 and Annex 6.**

Table 34 Climate Events

Date	Event	Damage
17.04.1975	Hail	Agricultural products have damaged
29.12.1975	Snow	Accidents have occurred in road traffic due to snow
04.01.1989	Frost	Agricultural products are damaged due to freeze
12.02.1998	Storm	The settlements have been damaged due to the storm
23.03.1998	Storm	The settlements have been damaged due to the storm
06.07.1998	Rain and Flood	The settlements have been damaged due to rain and snow
24.12.1998	Rain and Flood	The settlements have been damaged due to rain and snow
02.03.2001	Storm	Zinc cover materials have flown, port services have stopped
23.03.2001	Storm	Port services are damaged
28.03.2001	Fog	Traffic was damaged
14.04.2001	Storm	Fruits in the trees have fallen off
07.05.2001	Storm	Traffic was damaged, electrical wires were broken and some trees were overturned
20.08.2001	Soaker	Some houses were flooded
02.12.2001	Rain	Some houses werw flooded
07.02.2003	Storm	Chimneys of some house were fallen over
09.03.2003	Storm and Rain	Port services could not be done, some roofs were damaged
17.09.2003	Storm	Sailboats and big boats could not have sail in the sea
22.01.2004	Storm	Port services completely stopped
23.01.2004	Storm	Sailboats and big boats could not have sail in the sea
13.02.2004	Storm	Branches of some trees have been broken
14.02.2004	Storm	Sailboats and big boats could not have sail in the sea and the solar energies were damaged
20.02.2005	Storm	Sea transportation was failed
28.02.2005	Storm	Sea transportation was failed
09.03.2005	Storm	Sea transportation was failed
10.03.2005	Storm	Sea transportation was failed
01.04.2005	Storm	Sea transportation was failed
21.11.2005	Storm	Sea transportation was failed
15.12.2005	Hail	Traffic was damaged
13.10.2006	Storm	Branches of some trees have been broken
24.03.2007	Storm	Sea transportation was failed
28.03.2007	Rain and Flood	The settlements were damaged
15.10.2007	Storm	Sea transportation was failed
11.11.2007	Rain and Flood	People, animals, transportation and settlements were damaged
06.12.2007	Rain and Flood	The settlements were damaged
25.03.2008	Storm	Sea transportation was failed
07.04.2008	Storm	Sea transportation was failed
24.08.2008	Storm	Sea transportation was failed
15.10.2008	Storm	Sea transportation was failed
10.03.2009	Storm	Sea transportation was failed
13.03.2009	Hail	Some trees have been damaged
05.05.2009	Storm	Communication and energy transmission lines were damaged
26.10.2009	Storm	Sea transportation was failed
04.11.2009	Storm	Sea transportation was failed
12.12.2009	Rain and Flood	The settlements were damaged
27.01.2010	Frost	Greenhouses were damaged

Date	Event	Damage
07.04.2010	Hail	Some trees have been damaged
29.10.2010	Storm	Sea transportation was failed
19.02.2011	Storm	Sea transportation was failed
18.04.2012	Storm	Sea transportation was failed
03.10.2012	Rain and Flood	Traffic was damaged
09.11.2012	Rain and Flood	People, animals, transportation and settlements were damaged
10.12.2012	Rain and Flood	Vehicles were damaged

III.7 Protected Areas (Project Site and Sensitive Regions and Features in the Domain, National Parks, Nature Parks, Wetlands, Natural Monuments, Wildlife Conservation Areas, Wildlife Protection Areas, Wild Animal Cultivation Areas, Cultural Assets, Natural Assets, Protected Areas, Biogenetic Reserve Areas, Biosphere Reserves, Special Environmental Protection Areas, Special Protection Areas, Protection Areas Related to Drinking and Utilizing Water Resources, Tourism Areas and Centers and Other Protected Areas), Their Distances in the Activity Area, Possible Effects

In the area of the facility, in the **Annex-5** of the EIA Regulation; considering the List of Sensitive Areas, the status of protected areas is given below.

1. The areas required to be protected under the legislation of our country,

a) In the facility area; **there are no** "National Parks", "Natural Parks", "Natural Monuments" and "Nature Protection Areas" defined in Article 2 of the National Parks Law dated 09.08.1983 and numbered 2873 and in accordance with the third article of this Law.

b) In the facility area; **there are no** "Wildlife Preservation Areas and Wild Animal Settlement Areas" determined by the Ministry of Environment and Forestry in accordance with the Law on Land Hunting No 4915 dated 01.07.2003.

c) Within the facility area; **there are no** "Cultural Assets", "Natural Assets", "Protected Area" defined in the articles 1, 2, 3 and 5 of the heading "Definitions" of the first subsection of the 3rd paragraph of the Law on the Protection of Cultural and Natural Assets, No. 2863 dated 21.07.1983, and with the same law and Law No. 3386 dated 17.06.1987 (Law No. 2863 on the Amendment of Certain Articles of the Law on the Protection of Cultural and Natural Assets and the Addition of Certain Articles to this Law).

ç) **There are no** The "Wetlands", the areas of importance for scientific researches which are included in the scope of the Ramsar Agreement, areas of living of endemic species for our country, biosphere reserves, biotopes, biogenetic reserve areas and "Special Environmental Protection Zones " according to Article 9 of the Environmental Law No. 2872 by the Council of Ministers.

d) In the facility area; **there are no** areas defined in Articles 17, 18, 19 and 20 of the Water Pollution Control Regulation published in the Official Gazette No. 25687 dated 31.12.2004.

e) In the facility area; **there are no** "Sensitive Pollution Zones" defined in Article 49 of the Regulation on the Protection of Air Quality published in the Official Gazette dated 02.11.1986 and numbered 19269.

f) In facility area; **there is no** "Special Environmental Protection Areas" determined and announced as "Special Environmental Protection Zones" by the Council of Ministers in accordance with the 9th article of the Environmental Law No 2872 dated 09.08.1983,.

g) In the facility area; according to the Bosphorus Law dated 18.11.1983 and numbered 2960, **there are no** protected areas.

ğ) In the facility area; according to the Forest Law no 6831 dated 31.08.1956, **there are no** forest areas.

h) Facility area; according to the Coastal Law dated 04.04.1990 and numbered 3621, **there are no** areas that are subject to building prohibition.

ı) In the facility area; **there are no** areas mentioned in the Law on Rehabilitation of Olive Cultivation, No. 3573 dated 26.01.1939.

i) **There is no** pasture land in the facility area.

j) **There is no** wetland in the facility area specified in the Regulation on the Protection of Wetlands, which was published in the Official Gazette dated 17.05.2005 and numbered 25818.

2. Areas that need to be protected in accordance with international conventions which our country is a member

There are no areas that need to be protected in accordance with the international conventions which our country is a member.

3. Areas to be protected

a) Within the Facility area, there are no areas in the Approved Environmental Plan, which are identified as areas for which the existing features are to be protected and which are prohibited from building. (Natural character protected area, biogenetic reserve areas, and geothermal fields and so on.)

b) Agricultural Areas: There is an agricultural area in the facility area and the use of these areas for "non-agricultural purposes" by the General Directorate of Agricultural Production and Development of the Ministry of Agriculture and Rural Affairs is found appropriate (See Appendix 1).

c) Wetlands: There are no natural or artificial, permanent or temporary, stagnant or fluid areas with sweet, bitter or salty water, which are important as living environments for living beings, especially water birds within the facility area, depths not exceeding 6 meters in the withdrawal cycle of the sea tidal movement areas covered by marshland and turkey areas, and wetlands towards the land from the coastline of these areas.

d) There are no lakes, rivers, groundwater operating areas in the facility area.

e) In the facility area; there are no areas where biomass reserves, biotopes, biogenetic reserve areas, geologic and geomorphological occurrences in unique features exist, which are important for scientific research and / or endangered species and endemic species of our country.

III.8 Evaluation of Soil Properties and Usage Status (Classification of Soil Physical, Chemical, Biological, Land Use Capability, Erosion, Present Usage of Soil, Soil Etude), Land and Land Use in Terms of Related Legislation

General soil structure

Various soil characteristics are observed in Mersin Province. Mostly calcareous, brown forest soils are observed in the region. This is followed by red-brown soils, alluvial soils and other soil varieties. Various major soil groups were formed in Mersin Province with the main matter, climate, topography, vegetation and time effect. In addition to large soil groups, some types of terrain are seen that lack land cover and profile development. According to the classification according to the percentage of the saturation, the agricultural soils have 2.1% sand, 42.4% tin, 35.3% clayey and 20.2% clay. This distribution points to the existence of suitable soil for agriculture in the province.

Land property

According to the information obtained from the former Provincial Directorate of Agriculture; The land area of Mersin Province is 1,585,259 ha and its distribution according to large land groups is given in Table 35.

Table 35 . Mersin Province Land Existence

Great Soil Group	Area (ha)	%
Brown Forest Territories	644.939	40,7
Non-calcareous Brown Forest	355.388	22,4
Red Mediterranean Territories	226.301	14,3
Red Brown Mediterranean Territory	85.883	5,4
Alluvial Soils	80.723	5,2
Rendzina Soils	47.813	3,0
Colluvial Soils	45.031	2,8
Bare Rocks	79.762	5,0
Other land and water surfaces	19.419	1,2

Source: Mersin Environment and Situation Report, 2011.

Land capability classes

The soil distribution of Mersin Province according to land use ability classes is given in Table 36.

Table 36 Terrestrial Land Use Capability Classes

Land use capability	Area (ha)	%
I.class	41.895	2,6
II. class	44.558	2,8
III. class	65.103	4,1
IV. class	69.130	4,4
V. class	173.855	11,0
VI. class	1.095.575	69,1
VII. class	93.230	5,9
VIII. class	1.913	0,1

Source: Mersin Environment and Situation Report, 2011.

Land use status

According to the land use situation, soil distribution of Mersin Province is given in Table 37.

Table 37 Land Use Status

Usage	Area (ha)	%
Forest area	840.347	53,0
Agricultural area	406.000	25,6
Meadow-pasture area	59.282	3,7
Non-agricultural areas	279.671	17,7

Source: Mersin Environment and Situation Report, 2011.

According to the results obtained from the former Provincial Directorate of Agriculture; The arable land is 406,000 ha; Constitute about 25% of the provincial surface. 263,690 ha (65%) of these are dry agriculture and fallow lands, and 142,310 ha (35%) are irrigated areas. 53% (840,347 ha) of Mersin lands constitute forest areas.

When the distribution of agricultural areas according to their usage is examined; It is seen that 63% of the arable land is arable, 13% is the garden land, and 22% is the vineyard, vegetable and olive grove areas. The remaining 2% are areas of ornamental plants.

Approximately 160,000 ha of the agricultural land of Mersin Province are economically irrigable. There are enough water resources in the area. Approximately 16,000 hectares of irrigable land can be transited from dry agriculture to irrigated agriculture. If the agricultural potential of Mersin Province is considered to be quite high due to its soil structure and climate characteristics, priority should be given to investments in irrigation facilities, especially irrigation ponds.

Evaluation of land and land use in terms of relevant legislation

The plant area consists of agricultural land. However, in this regard, the Ministry of Agriculture and Rural Affairs approved the use of the land in question for non-agricultural purposes in 2010 (see Annex 1).

III.9 Determination of Existing Pollution Load in Terms of Air, Water and Soil of the Project Site and its Affected Area, Determination of Whether the Project Area Affects Any Surface Water Source, Determination of Whether the Project Area is in Drinking and Use Water Areas

Air Pollution

The biggest cause of air pollution is the combustion of fuels and the exhaust gases given to the atmosphere. In Mersin, air pollution caused by motor vehicles is an important problem in the city especially during winter months (Mersin Clean Air Action Plan, 2013). In addition, there is also air pollution from industrial facilities throughout the province.

Mersin is one of the big cities which the population and the industry are growing rapidly. The main sources of influence on air quality in Mersin are; Mersin-Tarsus Organized Industrial Zone (OIZ), Kromsan and Soda Industry Plants, Çimsa Cement Plant, Toros Fertilizer Plant, residences and motor vehicles. Mersin-Tarsus OIZ, which has 118 firms, is located 20 km east of the city. Air pollutants in the Mersin-Tarsus OIZ does not have an influence on air quality of the city center but it affects Mersin's overall air quality because of the distance of the OIZ and the dominant wind direction of the city.

Mersin-Tarsus OIZ has small and large scale industrial facilities. The pollutants from this area affect the quality of the city center's air quality due to the distance of this region from the city center.

Although the quarries located in the various regions of the city does not directly affect the settlements, the dust resulting from the activities of these facilities have little negative impact on the city's air quality.

Air pollution caused by heat: Air pollution in Mersin shows seasonal characteristics. There is pollution that is felt and detected during the winter months and late autumn. This shows that in Mersin, the source of air pollution is not only pollution caused by industrial and motor vehicles, but also caused by heating.

In Mersin, air pollution caused by industrial facilities on urban settlement is relatively low due to the fact that the selection of places for industrial facilities is determined according to air quality, also the pollutant qualities of energy sources (electricity, natural gas) used mainly in the industry are low.

The results of measurement of Mersin Indoor air quality are shown in **Table 38**, and it is seen that SO₂ and PM₁₀ values are normal.

Table 38 SO₂ ve PM₁₀ Measurement Results

Months	Parameters	2007	2008	2009	2010	2011	2012
January	PM ₁₀	-	156	108	62	63	47
	SO ₂	-	23	4	20	24	2
February	PM ₁₀	-	134	125	98	63	54
	SO ₂	-	14	2	14	13	1
March	PM ₁₀	-	112	109	91	45	52
	SO ₂	-	5	1	17	7	0
April	PM ₁₀	-	87	78	54	39	61
	SO ₂	-	2	1	11	10	0
May	PM ₁₀	-	64	65	108	46	42
	SO ₂	-	1	3	6	9	5
June	PM ₁₀	73	61	71	85	42	55
	SO ₂	12	1	12	14	0	4
July	PM ₁₀	88	56	55	70	56	53
	SO ₂	0	0	11	15	1	1
August	PM ₁₀	63	78	54	80	43	47
	SO ₂	1	0	14	16	13	10
September	PM ₁₀	72	68	39	64	50	56
	SO ₂	0	0	16	16	11	0
October	PM ₁₀	98	74	72	76	46	57
	SO ₂	2	1	16	13	4	1
November	PM ₁₀	125	99	53	50	46	51
	SO ₂	5	1	8	2	11	2
December	PM ₁₀	163	116	56	56	62	53
	SO ₂	10	4	17	4	4	4

Source: Mersin Clean Air Action Plan, 2013

Soil pollution

Industrial activities, fossil fuels used for heating in residential buildings, exhaust gases from motor vehicles and thermal power plants that generate energy based on fossil fuels pollute the final air and emit sulfur dioxide, nitrous oxide, particulate matter and hydrocarbons. These pollutants, which can hang in the air between 2 and 7 days, are subjected to various chemical and physical reactions in the atmosphere and can be transported from time to time. It reacts with water particles and other components in the atmosphere to form pollutants such as sulfurous acid (HSO₃), sulfuric acid (H₂SO₄) and nitric acid (HNO₃).

Water pollution

One of the biggest problems in the province is overuse and pollution of underground waters. The most prominent cause of underground water pollution is urban and industrial wastes. Solid, liquid or gaseous wastes are then transported to the groundwater, depending on the climate, the structure of the earth, the nature of the wastewater and time. One of the other important reasons for underground water pollution is excessive attraction. Especially in the eastern part of the province, which is concentrated in the industrial establishments and in Mersin-Silifke holiday sites are under the use of an underground water intensive. As a result, there is increasing pressure on groundwater, especially in places near the sea, there is a threat of salt water venture.

The most important groundwater pollution in Mersin is the direct supply of domestic waste with septic tanks and the inadequacy of the sewage system. Although the microorganisms found in abundant quantities in domestic wastewaters are naturally cleaned during transportation, compounds which are resistant to decomposition such as organic substances and detergents reach to ground water and can cause problems in terms of drinking water. The increase in the concentration of NO₃ in agricultural activities such as transport of harmful components in exhaust gases by rainwater, fertilizer use, pesticides and animal wastes can be listed as pollution causes.

Another most important environmental problem of the Mersin is the water and sea pollution caused by the infrastructure deficiencies of the settlements. In Mersin, a large part of the towns and municipalities are located by the sea. Due to the inadequacy of the sewage and treatment facilities of these municipalities and municipalities, domestic wastewater directly or indirectly reaches the sea and creates pollution at a considerable level⁵.

Impact of Facility Area on Surface Water Resources

The closest surface water source to the facility area is the irrigation ducts of DSI. All necessary sealing and drainage precautions will be taken for the planned installation. This will leave a distance of 50 m for the watering channels.

⁵ Mersin's Environmental Problems and Solution Proposals, 2009.

CHAPTER IV

IMPORTANT ENVIRONMENTAL EFFECTS OF PROJECT AND MEASURES TO BE TAKEN

CHAPTER IV: IMPORTANT ENVIRONMENTAL EFFECTS OF PROJECT AND MEASURES TO BE TAKEN

IV.1 Where, What Quantity and How Many Areas will Excavate in the Scope of the Works will be Done During the Area Preparation, Where Excavation and Construction Waste will be Transpored and stored or Which Purposes They will be used, If They will be used for Filling, Excavation and Filling Tables, Dust Emissions Occurring during the Trasportation

Amount of Excavation

It is expected that 44.155 m³ of excavation material will be formed during the construction activities of the planned project. When the vegetable soil thickness of the plant area is accepted as 20 cm, the amount of vegetable soil to be wiped from the surface during the excavation activities will be 8,831 m³. Before the excavation work is started, vegetable top soil will be wiped from the surface and stored in an appropriate area within the facility area in accordance with the technique. After completion of the construction activities, the vegetable top soil will be evaluated again by laying on the land.

Disposal of Excavation Material

The excavation material to be caused by the planned plant will be disposed of by being transported to the disposal site to be exhibited by Mersin Municipality. During the storage of excavation materials, the provisions of the "*Regulation on the Control of Excavation Soil, Construction and Demolition Waste*" dated 18.03.2004 and numbered 25406 and the "*Regulation on Control of Soil Pollution and Polluted Shelter with Point Source*", which was enacted in the Official Gazette dated 08.06.2010 and numbered 27605 provisions shall be observed.

Machinery and equipment to be used during excavation operations

Below is a list of machinery and equipment to be used in construction works:

- Truck Excavator
- Crane Dozer
- Greyder Loader
- Compressor Transmixer Cylinder sprinkler

Environmental impacts during excavation

Exhaust emission

New and well-maintained vehicles shall be used to control the emissions arising from the work machines during construction phase. The provisions of the "*Regulation on Exhaust Gas Emission Control*" published in the Official Gazette dated 04.04.2009 and numbered 27190 shall be observed. A list of equipment to be used in the construction phase of the project is given in **Table 39**.

Table 39 List of Equipment Intended for Use in Construction Phase

Machine Type	Unit	Engine Power (Kw)
Excavator	1	94
Dozer	1	99
Cylinder	1	63
Digger	2	156
Truck	5	235
Sprinkler	1	191
Crane	2	37
Loader	2	191
Compressor	1	11
Transmixer	2	280

Physical and chemical properties of the engine to be used in vehicles under the project It is given in **Table 40**.

Table 40 . Physical and Chemical Properties of the Engine to be Used

Component (%Weight)	C : %86,5 - H : %12,2 - O : %1,0 - S : %0,3
Density (P 15°C, gr/cm ³)	0,86
Lower Thermal Value	40,4
Viscosity (10-3 Pa S/C)	79,7/80
Max. CO ₂ content (% volume)	15,5

The emission factors given by EPA (Environmental Protection Agency) for heavy work machinery are given in **Table 41**.

Table 41 . Emission Factors Used in Calculations (Tier 4 Emission Standards for Engines up to 560 kW-EPA)

Engine Power	Year	CO (g/Kwh)	HC (g/Kwh)	NO _x (g/Kwh)	PM (g/Kwh)
56 ≤ kW < 130 (75 ≤ hp < 175)	2012 and above	5,0	0,19	0,40	0,02
130 ≤ kW ≤ 560 (175 ≤ hp ≤ 750)	2011 and above	3,5	0,19	0,40	0,02

Using the emission factors given in **Table 41**, the gas emissions in the construction phase according to the machine-equipment and total power levels given in **Table 39** have been calculated and presented in **Tables 42 and 43**.

Table 42 Expected Pollutant Values Originated from Work Machines

Pollutant	Vehicles and Work Machines	Expected Contaminant Value (kg / h)	
Excavator (1 unit)	PM	0,02 g/Kwh x 94 Kw x 1 unit x kg/1000 g	0,00188
	NO _x	0,04 g/Kwh x 94 Kw x 1 unit x kg/1000 g	0,00376
	CO	5 g/Kwh x 94 Kw x 1 unit x kg/1000 g	0,47
	HC	0,19 g/Kwh x 94 Kw x 1 unit kg/1000 g	0,01786
Grader (2 units)	PM	0,02 g/Kwh x 156 Kw x 2 units x kg/1000 g	0,00624
	NO _x	0,04 g/Kwh x 156 Kw x 2 units x kg/1000 g	0,01248
	CO	3,5 g/Kwh x 156 Kw x 2 units x kg/1000 g	1,092
	HC	0,19 g/Kwh x 156 Kw x 2 units kg/1000 g	0,05928
Truck (5 units)	PM	0,02 g/Kwh x 235 Kw x 5 units x kg/1000 g	0,0235
	NO _x	0,04 g/Kwh x 235 Kw x 5 units x kg/1000 g	0,047
	CO	3,5 g/Kwh x 235 Kw x 5 units x kg/1000 g	4,1125

Pollutant	Vehicles and Work Machines	Expected Contaminant Value (kg / h)	
	HC	0,19 g/Kwh x 235 Kw x 5 units kg/1000 g	0,22325
Sprinkle (1 Unit)	PM	0,02 g/Kwh x 191 Kw x 1 unit x kg/1000 g	0,00382
	NO _x	0,04 g/Kwh x 191 Kw x 1 unit x kg/1000 g	0,00764
	CO	3,5 g/Kwh x 191 Kw x 1 unit x kg/1000 g	0,6685
	HC	0,19 g/Kwh x 191 Kw x 1 unit kg/1000 g	0,03629
Dozer (1 Unit)	PM	0,02 g/Kwh x 99 Kw x 1 unit x kg/1000 g	0,00198
	NO _x	0,04 g/Kwh x 99 Kw x 1 unit x kg/1000 g	0,00396
	CO	5 g/Kwh x 99 Kw x 1 unit x kg/1000 g	0,495
	HC	0,19 g/Kwh x 99 Kw x 1 unit kg/1000 g	0,01881
Cylinder (1 Unit)	PM	0,02 g/Kwh x 63 Kw x 1 unit x kg/1000 g	0,00126
	NO _x	0,04 g/Kwh x 63 Kw x 1 unit x kg/1000 g	0,00252
	CO	5 g/Kwh x 63 Kw x 1 unit x kg/1000 g	0,315
	HC	0,19 g/Kwh x 63 Kw x 1 unit kg/1000 g	0,01197
Transmixer (1 Unit)	PM	0,02 g/Kwh x 280 Kw x 2 units x kg/1000 g	0,0112
	NO _x	0,04 g/Kwh x 280 Kw x 2 units x kg/1000 g	0,0224
	CO	3,5 g/Kwh x 280 Kw x 2 units x kg/1000 g	1,96
	HC	0,19 g/Kwh x 280 Kw x 2 units kg/1000 g	0,1064
Crane (2 Units)	PM	0,02 g/Kwh x 37 Kw x 2 units x kg/1000 g	0,00148
	NO _x	0,04 g/Kwh x 37 Kw x 2 units x kg/1000 g	0,00296
	CO	3,5 g/Kwh x 37 Kw x 2 units x kg/1000 g	0,259
	HC	0,19 g/Kwh x 37 Kw x 2 units kg/1000 g	0,01406
Loader (2 Units)	PM	0,02 g/Kwh x 191 Kw x 2 units x kg/1000 g	0,00764
	NO _x	0,04 g/Kwh x 191 Kw x 2 units x kg/1000 g	0,01528
	CO	3,5 g/Kwh x 191 Kw x 2 units x kg/1000 g	1,337
	HC	0,19 g/Kwh x 191 Kw x 2 units kg/1000 g	0,07258
Compressor (1 Unit)	PM	0,02 g/Kwh x 11 Kw x 1 unit x kg/1000 g	0,00022
	NO _x	0,04 g/Kwh x 11 Kw x 1 unit x kg/1000 g	0,00044
	CO	3,5 g/Kwh x 11 Kw x 1 unit x kg/1000 g	0,0385
	HC	0,19 g/Kwh x 11 Kw x 1 unit kg/1000 g	0,00209

Table 43 Total Mass Flow During Construction

Pollutant	Total Mass Flow (kg/hour)	Regulation Limit Value *	Evaluation
PM	0,05 922	1	Below the Limit Value
NO _x	0,11 844	4	Below the Limit Value
CO	10,7 475	50	Below the Limit Value
HC	0,56 259	3	Below the Limit Value

As a result of the calculations made, it is observed that the emissions of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), hydrocarbons (HC) and particulate matter (PM) from fuels used by construction machines, It was found that the values were well below the limit values.

Dust Emission

Possible dust emissions from the project are calculated below. The emission factors to be used during the calculations are given in **Table 44**.

Table 44 Emission Factors to be Used in the Calculation of Powder Amounts

Activity	Unit	Emission Factor
Removing	kg/tonne	0,025
Loading	kg/tonne	0,01
Transporting	kg/km.vehicle	0,7

Source: www.cedgm.gov.tr

1. Dust Emission due to Removing Process

i. Dust emissions originating from plant soil removal

Removal of 8,831 cubic meters of vegetable soil in the plant area will be completed in approximately 5 months and the density of the soil is 1.8 tons / cubic meter.

$$\text{Plant Soil Amount} = 8.831 \text{ m}^3 \times 1,8 \text{ tone/m}^3 = 15.895$$

$$\text{ton Working Hours} = 5 \text{ ay, } 26 \text{ day/month, } 16 \text{ hour/day}$$

$$\text{Monthly Excavation Amount} = 15.895 \text{ ton} / 5 \text{ month} = 3.179 \text{ ton/month}$$

$$\text{Daily Excavation Amount} = 3.179 \text{ ton/month} / 26 \text{ day} = 122,3 \text{ ton/day}$$

$$\text{Hourly Excavation Amount} = 122,3 \text{ ton/day} / 16 \text{ hour} = 7,64 \text{ ton/hour}$$

$$\text{Dust Emission} = 7,64 \text{ ton/hour} \times 0,025 \text{ kg/ton} = \mathbf{0,191 \text{ kg/hour}}$$

ii. Dust Emission originating from excavation

44.155 m³ of excavation material will be formed in the facility area and these operations will be completed in approximately 10 months and the density of the soil is 1.8 tons / m³.

$$\text{Excavation Amount} = 44.155 \text{ m}^3 \times 1,8 \text{ ton/m}^3 = 79.479 \text{ ton}$$

$$\text{Working Hours} = 10 \text{ ay, } 26 \text{ day/month, } 16 \text{ hour/day}$$

$$\text{Monthly Excavation Amount} = 79.479 \text{ ton} / 10 \text{ month} = 7.948$$

ton/month

$$\text{Daily Excavation Amount} = 7.948 \text{ ton/month} / 26 \text{ day/month} = 306$$

ton/day

$$\text{Hourly Excavation Amount} = 306 \text{ ton/day} / 16 \text{ hour} = 19 \text{ ton/hour}$$

$$\text{Dust Emission} = 19 \text{ ton/hour} \times 0,025 \text{ kg/ton} = \mathbf{0,475 \text{ kg/hour}}$$

2. Dust Emission originating from loading operation

iii. Dust emissions originating from plant soil loading

Dust Emission= 7,64 ton/hour x 0,01 kg/ton = **0,076 kg/hour**

iv. Dust Emission originating from Excavation loading operation

Dust Emission= 19 ton/h x 0,01 kg/tons = **0,19 kg/hour**

3. Dust Emission originating from transportation operation

v. Dust emissions originating from plant soil transportation

Since a truck has a capacity of 30 tons at a time, it will be average (122.3 tons / day) / (30 tons / one time) \approx 4 times a day. An appropriate area will be temporarily stored within the plant soil facility area that has been stripped from the plant site and will then be evaluated by re-use in the landscape repair work of the project site. It is assumed that plant material is transported about 100 m on site. According to this, the amount of dust to be caused by the transportation of plant soil;

Dust Emission= 0,7 kg/km-route x 4 route/16 hour x 0,1 km=**0,018 kg/hour**

vi. Dust Emission originating from Excavation transporting operation

Since a truck has a carrying capacity of 30 tons at a time, an average of (306 tons / day) / (30 tons / one time) \approx 10 times a day will be made. In calculations, dust emissions (between the site and the highway) are calculated using the distance from the site to the highway. It is assumed that the excavation material is transported about 100 m on the site. According to this, the amount of dust to be transported from the excavation material;

Dust Emission= 0,7 kg/km-route x 10 route/16 hour x 0,1 km=**0,044 kg/hour**

As a result of the calculations made, the dust emission from the removing process of **0,666 kg / h**, the loading process of **0.266 kg / h** and the transportation process of **0,062 kg / h** will occur. The total amount of dust emissions from all construction activities in the facility is **0.994 kg / hour**. The calculated value is below the dust emission limit value of 1.0 kg / h for the places outside the chimney, which are given in Annex 2 of IAPCR and which determine the model requirement. Therefore, no modeling work has been done for dust emissions.

IV.2 Amount of Water Needed in Construction and Operation Period, How to Get Where, Number of Employees to Work

Water need during Construction, wastewater to be formed and disposal methods

During the construction phase of the facility, the staff will need water for drinking and utilizing as well as to prevent dusting.

During the construction phase, the drinking and utility water required for the personnel will be provided by the demanding bottles or tankers to be brought to the facility site.

Water for utilization and drinking purposes, R.T. Regulation on "*Waters for Human Consumption Purpose*" published in the Official Gazette dated 17.02.2005 and numbered 25730 of the Ministry of Health and "*Amendment of the Regulation on Waters for Human Consumption*" Regulation which was published in Official Gazette dated 07.03.2013 and numbered 28580 will be implemented. The waters to be inspected and monitored shall be carried out according to regulations mentioned above and the companies that have "Water Transportation Permission Certificate with Tankers" given to Mersin Public Health Directorate will transport the water.

The number of personnel foreseen to work in the construction phase of the facility is 60. Accordingly, the amount of wastewater to be generated from the personnel was calculated as 12.72 m³ / day (60 persons x 212 lt / person-day⁶).

The wastewater to be generated from the personnel will be collected in the leak-proof septic tank which will be installed on the construction site and will be disposed of by using the sewer services of the municipality.

It is accepted that 10 m³ of water will be used daily to minimize the dusting that will be also generated during the land preparation and construction phases and it is planned to bring this water to the facility by tankers.

Water need during operation, wastewater and disposal methods

During the operation phase of the facility, the staff will need water for drinking and utilizing as well as to prevent dusting.

During the construction phase, the drinking and utility water required for the personnel will be provided by the demanding bottles or tankers to be brought to the facility site

.Water for utilization and drinking purposes, R.T. Regulation on "*Waters for Human Consumption Purpose*" published in the Official Gazette dated 17.02.2005 and numbered 25730 of the Ministry of Health and "*Amendment of the Regulation on Waters for Human Consumption*" Regulation which was published in Official Gazette dated 07.03.2013 and numbered 28580 will be implemented. The waters to be inspected and monitored shall be carried out according to regulations mentioned above and the companies that have "Water Transportation Permission Certificate with Tankers" given to Mersin Public Health Directorate will transport the water.

The number of personnel foreseen to operate the plant during the operation phase is 12. Accordingly, the amount of wastewater to be generated from the personnel was calculated as 2.54 m³ / day (12 persons x 212 lt / person-day⁷).

Throughout the project, stormwater channels will be installed around each of the units and throughout the facility. The water collected in the stormwater channels will be sent to the balancing tank. The project does not have any negative impacts on underground and surface water resources.

For the treatment plant to be constructed within the scope of the project, a discharge permission shall be issued in accordance with the provisions of the Regulation on WPCR which is published in the Official Gazette No. 25687 dated 31.12.2004. Domestic wastewater to be generated during operation phase; 2,54 m³ / day is assumed on the assumption that 100% of utilizing and drinking water that the personnel will use will return to wastewater. The wastewater that will be generated from the personnel who will work in the operation phase of the planned plant will be given to the entrance of the wastewater plant and subjected to the treatment process.

⁶ <http://tuikapp.tuik.gov.tr/Bolgesel/tabloOlustur.do>

⁷ <http://tuikapp.tuik.gov.tr/Bolgesel/tabloOlustur.do>

IV.3 Types of Agricultural Products Surrounding the Project Site, Possible Impacts on the Agricultural Areas and Measures to be Taken

Plant area and surrounding agricultural products

Despite the fact that the plant area consists of agricultural land, there is no agricultural activity in the field of activity.

Agricultural activities are the source of income for more than 80% of the people of the region. Fruits are lemons and strawberries, vegetables are tomatoes and cereals wheat and rice plant are the most grown products. Grain farming has spread all over the region.

Possible effects on agricultural areas and measures to be taken

The plant area consists of agricultural land. However, in this regard, the Ministry of Agriculture and Rural Affairs approved the use of the land in abrogated for non-agricultural purposes in 2010 (**see Annex 1**). Dust suppression will be carried out during the construction activities so that the agricultural land near the plant site is not affected by the activity. In addition, the emissions of the construction equipment will be checked by regular maintenance. Ground and surface water resources and soil pollution will be prevented by eliminating the solid and liquid waste to be formed during the activity within the scope of the relevant legislation.

When the facility starts its operation, it is not expected that any negative effects will occur on the agricultural land in the vicinity. Since the mud generated during the operation of the plant will be disposed of in a short time, this mud will also be prevented from mixing with ground and surface water resources.

IV.4 Vegetative Soil Loss caused by project, Plant and tree etc. species to be selected for how to make (eg, afforestation, green area landscaping, etc.) to create landscaping items on the project site or to be made for other purposes, the effects of the project on landscaping and If exist, Landscape Project

Vegetative Soil Loss

The scraping, storage of upper soil, removal and storage of the lower soil constitute a significant part of the landscape repair work. The vegetative top soil contains the seed bank. It is the most necessary elements of re-planting studies. This is very important both for biological restoration and for combating erosion.

The vegetable top soil will be stripped from the surface before the construction activities at the facility begin. The amount of vegetative soil to be scraped the surface is 8,831 m³. The mentioned plant soil will be stored in the project site in accordance with an appropriate area and technique so that it will not interfere with the excavation material and will be used for landscaping purposes at the end of construction activities.

The vegetative soil scraped off the surface will be stored in such a way that it will not be dispersed by air or water currents or other reasons, mixed with foreign matter and not deteriorated in quality.

The effects of the project on landscaping items and the measures to be taken

The aim of the landscape work is to provide a visual screening of the project area as well as to create a beautiful environment for the plant. In this context, the vegetative soil scraped off from the surface during excavation works is planned to be stored in a suitable part of the construction site and used after spreading to the places required within the scope of a landscaping project after completion of construction activities.

Vegetal soil will be covered with inorganic (polyethylene etc. material) or organic (grass, herbaceous plant etc.) material in order to protect the deposits against erosion, drying, weed flow and to sustain the vitality of the soil. After completion of the construction phase, planting will be carried out in accordance with the natural vegetation and landscape elements, with the majority of trees and indigenous plants being suitable for the site.

One of the elements that can affect the landscape during operation is smell. The odor exits more often originate in long-term mud reservoirs. The sludge will not be left in the treatment plant for a long time so that this problem is removed and the environmental landscape is not affected. Despite technical measures taken, fragrant plants will be used during landscaping to reduce or prevent odor distribution. In this respect, the possibility of being affected by odors in the Esenbağlar Quarter, which is the closest settlement to the facility area, will be minimized. The plants will be planted in groups in order to create a natural barrier that will prevent smell and prevent the plant from being seen in the landscaping work to be done.

IV.5 Flood Risk and Measures to be Taken, Commitment not to Start Before the Measures Required for Flood, Detailed Explanation of Flood Prevention Related Work in the Report

The nearest surface water source to the facility area is the water channel that passes near the facility and belongs to SHW. The canal is used for irrigation purposes.

In addition, Merzitli Stream is another water source that is closest to the plant site. It is not expected that the construction will be affected in a negative way due to planned plant activities.

The collection of stormwater will be ensured through the stormwater collection system to be built around the plant site. The stormwater collection system will be designed according to the largest precipitation values observed at standard times measured by the Mersin Meteorological Station. Stormwater will be disposed of by sending it to the balancing tank of the plant. No action will be taken until all measures are taken against the flood risk in the facility area.

IV.6 To Provide Ground Impermeability and Ground Sealing of Plant Processes, Drainage Operations, Drainage Measures to be Taken

The units to be included in the facility will be constructed as reinforced concrete. The required isolation procedures will be performed using ⁸geomembrane in the units that need to be leakproofed.

⁸Geomembrane is a material with excellent protection against extrusion because it shows high resistance against chemical substances, high tensile strength, low permeability, extremely resistant to puncture and cracking.

IV.7 Quantity and Characteristic of Wastewater to be Produced in the Project Scope, Construction and Operation Periods, Disposal Methods, Stormwater Channels to be Built around Each Unit and Each Facility, Impacts on the Underground and Surface Water Resources in the Area and the Measures to be Taken, Permits to be Taken

Wastewater and disposal methods that will occur during the operation phase

Wastewater and disposal methods to be used in the construction and operation phases of the facility are presented in detail in **Chapter IV.2.**

Stormwater Channels

Stormwater channels will be installed around the units and throughout the facility throughout the project. Collected stormwater will be disposed of in the balancing tank of the wastewater treatment plant.

Possible effects on underground and surface water resources and precautions to be taken

Within the scope of the project, the units will be installed as reinforced concrete and strengthened with the sealing system. Thus, the likelihood that any material will interfere with the groundwater will be removed. Similarly, materials such as oil, fuel and paint, which will be used in the scope of the project, are not likely to interfere with groundwater and surface water since they will be found in areas where impermeability and insulation are provided.

Permits to be taken

During the operation phase of the plant, the necessary permits will be obtained for the WPCR provisions. Project approval will be obtained before the wastewater treatment plant is constructed in accordance with the circulation number 2012/9, which was published in the Official Gazette dated 15.03.2012 and dated 15.03.2012 by the Environmental Management General Directorate of the Ministry of Environment and Urbanisation

IV.8 Wastewater Acceptance Standards originating from Industrial Activities

The planned facility is designed to treat the domestic wastewater of Tece, Kuyuluk, Davultepe and Mezitli Provinces. However, considering the fact that these areas may develop in the future in terms of industry, the facility is designed to have the technology to treat industrial wastewater with a capacity of 10%.

In this case, there is no industrial facility in the vicinity of the plant already planned, still plant will treat 4,600 m³ / day industrial wastewater for phase I (2035) and 6,700 m³ / day for phase II (2050).

The wastewater to be generated from the industrial facilities shall be supplied to the receiving body and discharging of the sewage system by using permissions. The discharge permits of the said plants and the connection to the sewerage systems are made according to Table 25 of WPCR.

When the plant goes into operation, it will be treated in accordance with the wastewater discharge criteria set out in the "WPCR Table 25" published in the Official Gazette dated December 31, 2004 and numbered 25687 for the treatment of industrial waste (**See Table 45**).

Table 45 Wastewater Standards Intended for Discharge to Wastewater Infrastructure Facilities of Wastewater

Parameter	Sewerage Systems at Wastewater Infrastructure Facilities Resulting With Complete Treatment	Sewerage Systems At Wastewater Infrastructure Facilities Resulting From Deep Sea Discharge
Temperature (°C)	40	40
Ph	6,5-10,0	6,0-10,0
Suspended Solid Matter (Mg/L)	500	350
Oil and Grease (Mg/L)	250	50
Tar and Oil Based Oils (Mg/L)	50	10
Chemical Oxygen Demand (Cod)	4.000	600
Biochemical Oxygen Demand (Bod ₅) (Mg/L)	-	400
Sulfate (So ₄ ⁻) (Mg/L)	1.700	1.700
Total Sulphur (S) (Mg/L)	2	2
Phenol(Mg/L)	20	10
Free Chlorine (Mg/L)	5	5
Total Nitrogen (N) (Mg/L)	- ^(A)	40
Total Phosphorus (P) (Mg/L)	- ^(A)	10
Arsenic (As) (Mg/L)	3	10
Total Cyanide (Toplam Cn ⁻) (Mg/L)	10	10
Total Lead (Pb) (Mg/L)	3	3
Total Cadmium (Cd) (Mg/L)	2	2

Parameter	Sewerage Systems at Wastewater Infrastructure Facilities Resulting With Complete Treatment	Sewerage Systems At Wastewater Infrastructure Facilities Resulting From Deep Sea Discharge
Total Chrome (Cr) (Mg/L)	5	5
Total Mercury (Hg) (Mg/L)	0,2	0,2
Toplam Bakır (Cu) (Mg/L)	2	2
Total Nickel (Ni) (Mg/L)	5	5
Total Zinc (Zn) (Mg/L)	10	10
Total Tin (Sn) (Mg/L)	5	5
Total Silver (Ag) (Mg/L)	5	5
Cl ⁻ (chloride) (Mg/L)	10.000	-
Surfactants Reacting with Methylene Blue (Mbas) (Mg/L)	Biodegradation of non-conforming substances in accordance with the Standards of the Turkish Standards Institute and their discharge are prohibited as a principle.	

IV.9 Wastewater Values after Treatment, Which Receiving Body will be used to Discharge Treated Water, Information about Receiving Body before Discharging, Alterations may occur in Receiving Body after Discharging, Giving Discharge Limits as Table, Commitment of Permissions Requiring based on WPCR, Commitment of the Project Report with in the scope of Circular numbered 2005/5 for Approval by the Ministry of Agriculture and Rural Affairs, Criteria to be Observed in respect of Fisheries Production Areas

Receiving Wastewater Values after Treatment and Which Receiving Body will be Used for Discharging

In the feasibility studies of the plant planned to be constructed; WPCR standard values and UWTR standard values published in order to harmonize the EU Environmental Legislation with the National Legislation are taken into consideration. The design parameters of the plant are given in **Table 4** and the design parameters of the plant are shown in **Table 1**.

In the design studies, BOD concentration was calculated as 375 mg / L, COD 625 mg / L, SSM 375 mg / L, Total Kjeldahl Nitrogen 67 mg / L and Total Phosphorus concentration 10 mg / L in the first and second phases of the plant (**See Table 46**).

Table 46 Discharging Limits

Parameter	UWTR (2006)	WPCR (2004)	Design Criteria
Suspended Solid Material	35 mg/L	25 mg/L	25 mg/L
Biological Oxygen Demand	25 mg/L	35 mg/L	25 mg/L
Chemical Oxygen Demand	125 mg/L	90 mg/L	90 mg/L

Parameter	UWTR (2006)	WPCR (2004)	Design Criteria
Total Nitrogen	10 mg/L*	-	10 mg/L
Total Phosphorus	1 mg/L*	-	1 mg/L

Treated water coming from planned plant will be transported from Mezitli WWTP to the deep sea discharge in Viranşehir and discharged from there to the sea. Deep sea discharge structure was built by Province Bank between 2004-2005.

Changes in Marine Environment after Discharging

The Mezitli region is the only area in the Mersin Metropolitan area that has beaches that can be explored as far as possible. These beaches are currently unavailable due to the inadequate quality of sea water. However, it is aimed that the quality of sea water will be improved and the local people will start to use these beaches by starting the treatment plant planned to be constructed in the near future. This situation is expected to revitalize tourism, which has not been developed yet. The Mezitli WWTP will contribute to the improvement of the sea water quality of the Mersin Gulf and thus of the Mediterranean.

Permits to be taken

During the operation phase of the plant, the necessary permits will be obtained for the WPCR provisions. For the planned installation, Project approval will be obtained before the wastewater treatment plant is constructed in accordance with the circular number 2012/9 issued by R.T. the Ministry of Environment and Urban Planning General Directorate of Environmental Management published in Official Gazette dated 15.03.2012 and numbered 1239.

Criteria to be Concerning Fisheries Production Fields

Aquaculture production site; Is defined as water areas where aquaculture is grown and naturally any production facility or facility can be built or used for production, hunting, production, breeding and harvesting. In this regard, some safeguard measures are taken with regard to the places identified as breeding grounds for marine life, and in our inland water a hunting ban is imposed for certain periods.

Only the wastewater treatment unit will be constructed within the scope of the planned project and the construction of the pipeline providing water transmission with gravity from the Mezitli WWTP to the deep sea discharge in Viranşehir was built by Province Bank between 2004-2005. The pumping stations and the sewage system that will be needed to collect wastewater from the Mezitli basin will be built in parallel with this project under another project. Therefore, it is not foreseen that the project will have a negative effect on the production areas of aquatic products. On the contrary, it is expected that sea water quality will be improved by deep sea discharge as mentioned above.

IV.10 Disposal and Evaluation of Treatment Sludge, Permits to be Taken

Disposal of treatment sludge

Sludge from the activated sludge unit to be included in the plant will be transported to the regular solid waste disposal site after the sludge is dewatered. The expected amount of sludge from the sludge dewatering unit is 57 ton / day for 1st phase and 82 ton / day for second phase.

Comparison of alternatives to treatment sludge disposal

As mentioned in **Section I.7**, during the feasibility studies on the disposal of sludge 3 different alternatives have been evaluated. These alternatives are;

- ✓ Transfer to solid waste disposal facility,
- ✓ Burning by sending to cement plants, and
- ✓ Compostable and usable as fertilizer in agriculture sector.

As a result of the evaluations made; It has been preferred that the treatment sludge to be caused by the planned treatment be "sent to the regular storage sites" because the calorific value is about 90% of the solid material content in the sludge so that the sludge must be met by the producer.

Permits to be taken

Treatment sludge resulting from plant units will be disposed of by being sent to landfills.

It will be ensured that industrial facilities in the region will begin to develop and will be disposed treatment sludge that will occur in case of transferring wastewater to Mezitli WWTP. Hazardous wastes will be sent to the hazardous waste disposal facilities in case of hazardous waste disposal in case of non-hazardous waste disposal, and in case of hazardous waste disposal in the scope of "Regulation Regarding Regular Storage of Waste" published in the Official Gazette dated 26.03.2010 and numbered 27533.

IV.11 Tasks to be done in bad weather conditions in the plant (rain, dry, cold

weather, etc.)

Process calculations and sludge calculations related to the planned basin aeration and biophosphorus tanks are designed according to the sum of the daily average domestic wastewater flow and the physical treatment and final settling of the other units according to the pollution loads due to the sum of infiltration and daily peak flow.

Effective reductions in the activated sludge process can be seen in cold weather conditions. However, this does not affect the treatment system in the negative. The aerators, scrapers and mixers in the tanks prevent the tanks from freezing under cold weather conditions. Equipment such as screens, blowers, mechanical sludge thickening units will be found in closed buildings so they will not freeze.

IV.12 Flora, Fauna, Biodiversity, Effects on Habitat Loss and Precautions to be Taken, Landscape Studies Planned

The flora and fauna characteristics of the planned facility and its immediate surroundings are given in detail in **Section III.5**.

The effects of flora and fauna in the operation phase of the project will not cause any permanent damage here. The fact that a large part of the plant area is in the nature of agricultural land, that natural plant species that can be found in a very small part are widespread (cosmopolitan), that these species are found abundantly in the area around the plant site, there are no endemic plants in danger status, It may be at a low level. In order to further reduce this effect, during the construction activities, it will be possible to store the scraped vegetable soil and use it in landscaping applications to be carried out during the operation stage of this vegetable soil.

The project will have significant effects on continental flora and fauna, especially during construction. The most impact will manifest itself in the habitat and topography of the construction site and the natural habitat of the construction sites. Apart from that, indirect effects such as noise, dust and vehicle traffic will also be relevant. The measures to be taken to reduce these effects are as follows:

- Construction activities will not start during flowering and breeding of animals.

- Before the start of construction activities, the existing vegetable soil in the area will be stripped and stored, and after the construction, the seeds of natural plant species will be germinated by spreading this vegetable soil to landscaping areas.
- During the construction activities, entering of machinery / equipment, equipment and workers into unused areas will be prevented.
- Construction activities shall be conducted in such a way as to allow the animals to leave the area.
- A minimum level of exposure will be ensured and activities that will produce noise at night will be avoided.
- During construction activities, dusting will be prevented by continuous watering on the field.
- = Regular maintenance of equipment to be operated during the construction phase will be carried out.
- Waste to be generated during construction activities will be disposed of within the framework of legislation.
- Pre-operation trainings will be given to the personnel working in the building to be conscious about this issue.
- The protection measures of this Convention and the provisions of Articles 6 and 7 shall be complied with for the fauna species which are under strict protection and protected according to the Annex 2 and Annex 3 lists of the Bern Convention.
- The provisions of the CITES Convention (Convention on the International Trade of Endangered Species of Wild Fauna and Flora) shall be respected.

IV.13 Waste, Types and Amounts of Hazardous and Special Treated Waste to be Produced in Construction and Operation Period, Disposal Method

Construction period waste and disposal methods

Excavation waste: Excavation works will be done during site preparation and construction works. While some of the excavation material to be produced during the excavation works will be used again in the filling works and land leveling works, the remaining part will be transferred to the areas that the municipality will allow.

In the construction phase of the facility, during the storage of excavation waste to be built during the excavation activities to be carried out in the construction phase, the "*Regulation on Control of Excavation Soil, Construction and Demolition Waste*" dated 18.03.2004 and numbered 25406 and the "" dated 08.06.2010 and numbered 27605, "Control and Regulation on Polluted Shelters with Point Source " will be implemented.

Construction waste: Construction waste will be generated during the construction of the planned plant and the construction phase. Construction waste is largely made of sheet metal and metal parts, packaging and boxes, lumber, etc. Construction-derived solid waste, containers, wood waste and scrap metals. Construction waste from concrete, scrap metal, and wood will be recycled, while non-recoverable construction waste will be collected on-site, on landfills dedicated to short-term accumulation of such waste on site. These areas will be selected to minimize rainfall effects or the possibility of soil contamination. Construction waste that can not be recycled and accumulated in the field will be transported to the disposal site of the municipality through trucks.

Domestic solid waste: Those that can be evaluated from domestic solid waste to be generated by the personnel to be employed within the facility will be collected in separate containers and given to licensed recycling companies. Waste that can not be recovered will be collected in separate containers and delivered to the municipality in order to be disposed of in accordance with the provisions of the "Solid Waste Control Regulation" published in the Official Gazette dated 14.03.1991 and numbered 20814.

During the construction activities of the plant, 60 people will work. As a result of the calculations made with the assumption that the amount of solid waste per person for Mersin Province is 1,08 kg / person-day⁹, the amount of solid waste to be generated from the personnel working at the construction phase of the plant was determined as 64,8 kg / day.

Hazardous waste: It is expected that dangerous waste (paint boxes, thinner containers,

etc.) will be formed due to construction activities. These waste will be temporarily stored in a leakproof concrete area within the facility area and then sent to the facilities which have a hazardous waste disposal license for final disposal. The provisions of the "Regulation on the Control of Hazardous Waste", which was published in the Official Gazette dated 04.09.2009 and numbered 27339, shall be observed during the storage and transportation of these substances.

Waste oils: As the preparation of the land within the scope of the project and the maintenance, repair and cleaning works of the vehicles that will work during the construction phase will not be done on the project ground, waste oil formation is not expected. However, where vehicle maintenance is required in the project, waste oils will be disposed of in accordance with the "Waste Oil Control Regulation" published in the Official Gazette dated July 30, 2008 and numbered 26952.

Vegetative waste oils: The personnel who will work in the construction phase of the project will be provided with ready meals from the outside food companies and the vegetable waste oil will not be formed in the field.

Waste batteries and accumulators: Maintenance, repair and cleaning of the vehicles to be used during the preparation and construction phases of the project will not be carried out on site. Waste batteries may be generated due to the battery change operations during the repair and maintenance activities of work machines. As a result of the battery change operations of the working machines, the waste liquid will be replaced with the full amount given by the authorized battery changing company.

The waste batteries that will be produced after the plant completes the life of the pillars to be used during the construction phase will be collected in the waste battery banks to be placed in the facility area.

Medical waste: An infirmary will be established on site for the health problems of personnel working in the construction phase of the project. In the case of more serious injuries, health centers in Mezitli and Mersin will be used. The project will be included in the existing system for the medical waste to be generated during the construction phase.

Tires with completed life span: Tire waste that have completed the life expectancy to arrive at construction stage in accordance with the "Regulation on Control of Completed Tires" published in the Official Gazette dated 25.11.2006 and numbered 26357 (amendment, Official Gazette dated 30.03.2010 and numbered 27537) Transportation permits will be provided to the environment permitting and licensed recycling facilities through vehicles licensed for transportation.

Operation Phase waste and disposal method

Domestic Solid Waste: Solid waste to be generated from personnel during operation phase of the facility shall be collected by the municipality and sent to the waste disposal facility of the municipality. Recycling of bottles, metal, wood chips and similar waste will be ensured.

The daily amount of domestic solid waste expected to occur during the operational phase of the plant is calculated as 12.96 kg (12 persons x 1.08 kg / person-day) kg.

Sludge: During the operation of the plant other solid waste will occur as biologically activated sludge flocs became stable and are inert waste formed from the other parts. Waste will occur will be taken to landfill sites. In the disposal of these waste, 03.08.2010 date and 27 661 numbered Official Gazette enacted the "Regulations on the Use of Soil of Domestic and Urban Sewage Sludge", 08.06.2010 and 27605, which entered gazette "Soil Pollution Control and Point Regulation on Welded contaminated Sites ", 26.03.2010 and 27 533 No. enacted the Official Gazette" Regulation on the Landfill of Waste "with 05.07.2008 date and 26927 numbered Official Gazette enacted" Regulation on Waste Management General Principles "Provisions shall be implemented.

Hazardous waste: Hazardous waste will form in very small quantities during the operational phase of the project. Hazardous wastes generated will be given to the licensed firm for final disposal after being temporarily stored in the facility area. The "Hazardous Waste Control Regulation", which was published in the Official Gazette dated 04.09.2009 and numbered 27339, will be applied in the collection, storage and disposal of hazardous wastes.

Vegetable waste oils: The personnel who will be working in the operation phase of the

project will be provided with ready meals from outside food companies, and there will not be any vegetable waste oil formation in the field.

Waste batteries and accumulators: Waste batteries and accumulators that may occur during operation phase will be disposed of in accordance with the "Regulation on Control of Waste Batteries and Accumulators" which was published in the Official Gazette dated 31.08.2004 and numbered 25569.

Medical waste: As in the construction phase of the project, the infirmary will be used during the operation phase and the medical waste to be generated from the wastewater will be included in the existing system.

IV.14 Transportation, Storage and Usage of Explosive, Inflammable, Hazardous and Toxic Items in the Scope of the Project in Construction and Operation Phases, Tools and Machines to be Used for These Works, Storage Methods, Disposal Methods and Safety Precautions

No explosives and / or toxic substances will be used for excavation works to be carried out during the preparation of the land. Construction machinery will be used for the preparation of the land and for the basic excavations. The fuels of the work machines to be used, the source gases

Explosive and flammable substances such as paints and solvents will be needed. A space will be allocated where the mentioned items can be temporarily stored on the premises. This storage area will be installed with the flooring covered with impermeable concrete.

IV.15 Measures to be taken against odor, dust, insect and fly generation

High amounts of organic matter in the wastewater are separated by malodorous compounds by bacteria present in the wastewater treatment plant. Since the activated sludge in the biological wastewater treatment plant contains very high amounts of bacteria and organic matter, the compounds formed by the organic substances separated by the bacteria cause bad odor.

Biological odor removal will be done to prevent the odor problem that may occur in the sludge compartment containing pre-treatment (screens) and sludge thickener and dewatering. Odor removal will be carried out by biofiltering and the most cost effective and efficient system will be used to provide odor treatment in the treatment plants. Dirty air in the units will be collected by the vacuum system and transmitted to the biofilter unit.

The odor will be absorbed by the axial type fans from the screen building containing the collection tank and fine screens in entrance. The sludge building where the thickening and dewatering processes are carried out is designed as reinforced concrete and covered. The odor removal unit is designed separately for the screen building and the sludge building due to the difference in distance between them

The following measures will be taken to prevent the bad smell coming from the wastewater treatment plant:

- Good operational conditions will be established.
- The treatment units will be cleaned periodically.
- The amount of solid waste and activated sludge to be formed will be reduced. Items that accumulate in the screens will be collected at frequent intervals.
- Units that may cause odor will be installed in closed environments.
- The sludge will be removed before long waiting. If it needs to be held for a while, lime should be added to the mud.
- The aeration rate will be increased in biological treatment units.
- The plant will be screened around the plant by planting seeds and trees.

Within the scope of the project, the provisions of the "Regulation on the Control of Emissions Causing Odor", which was published in the Official Gazette dated 04.09.2010 and numbered 27692, shall be observed.

IV.16 Transport Infrastructure Plan in the scope of the Project, Construction and Operation Phases, Operations Related to Construction of this Infrastructure; Materials to be Used, Chemical Materials, Vehicles, Machines; Powder Diffusive Mechanical Processes such as Crushing, Grinding, Transporting, Storage during Construction of

Infrastructure

Transportation infrastructure plan, construction, materials, chemicals, machinery and equipment

The plant area is located within the borders of Mezitli District. The closest settlement to plant is Esenbağlar Quarter 400 m (bird flight) and Akdeniz Quarter 900 m (bird flight). Access to the plant is provided by the Mersin-Silifke (D400) highway. The existing roads will be used within the scope of the project and there is no need for connection roads.

Within the scope of the project, only service routes will be provided for transportation to the units within the facility. The only chemical that will be used during these operations will be asphalt. The maximum amount of asphalt will be used in the construction of on-site transportation routes. Approximately 1 excavator, 2 trucks, 1 loader, 1 sprinkle, 1 dozer and 1 cylinder will be used in the service roads to be constructed. New service roads to be built under the project will be covered with only stabilized material and rectified by cylinders.

Powder Diffusive Mechanical Processes such as Crushing, Grinding, Transporting, Storage during Construction of Infrastructure

During the construction of the infrastructure, mechanical processes such as crushing, grinding, transportation and storage will not be performed. The necessary materials and equipment will be supplied from the market. During the excavation and loading operations, the soil will be wetted to prevent the future dust. Trucks will be covered with tarpaulins to prevent dusting during transportation of the materials. This situation is limited to the duration of construction and will take place after completion of construction works.

IV.17 Settlements [Impacts of Settlements during Operation and Construction, Number of Affected People and Measures to be Taken, Distance to Nearest Settlement Area and Demonstration on the Map (Separate for All Units Planned) Negative Impacts on the Living People, Effects on Livelihoods and Precautions] **Near-site settlements**

The plant area is located within the borders of Mezitli District. The closest settlement to plant is Esenbağlar Quarter 400 m (bird flight) and Akdeniz Quarter 900 m (bird flight).

The settlements near the site are shown in the maps presented in **Chapter II**.
Impacts and possible measures to be taken during the construction activities

Activities that may adversely affect local people during construction activities; exhaust emissions from work machines, noise and dust formation. To reduce them to a minimum level, the following aspects will be followed:

- Vehicles are to be maintained periodically.
- Construction activities that may cause noise will be performed during daylight hours.
- During the activities to be carried out within the scope of the project, "Environmental Hazard Assessment and Management Regulation", which has been published in the Official Gazette dated 04.06.2010 and numbered 27601 will be complied with. Protective equipment such as headgear, earbuds or earplugs shall be provided to protect employees' health and ensure continuity of activity in noise exposed environments.
- Humidification will be done on the way to avoid the dust.
- The necessary training will be given to the personnel who will work in the construction phase to prevent work accidents. In addition, warning signs will be placed in the work area.

- Electricity-related work will be carried out in order to minimize work accidents such as electric shocks, particularly in these jobs, and personnel will be informed about job safety.
- Workers will be examined periodically to prevent infectious diseases on site. According to the legislation, a workplace physician will be kept on the construction site.

In addition, it is not anticipated that any negative effects on the settlements will be expected, as the solid and liquid waste that will occur during the construction phase of the facility will be disposed within the framework of the relevant legislation.

Impacts and measures to be taken in the settlement during operation actions

Measures to be taken against the formation of odors, insects and flies that will occur during the operational phase of the plant are presented in detail in Section IV.15.

Within the scope of the project, the "Public Hygiene Law" and the regulations and regulations issued in this respect, the "Labor Law" number 4857 on occupational health and safety, the "Occupational Health and Safety Regulation" published in the Official Gazette dated 11.01.1974 and numbered 14765, "Regulation on Occupational Health and Safety Committees" published in Official Gazette No. 25426 dated .2004, "Regulation on Occupational Health and Safety Services" published in the Official Gazette dated 27.11.2010 and numbered 27768, Official Gazette No. 28339 dated 30.07.2012 Necessary measures will be taken in terms of worker health and work security within the framework of the "Occupational Health and Safety Law" published in the Gazette and related regulations will be implemented.

The employment facility will be created by providing the local facility according to the qualifications of the personnel to be employed in the construction and operation phases of the planned plant. In addition, there is no need for any expropriation work or resettlement since the facility area is owned by MESKI. Likewise, since no agricultural activities and / or livestock activities are carried out in the area of the facility, it is not expected that local people will have a negative effect on their livelihoods.

IV.18 Proposed Health Protection Band Distance for the Project, Display on Plan

The project subject plant, in accordance with the provisions of the "Regulation Regarding the Opening of Workplaces and Working Permits" published in the Official Gazette dated August 10, 2005 and numbered 25902

Class 2 is in the scope of Non-Performing Institution. The sanitary protection band is determined by inspection boards considering the harmful effects of the facilities on the environment and the health of the community and the pollutants.

The health protection band determined within the scope of zoning plans for the facility; 5 m in the narrowest part of the installation and 22 m in the widest part of the installation (**see Appendix 2**).

Following the EIA process, a Workplace Opening and Working License will be issued in accordance with the provisions of the "Regulation Regarding the Opening of Workplaces and Work Permits" published in the Official Gazette dated 10.08.2005 and numbered 25902. The required information and documents will be submitted to the relevant institution in full during the opening of the Opening and Working License.

IV.19 Where and How to Provide Housing and Other Social / Technical Infrastructure Needs for the Personnel to Work During the Operation of the Plant and the Population Due to the Personnel, Health Services to be Provided

Due to the fact that the planned facility is close to the district center, social facilities, public housing, etc. will not be constructed. It is planned that the staff working in WWTP will be provided from the local people. Therefore, the personnel to be employed within the scope of the project will be able to live in their own residence.

Within the scope of the project, one infirmary will be established in accordance with the provisions of the Labor Law. Smaller injuries will be intervened in the infirmary, and more serious injuries will benefit from the health facilities in Mezitli and Mersin.

IV.20 Noise Level to be Produced in the Scope of the Project, Assessment in the Scope of the Article 23 of the EHMR, Construction of the Background Measurements and Examination under Article 27, Calculation of the Noise Level during Operation Phase, Commitment of Obligations Related to Vibrations

An Acoustic Report has been prepared and presented in Annex 7 to determine the level of noise that will arise from the plant's both construction and operation phases. The calculations made under the Acoustic Report are summarized in the following sections:

Construction Phase

Noise levels to occur in the plant; is calculated with the formulas given according to the defined motor power levels defining at the tables given in the Official Gazette dated 22.01.2003 and entered into force by the Regulation on the Environment Noise Emissions Created by Equipment Used in the Field (2000/14 / EC)

The noise power levels of the vehicles are calculated according to the engine powers of the machines to be used in the project.

Excavator: The excavator motor power to be used in the plant area is 126 Hp = 94 kW .
 $P = 94 \text{ kW} > 55 \text{ kW}$

The formula " $L_w = 84 + 11 \log P$ " has been used to calculate noise power; $L_w = 84 + 11 \log 94 = 105,7 = 106 \text{ dB}$

Dozer (with Pallet): The dozer engine power to be used in the plant is 133 HP = 99 kW. $P_A = 99 \text{ kW} > 55 \text{ kW}$

The formula " $L_w = 84 + 11 \log P$ " has been used to calculate noise power; $L_w = 84 + 11 \log 99 = 105,95 = 106 \text{ dB}$

Vibratory Cylinder: The cylinder engine power to be used in the plant is 84 HP = 63 kW.
If $P = 63 \text{ kW} < 70 \text{ kW}$ then $L_w = 106 \text{ dB}$

Grader: Grader engine power to be used in the facility is 125 HP = 93 kW. $P = 93 \text{ kW} > 55 \text{ kW}$

The formula " $L_w = 82 + 11 \log P$ " has been used to calculate noise power; $L_w = 82 + 11 \log 93 = 103,6 = 104 \text{ dB}$

Crane: The crane engine power to be used in the plant area is 279 HP = 208 kW. $P = 208 \text{ kW} > 15 \text{ kW}$

The formula " $L_w = 96 + \log P$ " is used to calculate noise power; $L_w = 96 + \log 208 = 98 \text{ dB}$

Transmixer: The transmixer motor power to be used in the plant area is 375 Hp = 280 kW. $P = 280 \text{ kW} > 55 \text{ kW}$

The formula " $L_w = 82 + 11 \log P$ " has been used to calculate noise power; $L_w = 82 + 11 \log 280 = 108,9 = 109 \text{ dB}$

Truck (Dumper): The engine power of the truck to be used in the plant area is 315 HP = 235 kW. $P = 235 \text{ kW} > 55 \text{ kW}$

The formula " $L_w = 82 + 11 \log P$ " has been used to calculate noise power; $L_w = 82 + 11 \log 235 = 108 \text{ dB}$

Sprinkle: The sprinkle engine power to be used in the plant area is 256 HP = 191 kW. $P = 191 \text{ kW} > 55 \text{ kW}$

The formula " $L_w = 82 + 11 \log P$ " has been used to calculate noise power; $L_w = 82 + 11 \log 191 = 107 \text{ dB}$

Loader: The loader engine power to be used in the plant area is 125 HP = 93 kW. $P = 93 \text{ kW} > 55 \text{ kW}$

The formula " $L_w = 82 + 11 \log P$ " has been used to calculate noise power; $L_w = 82 + 11 \log 93 = 103,6 = 104 \text{ dB}$

Compressor: The compressor motor power to be used in the plant is 18 HP = 13.4 kW. If $P \leq 15$

$L_w = 97 \text{ dB}$

The calculated noise power levels are given in **Table 47**.

Table 47 Noise Power Level of Machine Equipment to be Used in Construction

Machine Equipment Name	Sound Power Levels (dB)	Number
Excavator	106	1
Dozer	106	1

Machine Equipment	Sound Power Levels	Num
Cylinder	106	1
Digger	104	2
Truck	108	5
Sprinkle	107	1
Crane	98	2
Loader	104	2
Compressor	97	1
Transmixer	109	2

Total noise power level caused by the work machines used in the facility area; Is calculated from the sound power level of each source with the help of formula 1 given below.

$$L_{Wt} = 10 \log \sum_{i=1}^n 10^{\frac{L_{wi}}{10}} \quad (1)$$

In this formula;

n: Number of noise sources

L_{wi} : Noise power levels (dB) values of noise sources

L_{Wt} : Total noise power level¹⁰

$$L_{WT} = 10 \times \log \left(1 \times 10^{\frac{106}{10}} + 1 \times 10^{\frac{106}{10}} + 1 \times 10^{\frac{106}{10}} + 2 \times 10^{\frac{104}{10}} + 5 \times 10^{\frac{108}{10}} + 1 \times 10^{\frac{107}{10}} \right. \\ \left. + 2 \times 10^{\frac{98}{10}} + 2 \times 10^{\frac{104}{10}} + 1 \times 10^{\frac{97}{10}} + 2 \times 10^{\frac{109}{10}} \right)$$

= 118,8 dBA¹¹

The noise pressure level (LPT), which originates from the machine / equipment and reaches a certain distance, is calculated using the formula 2 given below.

$$L_{PT} = L_{WT} + 10 \times \log \left(\frac{Q}{4\pi r^2} \right) \quad (2)$$

L_{PT} : Noise pressure (noise) level (dBA)

Q : Noise Level Constant (2 received)

r : Distance (m)

The reduction in the noise pressure level due to atmospheric swallowing of the air can also be taken into consideration because of its operation in an open environment. However, in the calculations with the most pessimistic approach, it is assumed that any decrease noise pressure level due to atmospheric swallowing will not occur.

The noise levels at different distances are calculated by these formulas and summarized in **Figure 33**. The change in noise level depending on the distance is presented in **Table 48**.

¹⁰Prof. Dr. Nevzat ÖZGÜVEN, Industrial Noise Control, Publication of Chamber of Mechanical Engineer

¹¹Since the difference between 11 dB and dBA is negligible, dB is taken as dBA.

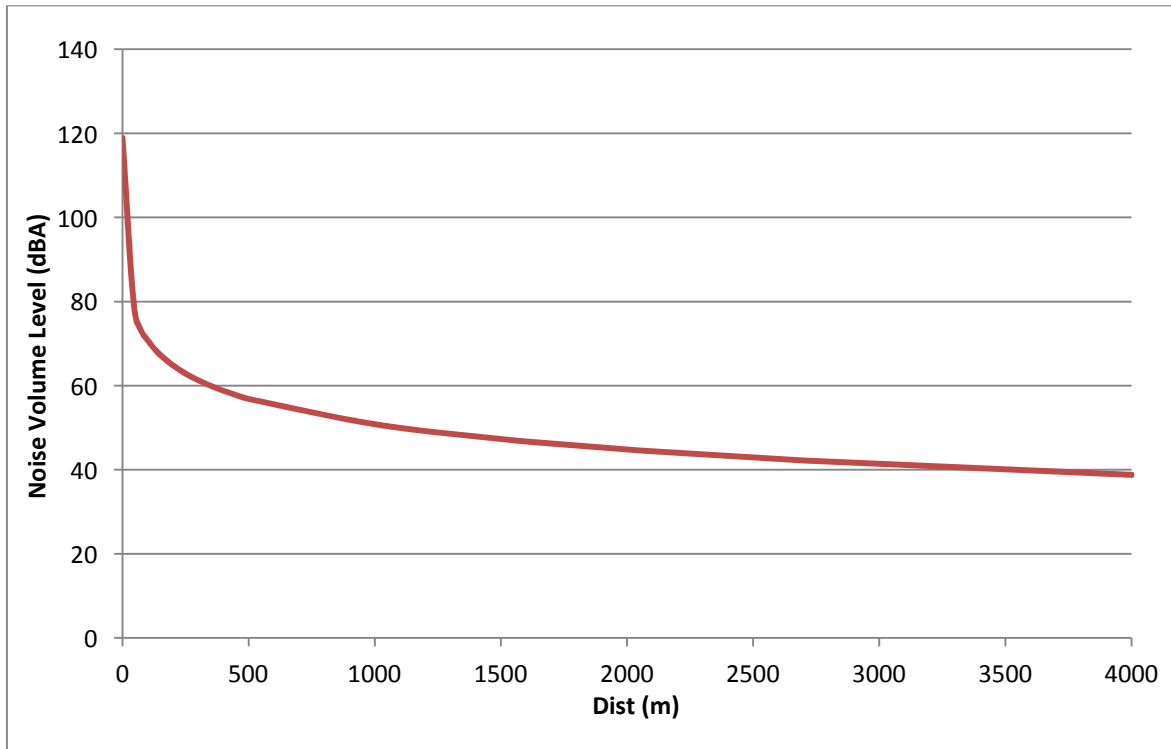


Figure 33 Distribution of Noise Resulting from Units in terms of Distance

Table 48 Values of noise level due to machinery / equipments in operation with respect to distance

Distance (m)	A- Weighted Noise Pressure Levels (dBA)
0	118,82
50	76,9
110	70,0
150	67,3
200	64,8
250	62,9
300	61,3
350	60,0
400	58,8
450	57,8
500	56,9
1.000	50,8
1.500	47,3
2.000	44,8
2.500	42,9
3.000	41,3
3.500	40,0
4.000	38,8

Assessment of the Calculation Result Values on the Frame of Article 23 of the Ordinance on EHAMR

Annex-7 Table 5 of the CRPD Regulation lists the Environmental Noise Limit Values for Site Area. These limit values are given in **Table 49**.

Table 49 Environmental Noise Limit Values for Site Area

Type of activity (construction, demolition and repair)	L _{day} (dBA)
Building	70
Road	75
Other Sources	70

As stated in **Article 23** of the CRPD Regulation, the daytime noise level during the construction phase of construction should not exceed 70 dBA around the sensitive building nearest to the work area. As can be seen from **Table 48**, the 70 dBA limit value is provided from 110 m.

The nearest sensitive building to the construction site is the residence with a distance of about 200 m. In the calculations made, the noise level at 200 m is 64.8 dBA and it is found that it is below the limit values of the Ordinance Regulation. In this case, it is not expected that the nearest settlement area will be adversely affected by noise.

Calculations are based on the assumption that all work machines will work in the same place and at the same time. In reality, such an application is unlikely. For this reason, the noise levels calculated in **Table 48** will be much lower than the calculated value.

Within the scope of the project, "Environmental Hazard Assessment and Management Regulation" dated 04.06.2010 and number 27601 will be meticulously observed.

Operation Phase

The noise levels of the main sources of noise at the facility are given in **Table 50**.

Table 50 List of Machinery Equipment to be Operated in Plant Operation Phase

Machine Type	L _w (dBA) ¹²	Unit
Sedimentation Tank	47,7	4
Dewatering Unit	49,2	1
Aeration Tank	61,6	4
Final Sedimentation Tank	46,6	4

Total Noise Level Calculation

Total noise power level to be generated from the units to be used in the plant operation phase; The noise power level of each source is calculated with the help of formula 1.

$$L_{WT} = 10 \times \log \left(3 \times 10^{47,7/10} + 1 \times 10^{49,2/10} + 6 \times 10^{61,6/10} + 3 \times 10^{46,6/10} \right) \quad (1)$$

$$= 68 \text{ dBA}$$

The noise pressure level (LPT) resulting from the units and reaching a certain distance is calculated by using the formula 2. The noise levels at different distances are calculated by these formulas and summarized in **Figure 34**. The change in noise level depending on the distance is presented in **Table 51**.

¹²Ankara WWTP measurement values are taken as reference.

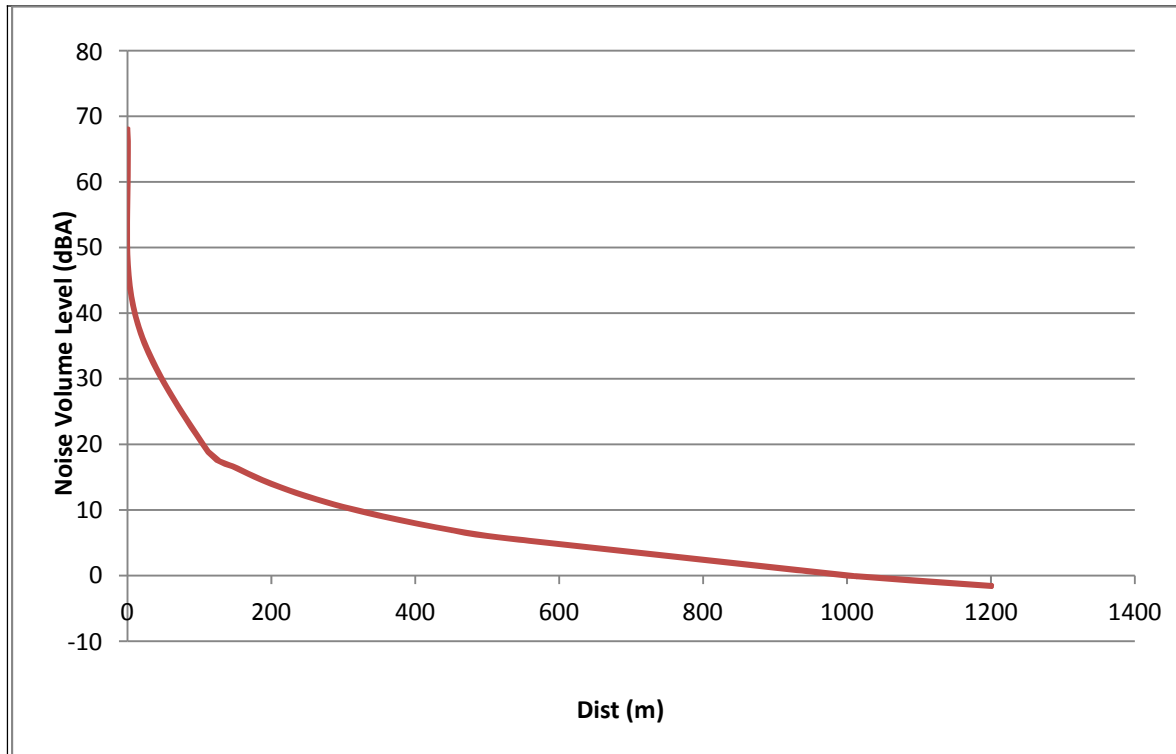


Figure 34 Distribution of Noise Resulting from Units in terms of Distance

Table 51 The Value of Noise Level from Units with respect to Distance

Distance (m)	A-Weighted Noise Pressure Levels (dBA)
0	67,98
50	40,0
110	19,2
150	16,5
200	14,0
250	12,0
300	10,5
350	9,1
400	8,0
450	6,9
500	6,0

Assessment of Calculation Result Values in the Frame of Article 22 of the Regulation of EHAMR

The limit values specified in Table-4 of Annex-VII of Regulation of EHAMR are given in **Table 52**.

Table 52 Environmental Noise Limit Values for Industrial Facilities (Annex 7, Table 4)

Areas	L _{daytime}	L _{even.} (dBA)	L _{night} (dBA)
Areas where education, culture and health care, as well as summer and camping sites are extensive,	60	55	50
Areas where commercial buildings and noise sensitive uses are extensive in areas where houses are extensive	65	60	55
Areas where workplaces are extensive in areas where commercial buildings and noise sensitive uses are existing together	68	63	58
For each facility within the Organized Industrial Zone or the Specialized Industrial Zone	70	65	60

The closest susceptible building to the facility area is the residence 200 meters away. The limit values given for Industrial Facilities in **Table 52** are for "Areas where houses are extensive in areas where commercial buildings and noise sensitive uses are together"; It is 65 dBA in daytime, 60 dBA in L_{evening} and 55 dBA in L_{night} .

In the calculations made for the plant, the noise level at 200 m is 14 dBA and it is below the limit values of L_{daytime} 65 dBA, L_{evening} 60 dBA and L_{night} 55 dBA given in the related regulation. In this case, it is not expected that the nearest settlement areas of the facility will be adversely affected by noise.

Calculations are based on the assumption that all work machines will work in the same place and at the same time. In reality, such an application is unlikely. For this reason, it is predicted that the noise level will be much lower than the values determined by the calculations.

When the facility goes into operation, noise measurements will be made on noise sources.

"Criteria for the Evaluation and Management of Environmental Noise" dated 06.2010 and numbered 27601 ARTICLE 22 contains the following criteria regarding the level of noise emitted from the environment, facilities, workshops, workshops and workplaces:

- a) The noise level emitted by each operation and the surrounding area shall not exceed the limit values given in Table-4 in Annex-VII.
- b) Operating near, on, below, or above such that it may affect susceptible to noise; The background noise level of the environmental noise level L_{eq} noise indicator transmitted by air from each workplace, workshop, workshop and similar businesses to the environment or transmitted to sensitive uses by noise via common partition elements, interiors, ceilings or adjacent walls shall not exceed 5 dBA.
- c) The total environmental noise level spreading from businesses such as workplaces, workshops, workshops and the organized industrial zone or small industrial site can not exceed the background noise level of L_{eq} noise indication by more than 7-10 dBA. Based on this range, total environmental noise level; The number of affected people exposed to the noise, the distance between the noise source and the susceptible places, and similar factors are determined by the Provincial Local Environment Committee Decision. If the limit value given in this paragraph is exceeded, each workplace contributing to the background noise level is equally responsible for exceeding the limit value. Once the contribution rates to the noise have been determined, each business takes necessary measures.
- d) The impulse noise LC_{max} noise indicator, which may be the result of the operation of the plant, workshop, workshop and workplace, can not exceed 100 dBCs.

Regarding the facility, necessary permits will be obtained in accordance with the provisions of the "Regulation on Permits and Licenses to be Obtained by the Environmental Law" published in the Official Gazette dated 29.04.2009 and numbered 27214.

The owner of the activity shall make the necessary applications to obtain the Noise Control Permission Certificate within 6 months after the operation of the plant.

Control Measures to be Taken if the Environmental Noise Level Calculated for the Construction Phase is Beyond the Boundary Values Given by the Ordinance of the EHAMR

As stated in Article 23 of the Ordinance of EHAMR the L_{daytime} (L_p) noise level during the construction phase of construction should not exceed 70 dBA around the sensitive building closest to the study area. The calculations related to the noise level to be generated during the construction phase were made in the Acoustic Report presented in **Annex 7** and as a result of the calculations made, it was determined that the noise levels of the nearest settlements would not be adversely affected. It is also assumed in the calculations that all work machines are operating at the same time and in the same place. But at no time will all the machines run in the same place and at the same time. For this reason, the actual noise level will be much lower than the calculated noise level.

In case of exceeding the limit values of the regulations in the construction phase, the working hours of the machines shall be limited, the disturbance caused by the vehicles shall be maintained regularly, and panels shall be installed to prevent the spread of noise if necessary.

IV.21 Employees, Numbers, Risky and Dangerous in terms of Human Health and Environment in the Scope of the Project (During Construction and Operation), Measures to be Taken

The plant is planned to have 60 people working in construction phase and 12 people in operation phase.

The following precautions will be taken for activities that may be dangerous in terms of human health and environment.

- Anyone other than plant employees will not be allowed to enter the facility without permission.
- The trainers will be given trainings such as electrical safety, fire fighting and first aid. Personnel protective equipment such as all personnel helmets, insulated gloves, insulated boots will be provided and this equipment will be checked regularly and renewed if necessary. Required warning signs will be placed in the facility area where necessary.
- Upon completion, all units will be operated and maintained for safety and repair. There will be no impact or damage to existing infrastructure facilities of maintenance and repair.
- All waste (solid waste and liquid waste) coming from the plant will be recovered or disposed of in accordance with the environmental standards specified in the regulations and not threatening human health.
- A fire warning and extinguishing system will be installed for possible fires in the facility area and maintenance of the system will be carried out in certain periods.
- In order to prevent any kind of work accidents, warning signs will be put on work areas and personnel will be provided with personal (boot, gloves, mask, glasses, etc.) equipment.
- Enough lighting will be provided in the facility area.
- The risks of occupational accidents due to the decrease in concentration that may occur by giving short breaks to the workers during the working period will be reduced.

In-service training will be provided in case of work accidents that will take place despite all kinds of preventive measures, health of employees, first aid and job security. The laws, regulations and regulations related to this subject will be observed.

IV.22 Emergency Action Plan (Precautions to be Taken Against Possible Accident, Fire, Explosion, Earthquake and Sabotage)

The project will prepare an emergency response plan to prevent unforeseen mishaps and to do so in such cases. The purpose of this plan is to organize the activities of the teams to collect data, make a study plan, take precautions to protect life and property, damage detection, emergency response and rescue teams in case of emergency such as fire, flood, earthquake, chemical hazards and sabotage (See Figure 35).

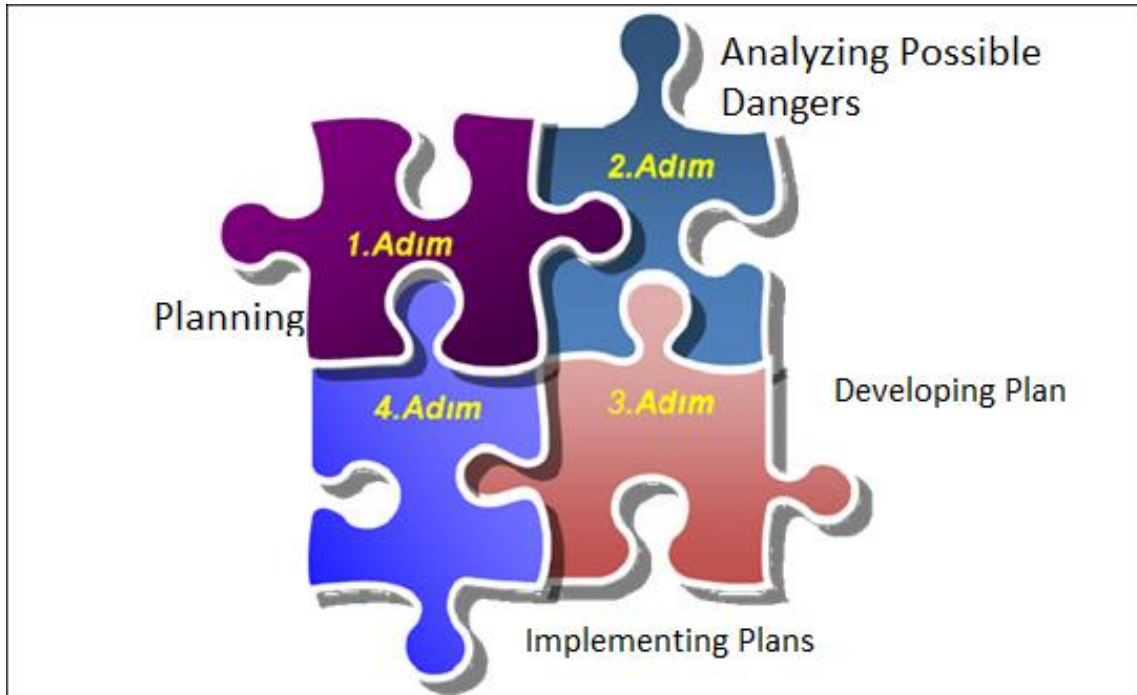


Figure 35 Application to be considered in Emergency Planning

The emergency response plan to be prepared within the scope of the project will be prepared taking into consideration the risk factors mentioned in the "Occupational Health and Safety Law" published in the Official Gazette dated June 30, 2012 and numbered 28339. This plan, which will be prepared, will take the necessary precautions to be taken into account and to be determined, and the employees will be given necessary trainings in these matters to ensure that they comply with the emergency response plans and act accordingly. Employer in the "Law on Occupational Health and Safety", which has been published in the Official Gazette,

- By taking into account the work environment, the materials used, the work equipment and the environmental conditions, it is possible to determine the possible emergency situations that may affect the employees and the working environment and to take preventive and restricting measures against them.
- Make necessary measurements and evaluations to protect against adverse effects of emergencies and prepare contingency plans.
- Considering the size of the workplace and the specific hazards it carries, the nature of the work done, the number of employees and other persons in the workplace in order to combat emergencies; It provides training and exercises by providing sufficient number of trained persons, equipped with appropriate equipment in prevention, protection, evacuation, fire fighting, first aid and similar matters, and ensures that the teams are always available.
- Especially in the areas of first aid, emergency medical intervention, rescue and fire fighting, it makes the necessary arrangements to provide contact with out-of-work organizations.

Within the scope of the "Occupational Health and Safety Law" published in the Official Gazette dated June 30, 2012 and numbered 28339, the Employer is obliged to ensure the health and safety of the employees regarding their work;

- It works to prevent occupational risks, to take all kinds of measures including education and information, to make organization, to provide necessary tools and equipment, to make health and safety measures compatible with changing conditions and to improve the current situation.
- It monitors the compliance with the occupational health and safety measures taken at the workplace, inspects and eliminates the nonconformities.
- Risk assessment is done or done.
- When assigning employees, it considers the suitability of the employee for health and safety.
- It takes the necessary precautions to ensure that employees who are not adequately informed and instructed do not enter vital and special dangerous places.

When the employer fulfills these obligations, it must take into consideration following issues; Avoiding risks, analyzing risks that can not be avoided, combating risks with resources, adapting to technical developments, replacing dangerous with nontoxic or less dangerous, prioritizing personal protective measures, personal protective measures, designing workplaces To prevent the adverse effects of health and safety on the uniformity of work and production, to reduce the most if it can not be avoided and to reduce the effects of factors related to technology, work organization, working conditions, social relations and working environment To develop a coherent and general prevention policy.

In the event of an emergency;

- It is a very good situation to be calm and to get to know what it is.
- If so, the "Emergency Alarm" should be activated.
- As indicated in the emergency evacuation plan, the emergency collection zone
- must go.
- When the site is abandoned; Electric shavers (fire and flood) should be closed.
- Elevators should not be used.
- It should be done according to the information given by the crisis desk.

In order to combat emergency situations within the planned facility, the points specified in **Table 53** will be taken into consideration.

Table 53 Emergency Plan

FIRST AID-EMERGENCY MEDICAL ASSISTANCE	The person who sees the person who needs to First aid / emergency medical assistance	It does not panic, it informs the employer / employees.
	Employer / Employer Deputy	The first aid outside the workplace and the medical institution that will provide emergency medical help are called
	Employee / Educated employee	He or she takes his first aid kit and emergency medical aid equipment and goes to the scene. He or she intervenes in the direction of education. He or she prepares the person in need of first aid and emergency medical assistance for transport to the nearest health facility.

	Other employees in the workplace	<p>He or she will be available to assist First aid and emergency medical assistance. They help providing first-aid / urgent medical aid teams from health institutions by addressing, describing, and so on to facilitate transportation. They remove obstacles in the doorways and escape routes that provide first aid and emergency medical assistance for evacuation of the person in need.</p> <p>If the situation continues, except employees who have the necessary equipment and who are not specifically assigned other workers will not continue their business.</p>
	The first person to see the fire	<p>He or she don not get into panic. They inform the employer and employees of the fire and location with a loud voice.</p> <p>They use emergency exit belongs to the region where it is located in order to arrive the emergency gathering area.</p>
FIRE	Employer / Employer Deputy	<p>He or she rings the emergency siren.</p> <p>They inform security officer and provide contact with organizations outside the workplace in the fight against fire. If necessary, they inform the police, first aid, emergency medical aid teams.</p> <p>They use emergency exit belongs to the region where it is located in order to arrive the emergency gathering area.</p>
	Employee / Educated employee	<p>He or she intervenes in the fire by taking the nearest fire tube without risking himself. They cut off the electricity / natural gas of the workplace, closes machines, equipment, tools and appliances in the workplace. They ensure the safety of chemicals (if any). Go to the fire zone and see if it is necessary to fire. They tell the fire department if need it. They will be in contact with the employer.</p> <p>They use emergency exit belongs to the region where it is located in order to arrive the emergency gathering area.</p>
	Security guard	When he or she hear the fire, they keeps the emergency exit routes open in accordance with the instructions
	Other employees in the workplace	They do not use the elevator as an emergency exit.
	Emergency Team	Emergency teams move in the direction of their mission definitions when needed.
	The first person to notice the leak	They do not get into panic. They inform the employer and employees of the leakage of gas leaks loudly.
LEAK-GAS LEAK	Employer / Employer Deputy	<p>They cut off the natural gas from the main valve or close the line valve where the gas leak is present.</p> <p>They inform security officer. They call a specialist company from outside the building. They inform İGDAŞ with a phone from outside the building.</p>
	Employee / Educated employee	<p>They investigate the leaking area., cut electricity / natural gas. They close any electrical machinery, equipment, equipment and any means of sparking that are near the leak.</p> <p>They intervene in accordance with the instructions in the direction of training.</p>

	Other employees in the workplace	<p>No one uses electrical switches, electrical appliances and equipment lifts, door bells and phones. No smoking.</p> <p>They depart from the emergency exit belonging to the region and go to the emergency gathering area.</p> <p>Except employees who have the necessary equipment and who are not specifically designated, other workers do not continue to work.</p>
	Emergency Team	Emergency teams move in the direction of their mission definitions when needed.
EARTHQUAKE	Employer / Employer Deputy	<p>They ring the emergency siren. They leave the emergency exit belonging to the region and go to the emergency gathering area. They take shelter in the predetermined life triangle.</p> <p>After the earthquake is over, they inform AKUT Civil Defense if necessary and if possible, firefighters, police, first aid and emergency medical aid teams.</p> <p>After the earthquake, they make the control of fire leakage etc.</p>
	Employee / educated employee	<p>They close electricity, natural gas and water in the workplace.</p> <p>They use emergency exit belongs to the region where it is located and goes to the emergency gathering area. They take shelter in the predetermined life triangle.</p> <p>After the earthquake, They control stability and leakage in electricity, water, natural gas lines.</p>
	Other employees in the workplace	They leave the emergency exit belonging to the region where they are, and go to the emergency gathering area. They take refuge in the pre-determined triangle of life.
	Employers / Employees	They do not use the elevator when the earthquake is over, they do not use the stairs until the earthquake is over. They do not go to apartment gaps, balcony.
	Emergency Team	Emergency teams move in line with their mission definitions when needed.
	Employer / Employer Deputy	They ring the emergency siren, warn the security officer. They use emergency exit belongs to the region where it is located and go to the emergency gathering area.
EXPLOSION	Employee / Educated Employee	<p>They cut electricity, natural gas, water, close machinery and equipment, tools and appliances. They provide the safety of chemicals in the workplace</p> <p>Takes the necessary precautions they go to the explosion zone. If necessary, they will notify the fire department, police, first aid and emergency medical aid teams.</p> <p>They use emergency exit belongs to the region where it is located and go to the emergency gathering area.</p>

	Other employees in the workplace	<p>They close the machinery and equipment of the place where they are located. Employees who have the necessary equipment and who are not specifically designated do not continue to work.</p> <p>They use emergency exit belongs to the region where it is located and go to the emergency gathering area.</p>
	Security guard	<p>By taking the necessary precautions, they ensure that apartment doors and emergency exit routes are open in accordance with the instructions.</p> <p>They use emergency exit belongs to the region where it is located and go to the emergency gathering area.</p>
	Emergency Team	Emergency teams move in the direction of their mission definitions when needed.
SABOTAGE	The first person to notice sabotage	<p>They do not get into panic. They inform the employer the employee and the sick people.</p> <p>They use emergency exit belongs to the region where it is located and go to the emergency gathering area.</p>
	Employer / Employer Deputy	<p>They ring the emergency siren. They inform the fire department police, first aid, security and emergency medical aid teams</p> <p>They use emergency exit belongs to the region where it is located and go to the emergency gathering area.</p>
	Employee / Educated Employee	<p>They ring the emergency siren. They cut electricity, water, natural gas in workplace.</p> <p>They close machinery and equipment, tools and appliances and provide the safety of chemicals.</p> <p>They use emergency exit belongs to the region where it is located and go to the emergency gathering area.</p>
	Other employees in the workplace	<p>They do not approach people, they do not intervene. They go to a safe area. They will not be spectators.</p> <p>Except employees who have the necessary equipment and who are not specifically designated, other workers do not continue to work.</p>
	Security guard	When they hear the sabotage, they keep the apartment doors and emergency exit routes open in accordance with the instructions received.
	Emergency Team	Emergency teams move in line with their mission definitions when needed
FLOOD	Employer / Employer Deputy	<p>They ring the emergency siren.</p> <p>They inform the municipality, fire department, first aid and emergency medical aid teams. Police call if necessary.</p> <p>They use emergency exit belongs to the region where it is located and go to the emergency gathering area.</p>

	Employee / Educated Employee	<p>They ring the emergency siren. They cut off the natural gas and electricity of the workplace and turn off machines and equipment, tools and devices.</p> <p>They use emergency exit belongs to the region where it is located and go to the emergency gathering area.</p>
	Other employees in the workplace	<p>They turn off machines and equipment, tools and devices. They ensure the safety of chemicals.</p> <p>They use emergency exit belongs to the region where it is located and go to the emergency gathering area.</p> <p>Except employees who have the necessary equipment and who are not specifically designated, other workers do not continue to work.</p>
	Emergency Team	Emergency teams move in line with the mission definitions in case of need.

In addition, necessary measures will be taken in the following matters.

Stroke of Lightning: In addition to the meteorological conditions, the condition of the ground surface is also very important in lightning formation. Ionizing materials such as high-rise buildings, trees, and metallic objects provide suitable conditions for lightning formation. Direct damage to the control and control center of the plant installation as a result of lightning storms will result in the main electrical unit being out of service. In this case, the operating company will contact the qualified electrician immediately, and the units will be set up in the necessary units to make the repair work as soon as possible. In order to minimize loss of life and property, the following points should be taken into consideration:

- Lightning rod (lightning strike) to be used in high buildings and structures (such as a minaret), to sit in the open space on the ground,
- It needs to try to land immediately on the water,
- Items containing sharp metal such as umbrellas will not be used,
- Care will be taken not to settle in groups on open ground.

Landslide: The places where landslides are dangerous will be set up and the slopes will be planted.

Chemical spillage into soil / surface waters - leakage: The following operations are applied when chemical substances such as oil, fuel oil and paint are spilled on construction sites and transportation routes.

When a leak source is detected;

- To prevent the spread of leaks, the leaking source will be surrounded by sand bags
- In large leaks, considering the ground gradient,
- A small canal is opened and filled with a material having a high absorbency, so that the substance diffused in the leaking end surroundings is collected and mixed with groundwater is prevented,
- Pollutant, used absorbent material and soil shall be labeled with bags of appropriate size and durability,
- A major leak and / or spill promptly report to the site manager will be given.

In case of leakage of fuel oil, oil and other chemicals to the surface water sources, buoys will be used according to the size of the leaks and the flow of the streams so that the chemical substances do not spread to the water surface. The interior of these buoys will be filled with absorbent fibrous material. In case chemical substances are poured into soil or surface water sources;

- Absorption of pollutants poured into the roads and soil with dry sand
- Use of sawdust to prevent spreading of spills on roads and soil
- The use of buoys to clean spills, the use of absorbent cushions,
- Use of plastic gloves, special clothing and personal protective equipment, Vacuum pump, use of chemical resistant barrels,
- Use of rigid plastic bags will be provided.

Storm and Hose: Storms are natural events that take place as a result of strong winds. Fierce winds blowing together with rainfall are called floods, and drizzle and rainless escapes are called typhoons. During these strong winds, there are helical vortices called hoses and high waves and floods in sea or lakes. To protect from storms and hoses; There will be an emergency warning system in the workplace. It is among the measures to be taken against storms and hoses to make roofs made of blocks and sturdy mounted parts, to use thick glass, not to use more accessories on outer surfaces and to plant the environment.

IV.23 Operational Benefit Cost Analysis (Operating Cost, Investment Cost, Economic Details as Wastewater Cost per m³)

The aim of the project is to build a high quality wastewater treatment system that will serve the population living in the western region of Mersin in order to prevent the pollution of the Mediterranean. The pumping stations and wastewater system necessary for the transmission of wastewater to the treatment plant to be constructed will be carried out in parallel with this project within a separate project. With the wastewater treatment plant planned to be built in Mezitli, it was planned to construct a facility with international standards and to serve as many settlements as possible, and engineering works have been continuing since 2007. The project aims to eliminate wastewater in an environmentally and sanitarly reliable way.

Expected costs for WWTP to be made in Mezitli are shown in **Table 54**. Included in the cost account are expenses for environmental protection (noise and odor control), commissions outside of customs duties, as well as transportation and installation within the cost of mechanical and electrical works, and towing costs. All general or unexpected costs and commissioning costs are also considered in construction costs.

Table 54 Project Cost Table

Work Definition	Total Cost (€)
Construction Works	5.300.000
Mechanic Works	7.000.000
Electric Works	2.600.000
Subtotal	14.900.000
Pressure Lines, Discharge Lines & Unexpected	3.800.000
Supervision and Supervision Consultancy	1.300.000
Total	20.000.000

Source: Mezitli Wastewater Treatment Plant Feasibility Report, 2011.

CHAPTER V

PUBLIC PARTICIPATION

CHAPTER V: PUBLIC PARTICIPATION

Amendments made within the scope of the project after public participation, Information and Documents to be given in this context

V.1 Prospect of Local Residents Affected by the Project

Planned Mersin WWTP will be held in Mezitli District of Mersin. This facility will serve the Mezitli, Davultepe, Tece and Kuyuluk settlements.

V.2 Methods Used by Public to Participate in EIA Process

Within the scope of the project, in accordance with the Article 9 of the EIA Regulation, in order to provide the participation of the EIA working people, to inform about the investment and to obtain opinions and proposals regarding the project, at 03.00.2013 at 10:00 am Mersin Province, Mezitli District, Mezitli Municipality The People's Participation Meeting was held in the Reception Hall (see Photo 10, Photo 11 and Photo 12).



Photo 10 Images from Public Participation Meeting-1



Photo 11 Images from Public Participation Meeting-2



Photo 12 Images from Public Participation Meeting-

Information on the Public Participation Meeting was announced prior to the date of the meeting at a local or national level. The participation meeting of the people realized within the scope of the project was realized under the presidency of Mersin Provincial Directorate of Environment and Urbanism.

In addition, promotional brochures were prepared to inform the public about the project and distributed to participants during the meeting.

V.3 People's Concerns about the Project, Opinions / Suggestions and Evaluation of the Subject

The following are some of the things that come to the agenda during the public participation meeting:

- Whether or not the facility area is processed in the lower-scale development plans,
- How to collect wastewater and how to discharge it,
- Whether the facility area is an agricultural area, whether it has received the required permits from the relevant administration.

In connection with the above mentioned issues, the authorities of MESKI provided explanatory information. Since the said plant is treated as "Wastewater Treatment Plant Area" with the decision of Mersin Metropolitan Municipality Assembly dated 15.10.2010 and numbered 1 / 1.000 and 1 / 5.000 scale as 344 numbered, the wastewater collection and discharge lines are not covered by this project but within the scope of a separate process Has been mentioned.

The fact that the facility area is agricultural land only mentioned that this issue is suitable for non-agricultural purposes by the Ministry of Agriculture and Rural Affairs in 2010.

V.4 Relevant Parties to the Opinions and Opinions / Suggestions and Evaluation of the Subject

There are no other institutions / organizations foreseen to be consulted for their Subject Views.

CHAPTER VI

**A NON-TECHNICAL
SUMMARY OF THE
INFORMATION PROVIDED
ACCORDING TO THE
ABOVE TITLE**

CHAPTER VI: A NON-TECHNICAL ASSESSMENT OF THE INFORMATION PROVIDED ACCORDING TO THE ABOVE TITLE

- The planned WWTP is located in Mezitli District of Mersin Province.
- The facility will be installed on the land owned by the Mersin Water and Sewerage Administration (MESKI) General Directorate of 76.600 m².
- Biological treatment will be carried out in the planned WWTP and conventional activated sludge system will be used which is pre-denitrification.
- Wastewater treatment plant planned in two stages, at the first stage until 2035 384,000 people, II. And by the year 2050 it will serve 556,000 people.
- The capacity of the plant is 55.000 m³ / day in the first stage and II. 80.000 m³ / day in the stage. Nitrogen and phosphorus removal units are also planned in the biological treatment plant to ensure discharge water discharge limits
- Advanced treatment technologies used in wastewater treatment plants will be used. In addition to conventional mechanical and biological treatment techniques, tertiary treatment techniques for nitrogen and phosphorus removal will be used, thus achieving very low nitrogen and phosphorus parameters in the effluent.
- The sewage sludge produced will be stabilized by fermentation and dewatered to the solid waste storage area. The first phase of the plant will be 57 tons per day and the second phase will be 82 tons of mud.
- According to feasibility studies; The service life of the planned concrete structures is 40 years and the service life of mechanical and electrical equipment is 15 years. It is anticipated that the construction activities will take about 24 month -
- In the feasibility studies of the plant planned to be constructed; The Standard Values of the Urban Wastewater Treatment Regulation (KAAY) published in order to harmonize the Water Pollution Control Regulation and the EU Environmental Legislation with the National Legislation are taken into consideration.
- - Excavation wastes to be generated from the project will be disposed in accordance with the provisions of the "Regulation on Control of Excavation Soil, Construction and Demolition Wastes" which was published in the Official Gazette dated March 18, 2004 and numbered 25406. While some of the excavation material that will appear during excavation works will be used again in filling and land leveling works, the remaining part will be transferred to areas that the municipality will allow.
- Construction waste will be generated during the land preparation and construction phase of the planned plant. Construction waste from the site will be recycled and unrecoverable construction waste will be collected in the temporary storage areas reserved for short-term accumulation of such wastes within the site area and transported to the municipal casting site through trucks.
- Construction waste will be generated during the land preparation and construction phase of the planned plant. Construction waste from the site will be recycled and unrecoverable construction waste will be collected in the temporary storage areas reserved for short-term accumulation of such wastes within the site area and transported to the municipal casting site through trucks.
- The ones that can be evaluated from domestic solid waste to be generated by the personnel to be worked within the scope of the project will be collected in separate containers and given to licensed recycling companies. Wastes that can not be recovered will be collected in separate containers and delivered to the municipality in order to be disposed of in accordance with the provisions of the "Regulation on Solid Waste Control" published in the Official Gazette dated 14.03.1991 and numbered 20814.
- A leak-free septic tank will be installed in the facility area for the wastewater that will be generated by the personnel who will work in the construction phase of the project. The waters accumulated in the fossil will be towed by the municipal sewer trucks. The wastewater that will be generated during the operation phase will be given to the WWTP to be installed.

- It is expected that hazardous waste (paint boxes, thinner containers, etc.) will be formed due to the construction activities. These wastes will be sent to facilities with a hazardous waste disposal license for final disposal once they have been temporarily stored on a leaky concrete site in the site area. The provisions of the "Regulation on the Control of Hazardous Wastes", which was published in the Official Gazette dated 04.09.2009 and numbered 27339, shall be observed during the storage and transportation of these substances.
- As the preparation of the land within the scope of the project and the maintenance, repair and cleaning of the vehicles to be operated during the construction phase will not be done on site, waste oil formation is not expected. However, vehicle maintenance must be carried out at the facility site
- Waste oils will be disposed of in accordance with the "Waste Oils Control Regulation" published in the Official Gazette dated 30.07.2008 and numbered 26952. -
- The staff of the project who will work in the construction and operation stages of the project will be provided with ready meals from the outside food companies and the vegetable waste oil will not be formed in the field.
- Waste batteries that will emerge after the installation completes the life of the batteries that will be used in the construction phase will be collected in waste battery pits that will be placed in the plant site.
- There will be a sickbay for the health problems of the staff working in the construction and operation phase of the project. Medical wastes to be incurred will be included in the existing system. -
- In accordance with the "Regulation on the Completion of Long Life Tires" which was published in the Official Gazette dated 25.11.2006 and numbered 26357 (amended, dated 30.03.2010 and numbered 27537), the tire wastes that have completed the life cycle of the construction period, To environment permits and to licensed recycling facilities.
- In accordance with the "Regulation on the Completion of Long Life Tires" which was published in the Official Gazette dated 25.11.2006 and numbered 26357 (amended, dated 30.03.2010 and numbered 27537), the tire wastes that have completed the life cycle of the construction period, To environment permits and to licensed recycling facilities..
- An Acoustic Report has been prepared for the determination of the noise levels of the plant due to the machine / equipment during construction and operation phase. According to calculations made, the noise levels caused by Mezitli WWTP were found to be below the limit values stated in the "Environmental Hazard Assessment and Management Regulation (EHAMR)" which was published in Official Gazette dated 04.06.2010 and numbered 27601
- A monitoring work will be carried out within the scope of the project. In the monitoring work, it will be checked whether the works produced during the construction, operation and closing period and the ongoing process reach the targeted points.
- There is no structure and / or area in the facility area with protection status. Therefore, any negative impact on the cultural and archaeological heritage of the planned installation during construction and operation will not occur.
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- There are no flora or fauna members in the protection area in the facility area.
- After the operation phase of the project is completed, rehabilitation works will be carried out in and around the facility in parallel with the shutdown operations on the site where it is installed.

During the construction and operation stages of the project; Under the Environmental Law No. 2872 and related regulations and other legislation, all necessary permissions shall be taken for the protection of the environment and the prevention of pollution and the related regulations shall be complied with. The activities will not be started without obtaining permission from the necessary public institutions and organizations.

- Law No. 2872 of 11.08.1983 dated 18132 and Law No. 138527 dated 13.05.2006 entitled "Amendment of the Environmental Law No. 5491"

- 6831 numbered "Forest Law",
- "Expropriation Law" numbered 2942, "Labor Law" numbered 4857
- Law No. 167 on "Underground Water Law" -
- Law No. 5403 on "Soil Conservation and Land Use"
- "Public Hygiene Law No. 1593", which was published in the Official Gazette dated 06.05.1930 and numbered 1489 and entered into force,
- "Regulation on Water for Human Consumption", published in the Official Gazette dated 17.02.2005 and numbered 25730,
- "Implementing Regulation of Article 16 of the Forest Law" published in the Official Gazette dated September 30, 2010 and numbered 27715,
- Published in the Official Gazette dated September 15, 2011 and numbered 28055, "Implementing Regulation of the 17th and 18th Articles of the Forest Law",
- Which was published in the Official Gazette dated 19.03.1971 and numbered 13783
- "Regulations Regarding Pits to be Built in Places Where Sewerage Construction Is Not Possible"
- "Regulation on the Control of the Pollution Caused by the Dangerous Substances in the Water and its Environment" published in the Official Gazette dated 26.11.2005 and numbered 26005,
- "Water Pollution Control Regulation", published in the Official Gazette dated 31.12.2004 and numbered 25687,
- "Solid Waste Control Regulation" which was published in the Official Gazette dated 14.03.1991 and numbered 20814,
- "Packaging Waste Control Regulation" which was published in Official Gazette dated 24.08.2011 and numbered 28035
- "Regulation on Control of Air Pollution caused by Industry", published in the Official Gazette dated 03.07.2009 and numbered 27277 (amendment, Official Gazette dated 30.03.2010 and numbered 27537)
- "Air Quality Assessment and Management Regulation", published in the Official Gazette dated 06.06.2008 and numbered 26898,
- The "Regulation on the Control of the Completion of the Tires Completed" published in the Official Gazette dated 25.11.2006 and numbered 26357 (Official Gazette dated 30.03.2010 and numbered 27537)
- "Regulation on the Control of Waste Oils", published in the Official Gazette dated 30.07.2008 and numbered 26952 (Official Gazette dated 30.03.2010 and numbered 27537)
- "Regulation on the Control of Excavation Soil, Construction and Demolition Waste" which was published in Official Gazette dated 18.03.2004 and numbered 25406,
- "Control of Soil Pollution and Regulation on Polluted Shelter with Point Source", published in the Official Gazette dated 08.06.2010 and numbered 27605,

- Regulation on the Control of Medical Waste "which was published in the Official Gazette dated 22.07.2005 and numbered 25883,
- "Regulation on the Regular Storage of Waste", published in the Official Gazette dated 26.03.2010 and numbered 27533,
- "Environmental Impact Assessment (EIA) Regulation" published in the Official Gazette dated July 17, 2008 and numbered 26939,
- "Environmental Hazard Assessment and Management Regulation" published in the Official Gazette dated 04.06.2010 and numbered 27601,
- "Regulation on the Control of Waste Batteries and Accumulators", published in the Official Gazette dated August 31, 2004 and numbered 25569 (Official Gazette dated 30.03.2010 and numbered 27537)
- "Regulation on Permits and Licenses to be Obtained by the Law of the Environment" published in the Official Gazette dated 29.04.2009 and numbered 27214,
- The "Regulation on the Control of Emissions Causing Odor", which was published in the Official Gazette dated 04.09.2010 and numbered 27692,
Provisions shall be observed.

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