ANTALYA METROPOLITAN MUNICIPALITY
ANTALYA WATER AND WASTEWATER ADMINISTRATION
GENERAL DIRECTORATE
(ASAT)

HURMA TREATMENT SLUDGE INCINERATION AND ENERGY RECOVERY FACILITY PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT REPORT

ALDAŞ
INFRASTRUCTURE MANAGEMENT AND CONSULTANCY SERVICES INC.

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ABBREVIATIONS

Incinerator Facility	Treatment Sludge Incineration and Energy Recovery Facility
Incinerator	The facility unit in which the treatment sludge is incinerated in the Treatment Sludge Incineration and Energy Recovery Facility.
WWTP	Wastewater Treatment Facility Plant
ASAT	General Directorate of Antalya Water and Wastewater Administration
ASME	American Society of Mechanical Engineers
RIW	Regulation on Incineration of Wastes
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
CFB	Circulating Fluidized Bed
PBST	Packed Bed Scrubber Tower
IUCN	International Union for Conservation of Nature and Natural Resources
KM	Dry Matter
LEB	Local Environment Board
CEMS	Continuous Emission Measurement System
IAPCR	Industrial Air Pollution Control Regulation
WPCR	Water Pollution Control Regulation
TurkStat	Turkish Statistical Institute
GW	Groundwater

EXECUTIVE SUMMARY

Antalya, which is the 6th largest province in Turkey in terms of area, is the 5th largest city of Turkey in terms of population. It is the third most immigrant city after Istanbul and Ankara. General Directorate of ASAT, by using the resources at optimum level, provides supply, transmission, operation, maintenance and repair services in order to provide healthy and continuous potable water to the amount of more than 16,000,000 annual visitors and 2,289,667 population living in the responsibility area of 20.909 km2 in 19 districts. Making plans and projects for the realization of investments and operation, maintenance and repair of these plants for healthy removal, treatment and discharge in relation to the standards of the used potable water are among the prior duties of General Directorate of ASAT.

Within the framework of his establishment purposes, ASAT provides water supply, transmission, operation, maintenance, and repair services to ensure the provision of healthy, potable, continuous drinking water.

In terms of environmental framework ASAT executes waste management, collection of wastewater, treatment, discharge of the wastewater in accordance with the international standards, sludge treatment, the realization of necessary investments, the operation, maintenance and repair of these facilities as per his prior obligation.

With his dynamic structure, ASAT provides uninterrupted, high-quality, and sustainable service within the framework of his obligations. In this context, ASAT hereby intends to realize Waste **Sludge Incineration and Energy Recovery Project** to meet the requirements to solve the sludge disposal necessities.

Cost of Hurma Wastewater Sludge Incineration and Energy Recovery Project is calculated as 32.000.000 €, and the turnover of the investment is estimated to be approximately 12 years. Construction period for Hurma Sewage Sludge Incineration and Energy Recovery Project is estimated as 3 years.

The project named Wastewater Treatment Plant Sludge Removal with the project number 2019K06-103201 and 400,000,000 ₺ budget for 2019-2022 years has been approved by the Presidency of Strategy and Budget Authority.

ASAT intends to continue its investments with the **French Development Agency** financed Waste Sludge Removal and Energy Recovery Project.

Within the scope of the Antalya Sustainable Water and Wastewater Management Project, the realization of the possible impacts on the region where the construction activities take place and the nearby settlements will be supervised by the Inspection Organization. During the activities, the Contractor should comply with the existing environmental laws and regulations and other legislation in this respect.

The Contractor shall undertake all relevant planning, including risk analysis linked to the construction works and areas related to construction work and specific environmental management reports special to construction site, (according to the Occupational Health and Safety Regulation).

The ESIA Report has been included environmental and social impact mitigation methods and safe working applications that must be implemented, during the main construction activities and especiallyrealization of risky activities. Taking of all necessary permission and licenses for the Contractor's construction works; safety of construction area, workers and citizen; transportation of excavation waste; transportation and removal of other wastes etc…will be controlled.

This Environmental and Social Impact Assessment Report has been prepared for the Hurma Waste Sludge Incinerator and Energy Recycling Project. Within the scope of the report, primarily information was given about the current situation and the new project. In the following sections of the report, the effects that may occur during the construction and operation phases have been determined, and evaluations have been made about the measures to be taken in accordance with national and international regulations in order to eliminate and/or minimize these effects.

Wastewater Sludge/Final Disposal Offer

In wastewater treatment, the liquid waste containing 95-99.5% water is called wastewater treatment sludge, which is the result of removing the substances removed by floating or settling in the wastewater in the physical and chemical treatment processes, and the dissolved substances as a result of biological treatment, and the removal of the microorganisms from the system by floating/precipitating.

The treatment of solid materials defined as treatment sludge and their removal in a way that causes the least damage to the environment is as important as wastewater treatment.

The optimal disposal of waste sludge, taking into account its environmental and economic effects, is an important problem for big cities. For this purpose, different preferences have emerged in different countries and there have been changes in preferences over time. The choice is made taking into account the needs, possibilities and priorities.

For sludge disposal, one of the most widely used applications in EU (European Union) countries, Japan and the USA is the incineration of waste sludge. The advanced technology and emission control applications of these facilities can more easily meet environmental sensitivities and this situation highlights the tendency to burn and obtain energy.

As stated in the Regulation on Incineration of Wastes, which was effectuated after being published in the Official Gazette dated 06/10/2010 and numbered 27721, regarding the activity to be carried out; Real and legal persons who want to establish a waste incineration facility must first obtain permission from the highest local authority for the location they have chosen to establish the facility. The suitability of the chosen location must be approved by the decision of the Local Environment Board (LEB). In this context, the site selection suitability was obtained as a result of the Environment Committee Meeting Decision. (Annex-2)

After the suitability of the site selection, the investor is obliged to submit the Feasibility Report, which also includes the financial analyzes, showing that the facility can fulfill the requirements in the relevant legislation and technical regulations.

Feasibility studies were carried out within the scope of wastewater operating capacities, wastewater characterization, sludge amounts resulting from the process, and waste sludge characterization of 30 domestic Wastewater Treatment Facilities in Antalya, which are planned to be used in the Incineration Facility of treatment sludge.

According to the sludge calculations generated in the Wastewater Treatment Facilities, the amount of sludge that will come to the Hurma Treatment Sludge Incineration and Energy Recovery Facility and be incinerated will be 500 tons/day. A feasibility study was carried out according to the amount of sludge 500 tons/day. Sludge disposal techniques and methodologies were examined in the report, and it was concluded that the pre-dry Incineration Facility is a more advantageous and useful solution for the facility in order to minimize the energy consumption in the incineration process and the size of the incinerator.

500 tons/day sludge with 17-20% dry matter content coming from 30 treatment plants belonging to the Asat General Directorate will be dried up to 40-45% in the pre-dried waste Incineration Facility and subjected to incineration. In this way, 5.0 MWH (5000 kWh) of electrical energy will be produced at the facility, and 1.5 MWH (1.500 kWH) of this energy will be reused in the incineration facility.

General Directorate of ASAT currently spends 5,13 million €/year for the disposal of 500 tons/day of treatment sludge. The investment cost and operational cost of the Hurma Treatment Sludge Incineration and Energy Recovery Facility were calculated as 32 million € and 2,43 million € the return of the investment was calculated as approximately 12 years.

Hurma WWTP is the central treatment plant with the largest waste sludge production capacity in Antalya City. Since approximately half of Antalya City's waste sludge is generated from the Hurma WWTP, the amount of sludge to be transferred will decreased in new project. In addition, when the location of the Hurma WWTP is compared with the location of the Cement Factory, it has been calculated that the transfer distance to the Hurma WWTP is shorter. While the sludge transfer distance is approximately 140,048 km/month in the current situation, this value is expected to decrease to 76,260 km/month within the scope of the new project. According to mentioned situation, carbon footprints calculation has been done and attached as Annex-23.

Within the Hurma Treatment Sludge Incineration and Energy Recovery Facility; Sludge incineration and energy recovery systems will be built in Antalya province, Konyaaltı district, Hurma Neighborhood, block 12131 and parcel number 7, to dry and burn the sludge that will come out of the Wastewater Treatment Facilities belonging to the General Directorate of ASAT and to convert the steam that will result from the combustion to heat energy recovery. The facility to be constructed is planned to be a facility that will have favorable energy efficiency, heat balance, environmental standards and permits and can operate under all meteorological conditions.

The Hurma Treatment Sludge Incineration and Energy Recovery Facility to be built is planned te be within the borders of Hurma Wastewater Treatment Facility within the borders of Antalya province, Konyaaltı district, Hurma neighborhood. Within the scope of incineration of sludge within the planned project, Fluidized Bed Incinerator technology was chosen as a unit of the

Incineration Facility. The Hurma WWTP is located on the Tünektepe road, at the 16th km of the Antalya-Kemer Highway.

The total area of the block 12131 and parcel number 7 where the Treatment Sludge Incineration and Energy Recovery Facility will be established is 174.658,00 m2; The Hurma Wastewater Treatment Facility, which is currently in operation, is on an area of 163,524.70 m2. Within the scope of burning the treatment sludge originating from the treatment facilities under the responsibility of ASAT and obtaining heat energy from the said incineration process, it is planned to construct an incineration facility on an area of 11133,31 m2 on block 12131 and parcel number 7. The Location Map of the area where the activity will be carried out is presented in Annex-3 and the 1/25,000 Scale Topographic Map is presented in Annex-4.

In accordance with subparagraph (a) of paragraph 1 of Article 7 of the "Turkish Environmental Impact Assessment Regulation" published in the Official Gazette dated 25.11.2014 and numbered 29186, Annex I list (List of Projects to be Applied Environmental Impact Assessment) "11 - The facilities with an area larger than 10 hectares excluding construction debris and excavation waste, and/or with daily wastes of equal to and more than 100 tonnes including the target year, are recovered daily, incinerated (thermal processes such as incineration by oxidation, pyrolysis, gasification, plasma etc.), are stored regularly and/or where its final disposal is carried out", the project is within the scope and this EIA Report has been prepared and Environment Impact Assesment Document was found suitable and approved by Ministry of Environment and Urbanization. (Annex-21)

1. PROJECT DEFINITION, OBJECTIVE AND FEATURES

1.1. PROJECT DEFINITION AND OBJECTIVE

1.1.1. Project Area

Within the Hurma Treatment Sludge Incineration and Energy Recovery Facility; Fluidized Bed incineration and energy recovery systems will be built in Antalya province, Konyaaltı district, Hurma Neighborhood, block 12131 and parcel number 7, to dry and burn the sludge that will come out of the Wastewater Treatment Facilities belonging to the General Directorate of ASAT and to convert the steam that will result from the combustion to heat energy recovery. The facility to be constructed is planned to be a facility that will have favorable energy efficiency, heat balance, environmental standards and permits and can operate under all meteorological conditions.

The total area of the 12131 block and parcel number 7 where the Treatment Sludge Incineration and Energy Recovery Facility will be established is 174.658,00 m2 and the Hurma Wastewater Treatment Facility, which is currently in operation, is on an area of 163,524.70 m2. Distribution Structure, Pump Stations, Pre-Treatment Unit, Platform Scale, Workshop and Social Facility, Transformer and Generator Building, Promotion Pump Unit, Anaerobic Reactors, Ventilation Pool, Final Sedimentation Pools, Sludge Storage and Mixing Tank, Sludge Dewatering Building, Blower Building, Aerated Sand and Oil Traps, Pre-Sedimentation Unit, Biogas Tanks, Mechanical Sludge Thickening Building, Odor Removal Unit, Administrative Building and Hydrophore Unit Building are located in the existing Hurma Wastewater Treatment Facility. In addition, within the boundaries of the existing treatment plant, there is a Thermal Drying Plant with a capacity of 150 tons/day, where the sludge from the treatment plant is dried. The Sewage Sludge Incineration and Energy Recovery Facility will be constructed in the empty area of the existing Hurma Wastewater Treatment Facility, whose coordinates are given in Annex-1.

The EIA and Environmental Permit Documents of the existing Hurma Wastewater Treatment Facility which was approved by Turkish Ministry of Environmental and Urban are presented in Annex-21.

Within the scope of incinerating the treatment sludge and obtaining heat energy from the said incineration process originating from the treatment facilities under the responsibility of ASAT, it is planned to construct an incineration facility on an area of 11133,31 m2 on block 12131 parcel number 7. The Location Map of the area where the activity will be carried out is presented in Annex-3 and the 1/25,000 Scale Topographic Map is presented in Annex-4.

The satellite image of the 12131 block 7 parcel, which also includes the Hurma Wastewater Treatment Facility and the Hurma Treatment Sludge Incineration and Energy Recovery Facility, is presented in Figures 1 and 2.



Figure 1: 12131 Block 7 Parcel Satellite Image

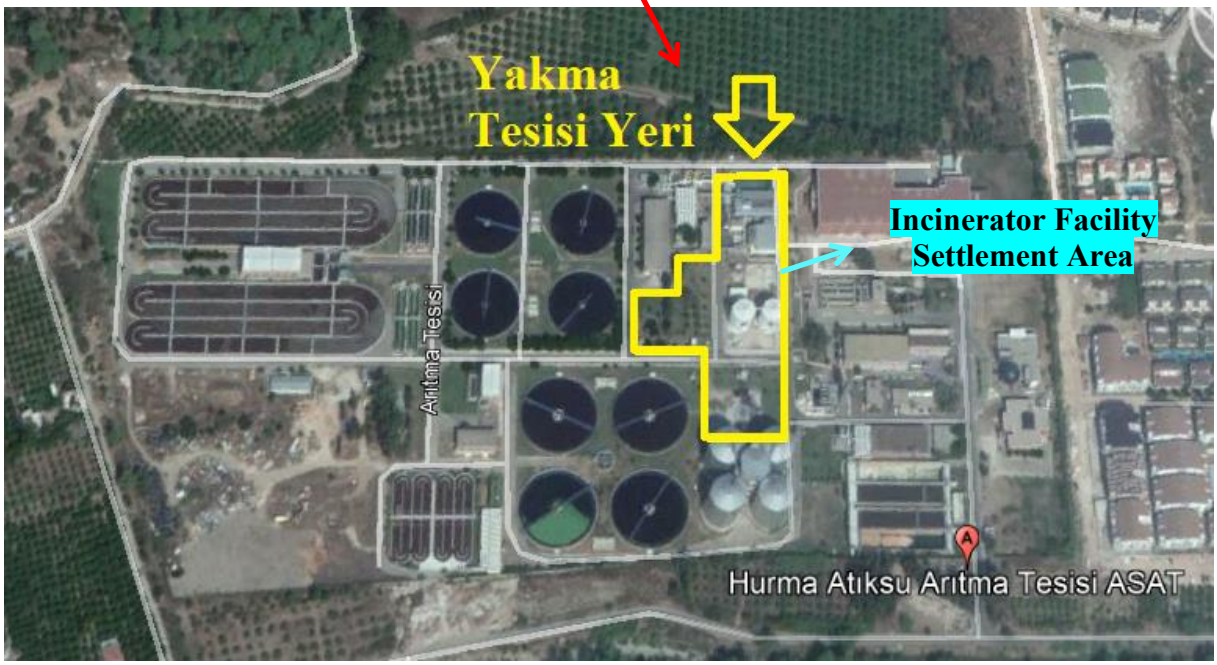
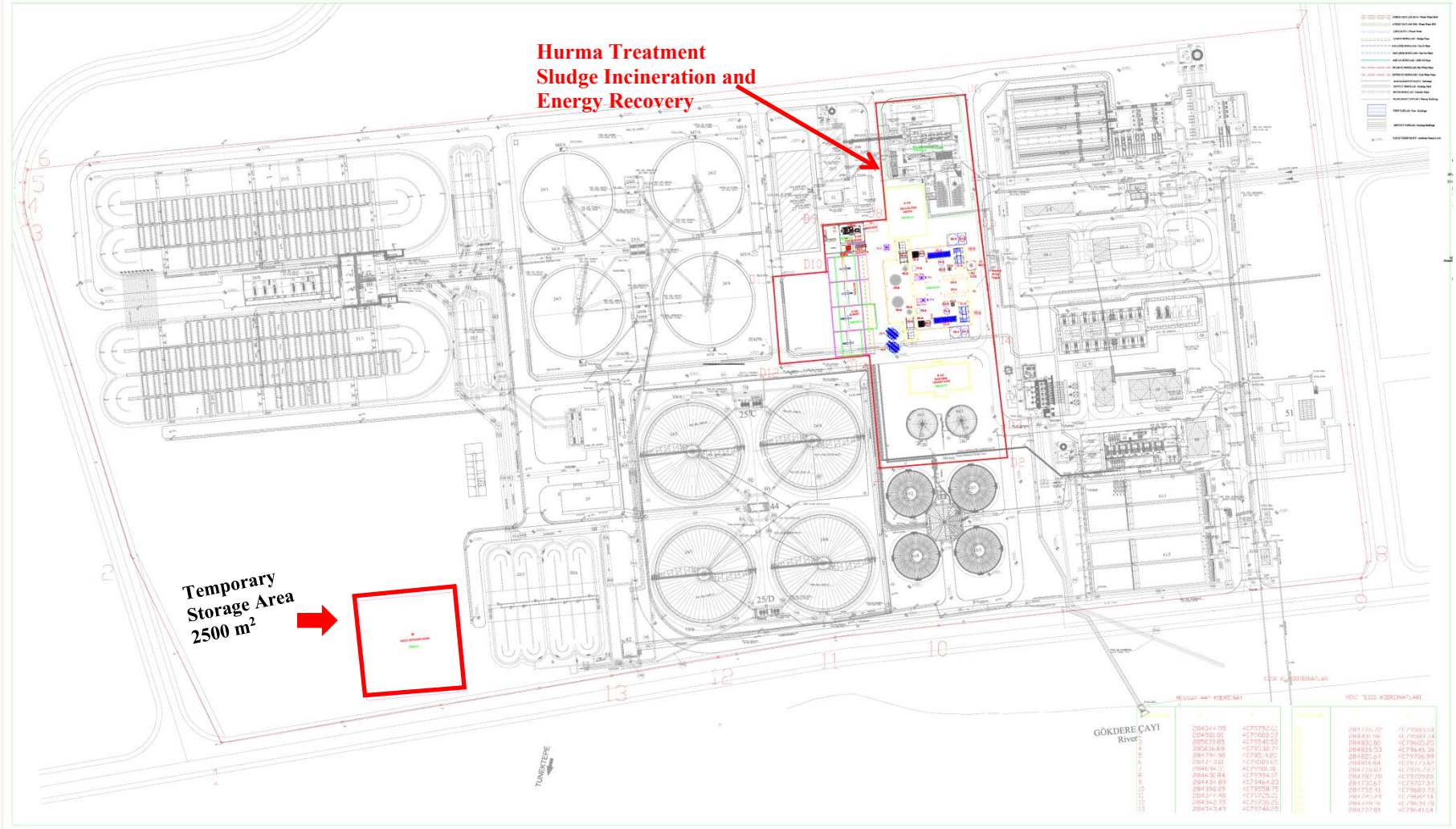
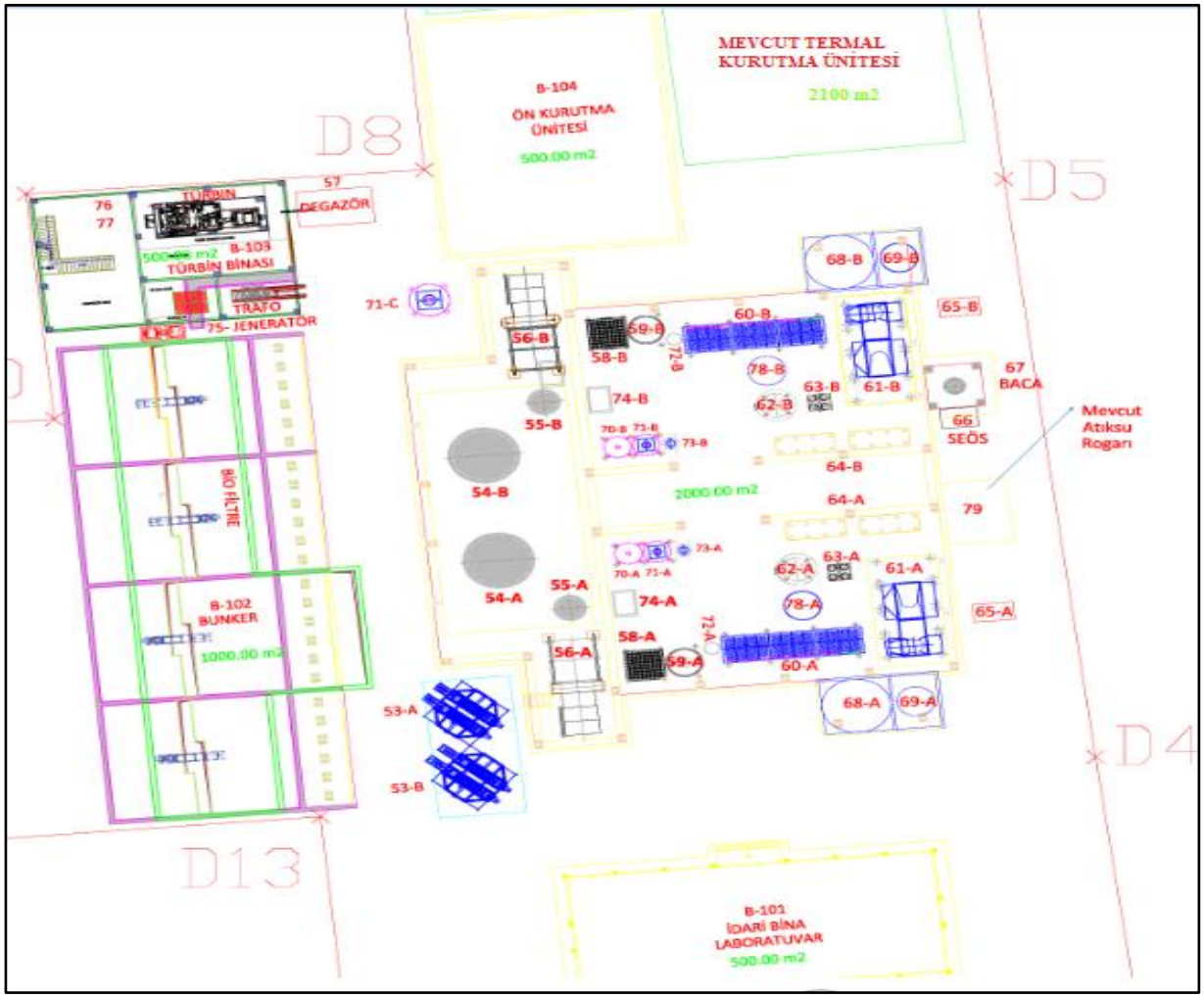


Figure 2: Satellite Image of Hurma Treatment Sludge Incineration and Energy Recovery Facility Location

The General Layout Plan for the project, as well as the 1/500 Scale General Layout Plan, are presented in Annex-5.


Hurma Treatment
Sludge Incineration and
Energy Recovery
Temporary
Storage Area
2500 m2
GÖKDERE ÇAYI
River

(a)



KOD	AÇIKLAMA
53-A/B	ÇAMUR SILOLARI
54-A/B	AKISKAN YATAKLI YAKMA FIRINI (FBI)
55-A/B	1. ISI ESANJÖRÜ (HEAT EXCHANGER)
56	ATIK IS KAZANI (WHB)
57-A/B	DEGAZÖR (DEGASIFIER)
58-A/B	ÇOKLU SIKLON (MULTI CYCLONES)
59-A/B	ACTIF KARBON REAKTÖRÜ (ACTIVE CARBON REAKTÖR)
60-A/B	TORBA FILTRE (JET PULSE FILTER)
61-A/B	2, 3 ve 4. ESANJÖRLER (EXCHANGERS)
62-A/B	DOLGU YATAKLI YIKAMA KULESI (SCRUBER)
63-A/B	VENTURI SOGUTUCU (VENTURI QUENCHER)
64-A/B	BLOWERLAR (BLOWERS)
65-A/B	ID FAN
66	SÜREKLI EMISYON ÖLÇÜM SISTEMI (EMISSION CONTRODLING)
67	BACA (STUCK)

KOD	AÇIKLAMA
68-A/B	KÜL SILOSU BÜYÜK (ASH SILO FÖR CYCLONE)
69-A/B	KÜL SILOSU KÜÇÜK (ASH SILO FÖR FILTER)
70-A/B	KUM SILOSU (SAND SILO)
71-A/B/C	KIREÇ SILOSU (LIME SILO)
72-A/B	BASINÇLI HAVA TANKI (COMPRESSED AIR TANK)
73-A/B	AKTIF KARBON (ACTIVATED CARBON)
74-A/B	PURGE AIR BLOWER
75	JENERATÖR (GENERATOR)
76	SÖGUTMA KULESI (COOLLING TOWER)
77	SU HAZIRLAMA VE YUMUSATMA ÜNITESI (WATER SOFTENER UNIT)
78-A/B	DENGELEME TANKI
79	NÖTRALIZASYON ÜNITESI
B-101	IDARI BINA VE LABORATUVAR
B-102	ÇAMUR KABUL BUNKERI
B-103	TÜRBIN BINASI (TURBINE BUILDING)
B-104	ÖN KURUTMA ÜNITESI

Figure 3: Layout of Hurma Treatment Sludge Incineration and Energy Recovery Facility Location

(b)

(**a:** Location of the Combustion Plant within the borders of the Hurma WWTP, **b:** Layout Plan of the Hurma Incineration Facility Units)

There are the existing Antalya Port, Port Akdeniz, Petro Marin near the project area and facilities such as Marine Vehicles Maintenance and Repair, Boat, Yacht Manufacturing etc. in the back area of the port within the borders of the Free Zone Directorate. In addition, there is a storage facility belonging to Petrol Ofisi near the project area and in the back area of the port. The planned projects are Marine Vehicles Maintenance and Repair, Boat, Yacht Manufacturing, etc. facilities and their capacity increase projects in the Free Zone, which is also in the back area of the Port. As a result of the cumulative calculations made within the scope of the Hurma Treatment Sludge Incineration and Energy Recovery Facility Project, taking into account the prevailing wind directions and climatic conditions, the said project is not expected to have a negative impact on the facilities located in and around the activity area.



Figure 4: Current and Planned Projects near the Project Area

1.1.2. Project's Economic and Social Importance and Necessity

With the increase in population, a high amount of treatment sludge is formed in the treatment of wastewater. The resulting waste sludge is increasing day by day. Comprehensive studies continue to be carried out on the inventory, management and final disposal of sewage sludge in Turkey.

The processing of the solid materials, which are defined as "Treatment Sludge" and where the pollutants carried with the water are collected intensively, and their removal in a way that causes the least damage to the environment, is as important as wastewater treatment. In recent years, together with the environmental investments made in wastewater treatment, the problem of treatment and disposal of treatment sludge has become a sensitive issue with both technological developments and legal regulations made in the European Union harmonization process.

It is essential that the treatment sludge, which is formed as a result of water and wastewater treatment in treatment plants, undergo appropriate treatment processes and be disposed of by fulfilling the necessary environmental health criteria. Sludge management is of increasing importance in our country as well as all over the world due to the inability to remove treatment sludge with high solid material content for the purposes of treatment, transportation, storage, land use directly from the plant or to be able to be put into an on-site cycle.

A significant amount of these produced sludge is disposed of in municipal solid waste storage facilities. Regular storage of treatment sludge is considered as the least complex, easiest to implement and sometimes the cheapest alternative among disposal alternatives. The continuous increase in waste treatment sludge makes it difficult to find a place for storage. At the same time, it has become necessary to dispose of the waste sludge by appropriate methods, as it is excessive and widespread to pose a threat to the environment.

When these factors are taken into consideration, it is important to determine the beneficial use alternatives (use for agricultural purposes, use as additional fuel, etc.) of treatment sludge as a raw material and energy source and bring it into our country's economy. The cost of processing and disposal of treatment sludge has a significant proportion in the total cost of the treatment plant. It is important both technically and legally to reduce the amount of treatment sludge formed from the wastewater treatment process and to process it with appropriate methods (stabilization, minimization, conditioning and dewatering, etc.).

Sludge disposal is the part where the most problems are experienced in the treatment plants and the operators spend the most time. Although the amount of sludge generated in wastewater plants constitutes a low percentage of 1 to 6% of wastewater, the investment cost of sludge treatment units is around 30-40% of the total system cost, and the operating cost is around 50% of the entire operating cost.

As the treatment sludge disposal system, within the planned Hurma Treatment Sludge Incineration and Energy Recovery Facility Project, the method in which the treatment sludge is incinerated, and energy recovery is obtained as a result of this combustion process has been chosen. In this way, the treatment sludge will be disposed of by incineration and energy recovery will be provided from the sludge burned with the fluidized bed sludge incinerator. The energy gained as a result of the incineration process will be able to meet 100% of the internal energy requirement of the Incineration Facility.

Treatment sludge formed in 30 Wastewater Treatment Facilities belonging to the General Directorate of ASAT in Antalya will be disposed of at the planned Hurma Treatment Sludge Incineration Facility. If we look at it from an environmental point of view, the waste sludge in question will not be stored regularly, but will be completely disposed of, as well as energy recovery will be provided and will contribute to the economy.

In conclusion, if the sewage sludge is not disposed of with an appropriate method, it can harm the environment and human health. For this reason, the safe disposal of the treatment sludge in terms of health and environment and the generation of energy as a result are the most important issues for the realization of the project.

Since there is incineration process in the facility subject to the project, waste gases will be generated in the facility. The facility will be designed to meet the physical and technical conditions specified in Articles 10, 11 and 12 of the Regulation on Incineration of Wastes, which was effectuated after being published in the Official Gazette dated 06.10.2010 and numbered 27721.

The combustion plant will be designed, equipped, constructed and operated in such a way that emissions to air will not cause air pollution at ground level in accordance with the Industrial Air Pollution Control Regulation. In addition, flue gas emissions will have a flue gas height to be

determined in a controlled manner and in accordance with the Industrial Air Pollution Control Regulation (IAPCR), taking into account the rated thermal power value of the facility. There will be flue gas treatment systems at the facility and a continuous emission measurement system (CEMS) will be present at the emission outlet chimney.

There are 78 personnel currently working at Hurma Wastewater Treatment Facility. It is planned to employ 55 personnel during the construction phase of the Hurma Treatment Sludge Incineration and Energy Recovery Facility Project, and an additional 10 personnel during the operation phase.

Within the scope of the planned project, care will be taken to employ permanent/temporary personnel from the region. It is planned that services such as material purchase and nutritional needs will be provided primarily from the region, and it is thought that the project will have a positive impact on the socio-economic structure of the region.

1.1.3. Workflow Chart of the Construction and Operation Phases of the Project

1.1.3.1. Construction Process Work-flow Chart

During the construction phase of the project, excavation works and concreting works will be carried out in the area. After the completion of the concreting process, machinery and equipment will be installed and the installed machinery and equipment will be covered. With the completion of the construction phase, the operation phase will begin. The work-flow chart for the construction phase of the project is presented in Figure 5.

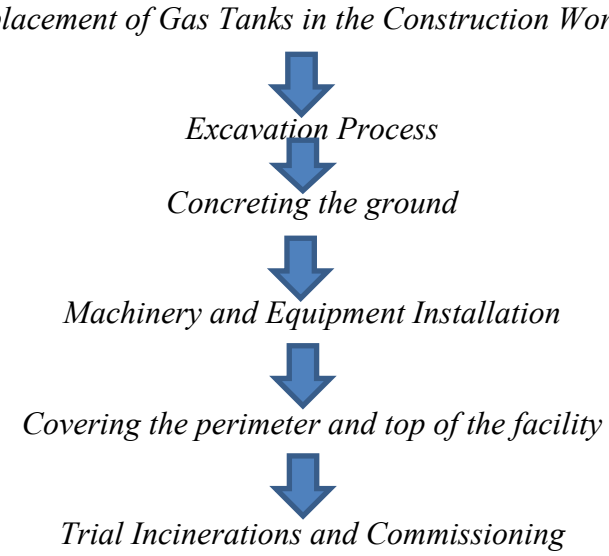


Figure 5: Construction Process Work-Flow Chart

The process flow chart of the operation phase of the project has been examined in detail under the title of "Section 1.2.".

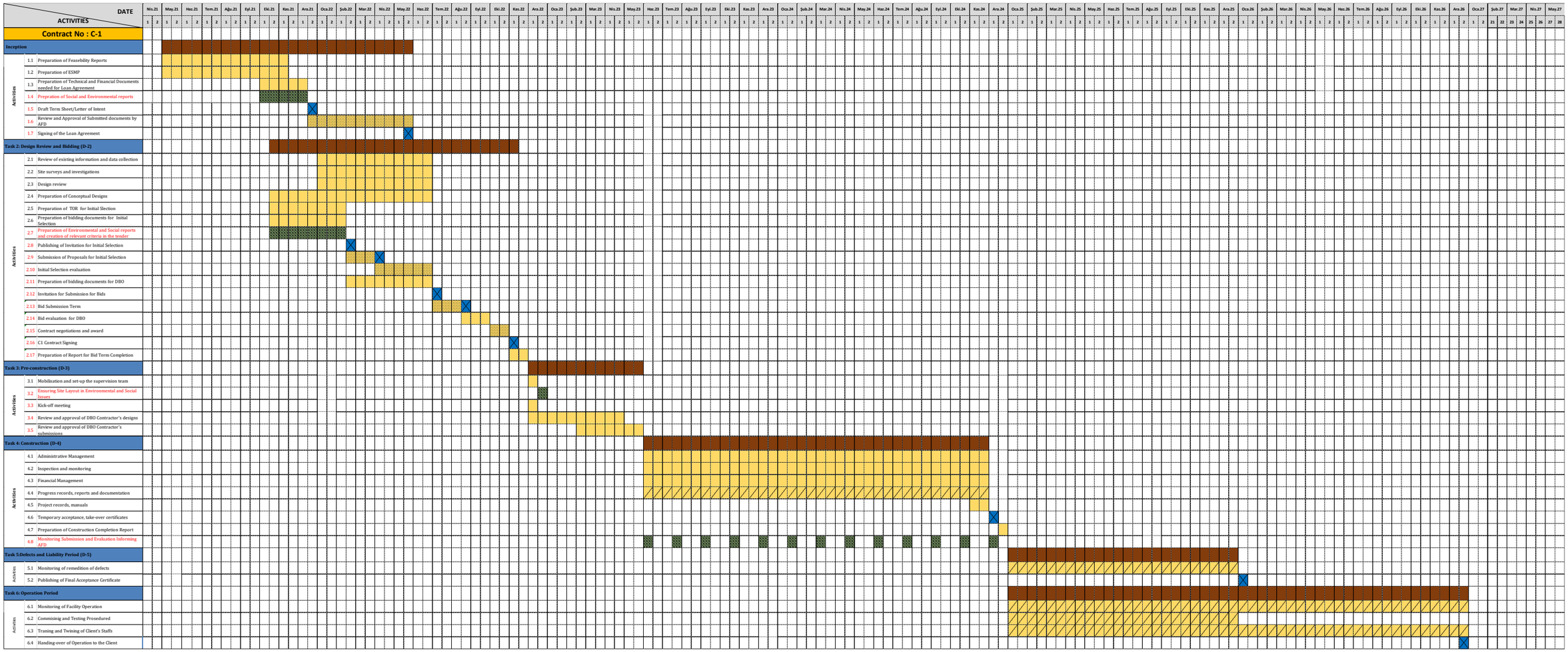
1.1.4. Number of Personnel to Work in the Construction and Operation Phases of the Project and Financial Resources Related to the Project

There are 78 personnel currently working at Hurma Wastewater Treatment Facility. It is planned to employ 55 personnel during the construction phase of the Hurma Treatment Sludge Incineration and Energy Recovery Facility Project, and an additional 10 personnel during the operation phase.

The cost of the Hurma Treatment Sludge Incineration and Energy Recovery Facility has been calculated as 32,00 Million €.

Project Components	Cost	
Mechanical Group	€	24.960.000
Electric Group	€	2.560.000
Construction Group	€	3.840.000
Design Works	€	320.000
Laboratory Works	€	320.000
TOTAL COST	**€**	**32.000.000**

1.1.5. Timetable for Project



See: **Annex-26** – Work Schedule for Hurma Treatment Sludge Incineration and Energy Recovery Facility Project

1.2. FEATURES OF PROJECT

Within the Hurma Treatment Sludge Incineration and Energy Recovery Facility; Fluidized Bed incineration and energy recovery systems will be built in Antalya province, Konyaaltı district, Hurma Neighborhood, block 12131 and parcel number 7, to dry and burn the sludge that will come out of the Wastewater Treatment Facilities belonging to the General Directorate of ASAT and to convert the steam that will result from the combustion to heat energy recovery. The facility to be constructed is planned to be a facility that will have favorable energy efficiency, heat balance, environmental standards and permits and can operate under all meteorological conditions.

General Directorate of ASAT currently spends 5,13 million €/year for the disposal of 500 tons/day of treatment sludge. The investment cost and operational cost of the Hurma Treatment Sludge Incineration and Energy Recovery Facility were calculated as 32 million € and 2,43 million € the return of the investment was calculated as approximately 12 years.

The Hurma Treatment Sludge Incineration and Energy Recovery Facility to be built; It is planned to be located within the borders of Hurma Wastewater Treatment Facility within the borders of Antalya province, Konyaaltı district, Hurma neighborhood. The Hurma WWTP is located on the Tünektepe road, at the 16th km of the Antalya-Kemer Highway.

The total area of the 12131 block and parcel number 7 where the Treatment Sludge Incineration and Energy Recovery Facility will be established is 174.658,00 m2 and the Hurma Wastewater Treatment Facility, which is currently in operation, is on an area of 163,524.70 m2. Within the scope of incinerating the treatment sludge and obtaining heat energy from the said incineration process originating from the treatment facilities under the responsibility of ASAT, it is planned to construct an incineration facility on an area of 11.133,31 m2 on block 12131 parcel number 7. The Location Map of the area where the activity will be carried out is presented in Annex-3 and the 1/25,000 Scale Topographic Map is presented in Annex-4.

Field photographs of the Hurma Treatment Sludge Incineration and Energy Recovery Facility Project, which will be located within the borders of the Hurma Wastewater Treatment Facility Area, are presented in Images 1, 2 and 3.



Image 1: Hurma Treatment Sludge Incineration and Energy Recovery Facility Project Area Image 1

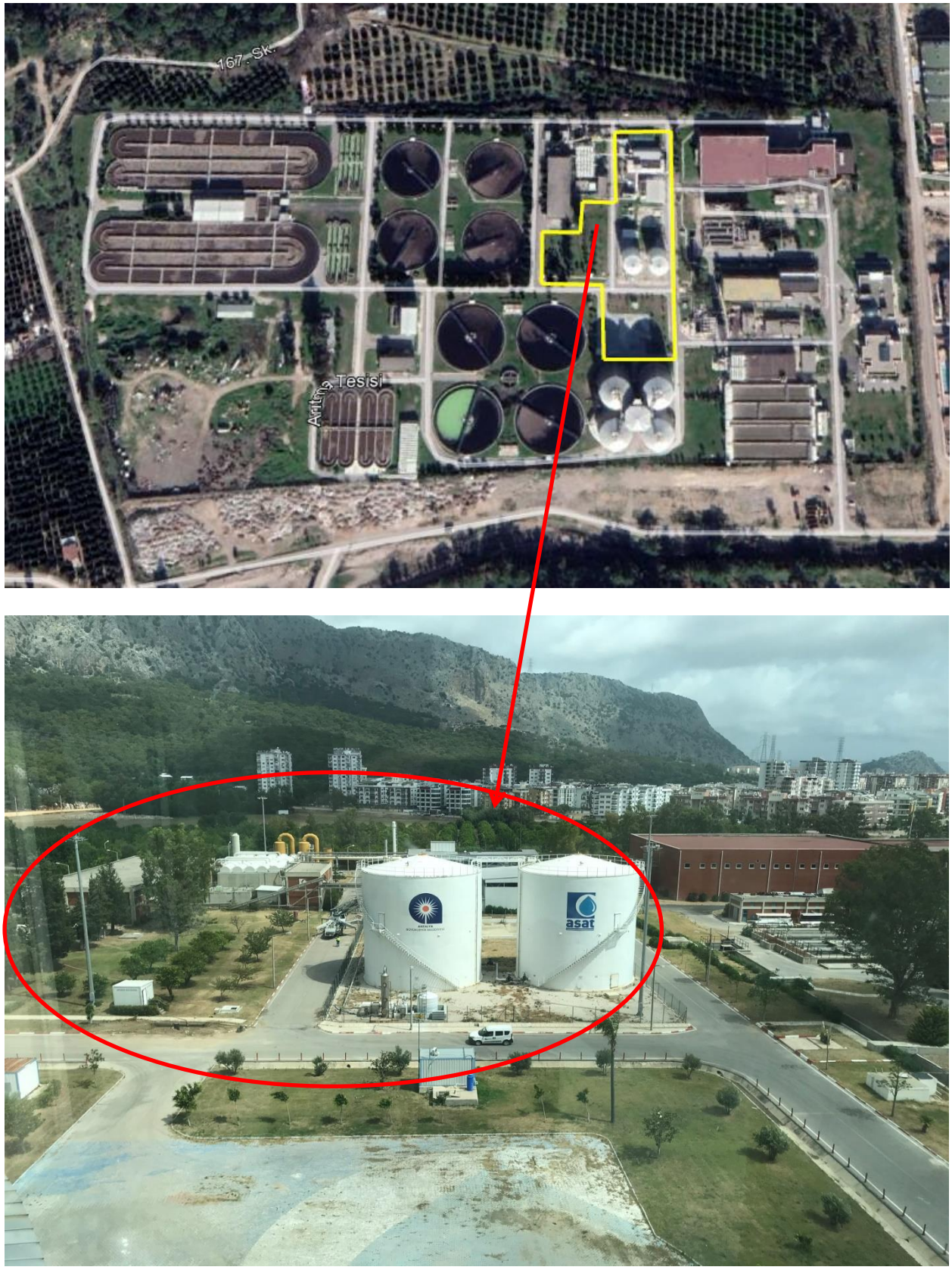


Image 2: Hurma Treatment Sludge Incineration and Energy Recovery Facility Project Area Image 2



Image 3: Hurma Treatment Sluge Incineration and Energy Recovery Facility Project Area Image 3

The total amount of waste sludge that comes out of 30 Wastewater Treatment Facilities within the borders of Antalya Province, which is under the responsibility of the General Directorate of ASAT, without drying, is approximately 500 tons/day and contains 17-20% solids. The Fluidized Bed Incineration Facility to be built within the scope of the said project will consist of 2 lines and its total capacity will be 500 tons/day. The hourly capacity of the facility is planned to be 20.83 tons/hour.

It is planned to have 2 separate belts within the Hurma Treatment Sludge Incineration and Energy Recovery Facility to be established. "Pre-Drying-Fluidized Bed Sludge Incinerator-Steam Boiler-Economizer (Waste Heat Boiler)-Filter" system units will be included in each belt.

All system equipment (feeding pumps, air blowers, etc.) within the project will have the feature and capacity to meet 15% more.

At the Hurma Treatment Sludge Incineration and Energy Recovery Facility, sludge with a dry matter content of 17-20% taken from 30 treatment plants belonging to the General Directorate of ASAT will be incinerated. The sludge will be transported from the facilities by licensed transport vehicles and brought to the incineration facility. For admission to the Hurma Treatment Sludge Incineration Facility, sludge from 30 Wastewater Treatment Facilities will first be discharged into an underground sludge bunker of 1000 m2 with a capacity of 1000 tons (1000 m3) (2x500 tons (2x500 m3). Afterwards, sludge will be transferred from the underground sludge bunker to the

above-ground sludge silos (2x118 m3) with above-ground sludge pumps. Two above ground sludge silos with a capacity of 118 tons (118 m3) will have a connection with the pre-drying facility to be built within the scope of the project.

The pre-drying facility to be built within the scope of the Hurma Waste Sludge Incineration Facility Project will operate with a capacity of 500 tons/day. After the mentioned pre-drying process, a sludge cake with a dry matter content of 40-45% will be obtained. The sludge cake with a dry matter content of 40-45% will be accepted into the fluidized bed incinerator.

Approximately 5 MWh (5,000 kWh) electricity will be produced during the incineration process at the facility. The internal consumption of the Waste Incineration Facility is calculated to be approximately 1.5 MWh (1,500 kWh (kilowatt hour)). The produced energy will meet 100% of the internal consumption of the Incineration Facility. The electricity consumption of the Hurma Wastewater Treatment Facility is approximately 3.5 MWh (3,500 kWh (kilowatt hour)), and it is anticipated that the electricity produced in the Incineration Facility can also meet the electricity need of the Hurma Wastewater Treatment Facility.

1.2.1. Process Flow Chart and Units

Starting from the waste acceptance, the detailed description of the processes to be applied in each unit, the recycling process/Incineration Facility and treatment facilities, the necessary schemes, formulas and figures are explained in detail under the sub-headings presented below.

The treatment sludge from the Wastewater Treatment Facilities of the General Directorate of ASAT with a calorific value of 500 tons/day, containing 17-20% dry matter and approximately 4000 kcal on a dry basis, will be dried in the pre-drying facility to a dryness rate of 40-45% and burned in a fluidized bed boiler. Steam will be produced in the steam boiler with the heat from combustion.

This steam will be partially used in the drying plant. Electricity will be produced with the remaining part and will be used for internal consumption of the facility. The Incineration Facility will produce its own energy. The electrical energy produced in the Combustion Plant is planned to be used to meet the internal consumption electricity need of the facility and the electricity need of the Hurma Wastewater Treatment Facility. It is foreseen that the electrical energy obtained in the Incineration Facility will meet the entire electricity need of Hurma Wastewater Treatment Facility in addition to its own internal consumption electricity need. The expected electrical energy generation is approximately 5.0 MWh (5,000 kWh).

Table 1: Hurma Treatment Sludge Incineration and Energy Recovery Facility Data

Hurma Treatment Sludge Incineration and Energy Recovery Plan Master Data			
Sludge Pre-Drying Unit			
Amount of Sludge		ton / day	500
Inlet Sludge SS Ratio		%	Between 17-20%
Exit Sludge SS Ratio		%	Between 40-45%
The amount of water evaporated		ton / day	285.7
		kg/saat	11.904,16
Fluidized Bed Incinerator			
Inlet Sludge Quantity		Ton / Day	214.3
		Kg/saat	8929.2
Inlet Sludge DM Ratio		%	42
Dry Sludge Heat Capacity		Kcal/kg	4000
Steam Generation			
Amount of Steam Generated		ton / day	36.000
		ton /hour	1.500
Electricity Production and Consumption			
Amount of Energy Generated		MWh - kWh	5,0 MWh (5,000 kWh)
Internal Electricity Consumption of Combustion Facility		MWh - kWh	1,5 MWh (1.500 kWh)
Electricity Consumption of Hurma Wastewater Treatment Facility		MWh - kWh	3,5MWh (3.500 kWh)
Net Energy Recovery from Incineration Facility (energy produced when internal consumption is subtracted)		MWh - kWh	3,5 MWh (3.500 kWh)
Facility Electricity - Natural Gas and/or Biogas Consumption			
Amount of Natural Gas and/or Biogas Consumed (It will be needed only within the scope of Pilot Ignition.)		Nm^3/hour	30,000 m^3
Electricity consumption	**Incinerator Facility**	MWh - kWh	1,5 MWh (1.500 kWh)
	Treatment plant	MWh - kWh	3,5MWh (3.500 kWh)

In the sub-headings presented below, all stages and units of the workflow chart within the scope of the project are explained in detail, respectively.

1.2.1.1. Platform Scale

Acceptance of treatment sludge at the Hurma Treatment Sludge Incineration and Energy Recovery Facility will begin by carrying out the weighing process in the on-floor type weighing unit made of steel material with a capacity of 60 tons, located in the Hurma Wastewater Treatment Facility. Then the sludge will be accepted to the sludge feeding bunker.





Figure 6: Sample Picture of Platform Scale Unit

Sludges (sludge from the treatment of urban wastewater) will be accepted within the scope of the project. Apart from this, no sludges will be accepted. The content of the waste will be analyzed in the laboratory located in the facility before the sludge weighed in the weighing unit is accepted into the feeding bunker of the incinerator and subjected to the incineration process. Within the scope of the Regulation on Incineration of Wastes, it will be determined whether the waste is dangerous or not and whether there is radioactive material in the waste content before it is incinerated. Wastes with halogen content below 1% will be accepted to the facility. When the analysis reports presented in Annex-7 are examined, it is seen that the halogen content in the analysis results is below 1%.

1.2.1.2. Underground Sludge (Feeding) Bunker and Above Ground Sludge Silo

1.2.1.2.1. Underground Sludge (Feeding) Bunker

Dewatered sludge with 17-20% dryness, dewatered in the decanter from 30 WWTPs in Antalya, will be weighed on the scale and then discharged to a 2-section underground silo with a total volume of 1000 tons, each with a capacity of 500 tons by trucks. The hydraulic sliding conveying system located under the compartments will convey the sludge to the screw conveyors in the middle parts, while the conveyors will feed the screw pumps located under each compartment. The sludge will be pumped into the intermediate above-ground storage silos by means of these pumps.

The design and manufacture will be made in such a way that the entire dumping area of the truck, where the sludge is accepted, stored, and the facility loading bunkers are 100% closed in order to ensure odor isolation. There will be two feeding bunkers. The bunker capacity is planned as 2x500 tons (m3), meaning its volume is 1000 m3. All areas related to sludge will be isolated from the outside air environment. Sulfate resistant (SRC) C35 concrete will be used in concrete structures with 100% impermeability to be used in this area.



Figure 7: Underground Sludge (Feeding) Bunker (sample image)

At the Hurma Treatment Sludge Incineration and Energy Recovery Facility, sludge with a dry matter content of 17-20% taken from 30 treatment plants belonging to the General Directorate of ASAT will be incinerated. The sludge will be transported from the facilities by licensed transport vehicles and brought to the incineration facility. For admission to the Hurma Treatment Sludge Incineration Facility, sludge from 30 Wastewater Treatment Facilities will first be discharged into an underground sludge bunker with a capacity of1000 tons (1000 m3) and a size of 1000 m2. Afterwards, sludge will be transferred from the underground sludge bunker to the above-ground sludge silos (2x118 m3) with above-ground sludge pumps. Two above ground sludge silos with a capacity of 118 tons (118 m3) will have a connection with the pre-drying facility to be built within the scope of the project.

The Bedded Sludge Incinerator will be fed with piston pumps. In the bunkers, there will be a grid that will separate objects over 4 cm, stones, etc. and will operate fully automatically.

The bunker to be built will be manufactured in accordance with the loading of sludge to the facility by trucks from outside the facility. In the meantime, trucks will be taken into the closed area and sludge will be discharged in order to prevent the odor that will disturb the environment. The odor inside will be removed by the air suction units.

1.2.1.2.2. Above Ground Sludge Silo

Before sludge is accepted to the pre-drying plant, sludge transfer will be provided from the underground sludge bunker to the above-ground sludge silos with the help of an above-ground pump.

The sludge pumped from the underground silo will be stored in 2 parallel working 118 tons (118 m3) above ground silos. There will be a hydraulic sliding frame at the bottom of the sludge silos, and each silo will be fed by 2 main screw pumps located under it. Via these pumps, the sludge will

be sent into the incinerator with injectors equidistant from each other around the Fluidized Bed Incinerator. Polluted air from sludge tanks and silos will be collected and deodorized by biofilters.

The gases accumulated in the silos will be transferred to the fluidized bed incinerator and a system will be set up to be burned there. In cases where the facility is not operating, an absorption system will be installed for odor control. This system will be installed as a backup for dangerous and explosive gases.

For level measurement in silos and bunkers, dangerous/explosive gas measurements such as H2S, CO and CH4 will be made and appropriate equipment will be installed. Bunkers and silos will be equipped with continuous level indicators, high and low level detectors and alarms to prevent overfilling and emptying. Adequate capacity above the high alarm will be provided to receive the full load. In order to monitor the level status in the storage silos, the Contractor will provide audible and visual alarms at the facility control and command center and facility observation and monitoring center.

There will be a hydraulically driven sliding floor mechanism at the bottom of the silos that will be made of stainless material. The transfer of the sludge cake to the pumps will be done by the auger systems under this mechanism.

Dewatered sludge cake storage silos will be equipped with the necessary and sufficient number of auger systems to feed all the pumps.

Silos will be equipped with platforms and ladders to reach the required areas. Platforms will be designed according to a load of 400 kg/m2 and will have guardrails. Railing joints and turns of all platforms and stairs will have euroclips. Railings, platforms will be suitable for wastewater gas conditions.

The main inlet bunker pump design will be in the form of a piston pump. The pump unit will be a “Valveless” “Double Cylinder Piston Positive Displacement Piston Pump” model. The hydraulic cylinders will be connected to the material cylinders / termination cylinders and the whole system will be hydraulically driven.

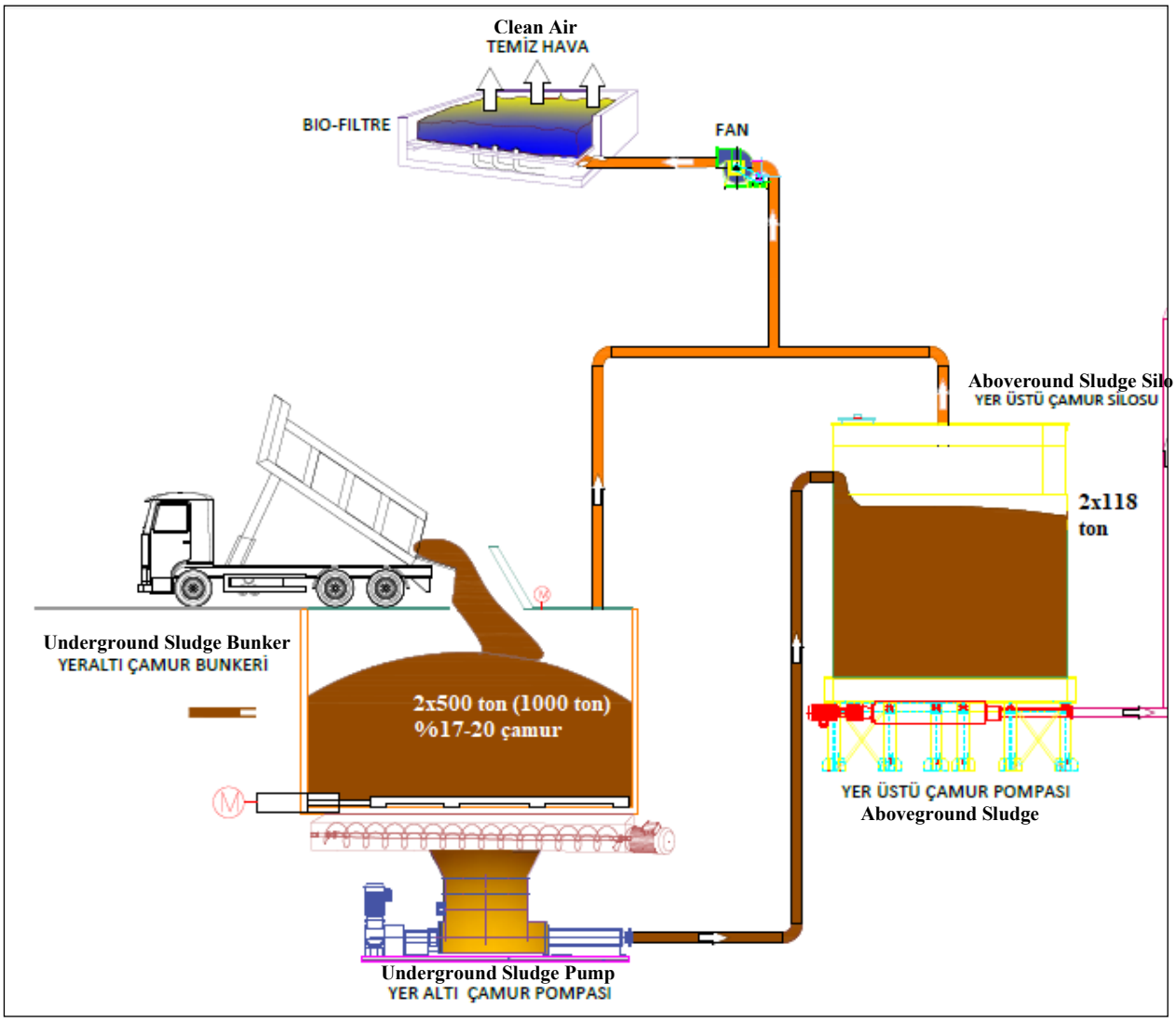


Figure 8: Planned Underground Sludge Bunker and Above Ground Sludge Silo Type Drawing

The purpose of selecting underground bunkers with a volume storage capacity of 1000 tons (1000 m3)

The capacity of the Fluidized Bed Sludge Incineration Facility is approximately 500 tons/day, and since treatment sludge with 17-20% DM content will be accepted, the volume of the underground bunkers in the project has been chosen to have the capacity to store the amount of 2 days. This capacity has been designed in order to prevent the possible release of sludge amounts by considering the future of treatment sludge from all Antalya District treatment plants (30 treatment plants). The bunkers are designed as reinforced concrete and completely closed, with full air and water insulation, and equipped with an odor removal system, and they will be kept closed except during unloading by making hydraulic-pneumatic covers in the parts where the transport trucks will unload.

The purpose of selecting the Above Ground Silos as 118 m^3 x 2

The treatment sludge to be taken from the above ground silos will be fed to the Fluid Bed Sludge Combustion boiler after pre-drying with 2 main and 1 spare pump-conveyor system with a capacity of 10-12 m3/hour. Sludge Feeding pumps will be located under the Above Ground silos and

continuous feeding will be possible. Each of the sludge feed pumps will operate for 24 hours. 10 m^3/hour x 24 hours= 240 m^3 x 2 pumps= 480 m^3/day requires above-ground silos for uninterrupted feeding of sludge. For this purpose, 2 above ground silos with a volume of 118 m3 have been designed so that each pump can operate continuously for approximately 10-11 hours. The aim here is to ensure that the Pump-Conveyor system operates at an effective pressure and uninterruptedly, and at the same time, to ensure the continuity of the system by preventing short-term disruptions that may occur between the Underground Silo and the Above Ground silo. Fluidized Bed Incinerator systems need continuous and homogeneous feeding, and underground and above ground silos are integrated into the system since they cannot operate in a short-term stop-start mode.

1.2.1.3. Pre-Drying Unit

The pre-drying plant to be built within the scope of the Hurma Waste Sludge Incineration and Energy Recovery Facility project will operate with a capacity of 500 tons/day.

The steam coming out of the drying product will move in the opposite direction to the flow and will be discharged from a steam port adjacent to the inlet of the product. Wet sludge fed from the sludge storage chamber by screw conveyors or piston pumps will be dried and transferred to the Incineration Facility by screw conveyors.

After the mentioned pre-drying process, a sludge cake with a dry matter content of 40-45% will be obtained. The sludge cake with a dry matter content of 40-45% will be accepted into the fluidized bed incinerator. A closed system equipment will be used in the drying section.

Table 2: Sludge Pre-Drying Unit

Sludge Pre-Drying Unit		
Parameter	**Unit**	**Amount**
Amount of Sludge	ton / day	500
Inlet Sludge SS Ratio	%	17-20
SS Ratio After Pre-Drying	%	40-45%
Amount of Water Evaporated	ton / day	285.7
	kg/saat	11.904,16
Dried Sludge Amount	ton / day	214.3

1.2.1.4. Incinator Feed Pumps

Two incinerators are planned within the scope of the project, and 2 main pumps are foreseen for each incinerator. Each sludge pump has the capacity to pump the sludge required by each incinerator at the required feed rate.

A pressurized sludge pipe from each sludge pump will feed the sludge injection port on the incinerator, the piping system is designed to ensure a smooth and even distribution of the incoming sludge at each injection port of the incinerator.

1.2.1.5. Incinerator Feed Pipelines

These pipelines are designed to be the easiest to manufacture in the available volume, to prevent blockages and to reduce pressure loss, with the least cost and to operate at 50 bar.

There are two main feed lines to the incinerators. In order to ensure a balanced feeding of the fluidized bed, the sludge will be introduced into the incinerator with two injectors equidistant from each other around the incinerator.



Image 4: Sludge Pipelines Feeding the Incinerator

1.2.1.6.Fluidized Bed Combustion Boiler Unit

Table 3: Combustion Boiler Information

Component	Value
Number of incinerators	2
The temperature in the hot air intake chamber	850°C
Temperature in the combustion chamber	> 850°C
Total height (m)	~ 11
Max outer diameter (m)	~ 6

The Fluidized Bed Incinerator consists of a steel body and a structure covered with thermal insulation and refractory layers of firebrick of appropriate thickness. Combustion takes place on the sand inside the incinerator. Hot air at 588 ˚C degrees, which is sent by hot air blowers to the hot air chamber located under the bed and heated by inert heat, blisters and fluxes the sand bed located on the refractory belt through tuyeres (air supply nozzles). The sludge, which is fed into the incinerator and has an average calorific value of 4000 kcal/kg, mixes with the hot sand and combustion air in the sand bed of the reactor and completely burns into an inert ash in a residence time of over 5 seconds. The waste gas with a temperature of 868 ˚C and containing ash produced in the reactor is first sent to the waste heat recovery system and then to the flue gas treatment system.

During the initial commissioning and operation of the incinerator, natural gas and/or biogas will be used as additional fuel in the burner. The amount of bed sand lost in the waste gas during

combustion is automatically determined and reinforced. The system also automatically controls the temperature with water spraying when necessary for cooling.

A fluidized bed incinerator will be used in the incineration of the treatment sludge. The sludge taken from the sludge drying plant will be fed to the fluidized bed boiler. The fluidized bed boiler performs pre-combustion (0-2 seconds) at 850°C.

At this stage, the water in the waste evaporates completely, all organic parts are oxidized and pass into the gas phase. At this stage, all inorganic parts are transferred to the second combustion chamber with the gas leaving the reactor in the form of very small particles. In the second combustion chamber, the combustion process will take place at 850°C for 4-6 seconds.

1.2.1.7. Air Fluidization and Fresh Air Blowers

The fluidizing air blower is multi-stage, centrifugal type with the following main features.

Component	**Unit**	**Value**
Air flow in normal design	Nm^3/h	18,000
Output pressure	mm	2700

Combustion air needed by the first start-up burner, which is mounted in the hot air inlet room, is supplied through a secondary pipe separated from the outlet pipe of the blower located at the outlet side of the heat exchanger.

The clean air blower is a centrifugal blower unit with the following main features:

Component	**Unit**	**Value**
Air flow in normal design	Nm^3/h	252
Output pressure	kPa	60

This blower feeds multiple points inside theincinerator to prevent the fuel injection nozzles from clogging and overheating.

1.2.1.8. Sand Storage + Feeding System

Due to the friction inside the incinerator, a small portion of the sand is thrown out of the incinerator along with the combustion gases. Sand particles that will come out of the incinerator with the gases as a result of combustion will be kept in the filters located in the flue gas treatment units under the heading "1.2.1.13. Flue Gas Treatment Units (Emission Control System)" and will be prevented from being discharged through the chimney. Since sand particles coming out of the incinerator will be attached to the filters, there is a loss of sand in the incinerator. River sand with a particle size of approximately 600 µm is used in the incinerator. This sand will not contain chlorides, sodium salts, potassium or iron compounds.

Sand brought by trucks will be transported to the silos by pneumatic system. The sand to be given to the incinerator will be transferred by the pneumatic conveying system.

The approximate amount of sand in the incinerator is 60,000 kg

Storage volume: 1 x reactor volume = 60 tons / 1.6 = 37.5 m^3 Selected storage volume: 40 m^3 / incinerator

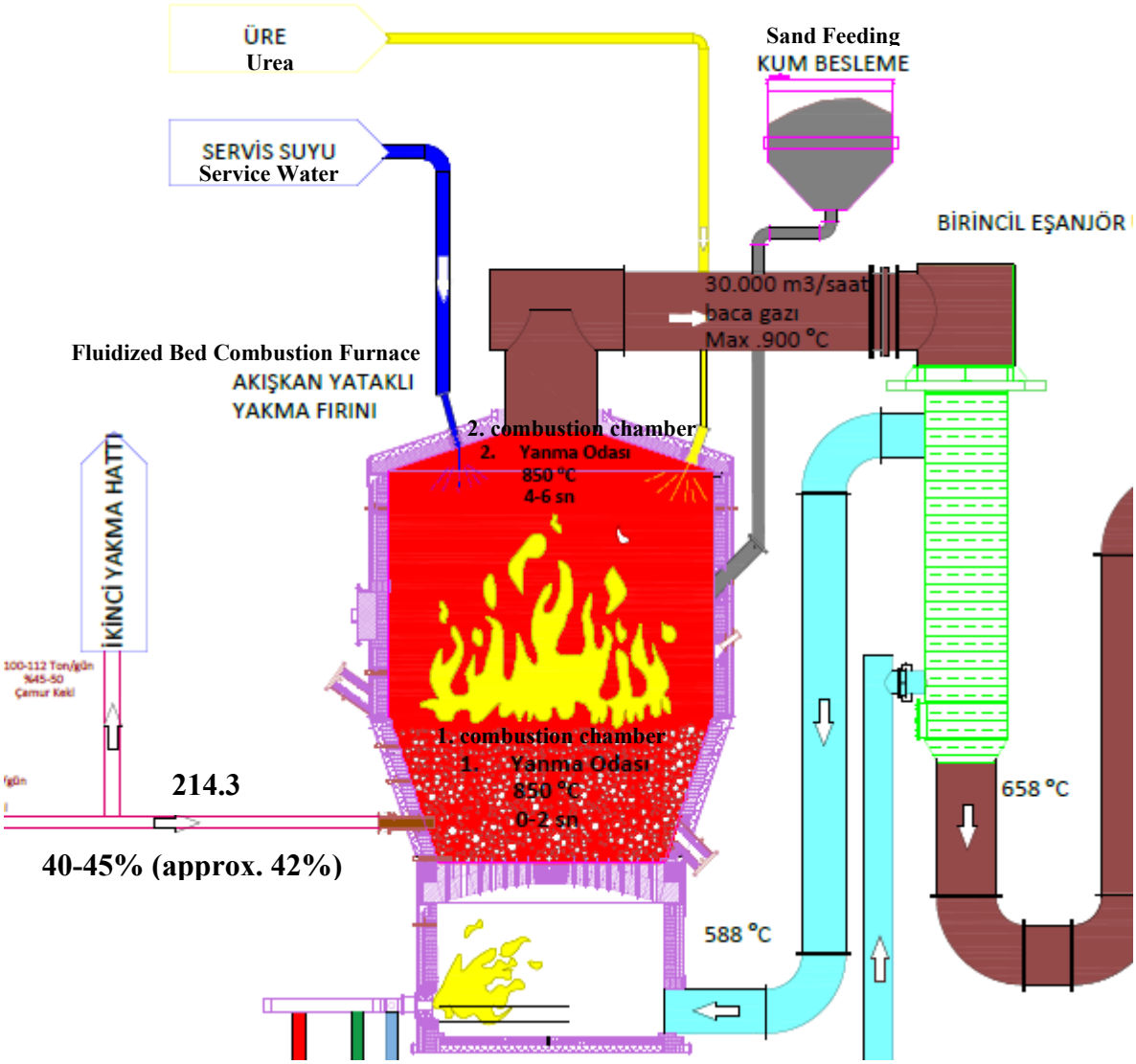


Figure 9: Planned Fluidized Bed Incinerator Boiler Type Drawing

Quarzsand M 32* (Silica) sand will be used as the bed sand in the fluidized bed incinerator. The sand called silica contains over 99% SiO2. Quarzsand M 32 is a substance characterized by its high fire resistance and chemical purity.

1.2.1.9. Fluidization Air Heat Recovery (Heat Exchangers)

The main philosophy of the system is based on the optimum use of the energy of the flue gas. For this purpose, the hot flue gases from the incinerator are firstly sent to the primary heat exchanger. In this way, the air with a temperature of 144 ºC from the fluidizing air blowers and further heat recovery systems is fed under the sand bed in the incinerator after being heated to 588 ºC by the heat of the incinerator flue gas at 900 ºC in the Primary Heat Exchanger. The continuity of the combustion process is ensured in this way.

In the fluidized bed boiler, all wastes and all inorganic particles that were burned at 850°C in the first stage and passed into the gas phase will be transferred to the second combustion chamber,

where they will be re-burned at 850°C. There will be a collection chamber under the second combustion chamber for the ash resulting from the combustion in the second combustion chamber.

The gases from the combustion reactor will be treated before being released into the atmosphere.

The steam produced in the boilers is used for electricity generation in two steam turbines.

In addition to the steam entering the turbine at high temperature and pressure, low pressure steam is sent to the drying facility from here.

It is planned that the temperature at the inlet of the waste heat boiler is around 900 °C, and the 1st group heat exchanger: 658 °C, the 2nd group heat exchanger: 157 °C, the 3rd group heat exchanger: 110 °C and the 4th group heat exchanger: 85 °C at the exit.

Here, around 25 ATM superheated pressure steam (saturated or superheated) is obtained and this heat is used in the drying facility and the remainder is used in electricity generation. 1st Group: 658 °C, 2nd Group: 157 °C, 3rd Group: 110 °C and 4th Group: 85 °C gases from the waste heat boiler are used in hot air production with the help of heat exchanger. Hot air is returned to the boiler as boiler feed air. Thus, the system efficiency is increased up to 85%.

The calorific value of the dried sludge is capable of self-combustion, and additional energy (natural gas and/or biogas) supply from outside will be at minimum level.

The Work Flow Chart of the Hurma Treatment Sludge Incineration and Energy Recovery Facility is presented in Figure 10 and also in Annex-6. In the business flow chart in question, all process units and all input-outputs in the process are shown.

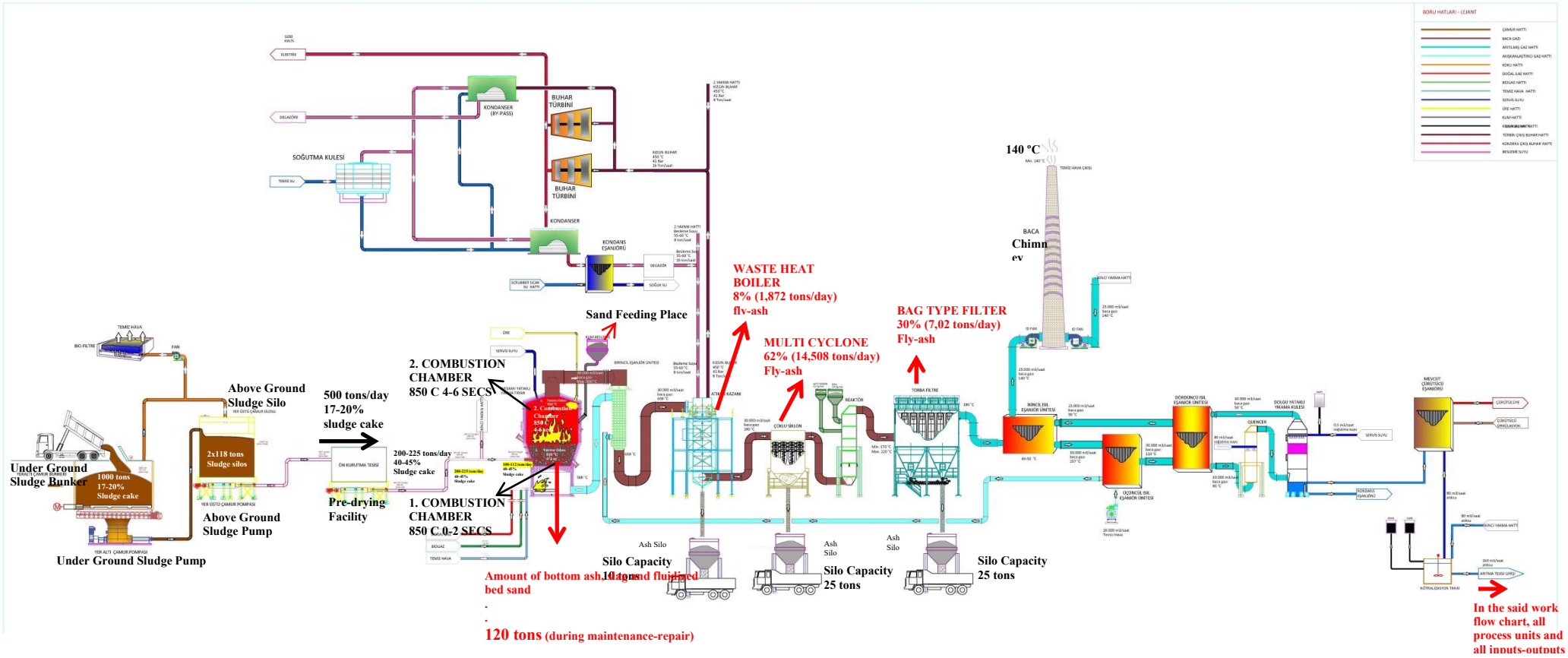


Figure 10: Hurma Treatment Sludge Fluidized Bed Incineration Plant Work Flow Chart

1.2.1.10. Waste Heat Boiler and Steam Turbine

It will produce superheated steam from the exhaust gas coming out of the fluidized bed incinerator and will come to the 2 planned waste heat boilers. Superheated steam will be produced at 16-18 Bar/455 °C in waste heat boilers and sent to two planned steam turbines. The steam required for the degasifier will be taken from the steam domes. The condensate water coming out of the steam turbine will be cooled in the condenser and sent to the degasifier.

In order not to interrupt the process in case of a problem in the steam turbine, the steam produced in the waste heat boilers will be sent to the condenser from the by-pass line by using the pressure reducing valve and the attemperator. Condenser and cooling tower capacity is determined according to the by-pass line. Waste heat boilers are of the type with water pipe and forced circulation. Low water volume will minimize the activation time.

There is a Thermal Sludge Drying Facility currently used within the borders of Hurma Wastewater Treatment Facility.

Currently, the amount of sludge generated from the operation of the Hurma Wastewater Treatment Facility is 240 tons/day on average. In the Incineration Facility, an average of 140 tons/day of the 240 tons/day sludge that will originate from the Hurma Wastewater Treatment Facility will be processed. The remaining average of 100 tons/day and sludge from other Wastewater Treatment Facilities up to an additional 50 tons/day (150 tons/day in total) can be processed and dried in the Thermal Drying Facility with a capacity of 150 tons/day, which is currently located within the Hurma Wastewater Treatment Facility. This will not affect the planned Incineration Facility capacity.

In the current situation, the thermal drying unit in the facility will not have an integration with the pre-drying facility planned within the project. The waste heat generated in the Hurma Treatment Sludge Incineration Facility, which is planned to be established within the scope of the project, will be able to be utilized only in the thermal drying facility. There may only be a connection with a technology that can provide heat integration, and this will not affect the operation and capacity of the Incineration Facility.

1.2.1.11. Superheater/ Steam Generator and Economizer

The superheater, steam generator and economizer will be mounted in the same body and sent to the field as a modular structure in one piece.

The superheater was added to the system to increase the saturated steam temperature to 450°C. The superheater surfaces are made of carbon steel seamless finned tubes. The superheater pipes will be placed horizontally. The gas flow will be perpendicular to the pipes. The superheater collectors unit will be installed in such a way that it is completely drained.

1.2.1.12. In-Boiler Piping

All steam and water pipelines will have vent and drain connections. Steam and water lines will be subjected to hydrostatic testing under 1.5 times the design pressure. Pipelines will be designed according to ASME standard. Pipelines will be supported where necessary.

Valves shall be accessible and removable by the operator in terms of maintenance and operation. Control valves will be flange connected.

There will be a safety valve on the superheater and on the steam dome. Safety Valves will be spring type.

Necessary platforms and ladders will be available for the Waste Heat Boiler and Steam Dome. The platforms will be placed within reach of the valves and boiler maintenance valves on all lines. Operators will also have access to measuring points and equipment requiring maintenance.

Insulation material thicknesses will be calculated and selected so that the outer surface temperature does not exceed 60°C.

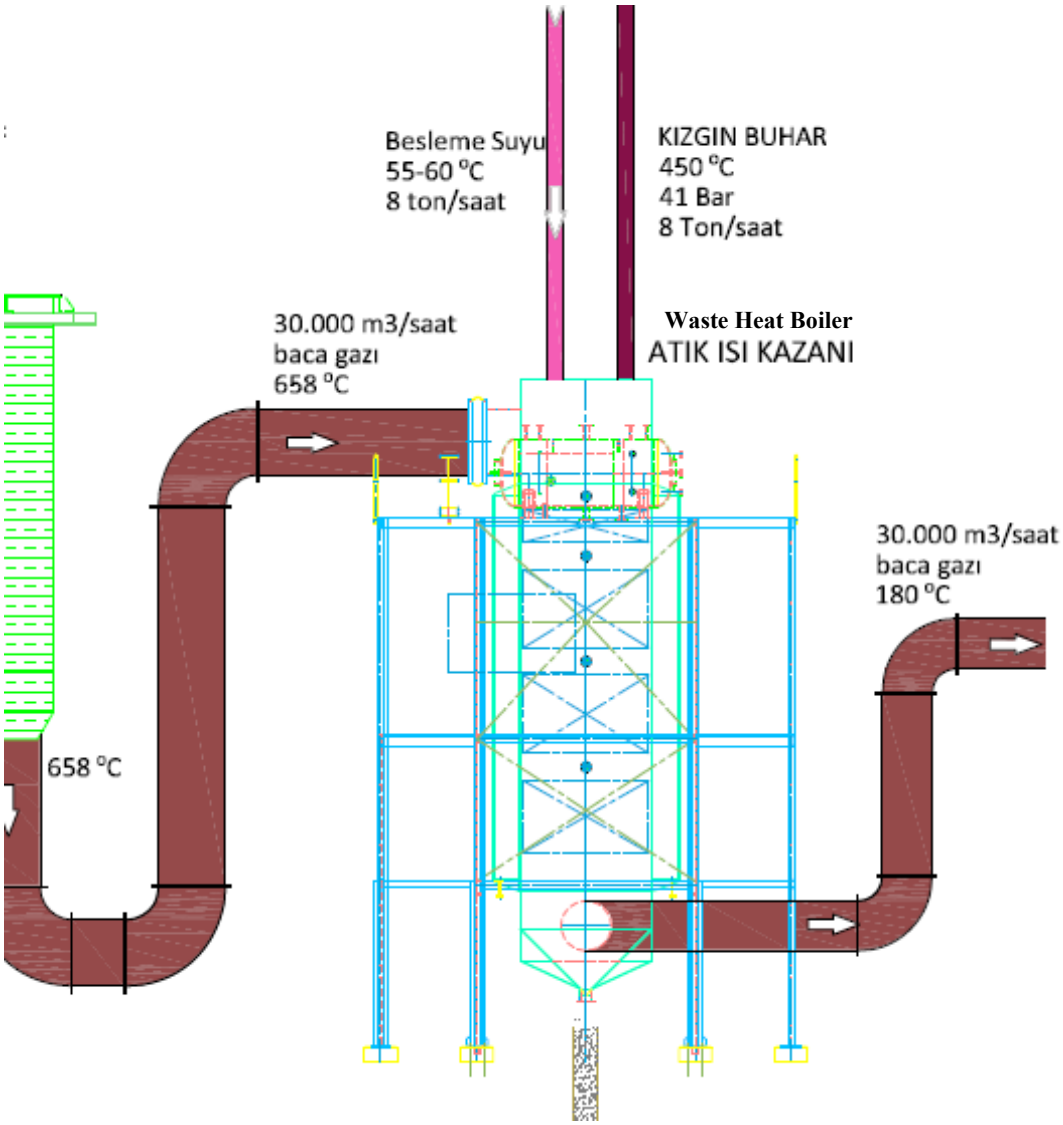


Figure 11: Waste Heat Boiler

The flue gas from the fluidized bed incinerator leaves the incinerator loaded with the total amount of ash from the sludge fed into the fluidized bed incinerator incinerator.

The waste heat boiler system has a special and proven layout and design that meets all the requirements arising from the specific downstream operating conditions of the fluidized bed incinerator.

In the case of energy production (turbine and electric generator), superheated steam is converted into saturated steam.

1.2.1.13. Flue Gas Treatment Units (Emission Control System)

Treatment sludge contains elements such as heavy metals, toxic compounds, pathogens, phosphorus and nitrogen. If effective control technologies are not used to reduce the emission of combustion gases, air quality can deteriorate significantly after sludge incineration. When properly designed and operated, the organic materials in the treatment sludge will be completely burned by incineration and mainly gases such as carbon dioxide, water and sulfur dioxide will be produced. During the sludge incineration process, there is a high probability of significant particulate release into the atmosphere. In order to prevent the emission of particles in question, flue gas treatment will be carried out with the treatment units detailed below. The particles in question will be kept in the filters within the flue gas treatment systems, and the purified gas will be released from the chimney.

Emission control system at the facility will be established in such a way as to provide emission values within the criteria of the relevant Law, Regulation and European Union Directive. The emission control system will be automatically controlled and operated from the Facility Control and Command Center during start-up, operation and shutdown. Equipment requiring regular maintenance will be accessible from permanent walkways and will be made of easily replaceable parts. Spare parts will be provided as well as necessary lifting beams and special tools so that replacement can be quick, safe and reliable.

After the filter, the waste gas will not exceed 140 °C before entering the chimney.

After the economizer at the steam boiler outlet, the emission control system will consist of, but not limited to, lime addition unit, filter unit/ceramic filter unit and a wet Washing Unit with bypass and a Packed Bed Scrubber Unit. Packed Bed Scrubber Unit shall be produced by the input value of 200 ppm SO2. NaOH can be added to the Scrubber Unit to purify the acidic gases in the waste gas. In the event that NOx levels in the flue gas increase, a device will be made to add urea/NH3 to the fluidized bed incineraton boiler.

Lime Dosing Unit, Activated Carbon Dosing Unit, Mixing Unit, NaOH Dosing Unit, Filter Unit/Ceramic Filter Unit, Packed Bed Scrubber Unit with bypass will be manufactured, which are the main components of the emission control system, which is one of the system/equipment/unit/instruments.

To control flue gas emissions a) multi-cyclone filter b) Activated carbon and lime dosing unit c) Mixing Unit d) NaOH Dosing Unit e) Filter Unit/ceramic filter unit f) Packed Bed Scrubber Unit with bypass g) Bag type filter h) Flue gas suction fan i) Chimney j) Emission control units such as CEMS (Continuous Emission Measurement System) and k) Flue Gas Washing Water Treatment System will be installed.

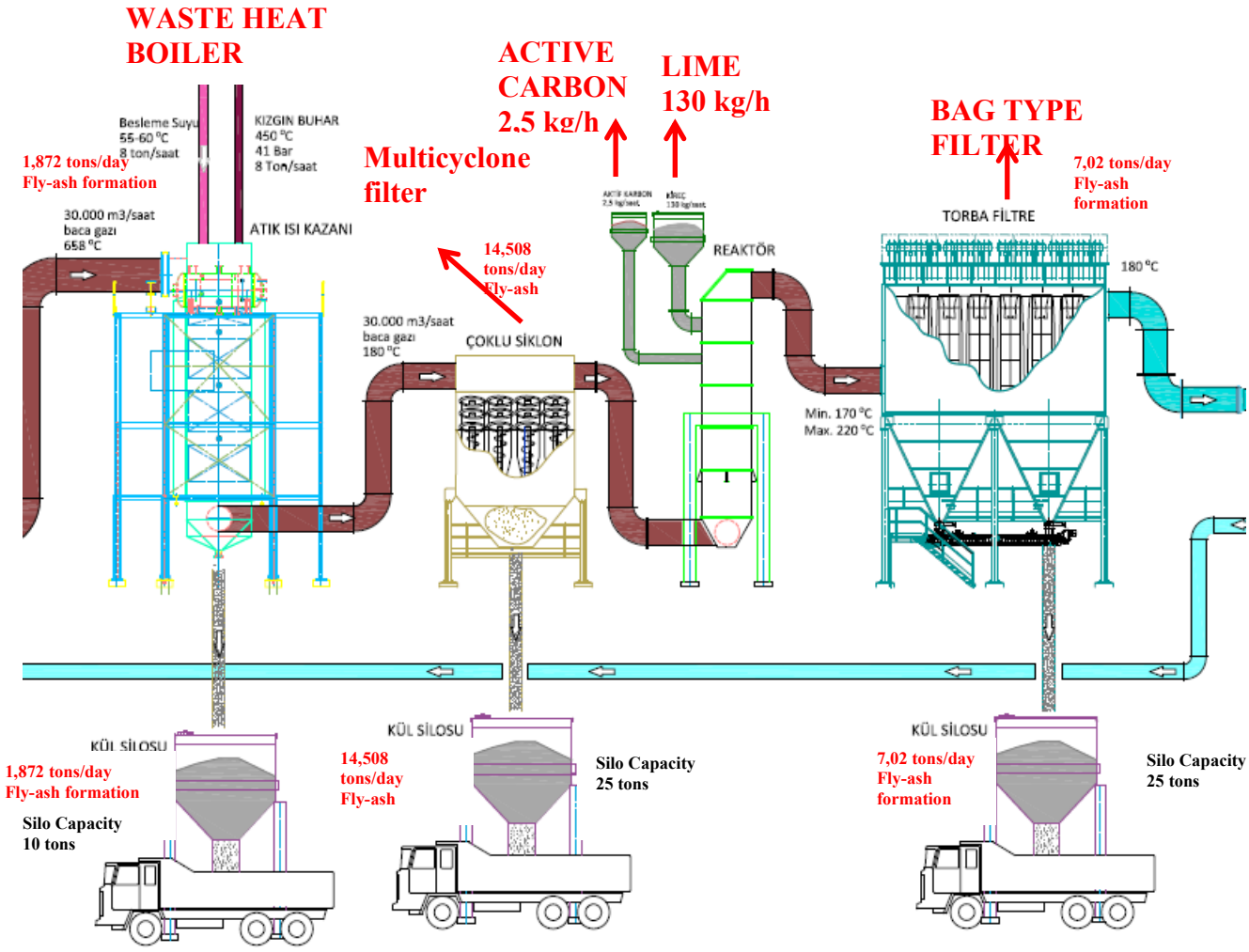


Figure 12: Flue Gas Treatment Units

1.2.1.13.1. Multi Cyclone Filter

The high temperature waste gas (180 – 210 °C) coming out of the waste heat boiler will pass through the cyclone and will primarily be purified from large particles. Each multi-cyclone filter will consist of 2 parallel lines and each will have a separate waste gas inlet.

The dust-laden flue gas coming out of the waste heat boiler enters the multi-cyclone body consisting of 81 small cyclones selected for particle retention. It allows the flue gas to enter into a circular motion. Particles over 4 microns pushed towards the outer walls by the centrifugal force effect caused by this flow are directed towards the conical lower part of each cyclone by gravity. The gas separated from the dust at a rate of 75%-85% passes through the cyclone inner outlet pipe to the upper chamber and is sucked by the Main Fan from the gas outlet on the main body. Dust particles accumulating in the lower chamber of the cyclone are directed to the ash silos via the pneumatic conveying system and are removed from the system by trucks.

1.2.1.13.2. Activated Carbon and Lime Dosing Unit

Activated carbon will be dosed to the flue gas before entering the bag filter at the multi-cyclone filter outlet, and the removal of mercury and other heavy metals, possible dioxins, furans and poly aromatic hydrocarbons in the gas will be ensured. At this point, lime dosage will be performed in addition to the activated carbon, and the removal of acidic compounds (SO2, etc.) in the gas will be ensured.

Activated carbon and lime to be injected as powder will be stored in silos with a two-day storage capacity and will be injected into the mixing reactor with the pneumatic conveying system. Due to the structure of the mixing reactor, it will increase the flue gas velocity with the cross section narrowing at the inlet and will provide a full mixing of the chemicals by spraying, and will increase the contact required for the reactions by creating a spiral air flow.

The activated carbon that will be required in the flue gas treatment system and the chemicals required in the facility will be stored in the chemical storage building, which is built jointly with the workshop building. Apart from activated carbon, boiler chemicals, acid, caustic and polymer chemicals can be stored in this warehouse under appropriate conditions.

1.2.1.13.3. NaOH-H2SO4 Dosing Unit

It will be used for the removal of sulfide compounds that will form in the emission gas.

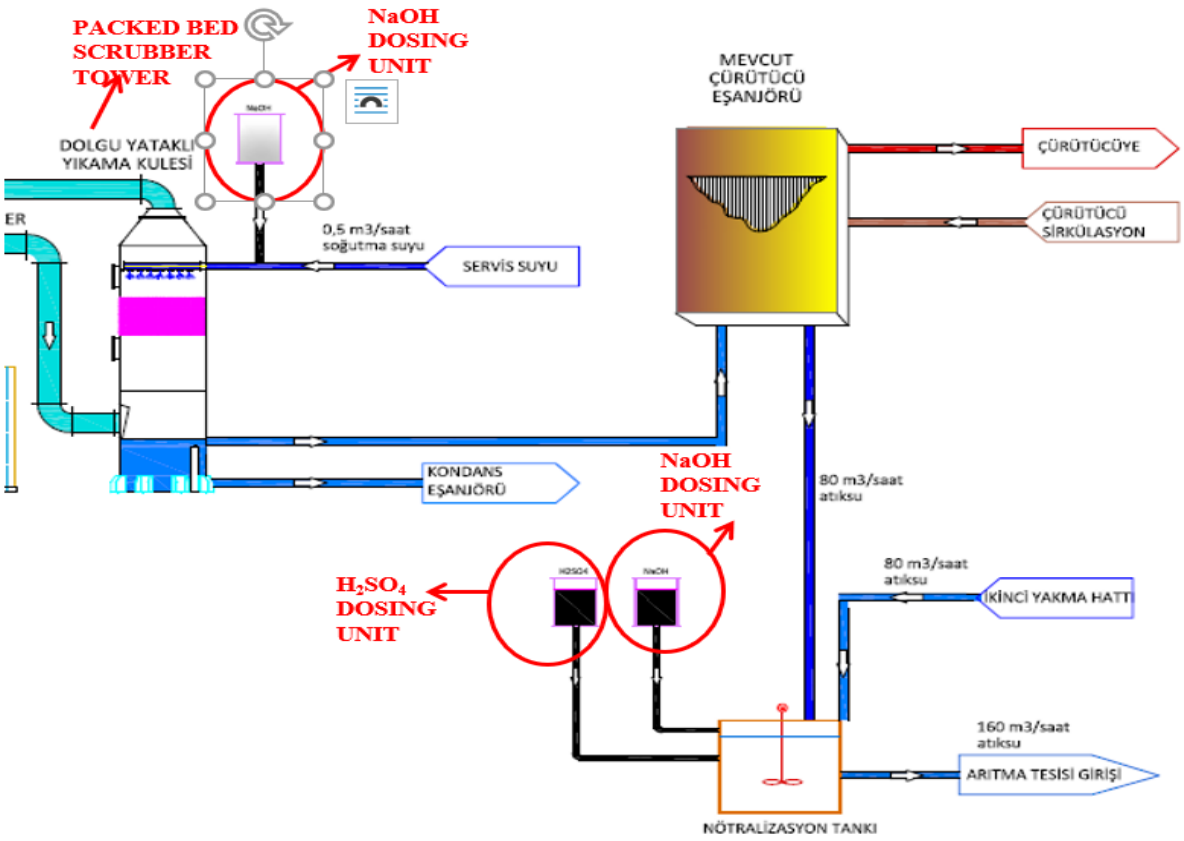


Figure 13: NaOH-H2so4 Dosing Unit

1.2.1.13.4. Filter Unit/Ceramic Filter Unit

The body of the construction with the filters will be manufactured with a minimum thickness of 3 mm. While one part of the filter is cleaned, the other filters will continue to operate. The body of the construction where the filter groups are located will be dust and gas tight. The body will flex under vacuum. The filter material will be resistant to a gas temperature of at least 250 °C. In order to prevent acid condensation, the gas temperature at the filter inlet will be at least 170 °C.

Ceramic filters are made of ceramic cartridges with a pore size of less than 150-200 µm. Due to their small pore size, they provide very sensitive filtration.



Figure 14: Ceramic Filter (Sample Picture)

1.2.1.13.5. Bag Type Filter

The flue gases from the reactor enter the bag type filters. Particles that cannot be retained in the cyclone filter will be retained in this unit. Particles kept in the cyclone filter and bag type filter will be collected separately and disposed of.

The flue gas, which is dosed with activated carbon and lime, will come to the bag type filter. Particles formed by chemical dosage and other particles passing through the cyclone will be kept by the bag type filter. Bag filters with 3 compartments (2 main and 1 online maintenance compartment) are foreseen for each flue gas treatment and the waste gas inlet of each is designed independently of the other.

The bag type filter will be of jet pulse type and will consist of 528 bags (352 original and 176 online maintenance). According to the differential pressure that may occur over time due to dust

retention in the filters, pneumatic cleaning will be carried out. While cleaning a clogged filter compartment, the system will continue to purify other filter compartments without stopping. There will be heaters in the filter outlet funnel to prevent condensation in the bag type filter over time and to prevent the particles from solidifying over time and washing out when the system is stopped. If necessary, heating will be done in the bag type filter.

Dust particles accumulated in the under-filter bunkers are directed to the ash silos via the pneumatic conveying system and removed from the system by trucks.

Bag type filter output values will be in accordance with the desired emission output values.

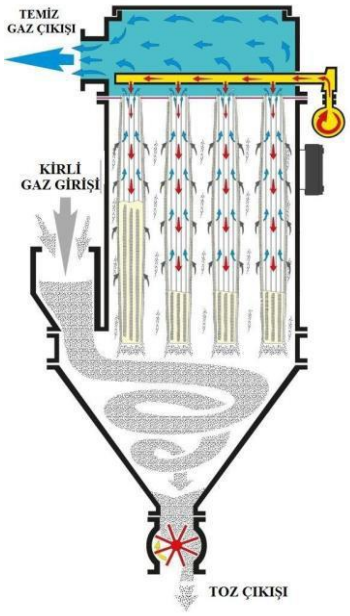


Figure 15: Bag Type Filter

1.2.1.13.6. Venturi Cooler and Packed Bed Scrubber Tower

Although the desired emission values will be provided at the bag type filter outlet, a Packed Bed Scrubber Tower (PBST) will be installed for safety purposes as the last link of the flue gas emission control. The flue gas, which is separated from the waste heat recovery system at 85°C, passes through the venturi cooler before the packed bed tower and is subjected to particle capture and cooling for the last time. The flue gas whose temperature drops to 50 oC moves vertically to the filling tower. Final removal of particles as well as SO2 removal with caustic liquid takes place in this area. The hot water obtained from this unit, where the final temperature reduction of the gas is achieved, will be used for different purposes such as heating the sludge before the decanter in the facility. If it is related to NOx treatment, Carbamide (Urea) will be fed to the incinerator when necessary.

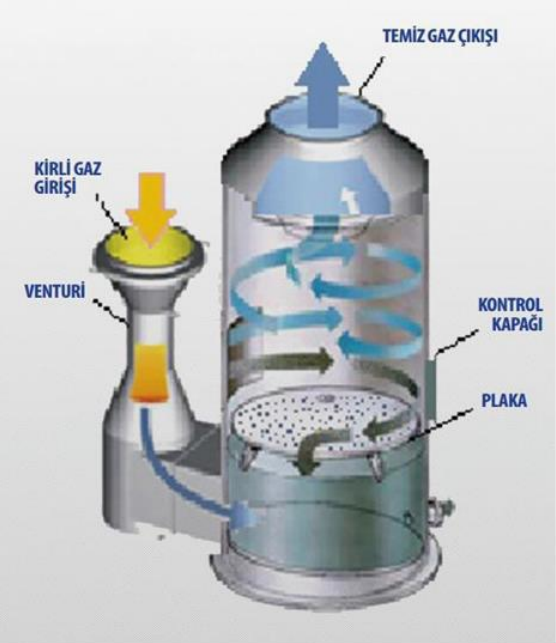


Figure 16: Venturi Cooler

The packed bed scrubber tower will be designed to remove SO2 and particulate pollutants in the gas. Venturi cyclonic packed bed scrubber towers are used for the removal of gases and particles.

Considering that the gas will be cooled in the system, the cooler venturi is considered as a monoblock in order to increase the particle removal efficiency.

The gas enters 4 venturi vertically downwards to the section that will also serve as gas cooling. 40 tons of 20°C water per hour is sprayed into the gas from the nozzles. Water and gas move vertically quickly through the venturi throat. While the particles are directed from the venturi floor to the tower chamber, the cleaned gas is cyclonically cleaned to the inner wall of the venturi body by circular rotation and high centrifugal force. The gas moves vertically into the packed tower.

Final cleaning takes place in the tower. At the same time, SO2 removal with caustic liquid takes place in this region.

The packed bed scrubber tower is activated automatically with the operation of the boiler. The NaOH tank injects chemicals with the washing nozzles until the previously adjusted pH values are reached into the washing water. The chemical is cut off when the pH value reaches the adjusted value of 9-10.

40 m3/hour of the caustic water coming from the gas washing liquid plant at a flow rate of 70 - 80 m3/hour is sprayed to the cooler and 30 m3/hour to the filling. Washing water is poured into the lower tower chamber through the filler. Towards upwards, the flue gas PBST is sucked from the upper point by the main system fan. PBST 500 ppm SO2 and 10gr/m3 particulate flue gas concentration is designed to meet the emission limit values specified in Annex-5 of the Regulation on Incineration of Wastes.

The by-pass packed bed scrubber unit will be placed after the filters. By-pass system will be activated only when necessary. While the scrubber unit is being manufactured, 200 ppm SO2 will

be accepted as inlet concentrations to these units and it will be sized to reach the emission limit values given in the Regulation on Incineration of Wastes and European Union Directives at the exit. This flow will be evenly distributed over the cross-sectional area of the scrubber unit and short circuits will be prevented. The scrubber unit will be cylindrical. Water containing NaOH will be supplied from above and waste gas will be supplied to the scrubber unit from below. Necessary flow adjustment will be made so that the liquid does not overflow. The operation of the system will be done through automation.

The water to be used in the washing unit will be treated wastewater from the treatment plant.

Although the flue gas emission values are provided at the filter outlet, a scrubber unit will be built for safety purposes. By making caustic dosage in the washing unit, the particles and SO2 compounds that cannot be kept in the bag type filter will be removed in this unit.

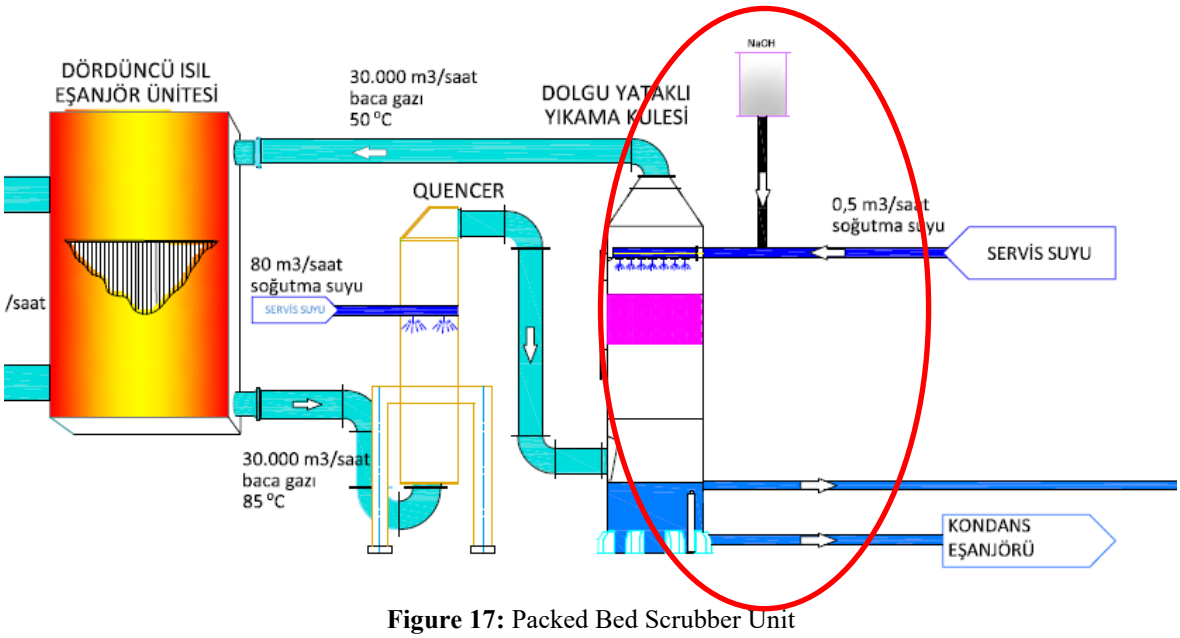


Figure 17: Packed Bed Scrubber Unit

1.2.1.13.7. Heat Recovery Exchanger System

This system will consist of 4 different heat exchangers. The purpose of using these heat exchangers is to increase the heat efficiency of the system and to perform the necessary heating processes. At the inlet of the waste heat boiler, the temperature is around 900 oC and at the outlet, the 1st Group: 658 oC, the 2nd Group: 157 oC, the 3rd Group: 110 oC and the 4th Group: 85 oC gases are used in the production of hot air with the help of a heat exchanger. Hot air is returned to the boiler as boiler feed air. Thus, the system efficiency is increased up to 85%. Via these equipments, the fluidizing air, which is 60 ºC at the blower outlet, is increased to 140 ºC and the flue gas temperature is gradually reduced to 85 ºC and then increased to120 ºC. Thus, the flue gas, which rises from 120 ºC to 140 ºC after the main suction fan, will also prevent the appearance of condensation and unaesthetic smoke when exiting the chimney.

1.2.1.13.8. Main Suction Fan and Chimney

Main Suction Fan

It ensures that the waste gases are withdrawn from the system and discharged from the chimney. This fan is managed by an electric motor and the flow rate of the waste gases can be adjusted by means of a frequency converter.

In the 500 tons/day system, there will be a suction fan belonging to each line, which ensures that all flue gas is sucked and given to 1 chimney at 40 m height. Emission control of the gases given to the chimney will be carried out with the "Continuous Emission Control System".

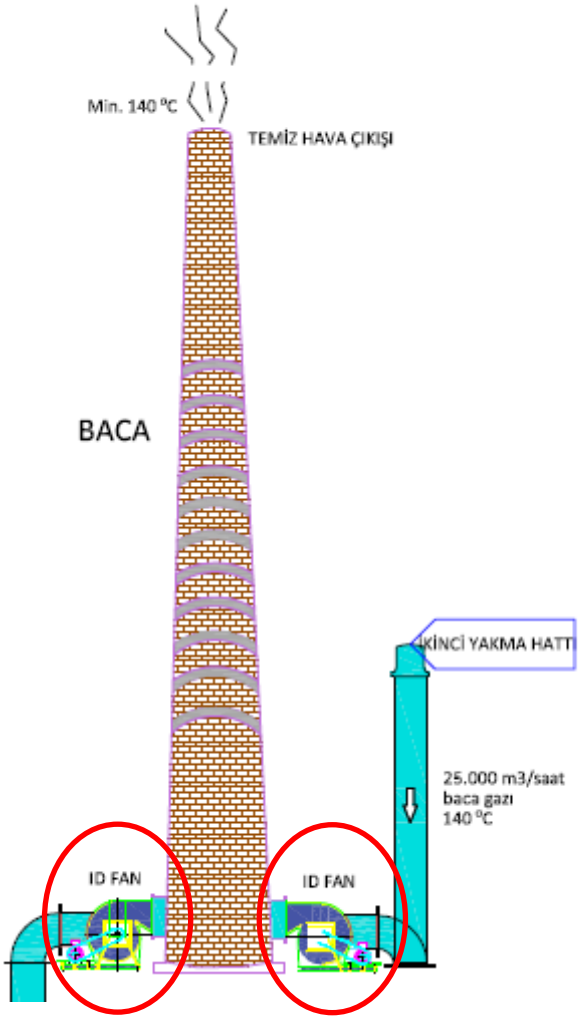


Figure 18: Flue Gas Suction Fans

Chimney

The flue gas temperature will be adjusted to 140 ˚C and discharged to the atmosphere from the chimney.

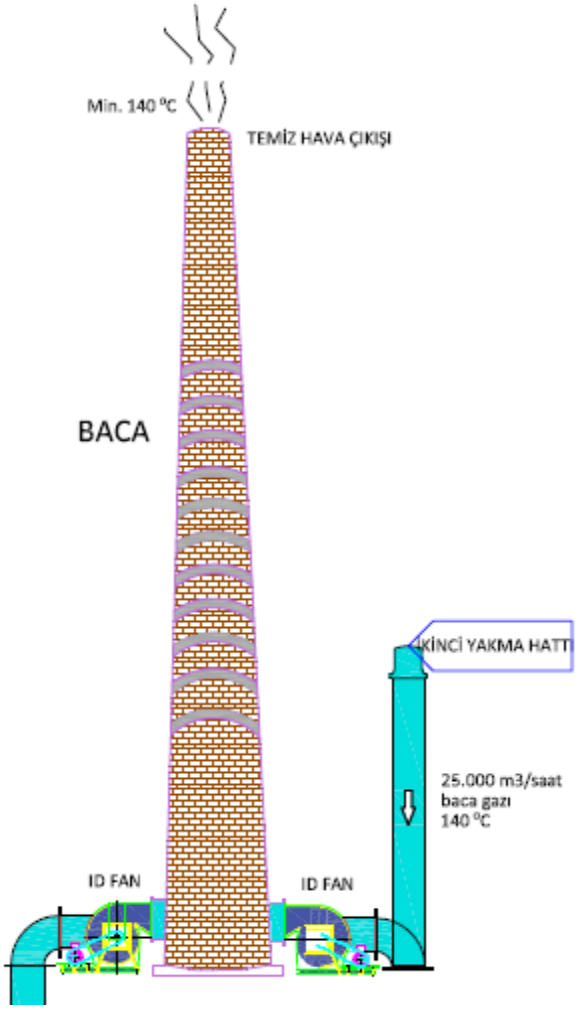


Figure 19: Sludge Incineration Facility Chimney

1.2.1.13.9. CEMS (Continuous Emission Measurement System)

Flue gas emission values will be monitored continuously with CEMS. Emission control units will carry out treatment in line with the information received from CEMS and will ensure that the flue gas emission values are kept under constant control.

1.2.1.13.10. Flue Gas Washing Water Treatment System

Treatment Sludge Incineration and Energy Recovery Facility will be established within the borders of Hurma Wastewater Treatment Facility. Within the scope of the project, only wastewater originating from the flue gas treatment system will be generated. There is no wastewater generation from any other process. The flue gas washing water coming out of the facility will be collected in the existing wastewater manhole and given to the entrance of Hurma Wastewater Treatment Facility, and thus the wastewater generated from the flue gas treatment will be treated.

Analysis of flue gas washing water sent to the entrance of Hurma wastewater treatment facility will be done regularly. Necessary treatment process will be applied to the flue gas washing water treated at the facility, and it will be ensured that it reaches the discharge standards.

1.2.1.14. Other Compenents

1.2.1.14.1. Laboratory

In accordance with the Regulation on Incineration of Wastes, incinerators must have a waste reception unit, laboratory, temporary storage areas and waste feeding system in order to provide operating conditions.

All units in question will be located in the Hurma Treatment Sludge Incineration and Energy Recovery Facility. The display of the 500 m2 laboratory planned to be established and the 2500 m2 temporary waste storage area to be used for the storage of process-based waste is available in the Layout Plan in Annex-5.

The following devices will be provided for the analyzes to be carried out in the laboratory to be established within the facility.

- Atomic Absorption Device: Heavy metals will be analyzed.
- Automatic Calorimeter Device: The calorific value in the fuel will be determined.
- Spectrophotometer: Flue washing water, heavy metal analyzes will be made.
- Microwave Shredding Device: It will be used as a pre-treatment in sample preparation.
- Toc Analyzer: Total organic carbon analysis will be made in slag and base ash.
- Analytical Balance: Weighing procedures will be done.
- Shaker: Mixing operations will be done.
- Drying Oven: Drying processes will be carried out.
- Pure Water Device: It will be used to prepare pure water.
- Ion Chromatography Device: Halogen content analysis will be done.

1.2.1.14.2. Equipment Service Water Supply

Different qualities of domestic water will be needed for different units within the facility. These are; incinerator spraying water, boiler feed water, cooling tower water, exhaust gas treatment systems feed water etc.

Necessary domestic water will be supplied from the treated water tank of Hurma Wastewater Treatment Facility, and in case of additional need, reinforcement will be made from the clean water tank currently used in the facility.

In this context, raw water supply pumps that absorb water from the warehouse where the existing plant effluent is stored have been foreseen.

Table 4: Cooling Tower Feed Water Quality

Parameter	Unit	Value
General Aspect	-	Clear, courless, odorless
pH	-	
TDS	mg/l	<2500

TSS	mg/l	<25
Ca Hardness	mg/l	< 800
Alcalinity	mg/l	30-50
Fe and Cu	mg/l	<0,1
SiO_2	mg/l	<150
Mn	mg/l	<0,1
Gress	mg/l	<5
Cl	mg/l	<50
SO_4	mg/l	<1200

Table 5: Hurma WWTP Effluent Values

Parameter	Unit	Value
COD	mg/L	40
BOD	mg/L	15
SS	mg/L	10
TN	mg/L	10
TP	mg/L	1
pH	-	6,5-8
Conductivity	µS/cm	<1,000-2,000

1.2.1.14.3. Sludge Storage Silos Deodorization

A biofilter is designed as an odor treatment system for silos where wet sludge will be stored.

The sludge pumped from the underground silo will be stored in 2 parallel working 118 tons (118 m3) above ground silos. There will be a hydraulic sliding frame at the bottom of the sludge silos, and each silo will be fed by 2 main screw pumps located under it. Via these pumps, the sludge will be sent into the incinerator with injectors equidistant from each other around the fluidized bed incinerator. Polluted air from sludge tanks and silos will be collected and deodorized by biofilters.

CH4, H2S and CO detectors have been added to the underground sludge bunker and aboveground silos for odor control purposes. These silos are covered however, when mud is poured into the underground silo with a truck, the hydraulic cover on the tank can be opened and the mud can be poured. According to the signal coming from the detectors, the dangerous gas levels in the tank can be monitored.

Vitiated air will be drawn from the silos by fans operated with frequency inverters and will be pumped into the incinerator or biofilter unit.

1.2.1.14.4. Steam Turbine

The steam produced in the boilers will be used for electricity generation in two steam turbines.

- The turbine will be at least single stage. If it is a double stage, it will be available to take steam between the stages.

- It will work according to the impulse principle. The waste steam at the turbine exit will be fully condensed. Turbine outlet pressure will be 0,30 Bar at most.
- There will be a safety valve in the turbine steam outlet chamber.
- Turbine, gearbox, oil tank, generator will be on a pedestal.
- There will be a hydraulically controlled emergency stop and a double-engine backup protection valve at the turbine inlet. There will also be a strainer steam filter at the inner inlet of this valve or on the steam line to protect the turbine blades.
- Automatic steam inlet valves that control the steam flow to the turbine will be placed after the stop valve, will operate as hydraulic control and will have a proportional control structure.
- Turbine body drains and drain valves will be adjusted to operate automatically.
- Couplings will be oil-free type, steel layer, flexible, high speed-low speed coupling with protector.
- There will be a personnel protection cover on the gearbox-generator coupling connection.

The gases accumulated in the bunker will be transferred to the fluidized bed incinerator and a system will be set up to be burned there. In cases where the facility is not operating, an absorption system will be installed for odor control. This system will be installed as a backup for dangerous and explosive gases.

1.2.1.14.5. Dust / Ash Collection System

There will be a pneumatic dust/ash collection system where dust/ash from all units in the facility can be collected. Each unit will have air locks at the dust/ash outlets to prevent air entry. There will be a separate blower for each fluidized bed sludge incinerator line in the pneumatic system. These blowers will collect the dust/ash to be collected in a common silo.

It is predicted that 100% (23.4 tons/day) fly ash will be generated with 8% (1,872 tons/day) from the waste heat boiler output, 62% (14,508 tons/day) from the multi-cyclone filter outlet and 30% (7.02 tons/day) of ash from the bag filter outlet.

The gases accumulated in the silos will be transferred to the fluidized bed incinerator and a system will be set up to be burned there. In cases where the facility is not operating, an absorption system will be installed for odor control. This system will be installed as a backup for dangerous and explosive gases.

The silo where the ashes will be collected will be in the form of bigbag sacks with a minimum volume of 1m3 so that the ashes can be transported for easy disposal.

1.3. CHARACTERISTICS OF THE WASTE SLUDGE TO BE ACCEPTED INTO THE INCINERATION FACILITY

The amount of waste sludge planned to be accepted into the Hurma Treatment Sludge Incineration and Energy Recovery Facility from each of the 30 treatment plants in Antalya province and their projections are presented in Table 6. In addition, Table 6 also includes information on the treatment

plants (capacities, commissioning dates, discharge point, facility coordinates, treatment process and sludge dewatering method) to which the sludge will be brought.

Table 6: Amount and Projection of Sludge Accepted to the Incineration Facility

AREA	No	Facility Name	Capacity (m^3/day)	Date of Transition to Operation	Hurma WWTP - SS Distances	Average Sludge Cake To Be Taken tons/day	Average Sludge Cake To Be Taken tons/month	Average Sludge Cake To Be Taken tons/year	Discharge Point	Treatment Process	Sludge dewatering method
WEST	**1**	Kalkan WWTP	4000 (25,000 Equivalent population)	2004	197	2	60	720	Basement (60 m depth)	Biological (Long Aerated Activated Sludge)	Decanter
	2	Kaş WWTP	5400 (36,000 Equivalent population)	2006	179	3	90	1080	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Belt Press
	3	Demre WWTP	8237 (69.231 Equivalent population)	2016	127	2	60	720	Demre Creek	Biological (Long Aerated Activated Sludge)	Belt Press
	4	Elmalı WWTP	2328 (25,000 Equivalent population)	2012	124	5	150	1800	Stream -Düden Discharge	Biological (Long Aerated Activated Sludge)	Belt Press
	5	Finike WWTP	8544 (59.590 Equivalent population)	2021 (planned)	103	1	30	360	Akçay Creek	Biological (Long Aerated Activated Sludge)	Decanter
	6	Kumluca WWTP	17300 (100,000 Equivalent population)	2008	88	10	300	3600	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Belt Press
	7	Korkuteli WWTP	14960 (80,000 Equivalent population)	2012	65	10	300	3600	Stream Discharge (Korkuteli Creek)	Biological (Long Aerated Activated Sludge)	Belt Press
	8	Tekirova WWTP	9000 (32.616 Equivalent population)	1992	49	5	150	1800	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Decanter
	9	Çamyuva WWTP	21975 (73.164 Equivalent population)	1994-2006	39	10	300	3600	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Decanter
	10	Kemer Central WWTP	21415 (71.300 Equivalent population)	1982-1994-2006	33	10	300	3600	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Belt Press
	11	Göynük WWTP	16342 (54.408 Equivalent population)	1991-2006	24	5	150	1800	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Belt Press

	12	Beldibi WWTP	22787 (78,183 Equivalent population)	1983-1999	18	8	240	2880	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)	Decanter
CENTER	**13**	**Hurma WWTP**	210000 (1,400,000 Equivalent population)	**1999-2001-2005-2011**	**0**	**140**	**4.200**	**50400**	**Mediterranean (Deep Sea Discharge)**	5-STAGE BARDENPHO PROCESS	Decanter
	14	Lara WWTP	62500 (450,000 Equivalent population)	2007-2014	41	70	2.100	25200	Mediterranean (Deep Sea Discharge)	5-STAGE BARDENPHO PROCESS	Decanter
EAST	**15**	Belek I WWTP	13100 (65,500 Equivalent population)	2015	52	15	450	5400	Stream Discharge (Beşgöz Creek)	Long Aerated Activated Sludge)	Decanter
	16	Serik WWTP	25000 (80,000 Equivalent population)	1992-2015	54	20	600	7200	Kızderesi-Acısu Creek	Biological (Long Aerated Activated Sludge)	Decanter
	17	Belek II WWTP	22600 (90,400 Equivalent population)	2015	60	15	450	5400	Acısu Creek	Biological (Long Aerated Activated Sludge System)	Decanter
	18	Boğazkent WWTP	11000 (55,000 Equivalent population)	2006	63	5	150	1800	Acısu Creek	Biological (Long Aerated Activated Sludge System)	Decanter
	19	Çolaklı WWTP	15000 (50,000 Equivalent population)	2000	80	8	240	2880	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Decanter
	20	Kumköy WWTP	75000 (240,000 Equivalent population)	2006-2016	84	40	1.200	14400	Mediterranean (Deep Sea Discharge)	6 Cassette Progressive Feeding Type Activated Sludge	Decanter
	21	Manavgat Central WWTP	75000 (240,000 Equivalent population)	2012-2015	96	40	1.200	14400	Mediterranean (Coastal Discharge to the Sea)	6 Cassette Progressive Feeding Type Activated Sludge	Decanter
	22	Okçular WWTP	20000 (80,000 Equivalent population)	2008	115	10	300	3600	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Decanter
	23	İncekum WWTP	15000 (75,000 Equivalent population)	2015	124	10	300	3600	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge System)	Decanter

	24	Türkler WWTP	15000 (55,194 Equivalent population)	2009	134	5	150	1800	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge System)	Decanter
	25	Konaklı WWTP	30000 (150,000 Equivalent population)	2007	141	10	300	3600	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Decanter
	26	Alanya Central WWTP	48,976 (251,142 Equivalent population)	1996-2012	147	20	600	7200	Mediterranean (Deep Sea Discharge)	Activated Sludge+ SBR (Sequential Batch Reactor)	Decanter
	27	Oba-Tosmur-Cikcilli WWTP	31000 (110,000 Equivalent population)	2009	155	10	300	3600	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Decanter
	28	Mahmutlar WWTP	20000 (117,647 Equivalent population)	2007	162	9	270	3240	Mediterranean (Deep Sea Discharge)	Biological (Long Aerated Activated Sludge)+DSD	Belt Press
	29	Gazipaşa WWTP	8,500 (50,000 Equivalent population)	2012	196	1	30	360	Stream Discharge - Hacı Musa Creek	MBR (Membrane Bioreactor)	Decanter
	30	Akseki WWTP	500 (5,000 Equivalent population)	2016	167	1	30	360	Basement Discharge	Long Aerated Activated Sludge	Decanter
Total					**-**	**500**	**15,000**	**180,000**			

Within the borders of Hurma Wastewater Treatment Plant, there is a Thermal Sludge Drying Plant with a capacity of 150 tons/day to dry the sludge coming from the treatment plants.

Currently, the amount of sludge generated from the operation of the Hurma Wastewater Treatment Facility is 240 tons/day on average. The 140 tons/day sludge specified in Table 7 represents the amount to be processed in the Incineration Facility. The remaining average of 100 tons/day and sludge from other Wastewater Treatment Facilities up to an additional 50 tons/day (150 tons/day in total) can be processed and dried in the Thermal Drying Facility with a capacity of 150 tons/day, which is currently located within the Hurma Wastewater Treatment Facility. The waste heat generated in the Hurma Treatment Sludge Incineration Facility will be utilized in the existing thermal drying facility. This will not affect the Incineration Facility capacity.

Within the borders of Hurma Wastewater Treatment Plant, 150 tons/day of sludge with 17-20% SS matter content processed in the Thermal Drying Facility, 90-95% SS matter and 25-30 tons/day de-watered sludge is formed after the thermal drying process. The material that comes out of the thermal drying facility is currently transported to disposal and/or energy recovery facilities through licensed companies.

With the commissioning of the Hurma Treatment Sludge Incineration and Energy Recovery Facility, the waste heat generated in the Hurma Purification Sludge Incineration Facility will be utilized and the sludge dried in the thermal drying facility will continue to be sent to disposal and/or energy recovery facilities through licensed companies.

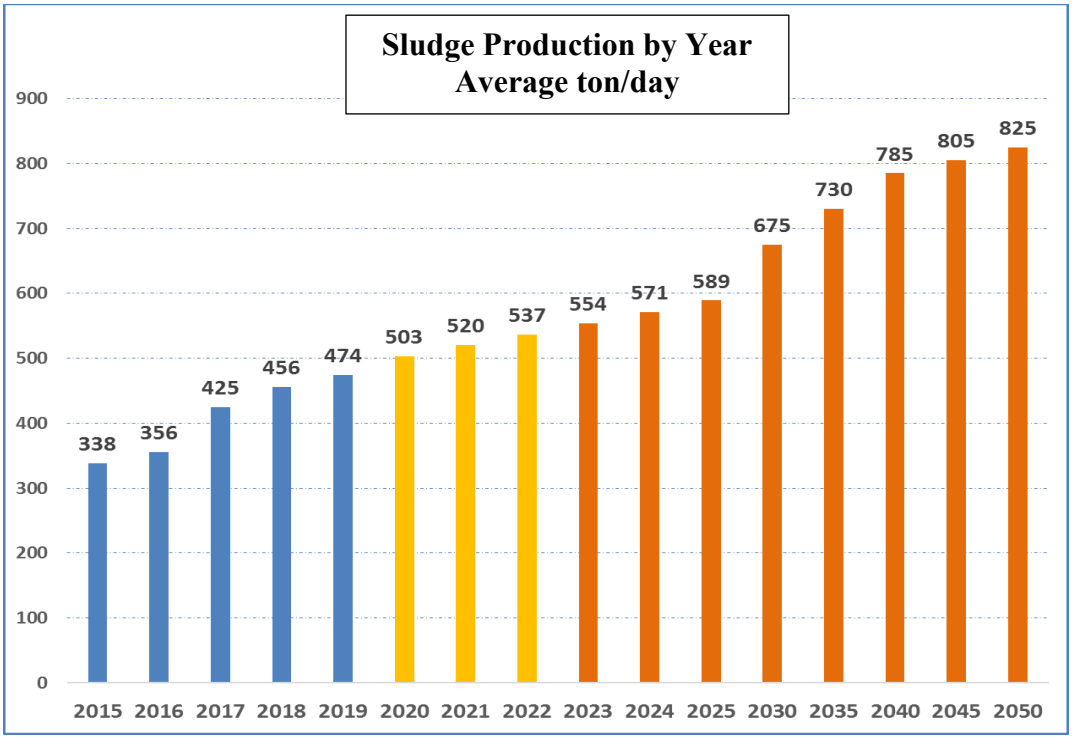
The amount of sludge accepted to the incineration plant from the 30 treatment plants presented in Table 7 may differ for each plant. In case the sludge to be brought from the treatment plants with low sludge amount cannot be brought daily according to the filling capacity of the licensed transport vehicles, the sludge amount entering the incineration plant can be brought to 500 tons/day by bringing the sludge from the treatment plants with more sludge production capacity. Thus, the waste sludge inlet capacity of the facility will be balanced.

The sludge with 17-20% solid matter content to be processed at the facility within the scope of the project will be burned in the fluidized bed incinerator. Some of the hot air released during the combustion process will dry the material called sludge cake. Thus, a relatively low-cost alternative for the drying unit will be formed. The energy that will be generated while sludge disposal is ensured by the incineration process will be converted into electrical energy with the help of electric tribunes and will be used to meet the energy needs of the facility.

1.3.1. Waste Sludge Projection by Years

The estimated annual average amounts of treatment sludge formed in Antalya Province Wastewater Treatment Facilities until 2050 are given in Chart 1. In the feasibility studies conducted for the disposal of sludge formed in the Wastewater Treatment Facilities in Antalya Province, it has been seen that it is more economical to construct one more incineration plant for the following periods, together with the planned Hurma Treatment Sludge Incineration Facility, in terms of transporting the sludge cake from the treatment plants. It was calculated by the General Directorate of ASAT that the capacity of the Hurma Treatment Sludge Incineration Facility would

be insufficient, and it was decided to include a new sludge incineration facility in the investment plan for the eastern Antalya region in the following years.



Graphic 1: Projected Total Sludge Cake Amounts*-tons/day

*(*This chart also includes the sludge processed in Hurma Thermal Sludge Drying Facility.)*

Table 7: Estimated Sludge Cake Amounts for Incineration Plants

Year	Hurma Incıneration Plant	East Region Incineraiton Plant (in the future)	Total
2019	324	0	324
2020	353	0	353
2021	370	0	370
2022	388	0	388
2023	406	0	406
2024	424	0	424
2025	439	0	439
2030	323	203	525
2035	361	219	580
2040	400	236	635
2045	414	242	655
2050	428	248	675

*(*The amount of 150 tons/day sludge cake to be processed in Hurma Thermal Sludge Drying Facility is not included in the values given in the table.)*

**The amount of sludge cake given in Table 7 and Graphic 1 are given as annual average amounts.*

In Table 7, the amount of 150 tons/day to be dried in the Thermal Sludge Drying Facility located in the Hurma Wastewater Treatment Facility is excluded from the sludge cake amounts given for the 1st stage Hurma Combustion Plant.

The amount of sludge accepted from 30 treatment plants to the incineration facility in Antalya may differ for each plant. The amount of sludge that will come from tourism regions in the tourism season and the remaining season will vary greatly. In case the sludge to be brought from the treatment plants with low sludge amount cannot be brought daily according to the filling capacity of the licensed transport vehicles, the sludge amount entering the incineration plant can be brought to 500 tons/day by bringing the sludge from the treatment plants with more sludge production capacity. Thus, the waste sludge inlet capacity of the facility will be balanced.

It will be ensured that the sludge formed in the tourism season is collected and transported to the Hurma Treatment Sludge Incineration Facility without waiting, stored in the waste acceptance bunker for a maximum of 2 days, and then subjected to incineration. Since the amount of sludge to be formed may be less outside of the tourism season, sludge will be supplied from treatment plants with more sludge-forming capacity instead of those with less sludge. Thus, the amount of sludge will be balanced as 500 tons/day.

Finally, 2 incineration plants are envisaged for Antalya Province, one to serve the central region (Hurma WWTP, Lara WWTP) and the western region, and one to serve the eastern region districts. In this context, the “Hurma Treatment Sludge Incineration and Energy Recovery Facility” with a capacity of 500 tons/day is the first stage of the process, and for the second stage, a separate second incineration facility that will cover the wastewater treatment plants in Serik, Manavgat and Alanya District in the Eastern Region for 2030 and later is planned. In the following years, due to the increase in the amount of treatment sludge in the sludge projection, the ESIA process will be carried out within the Eastern Region Incineration Plant Project, which is planned, and the necessary permits will be completed.

At the Hurma Treatment Sludge Incineration and Energy Recovery Facility, sludge with a dry matter content of 17-20% taken from 30 treatment plants belonging to the General Directorate of ASAT will be incinerated. The sludge will be transported from the facilities by licensed transport vehicles and brought to the incineration facility. For admission to the Hurma Treatment Sludge Incineration Facility, sludge from 30 wastewater treatment plants will first be discharged into an underground sludge bunker with a capacity of 1000 tons (1000 m3) and a size of 1000 m2. Afterwards, sludge will be transferred from the underground sludge bunker to the above-ground sludge silos (2x118 m3) with above-ground sludge pumps. Two above ground sludge silos with a capacity of 118 tons (118 m3) will have a connection with the pre-drying facility to be built within the scope of the project.

The pre-drying facility to be built within the scope of the Hurma Waste Sludge Incineration Facility Project will operate with a capacity of 500 tons/day. After the mentioned pre-drying process, a sludge cake with a dry matter content of 40-45% will be obtained. The sludge cake with a dry matter content of 40-45% will be accepted into the fluidized bed incinerator.

1.3.2. Charecteristic of Waste Sludge Accepted at the Facility

Sludge is defined as solids that are made to settle or float as a result of physical, chemical and biological treatment processes in wastewater. The properties of the treatment sludge vary according to the content of the treated wastewater and the treatment processes applied.

Treatment sludge are specified under the main heading of “Waste Management Facilities, Off-Facility Wastewater Treatment Facilities and Human Consumption and Wastes from Water Preparation Facilities for Industrial Use”, which is included in Section 19 of the ANNEX-IV Waste List of the “Waste Management Regulation”, which was published in the Official Gazette dated 02.04.2015 and numbered 29314. Under Section 19, with code number 19 08 and under the sub-heading of "Wastewater Treatment Plant Not Otherwise Specified", "sludge originating from the treatment of domestic/urban wastewater and industrial wastewater" is specified. The code for the sludge to be accepted to the Treatment Sludge Incineration Facility within the scope of the Project from the hazardous and non-hazardous waste sludge specified and given codes is given in Table 8 below.

Table 8: Sludge Code to be Accepted to the Facility

Sludge Codes to be Accepted to the Facility	Description
19 08 05	Sludges from urban wastewater treatment

(Source: "Waste Management Regulation, Annex-IV, Section 19, Article 19 08, which was effectuated by being published in the Official Gazette dated 02.04.2015 and numbered 29314)

There will be a matter of where the treatment sludge will be burned and energy will be obtained as a result of the incineration process with the "Hurma Treatment Sludge Incineration and Energy Recovery Facility" planned within the scope of the project. The sludge specified in Table 8 with the code 19 08 05 (Sludge from the treatment of urban wastewater) will be used within the scope of the project. No waste other than 19 08 05 (sludges resulting from the treatment of urban wastewater) will be accepted to the facility.

Before being subjected to the incineration process, the content of the waste will be analyzed in the laboratory that will be located in the facility. It will be determined whether the waste is dangerous or not and whether there is radioactive material in the waste content. Wastes with halogen content below 1% will be accepted to the facility. When the analysis reports presented in Annex-7 are examined, it is seen that the halogen content in the analysis results is below 1%.

Specific to the facilities where sludge will be accepted within the scope of the project, an analysis was made by the "Turkish Scientific and Technological Research Council, Marmara Research Center, Environment and Cleaner Production Institute". The minimum analyzes for the composition of the wastes to be accepted to the facility (including the calorific value of the waste, heavy metal, chlorine and fluorine content, moisture, slag and total organic carbon content in base ash) are presented in Annex-7. Dry matter ratios of the sludge to be accepted to the plant and the average of these ratios are presented in Table 9. As can be seen from Table 9 created according to the results of the analysis, the dry matter percentage of the sludge to be accepted into the plant within the project generally varies between 17-20%.

Table 9: Solid Matter Ratios of Sludge to be Accepted to the Plant

NO	SAMPLED TREATMENT PLANT	(*)Solids (%)
1	DEMRE WWTP	13.9
2	İNCEKUM WWTP	22.73
3	HURMA WWTP (Digested Sludge)	17.53
	HURMA WWTP (Biological Sludge)	19,156
4	ALANYA WWTP	19.86
5	OBA WWTP	18.18
6	MAHMUTLAR WWTP	15.37
7	MANAVGAT WWTP	17.7
8	ÇOLAKLI WWTP	15.49
9	KUMKÖY WWTP	16.76
10	KEMER WWTP	13.86
11	TEKİROVA WWTP	13.87
12	GÖYNÜK WWTP	9.78
13	ÇAMYUVA	13.98
14	BELDİBİ	13.2
15	ELMALI WWTP	16.51
16	KORKUTELİ WWTP	14.44
17	GAZİPAŞA WWTP	15.84
18	AKSEKİ WWTP	21.13
19	BOĞAZKENT WWTP	20.18
20	ALANYA KONAKLI WWTP	16.92
21	TÜRKLER WWTP	18.49
22	SERİK WWTP	20.52
23	KALKAN WWTP	20.54
24	BELEK 2 WWTP	20.2
25	KAŞ WWTP	17.66
26	KUMLUCA WWTP	14.46
27	BELEK 1 WWTP	19.56
28	OKÇULAR WWTP	15.19
29	LARA WWTP	18.76
AVERAGE SUSPENDED SOLID VALUE		17,059

Possible wastes to be generated after the incineration process and the waste codes related to these wastes have been evaluated in detail under the title of *"Section 6.9. Solid Wastes to be Generated During the Construction and Operation Phase of the Project and the Measures to be Taken"*.

1.4. ENVIRONMENTAL BENEFIT-INVESTMENT COST OF THE PROJECT

General Directorate of ASAT currently spends 5,13 million €/year for the disposal of 500 tons/day of treatment sludge. The investment cost and operational cost of the Hurma Treatment Sludge Incineration and Energy Recovery Facility were calculated as 32 million € and 2,43 million € the return of the investment was calculated as approximately 12 years.

Table 10: Investment Cost of Project

Project Components	Cost (M€)
Mechanic Grup	24,96
Electric - Automation Grup	2,56

Construction Grup	3,84
Design Works	0,32
Laboratory Works	0,32
TOTAL	**32.00**
Operational Cost (Yearly)	**2,43**
Financial Expenses	0,03
Staff	0,7
Sludge Transportation	0,65
Raw Material/Start up	0,25
Electricity Comsumption	0,8
Operational Income (Annual)	**5.13**
Elimination of Final Sludge Removal Cost (to Cement Factory)	2.73
5 MWh Electricity Production	2.4
Return of Investment	**~12 year**

In order to determine the characteristics of the sludge within the scope of the project, within the scope of to determine the calorific value of the sludge, heavy metal, chlorine and fluorine content of the sludge, the total carbon content in moisture, slag and bottom ash for each treatment plant sludge were analyzed at Scientific and Technological Research Council of Turkey Marmara Research Center Environment and Cleaner Production Institute and the relevant analysis reports are shared in Annex-7. According to the analysis reports in question, the upper calorific value of the sludge to be used in the dry sample is 4987 Kcal/kg, and the lower calorific value is 2874 Kcal/kg. **(The lowest and highest calorific values are taken from the sludge analyzes presented in Annex-7.)**

Table 11: Average of Lower and Upper Heating Values According to Analysis Results

Upper Calorific Value – Lower Calorific Value Parameters	**Value**
Upper calorific value (Kcal/kg)	≥ 4987
Lower heating value (Kcal/kg)	≥ 2874
Average of Upper Calorific Value-Lower Calorific Value Parameters of Samples in the Whole	
Average Upper calorific value (Kcal/kg)	3924
Average Lower heating value (Kcal/kg)	3685.5

(Note: Finike WWTP is not in operation yet, analysis results are not available. Finike WWTP is planned to be operational in 2021.)

The sludge with 17-20% solid matter content to be processed at the facility within the scope of the project will be burned in the fluidized bed incinerator. Some of the hot air released during the combustion process will dry the material called sludge cake. Thus, a relatively low-cost alternative for the drying unit will be formed. The energy that will be generated while sludge disposal is ensured by the incineration process will be converted into electrical energy with the help of electric tribunes and will be used to meet the energy needs of the facility.

Treatment sludges formed in 30 Wastewater Treatment Plants belonging to the General Directorate of ASAT in Antalya will be disposed of in the planned Waste Sludge Incineration Facility. If we look at it from an environmental point of view, the waste sludge in question will not be stored regularly, but will be completely disposed of, and. energy recovery will be provided.

2. POLITICAL, LEGAL AND ADMINISTRATIVE FRAMEWORK FOR THE PROJECT

In accordance with subparagraph (a) of paragraph 1 of Article 7 of the "Environmental Impact Assessment Regulation" published in the Official Gazette dated 25.11.2014 and numbered 29186, Annex I list (List of Projects to be Applied Environmental Impact Assessment) "11 - The facilities with an area larger than 10 hectares excluding construction debris and excavation waste, and/or with daily wastes of equal to and more than 100 tonnes including the target year, are recovered daily, incinerated (thermal processes such as incineration by oxidation, pyrolysis, gasification, plasma etc.), are stored regularly and/or where its final disposal is carried out", the project is within the scope and this ESIA Report has been prepared according toTurkish Legislation and frame work of International regulations.

2.1. PERMISSION PROCEDURE DUING THE OPERATION STAGE

According to Turkish Legislation, after the completion of the EIA process for the project, a Temporary Activity Certificate will be obtained within the scope of the Environmental Permit and License Regulation, published in the Official Gazette dated 10.09.2014 and numbered 29115 (Amended OG: 21.09.2016-29834, 08.07.2019-30825, 06.11.2020-31296).

Trial incineration will be carried out within the period of the temporary activity certificate issued in accordance with the provisions of the Environmental Permit and License Regulation. Before obtaining a license, the operator of a waste incineration facility is obliged to conduct a three-month trial incineration with a continuous measuring device in order to analyze the waste to be incinerated at the facility and to prove that it meets the standards for emissions and wastewater to be generated depending on the waste feed rate.

In a waste incineration facility, in line with the test incineration plan approved by the Ministry, a trial incineration is carried out for three months under the supervision of the Ministry and/or the representatives of the Provincial Directorate of Environment and Urbanization, in order to prove that the standards and principles in this Regulation are met. At the end of the trial incineration, a report is prepared and sent to the Ministry for approval. It is obligatory to make measurements based on the most unfavorable conditions in trial incineration for incinerators where wastes with different characteristics will be disposed of, such as the highest chlorine content and ash component, and the lowest combustion temperature. In waste incineration plants that will burn only one type of waste, trial incineration is carried out within a period to be determined by the Ministry, provided that it is not less than one week.

The Trial Incineration Plan, prepared in the format determined by the Ministry of Environment and Urbanization within the term of the Temporary Operating Permit, will be submitted to the Ministry of Environment and Urbanization and approved. Trial incineration will not be started

until the Trial Incineration Plan is approved by the Ministry. As a single type of waste will be incinerated at the facility within the scope of Article 8 of the Regulation on Waste Incineration within the scope of the approved Trial Incineration Plan, trial incineration will be carried out within a period to be determined by the Ministry, provided that it is not less than one week.

After the Trial Incineration, the Trial Incineration Result Report will be prepared and submitted to the Ministry of Environment and Urbanization.

An Environmental Permit and License on Air Emission and Waste Incineration and Co-incineration will be obtained in accordance with the Trial Incineration Plan and Trial Incineration Result Report and the Environmental Permit and License Regulation approved by the Ministry of Environment and Urbanization.

2.2. NATIONAL AND INTERNATIONAL STANDARDS TO BE USED IN THE PROJECT

During the flora and fauna determination studies carried out in this ESIA Report prepared within the scope of the project, the International Union for Conservation of Natural Life and Natural Resources (IUCN) Red List Categories, 2020-2021 Central Hunting Commission Decisions prepared on the basis of Bern Convention Annex II and Annex III, Article 4 of Land Hunting Law No. 4915 and Annex-I Game Animals Determined by the Ministry of Agriculture and Forestry, which were taken under protection by the Central Hunting Commission and Appendix-II Game Animals Allowed for Hunting in the Periods Determined by CHC (Central Hunting Commission) have been taken into consideration.

When the field study for the activity area subject to the project, the project area and the flora list of the affected area, which was created with the support of literature resources, is examined, no plant species is included in the red list category of the International Union for Conservation of Natural Life and Natural Resources (IUCN). In addition, no plant species was found within the scope of Bern Convention Annex I list (Flora species that are strictly protected). The plant species in the list are widely distributed in our country, and the extinction of the species in question due to the activity will be out of question. In case of detection of species that are under certain protection and under protection according to Appendix-2 (Fauna Species Protected) and Appendix-3 (Protected Fauna Species) of the Bern Convention, the Bern Convention protection measures, and the provisions of Articles 6 and 7 of this convention will be complied with.

Within the scope of the project, no intentional damage will be done to the species and other living species that are protected by the Bern Convention, and no commercial action will be taken against the species. The provisions of the CITES Agreement regarding the activity will be complied with.

National and international standards regarding the effects of waste, gas, dust emission, noise, etc. to be generated within the scope of the project will be complied with national and international standards, and applicable legislation will be performed. In this context;

- “Regulation on Control of Packaging Wastes” which effectuated after being published in the Official Gazette dated 27.12.2017 and numbered 30283 (Amended O.G.: 13.03.2020-31067)

- "Regulation on Control of Waste Batteries and Accumulators" which was effectuated after being published in the Official Gazette dated 31.08.2004 and numbered 25569 (Amended O.G.: 03.03.2005-25744, 31.07.2009-27305, 30.03.2010-27537, 05.11.2013-28812, 23.12.2014-29214).
- "Waste Oil Management Regulation", which was effectuated after being published in the Official Gazette dated 21.12.2019 and numbered 30985
- "Waste Management Regulation" which was effectuated after being published in the Official Gazette dated 02.04.2015 and numbered 29314 (Amendment O.G.: 23.03.2017-30016)
- "Regulation on Incineration of Wastes" which was effectuated after being published in the Official Gazette dated 06.10.2010 and numbered 27721 (Amended O.G.: 07.04.2017-30031)
- "Regulation on Control of Waste Vegetable Oils" which was effectuated after being published in the Official Gazette dated 06.06.2015 and numbered 29378
- "Regulation on the Prevention of Major Industrial Accidents and Mitigation of Their Effects", which was effectuated after being published in the Official Gazette dated 02.03.2019 and numbered 29378
- "Environmental Inspection Regulation" which was effectuated after being published in the Official Gazette dated 21.11.2008 and numbered 27061 (Amendment O.G.: 22.10.2009-27384, 12.11.2010-27757, 16.08.2011-28027).
- "Environmental Impact Assessment Regulation", which was effectuated after being published in the Official Gazette dated 25.11.2014 and numbered 29186 (Amended O.G.: 09.02.2016-29619, 26.05.2017-30077, 14.06.2018-30451, 19.04.2019-30750, 08.07.2019-30825, 28.11.2019-30962)
- "Environmental Permit and License Regulation" which was effectuated after being published in the Official Gazette dated 10.09.2014 and numbered 29115 (Amended O.G.: 21.09.2016-29834, 08.07.2019-30825, 06.11.2020-31296)
- "Regulation on Evaluation and Management of Environmental Noise", which was effectuated after being published in the Official Gazette dated 04.06.2010 and numbered 27601 (Amended O.G.: 27.04.2011-27917, 08.11.2015-29536).
- "Exhaust Gas Emission Control Regulation" which was effectuated after being published in the Official Gazette dated 11.03.2017 and numbered 30004.
- "Regulation on Control of Excavated Soil, Construction and Demolition Wastes", which was effectuated after being published in the Official Gazette dated 18.03.2004 and numbered 25406
- "Regulation on the Protection of Drinking-Double Water Basins" which was effectuated after being published in the Official Gazette dated 28.10.2017 and numbered 30224

- "Regulation on the Control of Odor-Creating Emissions" which was effectuated after being published in the Official Gazette dated 19.07.2013 and numbered 28712.
- "Regulation on Control of End-of-Life Tires", which was effectuated after being published in the Official Gazette dated 25.11.2006 and numbered 26357 (Amendment O.G.: 30.03.2010-27537, 10.11.2013-28817, 11.03.2015-29292).
- "Regulation on Control of Industrial Air Pollution", which was effectuated after being published in the Official Gazette dated 03.07.2009 and numbered 27277 (Amended O.G.: 30.03.2010-27537, 10.10.2011-28080, 13.04.2012-28263, 16.06.2012-28325, 10.11.2012-28463, 20.12.2014-29211)
- "Regulation on the Monitoring of Greenhouse Gas Emissions", which was effectuated after being published in the Official Gazette dated 17.04.2014 and numbered 29003 (Amended OG: 29.06.2016-29757, 31.05.2017-30082)
- Date 31.12.2004 and number 25687 (Amended O.G.: 13.02.2008-26786, 30.03.2010-27537, 24.04.2011-27914, 25.03.2012-28244, 10.01.2016-29589, 14.02.2018-30332, 14.01.2020 -31008) "Water Pollution Control Regulation" was effectuated after being published in the Official Gazette
- "Regulation on Control of Soil Pollution and Sites Contaminated by Point Source Pollution" which was effectuated after being published in the Official Gazette dated 08.06.2010 and numbered 27605 (Amended OG: 14.06.2012-28323, 11.07.2013-28704).
- "Regulation on the Protection of Ground Waters Against Pollution and Deterioration" which was effectuated after being published in the Official Gazette dated 07.04.2012 and numbered 28257 (Amended O.G.: 22.05.2015-29363).
- "Environmental Law" numbered 2872 (law amendments numbered 3301, 3362, 3416, 3416, 5491 and 7153) which was effectuated after being published in the Official Gazette dated 11.08.1983 and numbered 18132
- "Occupational Health and Safety Regulation" which was effectuated after being published in the Official Gazette dated 09.12.2003 and numbered 25311
- "Occupational Health and Safety Law" Published in the Official Gazette dated 30.06.2012 and numbered 28339
- "Highway Traffic Law" numbered 2918 and "Regulation on Facilities to be Constructed and Opened on the Side of the Highway", which was effectuated after being published in the Official Gazette dated 15.05.1997 and numbered 22990.
- "Water Basin Protection and Control Regulation" of Antalya Water and Wastewater Administration General Directorate
- "Regulation on Buildings to be Built in Disaster Areas"
- "Turkey Building Earthquake Regulation"

2.3. TURKEY DEEP -SEA DISCHARGE REGULATION

Turkish Wastewater Discharge procedures are in line with the World Bank's Legislation, with some exceptions. With the “Water Pollution Control Regulation” (WPCR, 2004) published in the Official Gazette dated 31 December 2004 and numbered 25687, it is aimed to protect and use ground and surface water resources in accordance with sustainable development goals. According to Turkish legislation, before the discharge of wastewater made directly into receiving environments with deep sea discharge, it is necessary to ensure treatment up to the limit values estimated on this issue. Wastewater properties that can be given to the receiving environment by deep sea discharge are limited.

For deep sea discharge to the receiving environment, the wastewater must not exceed the limit values specified in the “Regulation on the Control of Pollution Caused by Hazardous Substances in Water and its Environment”.

The properties of wastewater that can be allowed to discharge from the sea are specified in the Water Pollution Control Regulation. It is not allowed to discharge the waters containing polluting properties more than the limit values in this table into the sea (WPCR, 2004).

For the institutions and organizations, it is obligatory to obtain an environmental permit from the administration regarding deep sea discharges. The provisions of the Regulation on Permits and Licenses Required by the Environmental Law are applied regarding obtaining process of environmental permits. The "Deep Sea Discharge Technical Information List" in Annex-3C of this regulation is filled according to the procedure specified in the notification issued according to this regulation and submitted to the administration together with the monitoring results.

In cases where the Turkish Legislation differs from The World Bank Legislation, the more stringent one will be applied to the project implementation.

2.4. THE TURKISH REGULATION ON EIA

Under Article 10, Environmental Law sets out the general scope of the Environmental Impact Assessment (EIA) procedure in Turkey, indicating that institutions, agencies and establishments that lead to environmental problems as a result of their planned activities are obliged to prepare Environmental Impact Assessment report or Project Information File (PIF). Based on this legal framework, the Regulation on Environmental Impact Assessment (henceforth “EIA Regulation”) was put into force for the first time after being published in the Official Gazette numbered 21489 and dated on February 7, 1993. Since then there had been several amendments in the first regulation and new EIA regulations were published in 2008 and 2013 repealing the former regulations in force. The latest EIA Regulation has been published in the Official Gazette dated November 25, 2014 and numbered 29186, which repealed the 2013 EIA Regulation.

The EIA Regulation is largely in line with the EU Directive on EIA. The key relevant steps of the Turkish EIA procedure namely screening, public consultation, scoping, disclosure and supervision are briefly reviewed below in the order they are prescribed to occur.

Screening

The EIA Regulation classifies projects into two categories:

- *Annex I projects.* These are projects that have significant potential impacts and require an EIA. Annex I of the EIA Regulation lists these projects types, so project proponents are expected to start the EIA procedure without any other screening process; and
- *Annex II projects.* Annex II of the EIA regulation covers the projects that may or may not have significant effects on the environment. Proponents of Annex II projects are required to submit a Project Information File (PIF) to the Ministry of Environment and Urbanization (MoEU). The PIF is prepared following the General Format for PIF provided in Annex IV of the EIA Regulation and contains information on: (i) project characteristics; (ii) environmental characteristics of the project site and impact area; and (iii) significant impacts of the project and measures to be taken during construction and operation phases of the project. A non-technical summary of the above items is also to be added to the PIF. The PIF is submitted to the MoEU for review and evaluation. Provincial Directorate gives its "EIA is Necessary" or "EIA is not necessary" decision regarding the project. The decision of the Provincial Directorate is communicated to public using appropriate means (i.e. announcement boards, internet).

Below table provides the list of project types that will be considered for funding under the project and their category per the EIA Regulation. The social impacts within the screening are not compulsory in the national EIA regulation and generally are either very briefly mentioned or not at all.

Investment area	**Annex I**	**Annex II**
Water and Wastewater	• WWTPs having a capacity of 150,000 p.e. and/or 30,000 m^3/day	• WWTPshaving a capacity between 50,000 – 150,000 p.e. and/or 10,000 – 30,000 m^3/day
Solid Waste Management	• Except, demolishing and excavated soil disposal areas, Landfill, Recycling or Incineration facilities (thermal processes regarding burning with oxygen, pyrolysis, gasification etc.) receiving ≥ 100 tones/day or with an area of ≥10 ha.	• Except, demolishing and excavated soil disposal areas, Recycling, Composting or Incineration facilities (thermal processes regarding burning with oxygen, pyrolysis, gasification etc.) receiving < 100 tones/day.

Source: Republic of Turkey, Regulation on EIA (Official Gazette No. 29186, November 25, 2014)

2.4.1. Public Consultation

For projects that require the preparation of an EIA, the Governorate is required to inform the public that a project application has been submitted in a specified locality, that the EIA process has begun and that the public may submit its comments and suggestions to the Governorate or MoEU. The

announcement is made using a variety of methods, including the internet, bulletin boards and loudspeaker announcements. MoEU informs the public of the same through the internet.

A formal public consultation meeting occurs for projects that are subject to an EIA after the screening process and prior to scoping. The project proponent organizes a "public participation meeting" chaired by MoEU provincial director in a location that affected local groups can access easily. The invitation to the meeting is published in a national and a local newspaper at least ten days prior to the meeting. There is no requirement that information on the project should be provided to the public in advance, except for the subject matter of the meeting. However, the EIA Regulation specifies that during the meeting, which is chaired by the Director or a member of MoEU's provincial directorate, it should be ensured that the public is informed about the project, and its comments and suggestions regarding the project are obtained. The meeting chairperson may request comments in writing too. Minutes of the meeting are kept and submitted to MoEU and the Governorate. The Governorate is required to inform the public about the timeframe for submission of public comments and suggestions. Such comments and suggestions are submitted to the EIA commission.

Scoping

The project proponent presents a project dossier (PIF for Annex II projects or using the outline given in Annex III of the EIA regulation for Annex I projects) to a commission, which comprises representatives of MoEU and relevant organizations as identified by MoEU. Based on the information submitted, the commission determines the scope of the EIA and the "project specific format". Furthermore, the commission may exclude or include some items depending on the specific characteristics of the proposed project. The commission also determines the level of detail under each heading depending on the special project's environmental impacts. In this process, the commission takes into consideration of the opinions expressed during the public participation meeting.

2.4.2. Review and approval of the EIA report

As mentioned previously, the commission revises the draft version of the EIA report. In its review, the commission assesses (i) the adequacy of the EIA report and its annexes; (ii) whether the analyses, evaluations or calculations were adequately substantiated by relevant data and documentation; (iii) whether the potential environmental impacts of the project were evaluated in adequate scope and depth; (iv) whether measures necessary to prevent or mitigate negative environmental impacts have been identified; (v) whether the public participation meeting was carried out in accordance with prescribed procedures and the issues brought up during the meeting were adequately addressed in the report. While the EIA identifies a project's environmental impacts and mitigation measures, it does not specify costs and institutional responsibilities associated with these mitigation measures. Neither does the EIA include a monitoring plan.

The final EIA report, which incorporates the commission's assessments, is then submitted to the MoEU for final review. MoEU determines whether the "EIA is positive" in which case the project proponent may implement the project or "EIA is negative" in which case the project may not go any forward.

Disclosure

The draft EIA report is made available to the public for comments at Central MoEU or provincial directorate. After MoEU's final evaluation of the EIA report, the Governorate announces to the public MoEU's decision together with its justifications. Disclosure of the final EIA document is not foreseen in the EIA Regulation.

2.4.3. Monitoring and inspection

According to the EIA Regulation, MoEU monitors and inspects projects that were assessed either "EIA is not necessary" or "to have a positive EIA" based on provisions specified in the PIF or the EIA, respectively. Furthermore, the project proponent is obliged to submit project progress reports to MoEU. In case MoEU determines non-compliance, the Governorate issues a warning. If after the granted time compliance is still not achieved the Governorate may suspend the operation of the plant in question.

National Laws on Social Impacts

Although the Turkish EIA Regulation does not entirely meet the requirements of international standards in terms of social impacts and stakeholder engagement, there are some legal arrangements for managing various social impacts. In this respect, the following are identified to be a non-exhaustive list of social legal framework applicable for this project:

- Labor Law (No. 4857), published in the Official Gazette no. 25134 dated 10 June 2003
- Law on Occupational Health and Safety (No. 6331), published in the Official Gazette no. 28339 dated 30 June 2012
- Regulation on Contractors and Sub-contractors, published in the Official Gazette no. 27010 dated 27 September 2008
- Laws on Right to Information (No. 4982), published in the Official Gazette no 25269 dated 24 October 2003
- Regulation on the Environmental Impact Assessment (EIA) published in the official Gazette no. 29186 dated 2525 November 20142014.
- In terms of land acquisition and involuntary resettlement, the relevant legal arrangements of Turkey are summarized below:
- Expropriation Law, published in the Official Gazette no. 18215 dated 8 November 1983
- Amendment on Expropriation Law, published in the Official Gazette no. 24393 dated 5 May 2011

National Laws on Labor and Working Conditions

Occupational Health and Safety

In recent years, Turkey has undergone a reform to improve its national Occupational Health and Safety (OHS) system through adapting a set of international and regional standards into its national level requirements for the prevention occupational risks as defined in the ILO Occupational Safety

and Health Convention, 1981 (No. 155). The convention, along with the Occupational Health Services Convention, 1985 (No. 161) were both ratified by Turkey in 2005 who Turkey is also party to the Labor Inspection Convention, 1945 (No. 81) since 1951. In 2014, Turkey ratified the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187).

During 2012, a stand-alone Law on OHS (No. 6331) was put into force (20 June 2012). The OHS Law governs workplace environments and industries (both public and private) as well as virtually all classes of employees including part-time workers, interns, and apprentices. The legislation is comprehensive and is generally applicable across all sectors and many industries.

Labor and Working Conditions

Turkey is party to a multitude of ILO conventions, including but not limited to conventions on: equal treatment of employees, gender equality, child labor, forced labor, OHS, right of association and minimum wage. Accordingly, the current Turkish Labor Law (No.4857) is to large extent consistent with ESS2 requirements.

There are also secondary legislation that may apply to the project which include regulations on annual leave, working hours, overtime work, minimum wage, female and child employees. The Ministry of Family Labor and Social Services has published various communiques and circulars that set ground for the implementation of the Labor Law which may also be referenced during project implementation.

National Laws on Land Acquisition

In the scope of the Turkish legal framework, land acquisition/expropriation related issues are handled through the Expropriation Law No: 2942 (amended by Law No: 4650 in 2001).

Compensation for the subject property/assets to be expropriated is determined according to procedures and principles outlined in Articles 8, 10 and 11 of the Law. Article 27 authorizes the expropriation agency to confiscate the assets required by the project earlier than the time needed in normal expropriation procedure. This process does not prevent challenges of the property owners against the determined valuation.

2.5. WORLD BANK ENVIRONMENT AND SOCIAL STANDARTS

The WB Environmental and Social Standards (ESSs) set the requirements to be met by Borrowers with respect to the identification, evaluation and mitigation of social and environmental risks and impacts associated with projects supported by the Bank through Investment Project Financing. Nine (as ESS 7 is not relevant) out of the ten ESSs establish the standards that the Borrower and the project will meet through the project life cycle, as follows:

- ESS1: Assessment and Management of Environmental and Social Risks and Impacts;
- ESS2: Labor and Working Conditions;
- ESS3: Resource Efficiency and Pollution Prevention and Management;
- ESS4: Community Health and Safety;
- ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;

- ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- ESS8: Cultural Heritage;
- ESS9: Financial Intermediaries; and
- ESS10: Stakeholder Engagement and Information Disclosure.

In accordance with the ESSs, the World Bank Group's Environment, Health and Safety (EHS) Guidelines should be apply to the project. Therefore, this project will apply the relevant requirements of the EHS Guidelines. In cases where the Turkish requirements differ from the levels and measures presented in the EHS Guidelines, the more stringent one (such as the most stringent discharge and emission standards) will be applied in the project specifications.

ESS1 Assessment and Management of Environmental and Social Risks and Impacts

The World Bank requires assessment, management and monitoring of environmental and social risks and impacts of projects supported bythe Bank to ensure that projects are environmentally and socially sound and sustainable. The objectives of ESS1 is; (i) to identify, evaluate and manage the environmental and social risks and impacts of the project in a manner consistent with ESSs; (ii) to adopt mitigation hierarchy approach to (a) anticipate and avoid risks and impacts, (b) where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels, (c) once risks and impacts have been minimized or reduced, mitigate, and (iv) where significant residual impacts remain, compensate for or offset them, where technically and financially feasible, (iii) to adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged in sharing development benefits and opportunities resulting from the project, (iv) to utilize national environmental and social institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects whenever appropriate, and (v) to promote improved environmental and social performance in ways which recognize and enhance Borrower capacity.

As per requirements of ESS1, the Borrower will: (i) conduct an environmental and social assessment of the proposed subprojects; (ii) undertake stakeholder engagement and disclose appropriate information in accordance with ESS10; (iii) develop an Environmental and Social Commitment Plan (ESCP), and implement all measures and actions set out in the legal arrangement including the ESCP; and (iv) conduct monitoring and reporting on the environmental and social performance of the project against the ESSs.

ESS2 Labor and Working Conditions

The objectives of ESS2 is to: (i) promote safety and health at work; (ii) promote the fair treatment, nondiscrimination and equal opportunity of project workers; (iii) protect workers including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with ESS2) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate; (iv) prevent the use of all forms of forced labor and child labor (v) support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law; and (vi) provide project workers with accessible means to

raise workplace concerns. The applicability and scope of application of ESS2 depends on the environmental and social assessment described in ESS1 and the type of employment relationship between the Borrower and the project workers.

ESS2 requirements cover; the development and implementation of written labor management procedures which will be applicable to the project. These procedures will set out the way in which project workers will be managed, in accordance with the requirements of national law and this ESS, and will include the description of the following; (i) working conditions and management of worker relationships (such as development and implementation of labor management procedures applicable to the project) including terms and conditions of employment, nondiscrimination and equal opportunity, and worker's organizations; (ii) protecting the work force including defining a minimum age for workers, prohibiton of child labor and forced labor; (iii) grievance mechanism (for the workers); (iv) occupational health and safety; (v) contracted workers; (vi) community workers; and (vii) primary supply workers.

ESS3 Resource Efficiency and Pollution Prevention and Management

The objectives of ESS3 is to: (i) promote the sustainable use of resources, including energy, water and raw materials; (ii) avoid or minimize adverse impacts on human health and the environment by avoiding minimizing pollution from project activities; (iii) avoid or minimize project related emissions of short and long-lived climate pollutants; (iv) avoid or minimize generation of hazardous and non-hazardous waste; and (v) minimize and manage the risks and impacts associated with pesticide use. The applicability of ESS3 depends on the environmental and social assessment described in ESS1.

ESS3 requirements cover: (i) resource efficiency including energy, water and raw material use; and (ii) pollution prevention and management including management of air pollution, hazardous and non-hazardous wastes, chemicals and hazardous materials, and pesticides.

ESS4 Community Health and Safety

ESS4 addresses potential health, safety, and security risks and impacts on project-affected communities and corresponding responsibility of Borrowers to avoid or minimize these, with particular attention to vulnerable people. The objectives of ESS4 is to: (i) anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and nonroutine circumstances; (ii) promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams; (iii) avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials; (iv) have in place effective measures to address emergency events; and (v) ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities. The applicability of ESS4 depends on the environmental and social assessment described in ESS1.

ESS4 requirements cover: (i) community health and safety including infrastructure and equipment design and safety (including safety of dams), safety of services, traffic and road safety, ecosystem services, community exposure to health issues, management and safety of hazardous materials, and emergency preparedness and response; and (ii) security personnel.

ESS5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

The objectives of ESS5 is to: (i) avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives; (ii) avoid forced eviction; (iii) mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by: (a) providing timely compensation for loss of assets at replacement costs and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher; (iv) improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure; (v) conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant; and (vi) ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation, and the informed participation of those affected. The applicability of ESS5 depends on the environmental and social assessment described in ESS1 and applies to permanent or temporary physical and economic displacement resulting from the types of land acquisition or restrictions on land use undertaken or imposed in connection with project implementation described in ESS5.

ESS5 requirements cover the preparation and implementation of a resettlement framework or plan which will set ground for: (i) general requirements such as eligibility classification, project design, compensation and benefits for affected persons, community engagement, grievance mechanism, planning and implementation; (ii) physical and economic displacement; (iii) collaboration with other responsible agencies or subnational jurisdictions; and (iv) technical and financial assistance.

ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources

The objectives of ESS6 is to: (i) protect and conserve biodiversity and habitats; (ii) apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity; (iii) promote the sustainable management of living natural resources; and (iv) support livelihoods of local communities including Indigenous Peoples, through the adoption of practices that integrate conservation needs and development priorities. The applicability of ESS6 depends on the environmental and social assessment described in ESS1.

ESS6 requirements cover: (i) general requirements including assessment of risks and impacts, conservation of biodiversity and habitats (modified, natural, and critical habitats), legally protected and internationally recognized areas of high biodiversity value, invasive alien species, and sustainable management of living natural resources; and (ii) primary suppliers.

ESS8 Cultural Heritage

ESS8 sets out general provisions on risks and impacts to cultural heritage from project activities. The objectives of ESS8 is to: (i) protect cultural heritage from the adverse impacts of project activities and support its preservation; (ii) address cultural heritage as an integral aspect of sustainable development; (iii) promote meaningful consultation with stakeholders regarding cultural heritage; and (iv) promote the equitable sharing of benefits from the use of cultural

heritage. The applicability of ESS8 depends on the environmental and social assessment described in ESS1.

ESS8 requirements cover: (i) general requirements, (ii) stakeholder consultation and identification of cultural heritage including confidentiality and stakeholders' access; (iii) legally protected cultural heritage areas; (iv) provisions for specific types of cultural heritage including archaeological sites and material, built heritage, natural features with cultural significance, and movable cultural heritage; and (v) commercial use of cultural heritage.

ESS9 Financial Intermediary

Financial Intermediaries (FIs) are required to monitor and manage environmental and social risks and impacts of the projects they finance. The objectives of ESS9 is to: (i) set out how the FI will assess and manage environmental and social risks and impacts associated with the subprojects it finances; (ii) promote good environmental and social management practices in the subprojects the FI finances; and (iii) promote good environmental and sound human resources management within the FI. ESS9 applies to FIs that receive financial support from the Bank including public and private financial services providers.

ESS9 requirements cover: (i) environmental and social management system including environmental and social policy, environmental and social procedures, organizational capacity and competency, and monitoring and reporting; and (ii) stakeholder engagement.

ESS10 Stakeholder Engagement and Information Disclosure

Open and transparent engagement between the Borrower and project stakeholders is one of the essential elements of good international practice and effective stakeholder engagement improves the environmental and social sustainability of projects. The objectives of ESS10 is to: (i) establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties; (ii) assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance; (iii) promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them; (iv) ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format; and (v) provide project-affected parties with accessible and inclusive means to raise issues and grievances, and allow Borrowers to respond to and manage such grievances. ESS10 applies to all projects supported by the Bank through Investment Project Financing.

ESS10 requirements cover the development of a stakeholder engagement framework and/orplan that will define the following; (i) engagement during project preparation including stakeholder identification and analysis, stakeholder engagement plan, information disclosure, and meaningful consultation; (ii) engagement during project implementation and external reporting; (iii) grievance mechanism; and (iv) organizational capacity and commitment.

2.5.1. Key Differences Between the Turkish EIA Regulation and the WB ESSs

The Turkish EIA procedures are, with some exceptions, in line with the WB's ESSs. The primary exceptions are in project categorization, scope of environmental and social assessment, and public consultation. In cases where the Turkish legislation differ from the ESSs, the more stringent one will be applied to the project implementation.

Project categorization

According to the World Bank's E&S Policy, projects (including projects involving FIs) are classified into one of four classifications as ***High Risk, Substantial Risk, Moderate Risk*** or ***Low Risk*** taking into account relevant potential risks and impacts, such as the type, location, sensitivity and scale of the project; the nature and magnitude of the potential E&S risks and impacts; the capacity and commitment of the Borrower; and other areas of risks that may be relevant to the delivery of E&S mitigation measures and outcomes (see Annex 1 for details).

There are no clear-cut border values distinguishing the classification of the projects or, unlike the Turkish EIA Regulation (where projects are classified into two categories as Annex I and Annex II projects), any ready lists of project types for classification; rather projects are screened on a case by case basis in the environmental and social risk classification of the WB.

Scope of Environmental and Social Assessment

The scope and type of E&S assessment required as per ESS1 varies proportionate to the potential risks and impacts of the project and, in an integrated way, all relevant direct, indirect and cumulative environmental and social risks and impacts throughout the project life cycle, as per the ESSs 2-10, are assessed.

Indicative outlines of ESIA report and ESMP are given in Annex 2.

Comparisonof the indicative outline required by the WB for ESIA with the general format of a Turkish EIA indicates a number of key differences as follows:

- the absence of an executive summary and information on the legal and institutional framework in the Turkish EIA (Technical level of information in the non-technical summary required in the Turkish EIA may not meet WB requirements);
- possible discrepancies with regard to the level at which the project's environmental and social impacts, its alternatives, and mitigation measures for the impacts are discussed (such as lack of discussions on residual impacts, limited discussion on indirect and induced impacts, limited assessment regarding use of resources and GHG emissions);
- social impact assessment is not completely integrated to the Turkish EIA and this results in the absence of proper social baseline, identification and assessment of theproject induced social impacts including impacts on disadvantaged or vulnerable and gender related issues;
- there arelimited requirement to cover risks and impacts related to (i) community health and safety; (ii) occupational health and safety; and (iii) labor and working conditions;

- limited or no requirement to cover cumulative impacts with other projects in the Turkish EIA; and
- limited emphasis on the associated facility in the Turkish EIA.

Nevertheless, the project specific format for Turkish EIA may require more details under some of these headings than indicated in the general format. Consequently, a case by case review of the Turkish EIAs is necessary to identify gaps with WB requirements.

Public consultation and disclosure

Pursuant to ESS 1, stakeholder engagement is an integral part of E&S assessment and should be conducted in accordance with ESS 10. Within this scope, the Borrowers should identify the different stakeholders (project-affected parties and other interested parties including disadvantaged or vulnerable), and develop and implement a Stakeholder Engagement Plan (SEP), in consultation with the Bank, proportionate to the nature and scale of the project and its potential risks and impacts.SEP should describe the timing and methods of engagement with stakeholders throughout the life cycle of the project, and also describe the range and timing of information to be communicated to the parties as well as type of information to be sought from them. The Borrower should disclose project information to allow stakeholders to understand the risks and impacts of the project, and potential opportunities, in a timeframe that enables meaningful consultations with the stakeholders on project design.

The Turkish EIA Regulation requires “pre-scoping” public consultation only for projects requiring an EIA, and only requires announcement of the environmental assessment together with the justification. However, ESS 10 does not specify an exact number and method of public consultation and information disclosure but instead the standard requires a continuous stakeholder engagement approach through the life cycle of the project that will be decided proportionate to the nature, scale and impact magnitude of the project.

2.6. EU ENVIRONMENTAL LEGISLATION

The EU Environmental Policy is a dynamic policy area that provides an integrated management understanding with the objectives of many policy areas, primarily in the protection of the environment, prevention of the problem at the source, efficient and sustainable use of natural resources, guarantee of human health and the highest standard of living. The EU encourages the implementation of this policy not only within the EU but also through collaborations with other countries.

The development of this policy area has been accelerated by the Environmental Action Programs (EAP), which best offers the EU's integrated environmental management approach and has been prepared since 1973. The last phase of the EAP, which allows more effective solutions to solve global problems, covers the 2014-2020 years with the Seventh Program.The Environmental Action Programs, which have been prepared in 1973, have been quite effective in the development of the European Union's environmental policy:

In 1973 first Environmental Action Program

In 1977, 2nd Environmental Action Program

3th Environmental Action Program

4th Environmental Action Program

5th Environmental Action Program

The 6th Environmental Action Program period has been completed in 2012

7th Environmental Action Plan Based On: EU's environmental target within 10 years has been put forth. The main targets of the "Environment 2020: Our Future, Our Choice" programme are;

- Climate Change
- Nature and Biodiversity
- Environment and Health
- Natural Resources and Wastes

We can explain these four titles as follows;

Climate Change: EU member states have undergone a program to reduce greenhouse gas emissions by 8% between 2013-2020.

Nature and Biodiversity: Protection of different living species and prevention of industrial accidents.

Environment and Health: To prevent the adverse impacts of air, water, noise pollution on human health.

Natural Resources and Wastes: Solving the waste problem by ensuring that resources are used correctly and wastes are properly separated and recycled.

Basic Application Areas in EU Environmental Policy

Horizontal Legislation

- Environmental Impact Assessment (EIA) (EIA Directive 2011/92 / EC)
- Strategic Environmental Assessment (SEA) (Strategic Environmental Assessment Directive 2001/42 / EC)
- Environmental Information Access (Directive 2003/4/EC on Environmental Information Access)

Air Quality

The Air Quality Framework Directive 2008/50 / EC includes regulations for emission reduction of ozone depleting substances, emissions related with volatile organic compounds (VOC) and fuel quality.

Waste Management

Basic regulation is the Waste Framework Directive 2008/98 / EC. According to the waste management hierarchy set out in the Framework Directive, waste management strategies should focus primarily on preventing the formation of wastes.

Water Quality

Directives are formed related to the Water Framework Directive 2000/60 / EC, which is the priority for harmonization for this sector. The Water Framework Directive is the basic legal framework that envisages the protection and improvement of all water bodies in the European Union in terms of quality and quantity, based on the principle of integrated watershed management and participation of people in decision-making processes.

Nature Protection

In the EU acquis, Bird 2009/147 / EC and Habitat Directives 92/43 / EEC are important and have priority. These directives include the provisions for the identification of protected areas - in particular Natura 2000 areas - and the priority safeguard measures to be considered in all sectors.

Industrial Pollution Control and Risk Management

- Integrated Pollution Prevention and Control (IPPC) Directive 2008/1/EC
- Large Incineration Facilities Directive 2001/80 / EC
- Industrial Emissions Directive 2010/075 / EC

Chemicals

Regulation 1272/2008 / EC contains arrangements for the classification, packaging and labeling of substances and mixtures.

Another important regulation in the chemicals is REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) Regulation 1907/2006 / EC.

Climate Change

There are EU Regulations related to greenhouse gas emission monitoring, emission trading system, reduction of greenhouse gas emissions from sectors other than the emission trading system (Effort Sharing Decision 406/2009 / EC), carbon trapping and storage, control of F-gases and protection of the ozone layer.

Noise

There is Environmental Noise Directive 2002/49 / EC on the assessment and management of environmental noise. In accordance with the Directive, preparation of the strategic noise maps and the creation of noise action plans are required for the residential areas with a population of more than 250,000 inhabitants, main roads with more than 6 million vehicles per year, main railways with more than 60.000 km of trains per year, and airports with movement more than 50,000 per year.

Compliance with the EU Environmental Acquis

EU Integrated Environmental Strategy (2007-2023) in Turkey, which is a prerequisite for accession to the EU, includes detailed information on required technical and institutional infrastructure, obligatory environmental improvements and regulations to ensure compliance with the EU environmental legislation and implementation of the regulations in an effective way.

In the scope of EU Integrated Environmental Strategy, particularly in Turkey, aim, target, strategy and planning activities have been introduced for the environmental priorities as of water, waste, air, industrial pollution control, conservation of nature and horizontal sector.

3. OWNERSHIP STATUS OF THE PROJECT AREA

The place chosen as the project area is within the boundaries of the parcel where Hurma Wastewater Treatment Plant is located, and the total area of the parcel consists of 174,658.00 m2. It is planned to build a "Treatment Sludge Incineration Plant" on 11,133.31 m2 of the 174,658.00 m2 parcel area. The land ownership belongs to the Antalya Metropolitan Municipality and the deed for the area where the activity will be carried out is given in Annex-9. The 1/25,000 scale Topographic Map showing the project area is presented in Annex-4.

The Treatment Plant is located within the boundaries of plot no. 7 of block 12131. When the block and parcel in question is questioned from the "General Directorate of Land Registry and Cadastre Parcel Inquiry Practice", the attribute information of the borders, including the Project area of the Incineration Plant, is seen as the "Treatment Plant Area". (Table 12)

Table 12: Attribute Information of Plot Boundaries of Plot No. 12131 Block No. 7

Property No.	16863965
City	Antalya
District	Konyaalatı
Neigborhood	Hurma
Lot	12131
Block	7
Deed Area	174.658
Qualification	Wastewater Treatment Plant Area
Position	-
Area Type	Main Property
Die Plate	-

The Hurma WWTP'S deed for the area is in Annex-8.

3.1. EVALUATION OF PLACE AND TECHNOLOGY ALTERNATIVES

3.1.1. Location Alternatives

The Hurma Treatment Sludge Incineration and Energy Recovery Facility to be built; It is planned within the borders of Hurma Wastewater Treatment Plant in Antalya province, Konyaaltı district,

Hurma neighborhood. The Hurma WWTP is located on the Tünektepe road, at the 16th km of the Antalya-Kemer Highway.

The total area of the block 12131 and parcel number 7 where the Treatment Sludge Incineration and Energy Recovery Facility will be established is 174,658.00 m2; The Hurma Wastewater Treatment Facility, which is currently in operation, is on an area of 163,524.70 m2. Within the scope of burning the treatment sludge originating from the treatment facilities under the responsibility of ASAT and obtaining heat energy from the said incineration process, it is planned to construct an incineration facility on an area of 11,133.31 m2 on block 12131 and parcel number 7. The Location Map of the area where the activity will be carried out is presented in Annex-3 and the 1/25,000 Scale Topographic Map is presented in Annex-4.

As stated in the Regulation on Incineration of Wastes, which was effectuated after being published in the Official Gazette dated 06/10/2010 and numbered 27721, regarding the activity to be carried out; Real and legal persons who want to establish a waste incineration facility must first obtain permission from the highest local authority for the location they have chosen to establish the facility. The suitability of the chosen location must be approved by the decision of the Local Environment Board (MÇK). In this context, Local Environment Board Meeting Decision dated 23.10.2019 and numbered 2019/03, Local Environment Board Meeting Decision dated 05.12.2019 and no. 2019.04-1, and Local Environment Committee Meeting Decision dated 11.06.2020 and no. 2020/02-03, the site selection suitability was obtained as a result of the Environment Committee Meeting Decision. (Annex-2)

A different location alternative is not considered as the project area.

The Layout Plan, which is the basis of the planned project, is included in Annex-5.

3.1.2. Technology Alternatives

As the treatment sludge disposal system, within the planned Hurma Treatment Sludge Incineration and Energy Recovery Facility Project, the method in which the treatment sludge is incinerated, and energy recovery is obtained as a result of this combustion process has been chosen. In the chosen method, the treatment sludge will be disposed of by incineration, and energy recovery will be provided from the sludge burned with the fluidized bed sludge incinerator. The energy gained as a result of the incineration process will be able to meet 100% of the internal energy requirement of the Incineration Facility and the electricity need of the Hurma Wastewater Treatment Facility.

Treatment sludges formed in 30 Wastewater Treatment Plants belonging to the General Directorate of ASAT in Antalya will be disposed of in the planned Waste Sludge Incineration Facility. If we look at it from an environmental point of view, the waste sludge in question will not be stored regularly, but will be completely disposed of, and energy recovery will be provided.

For sludge disposal, one of the most widely used applications in EU (European Union) countries, Japan and the USA is the incineration of waste sludge. The advanced technology and emission control applications of these facilities can more easily meet environmental sensitivities and this situation highlights the tendency to burn and obtain energy.

After the suitability of the site selection, the investor is obliged to submit the Feasibility Report, which also includes the financial analyzes, showing that the facility can fulfill the requirements in the relevant legislation and technical regulations, to the Ministry of Environment and Urbanization and obtain an appropriate opinion. The feasibility report can be prepared by institutions and organizations holding the environmental impact assessment qualification certificate or by environmental consultancy firms authorized by the Ministry. For this reason, a Feasibility Report has been prepared and appropriate opinion has been received for the prepared feasibility report.

According to the sludge calculations in the wastewater treatment plants, the amount of sludge that will arrive the Hurma Treatment Sludge Incineration and Energy Recovery Plant and be incinerated will be 500 tons/day. A feasibility study was carried out according to the amount of sludge 500 tons/day. Sludge disposal techniques and methodologies were examined in the report, and it was concluded that the pre-dry Incineration Facility is a more advantageous and useful solution for the facility in order to minimize the energy consumption in the incineration process and the size of the incinerator.

3.1.2.1. Advantages Of Fluidized Bed Technology

1) High combustion efficiency and high heat transfer coefficient:

High combustion efficiency is achieved in Fluidized Bed boilers due to the smooth solid-gas mixture and the long residence time of the particles in the bed. Combustion efficiency is further increased by trapping the particles leaving the boiler and returning them to the system. In addition, since the heat transfer coefficient inside the bed is very high, the heat transfer surfaces and thus the boiler dimensions are smaller than conventional boilers and require less investment cost.

2) Ease of fuel preparation:

Compared to pulverized boilers, fuel preparation facilities are simpler, operating maintenance and investment costs are lower.

3) High efficiency:

Especially when fuels with low ash melting point are burned in fluidized bed boilers, many boiler operation problems are not encountered as a result of ash adhering to the heat transfer surfaces, since they are operated at temperatures below the melting point. Therefore, there is an efficiency of 90 – 95% in fluidized bed boilers.

4) Flexibility in fuel composition:

Thanks to the high thermal capacity of the bed material, the instant heating of the fuel when it enters the bed and providing the particles for a long time for combustion ensure that even fuels with low calorific value can be easily burned in fluidized bed boilers.

5) Low NOx and SO2 emissions:

Sulfur dioxide is one of the most emphasized emissions, especially since it causes acid rain and therefore creates acid accumulation in the air and water. While sulfur dioxide is formed by the oxidation of the sulfur contained in the fuel during combustion, this sulfur dioxide is retained by

feeding limestone to the bed area in fluidized bed boilers. It is then transported out of the system as bed ash and fly ash.

Nitrogen oxides are gases that have far more far-reaching effects than sulfur oxides in their interactions with the environment. Nitrogen oxides have significant effects on the environment due to their role in acid rains, ozone depletion, greenhouse gas effect and photochemical fog formation.

There are two sources for the formation of these gases as a result of combustion: 1- nitrogen in the fuel, 2- atmospheric nitrogen in the air supplied for combustion. Atmospheric nitrogen, especially at temperatures of 1200°C and above, reacts with oxygen to form thermal-nitrogen oxide, so no significant nitrogen oxide is formed in fluidized bed boilers with much lower operating temperatures.

Fuel-derived nitrogen oxides: In CFB (Circulating Fluidized Bed) burners, a reducing atmosphere is created by gradual air supply for the emissions of nitrogen oxides, and oxidation of nitrogen into nitrogen oxide is prevented.

As a result, NOx and SO2 emissions occur below the environmental limits without additional flue gas treatment plants, thanks to the low combustion temperature and gradual air supply, low NOx formation and the retention of limestone and SO2 in the combustor.

6) Usable ash:

Dry and storable ash obtained as a result of the incineration process can be used as a raw material in cement plants for obtaining arable soil, waste/sludge stabilization, base material in road construction, filling material in the recovery of open mines.

3.1.3. Providing Information by the Operator on Whether its Establishment is within the Scope of the "Regulation on the Prevention of Major Industrial Accidents and Mitigation of Their Effects"

“Regulation on the Prevention of Major Industrial Accidents and Mitigation of Their Effects”, which which was effectuated after being published in the Official Gazette dated 02.03.2019 and numbered 30702;

“Scope

ARTICLE 2 – (1) *This Regulation is applied, in quantities equal to or above the limit values specified in Section 1 and Section 2 of Annex-1, contains, is likely to contain, or industrial industrial substances subject to Section 1 and Section 2 to lower and upper-level establishments where dangerous substances are expected to occur in such quantities during the loss of control of a chemical process"*. is said.

Within the scope of the Hurma Waste Sludge Incineration Plant Project, activated carbon and the chemicals (CaO, NaOH and H2SO4) required in the facility will be used, and these chemicals which will be used in are not included in Part 1 and Part 2. of the Section of Annex-1 of the Regulation on the Prevention of Major Industrial Accidents and No. 30702, dated 02.03.2019.

Obligations within the scope of the "Regulation on the Prevention of Major Industrial Accidents and Mitigation of Their Effects", which was published in the Official Gazette dated 02.03.2019 and numbered 30702, for chemicals to be used in the enterprise will be fulfilled. If it falls within the scope of the regulation, the provisions of the regulation will be complied with.

4. CURRENT ENVIRONMENTAL CHARACTERISTICS OF THE PROJECT LOCATION AND IMPACT

4.1. POSITION OF LOCATION SELECTED FOR THE PROJECT

Hurma Treatment Sludge Incineration and Energy Recovery Facility is planned to be located within the boundaries of Hurma Wastewater Treatment Facility within the boundaries of Antalya province, Konyaaltı district, Hurma neighborhood. The Hurma WWTP is located on the Tünektepe road, at the 16th km of the Antalya-Kemer Highway.

The total area of the 12131 block and parcel number 7 where the Treatment Sludge Incineration and Energy Recovery Facility will be established is 174,658.00 m2 and the Hurma Wastewater Treatment Facility, which is currently in operation, is on an area of 163,524.70 m2. Within the scope of incinerating the treatment sludge and obtaining heat energy from the said incineration process originating from the treatment facilities under the responsibility of ASAT, it is planned to construct an incineration facility on an area of 11,133.31 m2 on block 12131 parcel number 7. The Location Map of the area where the activity will be carried out is presented in Annex-3 and the 1/25,000 Scale Topographic Map is presented in Annex-4.

The satellite image of the 12131 block 7 parcel, which also includes the Hurma Wastewater Treatment Plant and the Hurma Treatment Sludge Incineration and Energy Recovery Facility, is presented in Figure 20.



Figure 20: Position of Location Selected for the Project

4.2. DEFINING OF INCINERATION FACILITY IMPACT AREA

The facility impact area is the area with a radius of 50 (fifty) times the chimney heights determined according to the principles given in Annex-4 of this regulation, starting from the center of the emissions specified in Annex-2 of Industrial Air Pollution Control Regulation (IAPCR) defining the Project Area of Impact and Explaining How It Is Determined, Displaying the Project Area and Impact Area on the Map, and Coordinate Information.

In facilities where the effective height of emissions from the ground (h+h) is less than 30 m, the facility impact area is a square-shaped area with a side length of 2 km. If the surface distribution of non-chimney emission sources (area source) is greater than 0.04 km2, the facility impact area is a square-shaped area with a side length of 2 km, with the area in the middle of the source square.

Considering the 40 m high emission chimney to be located in the facility, a circular area with a radius of 50 (fifty) times the chimney heights and a side length of 2 km has been determined as the impact area. The determined domain is as shown in Picture 5.

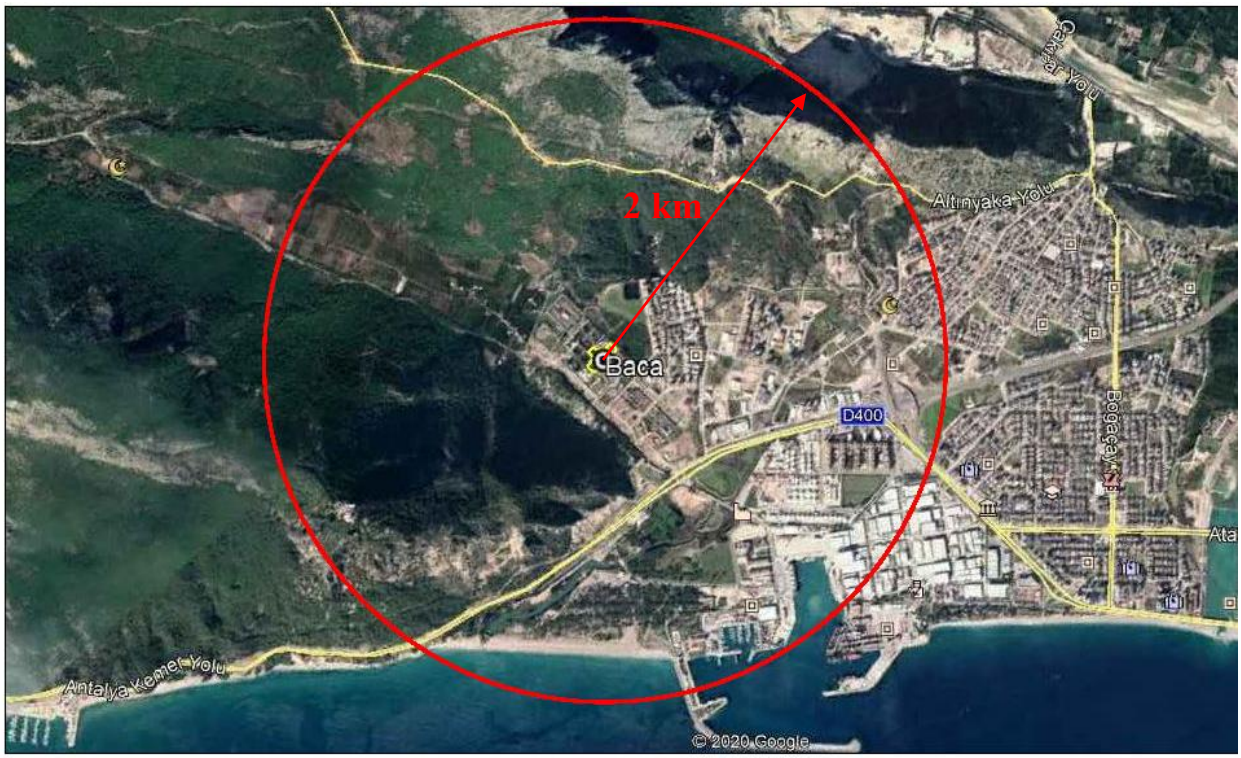


Image 5: The Project Impact Area

The coordinates of the deed area and the project area of "Hurma Treatment Sludge Incineration and Energy Recovery Plant Project" are presented in Tables 13 and 14 below.

Table 13: Deed Area Coordinates

Corner Coordinates	UTM DATUM: ED 50 TYPE: UTM DOM: 33 ZONE: 36		GEOGRAPHICAL DATUM: WGS-84 TYPE: GEOGRAPHICAL DOM: - SCALE FAC: -	
Point No:	Y(Right)	X (Up)	Latitude	Longtitude
1	284344.95	4079752.61	3685213902	2758156836
2	284981.80	4079808.37	3685278644	2758869279
3	285009.85	4079540.52	3685037954	2758908307
4	285006.69	4079532.74	3685030876	2758904989
5	284794.90	4079514.20	3685009340	2758668072
6	284743.01	4079509.65	3685004065	2758610018
7	284684.31	4079501.00	3684994932	2758544454
8	284630.84	4079493.12	3684986617	2758484729
9	284434.89	4079464.23	3684956114	2758265861
10	284392.09	4079558.75	3685040305	2758215206
11	284344.48	4079725.21	3685189211	2758157098
12	284342.75	4079736.26	3685199119	2758154839
13	284343.49	4079746.25	3685208140	2758155379
Total Area				174,658.00 m^2

Table 14: Coordinates of the Site where the Hurma Trearment Sludge Incineration and Energy Recovery Facility will be built

Point no	Y	X
D1	284776.72	4079585.60
D2	284831.98	4079589.34
D3	284830.80	4079605.25
D4	284826.53	4079646.36
D5	284820.64	4079706.99
D6	284814.84	4079770.42
D7	284778.87	4079767.87
D8	284782.78	4079709.08
D9	284750.67	4079707.34
D10	284752.41	4079683.72
D11	284725.24	4079682.14
D12	284728.18	4079638.70
D13	284772.81	4079641.64
Total area	**11.133,31 m²**	

The Topographic Map of the Project is given in Annex-4, and the coordinates of the location selected for the Project are also presented in Annex-1.

4.3. DISTANCES OF PROJECT AREA AND UNITS TO DISTRICTS, NEIGHBORHOODS

The settlements and facilities near the Incineration Facility planned to be established within the scope of the project are shown one by one on the satellite map in Figure 21 and their distances to the plant are indicated in Table-15.

Table 15: The distance of the activity area to the residential areas and the locations of the residential areas

Residential area	Distance	Direction
Antalya City Center	13 km	Northeast
to Hurma Neighborhood Center	3000 m	North - Northeast
Mosque	1700 m	Northeast
Park Area	1100 m	Northeast
Free Zone	1800 m	East - Northeast
Fuel Products Storage Area	1200 m	East - Northeast
Port Akdeniz	2300 m	East - Northeast
Gas station	1180 m	East
Marina	1700 m	East
Nearest Residential Area	230 m	East
2nd Nearest Residential Area	250 m	North

Settlements and facilities near the project area are also presented in Annex-9.

The project is not expected to have any adverse effects on nearby settlements and facilities.



Figure 21: Distances of Project Area and Units to Districts, Neighborhoods

4.4. MAPS AND PHOTOS SHOWING THE CURRENT LAND USE OF AGRICULTURAL LANDS LOCATED IN THE PROJECT AREA AND ITS NEIGHBORHOOD, GROUND AND SURFACE WATERS, EARTHQUAKE BELTS, GEOLOGICAL STRUCTURE, SETTLEMENT AREAS, TRANSPORTATION NETWORK, ENERGY TRANSMISSION LINES, PIPELINES, DISPLAY WITH KEY INFORMATION ON IT, DISPLAYING NAMES, DIRECTIONS AND DISTANCES

The project area is 310 m to the nearest forest land, 520 m to the 2B forest land, 1.56 km to the Beydağları Coastal National Park, 3000 m to the Hurma Neighborhood center, 1700 m to the Mosque, 1100 m to the Park Area, 1800 m to the Free Zone, 1200 m to the Fuel Products Storage Area, 2300 m to Port Akdeniz, 1180 m to Gas Station, 1700 m to Marina and 230 m to Nearest Residence 1.06 km to Sarısu Stream, 2.3 km to Çandır Stream, 3,83 km to Boğaçayı, 150 m and 90,58 m from the Energy Transmission Line.

There are no pipelines used for the transportation of fuel, gas, and potable-use water at the site.

The Energy Transmission Line passes through the area defined as the treatment plant, according to the 1/100,000 Scale Environmental Plan. Pipelines and energy transmission lines used in the transportation of any fuel, gas and potable-use water do not pass through the area to be used as an incineration plant. Two Energy Transmission Lines pass near the Combustion Plant Area. One is at a distance of 0.15 km and the other at a distance of 90.58 m. (See Figure 22)



Figure 22: Distance of Project Area to Energy Transmission Lines

The project will not have a negative impact on pipelines and energy transmission lines used in the transportation of any fuel, gas, and potable-use water.

The 1/25,000 Scaled Sensitive Regions Map for the project area is presented in Annex-10, and the project site is 710 m to the Natural Protected Area, 200 m to the Military Area, 470 m to the Tourism Center, 550 m to the Stream, 1200 m to the Fuel Products Storage Area, 360 m to the Urban Settlement Area, 150 m to the Energy Transmission Line and 310 m to the Forest Area.

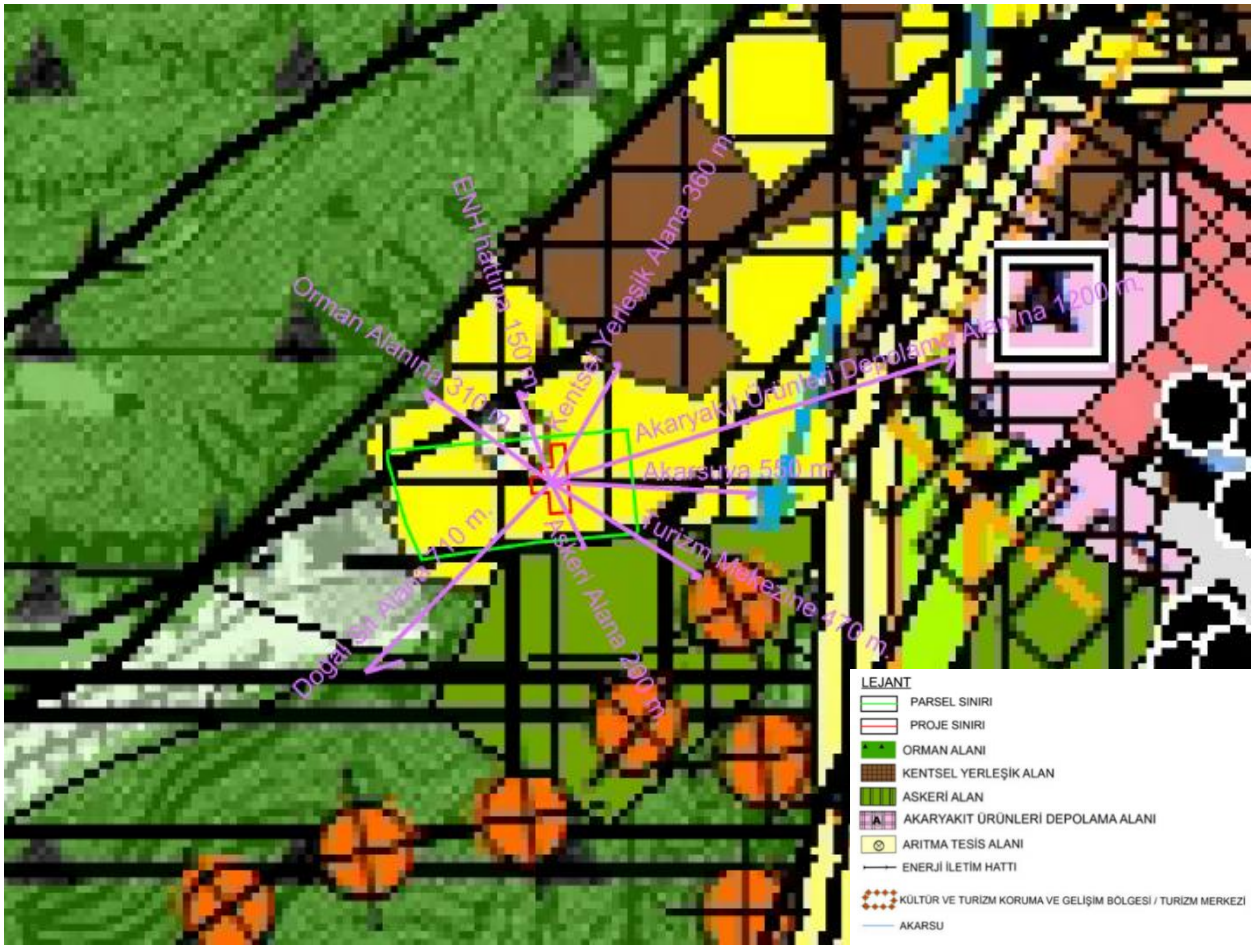


Figure 23: Responsive Regions Map for the Project

There is no agricultural land in the project area and its immediate surroundings.

The Location Map showing the transportation network to the project site is presented in Annex-3.

The closest airport to the facility planned to be established is Antalya Airport, and the approximate distance from the planned area to Antalya Airport is 20 km. Antalya airport is the airport with the highest air traffic after Istanbul. A total of 177,886 flights were carried out at Antalya Airport in 2014, with a total passenger traffic of 14,701,029. In 2015, 17,765,026 passenger traffic occurred with 175,083 flights. According to the data of the end of 2016, the number of flights is 127,497 and the number of passengers is 13,205,611.

In the Circular of the General Directorate of Civil Aviation on Construction Criteria around Airports dated 24.07.2012, it has been stated that the provisions of "Within the first 6,000 meters

of the landing-take-off coordinates (approach and take-off-climb surfaces, whose criteria are specified in ICAO and continue for 15,000 meters) included in the Airport Obstacle Plans; Failure to plan and build all kinds of flammable, explosive, fuel oil facilities and warehouses and similar structures and industrial facilities that will produce intense smoke, Obtaining permission from the General Directorate of Civil Aviation before construction for all structures to be constructed at a height of 150 meters or more from the 3. ground level of the land." will be complied with.



Figure 24: Distance Between the Facility and Antalya Airport

When the evaluation is made according to the provisions of the Circular of the General Directorate of Civil Aviation mentioned above, the height of the planned facility and the location of the facility will not adversely affect air transportation safety. The letter of the General Directorate of Civil Aviation dated 28.09.2020 and E.15084 is presented in Annex-11. In the related opinion, it was stated that the airports open to civil air transportation, which are the subject of the request, are outside the limits of the obstacle plans.

The facility planned to be established will not affect air transportation security.

The distance of the Project Area to the nearby dams is listed below.

- 63 km from Manavgat Beşkonak Dam and HPP,
- 50 km to Küçüksu Dam,
- 55 km to Karacaören Dam,
- 47 km to Korkuteli Dam,
- 80 km to Çavdır Dam
- 77 km to Yazır Dodurgalar Dam
- 59 km to Korkuteli Kozağacı Çağman Pond.

In addition, the project site is approximately 32 km of air distance to Pozan Lake.

There are several streams or streams in the area where the porous travertine (Al) layer on which most of the city is built. The only stream that can be considered important in the lower travertine plateau is the Düden Stream.

On the border between the lower travertine plateau and the alluvial plains, there are many springs feeding small streams. Apart from these springs, many springs feeding small streams also originate from the carstic limestones forming the high topography in the west of the Antalya Plain.

Streams fed by the main Travertine and Karst Limestone Springs in the region; Arapsuyu I and II are Kopak Stream and Sarısu Stream.

Sarısu Stream is located in the southeast of the project site and reaches the sea from the north of the port. Although the average flow of Sarısu Stream is 500-600 liters, this stream becomes dry in summers.

The Travertine formation of Antalya is bounded from the west and east by the alluvial plains of Aksu Stream and Boğaçay, which are constantly flowing.

Aksu Stream, located in the east of Antalya, is the largest stream in the region. Boğaçay is formed by the combination of Doyran, Çandır, Göksu and Karaman rivers. Çandır and Doyran Streams have water only in rainy seasons. Karaman Stream is fed by springs in the north.

The Project Site is 1.06 km from Sarısu Stream. It is also 2.3 km from Çandır Stream and 3.83 km from Boğaçay.

Specific to the project area, there is "Antalya Province Konyaaltı Hurma Wastewater Treatment Plant Sludge Incineration Unit Area Soil and Foundation Investigation Data Report" dated May 2020, and according to the data regarding 5 drillings in the field, the highest groundwater level is in the Drilling well No. SK-4 measures 2.9 m. Detailed explanations within the scope of the groundwater characteristics of the project area are examined under the title of “Section 5.7. Hydrogeological Characteristics”.

There will be no negative impact on underground and surface water resources in the region as a result of the project activity. In addition, the project is not expected to have any impact on the groundwater level.

In the Earthquake Hazard Map prepared by AFAD Earthquake Department, the project site is in the medium danger class (PGA 475: 0.270 maximum ground acceleration (g)). Detailed explanations about Seismic Zones and seismicity are presented under the title of “5.5. Seismicity”.

The field covers the 1/25,000 scale Antalya 024-b3 and 024-a4 maps. Beydağları autochthon, Anamas-Akseki autochthon, Antalya nappes, Beyşehir-Hoyran-Hadim nappes and neoautochthonous Miocene-Quaternary rock units are located in the field, which is located in the northeast of Antalya Bay.

It is located in the region where the dense carbonates of the field complex are bordered with young units on the Antalya plain. The geological structures related to the project site are examined in detail under the title of “5.1. Geological Features”.

4.5. APPROVED ENVIRONMENTAL PLAN INCLUDING THE PROJECT SITE, MASTER ZONING PLAN, IMPLEMENTATION ZONING PLAN, PLANNING INFORMATION REGARDING THE PROJECT AREA (1/100000, 1/25000, 1/5000, 1/1000 SCALED ON THE PLANS IN FORCE, SHOWING THE HEALTH PROTECTION BAND ON THESE PLANS, INCLUDING THE APPROVED PLANS AS THE ORIGINALS, INCLUDING THE EXPLANATIONS ON THE SUBJECT IN THE REPORT TEXT)

Approved Environmental Plan including the Project Site, Master Zoning Plan, Implementation Development Plan, and planning information regarding the project area are examined in detail under the following sub-headings.

The project site remains in the Wastewater Facilities Area legend in the 1/25,000 Scale Master Development Plan. The 1/25,000 Scale Master Zoning Plan and its Legend taken specifically for the project are presented in Annex-12.

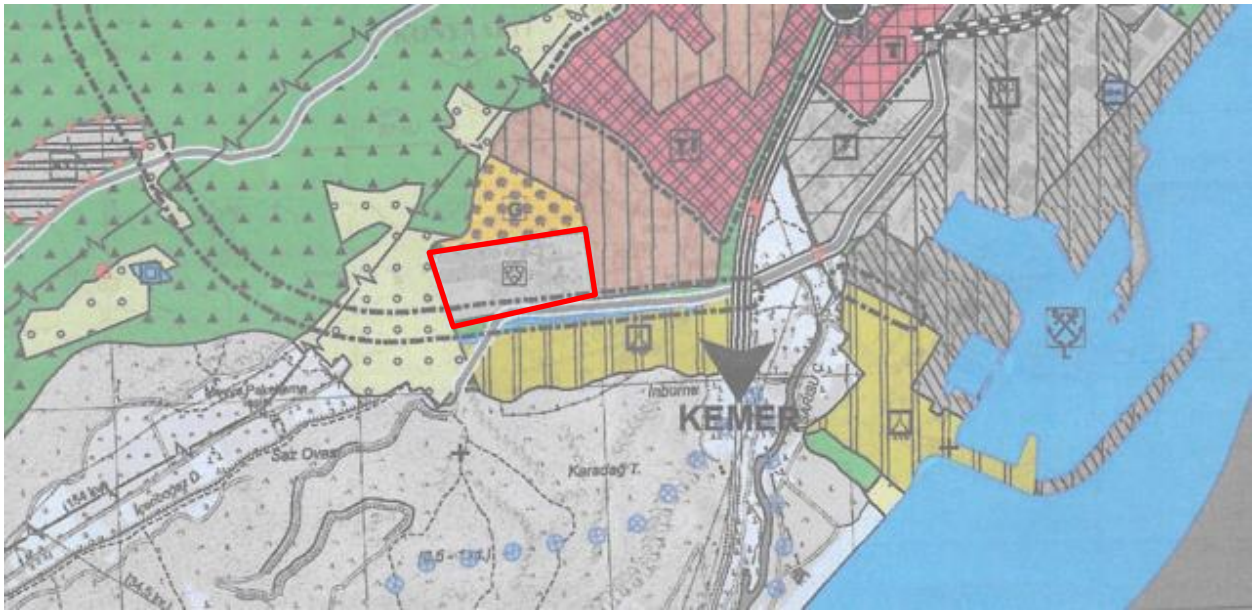


Figure 25: Location of the Project Site in the 1/25.000 Scale Master Zoning Plan

The site selection suitability was obtained within the scope of the project, as a result of the Local Environment Board Meeting Decision dated 23.10.2019 and numbered 2019/03, Local Environment Board Meeting Decision dated 05.12.2019 and no. 2019.04-1, and Local Environment Committee Meeting Decision dated 11.06.2020 and no. 2020/02-03, Environment Committee Meeting Decision. (Annex-2)

The project area is marked as Wastewater Facilities Area (Treatment, Pumping Center) in the 1/1000 Scale Implementation Zoning Plan and 1/5000 Scale Master Zoning Plan. In the Plan Notes of the 1/1000 Scaled Implementation Zoning Plan and the 1/5000 Scaled Master Zoning Plan, it is

stated that "Wastewater Sludge Incineration Plant" Can Be Built in the Area of Wastewater Treatment Plants. (see Annex-13)

The planned Hurma Treatment Sludge Incineration and Energy Recovery Facility Project will be established in the middle of the existing Hurma Wastewater Treatment Plant and will be located 40 m ± 25% from the neighboring land border, road, etc. to each front.

Within the scope of the project, considering the effects of the facility on community and environmental health, the provisions of the Ministry of Health dated 17.02.2011 and numbered 6539 "Distance of the Health Protection Strip to be Left Around the Non-Sanitary Institutions That May Affect the Environment and Community Health" will be complied with.

4.6. THE RELEVANT PLAN SHEETS, LEGEND, AND PLAN PROVISIONS OF THE CURRENT 1/100,000 SCALED ENVIRONMENTAL PLAN (EP) INDICATE THE SCOPE OF WORK DOCUMENT SHOWING THE PROJECT AREA IN THE APPROVED ENVIRONMENTAL PLAN

The project area is in the O25 sheet of the 1/100,000 Scale Environmental Plan for the Antalya-Isparta-Burdur Planning Region and remains in the treatment plant area legend. The original size 1/100,000 Environmental Plan Sheet, Legend and Related Plan Provisions with the stamp "Certified Copy" taken specifically for the project are presented.

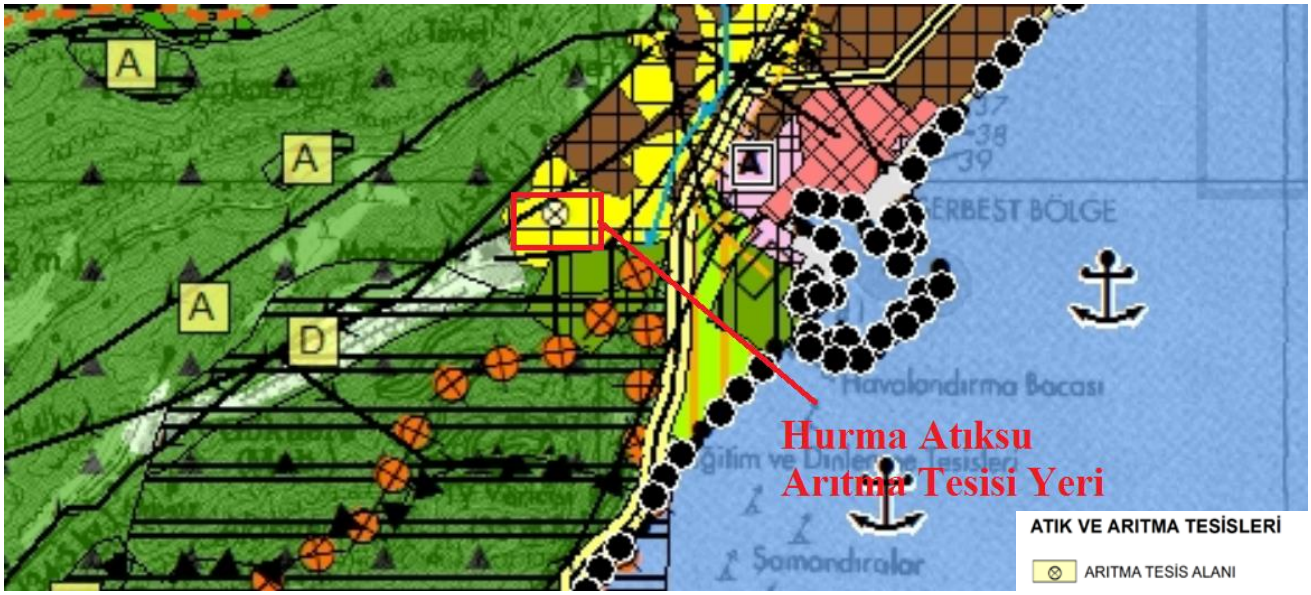


Figure 26: Status of the Project Area According to the Environmental Plan

4.7. PLAN SHEET OF THE APPROVED CITY DEVELOPMENT PLAN

The project area is marked as Wastewater Facilities Area (Treatment, Pumping Center) in the 1/1,000 Scale Implementation Zoning Plan and 1/5,000 Scale Master Zoning Plan. In the Plan Notes of the 1/1,000 Scaled Implementation Zoning Plan and the 1/5,000 Scaled Master Zoning

Plan, it is stated that "Wastewater Sludge Incineration Plant" Can Be Built in the Area of Wastewater Treatment Plants. Approved city development plans for the region in which the project area is located, 1/5,000 and 1/1,000 scaled plan sheets, legend sheets and plan provisions are presented in Annex-13.

1/1,000 scaled Implementation City Development Plan Amendment, prepared for Energy Production Area Planning in Antalya Province- Konyaaltı District Hurma Neighborhood, 12131 block, 7 parcel, was approved by the Antalya Metropolitan Municipality Department of Reconstruction and Urbanization with the decision numbered 514 on 14.08.2020.

Antalya Province- Konyaaltı District Hurma Neighborhood 12131 block 7 parcel 1/5,000 scale Master Zoning Plan Plan Grade Amendment was approved by the Antalya Metropolitan Municipality Department of Reconstruction and Urbanization with the decision numbered 379 on 14.07.2020.

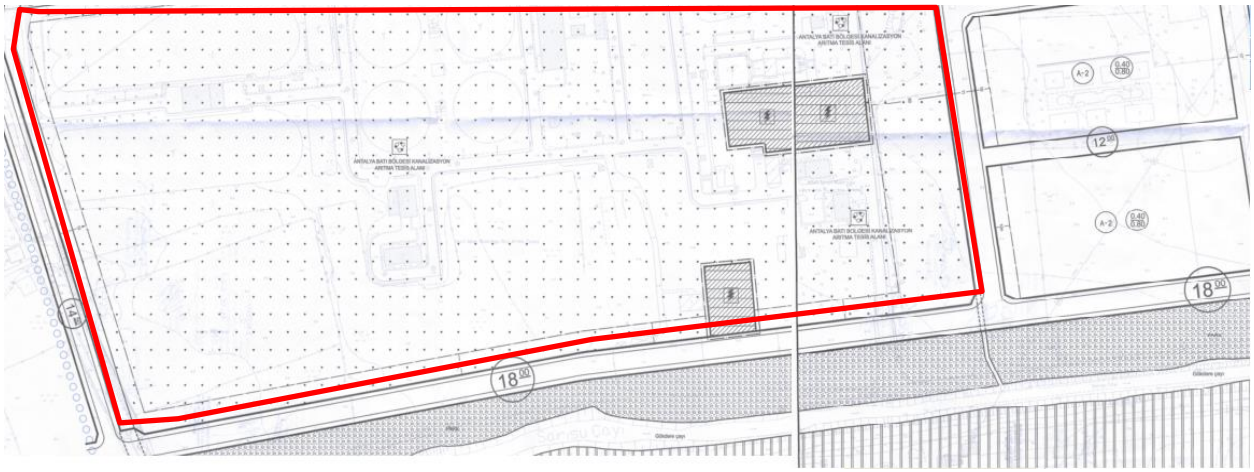


Figure 27: 1/1000 Scale Implementation City Development Plan



Figure 28: 1/5000 Scale Master City Development Plan

4.8. THE CURRENT LAND USE OF THE PROJECT AREA

The total area of the block 12131 and parcel number 7 where the Treatment Sludge Incineration and Energy Recovery Facility will be established is 174,658.00 m2; The Hurma Wastewater Treatment Facility, which is currently in operation, is on an area of 163,524.70 m2. Within the scope of incinerating the treatment sludge originating from the treatment plants under the responsibility of ASAT and obtaining heat energy from the said incineration process, it is planned to build an incineration plant in the 11,133.31 m2 part of the parcel no. 7 on block 12131, which is not used within the scope of the treatment facility activity.

In Table 16, the land classes of Antalya province are presented according to the Classification of Usability. The first 4 classes of land are suitable for growing field crops and forest-pasture and meadow plants well adapted to the region under good soil management. It can be grown in some special plants, provided that soil and water protection measures are taken in VI. and VII. classes. Although Class VIII land can be put into production with very effective and expensive rehabilitation works, the product to be obtained under the current market conditions cannot meet the investment expenditures.

Table 16: Land Classes of Antalya Province

LAND CLASS	I	II	III	IV	V	VI	VII	VIII	TOTAL
Total Land	93.3	109.5	76.1	54.8	31.0	166.3	1146.1	381.0	2058.1
Agricultural Land	92.0	103.5	67.1	37.9	0.4	85.3	11.0	-	397.2
%	98.6	94.5	88.2	69.2	1.3	51.3	1.0	-	19.3

The soil profile depth of the lands in the immediate vicinity of the project site varies between 60-150 cm. The soil profile continues as a layer of soil mixed with gravel or pure gravel after 150 cm. The lands around the project site are in Class II and III land groups.

The project area is located within the boundaries of plot no. 7 of block 12131, where the existing Hurma Wastewater Treatment Plant is located. When the island and parcel in question is questioned from the "General Directorate of Land Registry and Cadastre Parcel Inquiry Practice", the attribute information of the borders, including the Project area of the Incineration Plant, is seen as the "Treatment Plant Area".

For this reason, the current usage situation of the project site is wastewater treatment plant operation.

There are no areas under protection for special purposes such as forest areas, afforestation areas, wildlife and vegetation protection within the project area. The Project Area is in the O25 map of the 1/100,000 Scale Environmental Plan published by the Ministry of Environment and Urbanization General Directorate of Spatial Planning and remains in the legend of the treatment plant area.

4.9. PROTECTED AREAS

(Project Area and Sensitive Regions in the Influence Area and Their Characteristics, National Parks, nature parks, Wetlands, Natural Monuments, Nature Conservation Areas, Wildlife Sanctuaries, Wild Animal Settlement Areas, Cultural Heritage, Natural Assets, Sites and Protected Areas, Areas under protection according to the Boğaziçi Law, Biogenetic Reserve Areas, Biosphere Reserves, Special Environmental Protection Areas, Special Protected Areas, protection areas related to drinking and utility water resources, Tourism Areas and Centers and other protected areas), their distances to the activity area, possible effects

4.9.1. Sensitive Regions and Their Characteristics

There are no areas under protection for special purposes such as forest areas, afforestation areas, wildlife and vegetation protection within the project area. The project area is marked as the treatment plant area in the 1/100,000 Scale Environmental Plan published by the Ministry of Environment and Urbanization General Directorate of Spatial Planning.

The 1/25,000 Scaled Sensitive Regions Map for the project area is presented in Annex-11, and the project site is at a distance of 710 m to the Natural Protected Area, 200 m to the Military Area, 470 m to the Tourism Center, 550 m to the Stream, 1200 m to the Fuel Products Storage Area, 360 m to the Urban Residential Area, 150 m to the Energy Transmission Line and 310 m to the Forest Area.

4.9.2. National Parks, Nature Parks, Wetlands, Natural Monuments, Nature Protection Areas, Wildlife Protection Areas, Wild Animal Settlement Areas

The distances to the protected areas near the project area are presented in Figure 29 and Figure 30 With the map created using the application on the "http://geodata.ormansu.gov.tr" web page of the Ministry of Agriculture and Forestry.

According to the map in Figure 29, the project area is at a distance of;

- 39.95 km to Tekirova Nature Park,
- 35.91 km to Dibek Nature Protection Area,
- 69.69 km to Çığlıkara Nature Reserve,
- 54.34 km to Wetland,
- 75 km to Wetland,
- 90 km to Wetland,
- 15.64 km to Güllük Mountain Termesos National Park
- 93 km to Wetland,
- 100 km to Burdur Lake,
- 94 km to Nature Park,
- 89.29 km to Kovada Lake National Park,
- 61.2 km to Köprülü Canyon National Park,
- 114 km to Beyşehir Lake and Kızıldağ National Park,
- 28.6 km to Kurşunlu Waterfall Nature Park,
- 95 km to Üzümdere National Park,
- 30 km from the Conservation Forest and
- 1.56 km to Beydağları Coastal National Park.

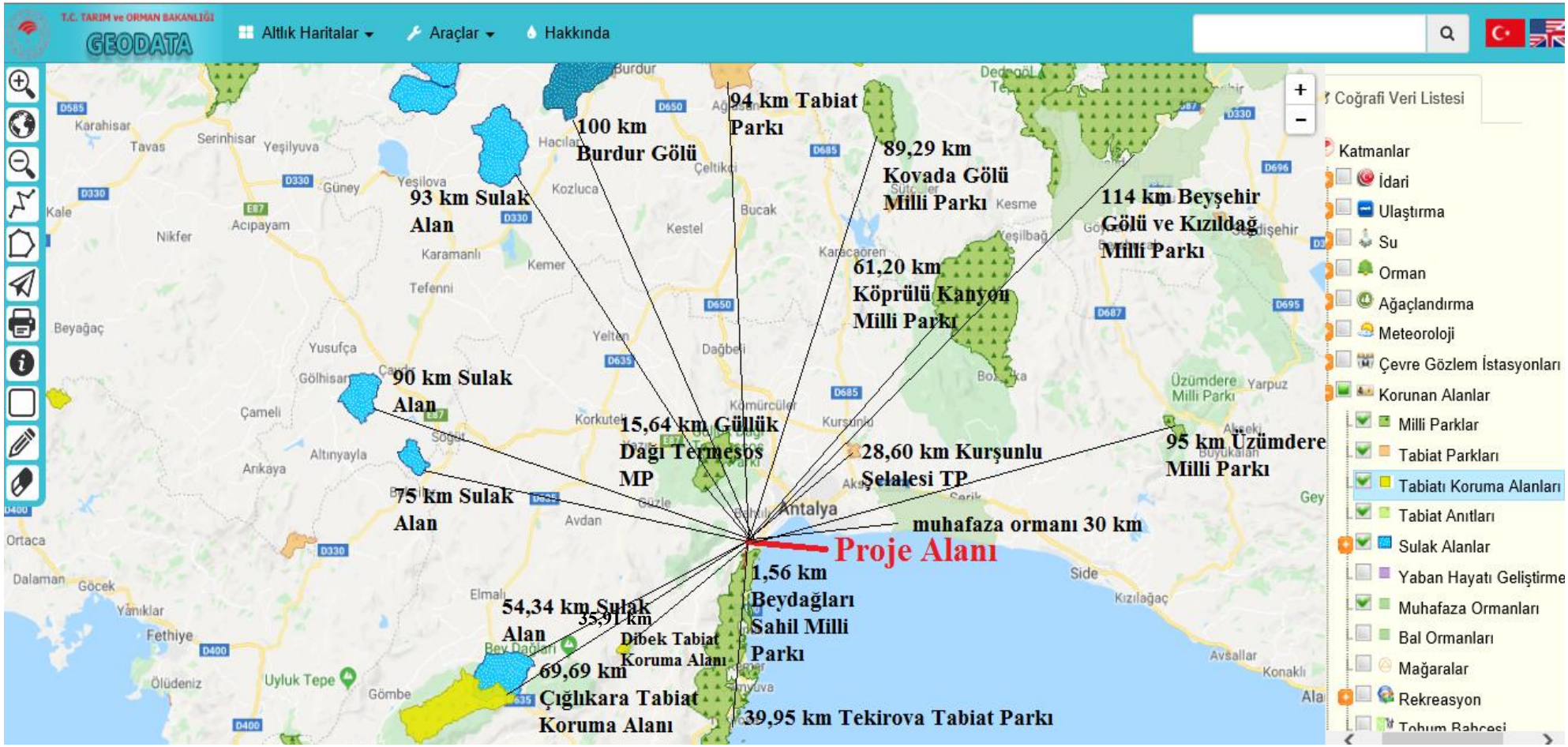


Figure 29: Distance of Project Area to Protected Areas 1

According to the map in Figure 30, the project area is 7.41 km to the Sivridağ Wildlife Development Area, 5 km to the Seed Garden, 7.55 km to Düzlerçamı Wildlife Development Area, 7 km to Gene Field, 1.38 km to the Seed Garden, 1.38 km to the Seed Garden.



Figure 30: Distance of Project Area to Protected Areas 2

The Project will not have any negative impact on areas under protection for special purposes such as forest areas, afforestation areas, protection of wildlife and vegetation.

4.9.3. Cultural Heritage

Antalya province is a city rich in architectural and archaeological heritage and natural beauties. There are 118 Archaeological Sites, 26 Natural Sites and 17 Archaeological Natural Sites in the province.

There is a 1st Degree Archaeological Site with an air distance of approximately 2 km northwest and 3 km southwest of the project site, and a 3rd Degree Archaeological Site approximately 10 km south.

I. Degree Archaeological Site: These are the sites that will be preserved as they are, except for scientific studies for protection.

II. Degree Archaeological Sites: Sites that need to be protected, but whose conditions of protection and use will be determined by the conservation committees and that will be preserved as they are, except for scientific studies for protection.

III. Degree Archaeological Sites: These are the archaeological sites where new arrangements can be allowed in line with the protection - use decisions.

In the southern part of the project area, there is a 1st Degree Natural Protected Area at an air distance of approximately 380 m from the bird's edge, and a 3rd Degree Natural Protected Area at 370 m south.

I. Degree Natural (Naturally-Formed) Site: These are areas that have universal value in terms of scientific preservation, that must be protected in terms of public interest due to their interesting features and beauties and that they are rare, and that will be preserved as they are, except for scientific studies for protection.

II. Degree Natural (Naturally-Formed) Site: These are the areas that can be opened for use considering the public interest as well as the protection and development of the natural structure.

III. Degree Natural (Native) Sites: These are areas that can be opened to residential use, taking into account the potential and usage characteristics of the region, in order to protect and develop the natural structure.

In the southern part of the activity area, at a distance of 1,600 m, there is the border of Olympos National Park, which covers an area of 35,000 hectares, within the borders of Antalya central district and Kemer district.

In the determination of the protected areas determined by the Ministry of Culture and Tourism, it is taken into account that they have enough protected areas to protect the cultural and natural assets that need to be protected, to preserve their appearance and harmony with their environment.

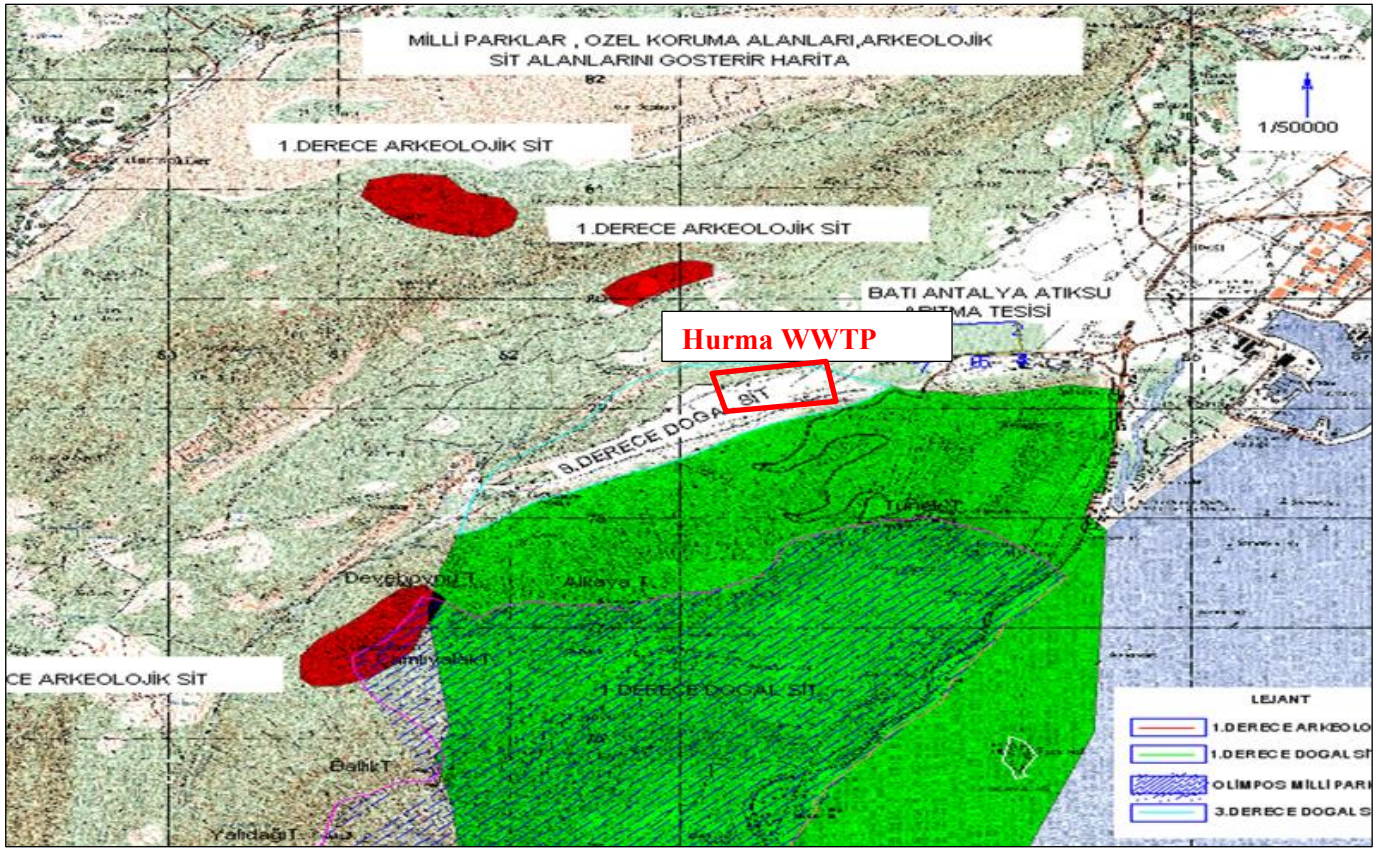
Archaeological Sites, Natural Sites, National Parks and conservation areas in the project site and its immediate surroundings are shown in Figures 31 (a) and 31 (b). The project site is not located within the boundaries of protected areas and national parks. In addition, there are elevation differences between the project site and the mentioned protection areas, and the distances are the distances determined as bird's head without considering the elevation differences. For this reason, the real distance between the project site and the protected areas is greater than the distances given.

The transportation route and access road to be used during the construction and operation phases of the project will not be realized within or near the mentioned protection areas.

In addition, it was stated that there was no inconvenience for the establishment of the West Antalya Wastewater Treatment Plant in line with the positive opinion given by the Museum Directorate, the facility area is outside the protected areas, there is no visual residue in and around the application area of the project, so there is no harm in terms of the "Law No. 2863 on the Protection of Cultural and Natural Assets" and "The Law on Amending Some Articles of the Law No. 3386 on the Protection of Cultural and Natural Assets and Adding Some Articles to this Law".



(a)



(b)

Figure 31: (a): Location of National Parks and Sites in and around the Project site (b): Location of National Parks and Sites in and around the Project Site

The Antalya Cultural Inventory, which determines the history, archeology, civil architectural examples and natural and cultural texture of Antalya, has been completed by the Antalya Governor's Office. With this important study carried out on a provincial scale, the archaeological and cultural assets of Antalya were mapped, and the cultural assets of the center and districts were collected in separate books.

The Antalya cultural and natural heritage inventory is published in 8 volumes by the Antalya Governorship for the protection of Antalya's cultural and natural values. (Center, Alanya, Akseki - Gündoğmuş - İbradı –Gazipaşa, Demre, Kaş, Kemer-Kumluca-Finike, Korkuteli-Elmalı, Manavgat-Serik)

The cultural heritage inventory for the region where the project area is located in Antalya province, Konyaaltı district, Hurma Neighborhood, block 12131 and parcel no. 7 is included in the volume defined as the Central Region.

Within the Antalya Central Region;

A-Cultural Properties Registered as a Single Structure

1. Muratpaşa Mosque
2. Balbey Mosque
3. Müsellim Mosque
4. Demircikara Ali Mosque
5. Sheikh Sinan Mosque and Tomb
6. Şarampol Mosque
7. Ağlarönü Mosque
8. Karaöz Villave Cebel Mosque
9. Kızıllı Village Mosque
10. Yeşil Karaman Mosque
11. Sheikh Şuca Tomb
12. Bazaar Bath
13. Evdirhan
14. Kırkgöz Inn
15. İkikapılı Inn
16. Tek Kapılı Inn
17. Ekşili Village Fountain And Trees
18. Antalya high School
19. Metropolitan City Hall
20. Değirmen (Mill) Front Shop Buildings
21. Former Governor's Mansion (Teacher's House)

22. Gazi Mustafa Kemal Primary School
23. Aksu Village Institute Buildings
24. Grain Bazaar Neighborhood 332 Block, 2 Plot
25. Hurma Warehouse Remains
26. Soğucaksu Bridge
27. Arapsuyu Ancient Bridge Ruin
28. Arapsuyu Ancient Wall Ruins
29. Arapsuyu Ancient Road Ruins
30. Cihadiye Ancient Bridge And Road Ruins
31. Aksu Ahmet Ali Creek Ancient Waterway Remains
32. Çalkaya Grave Ruins
33. Dağbeli Mausoleum Remnant
34. Dağbeli Watchtower Remnant
35. Dağbeli Katrancı Peak Watchtower Remnant
36. Doyran Kisle Location Monastery Ruins
37. Doyran Remains of Three Buildings
38. Duacı Köyü Church Ruin
39. Geyikbayırı Village Sarcophagus Remains
40. Geyikbayırı Village Chapel Ruins
41. Hisar Çandır Village Sarcophagus Remains
42. Karaçallı Necropolis Area
43. Konyaaltı Building Remains
44. Nebiler Village Ancient Building Remains
45. Yağca Village Ancient Tower Remain
46. Yeni Village Building Remain
47. Başköy Ancient Building Remain
48. Karaindibi Cave
49. Kocain Cave
50. Hocanın Cistern
51. Kanlı Asır Cistern
52. Kartica cistern
53. Two Tree Cistern

B-Other Archaeological Sites

1. Bademağacı Mound
2. Çıplaklı Village Archaeological Site
3. Çitdibi Village Ancient Settlement Area
4. Dağbeli Üstünağı Ruins
5. Demirci Kara Islamic Cemetery
6. Doyran Ancient Settlement Area Between Two Mountains
7. Düden Archaeological Site
8. Güzeloba Village Ancient Settlement Area
9. Kelbessos Ancient City
10. Kovanlık Village, Doseme Bosporus Location
11. Lyrbotae Ancient City
12. Magydus Ancient City
13. Neapolis Peripolion
14. Üçoluk Village İkizce Remains
15. Üçoluk Village Kale Hill Ruins
16. Varsak Pitcher
17. Yukarıkaraman Archaeological Site
18. Yamansaz Archaeological Site
19. Yeşil Karaman Village Ancient Settlement Area
20. Yurtpınar Town Ancient Ruins Area
21. Yurtpınar Town Pıtılar Neighborhood Ancient Settlement Area
22. Hacısekiler Village Archaeological Site
23. The Remains of Cihadiye Water Canals

The general map showing the cultural properties within the Antalya Central Region is presented in Figure 32.



Figure 32: Antalya Center Cultural Heritage General Map

The project area is within the boundaries of the treatment plant area and there is no cultural or natural heritage in the area.

4.9.4. Areas under protection according to the Boğaziçi Law, Biogenetic Reserve Areas, Biosphere Reserves, Special Environmental Protection Areas, Special Protection Areas, protection areas related to drinking and utility water resources, Tourism Areas and Centers and other protected areas)

The project site, protected areas according to the Boğaziçi Law, and Biogenetic Reserve Areas do not remain within the Biosphere Reserves.

Special Environmental Protection Areas in Antalya and their distance to the activity area;

- Belek Special Environmental Protection Area: 44 km

- Kaş-Kekova Special Environmental Protection Area: 90 km

- Patara Special Environmental Protection Area: 116 km

- Finike Submarine Mountains Special Environmental Protection Area: It is 76 km.

The closest drinking water sources to the project site are Korkuteli Basin located 41 km northwest of the project site and Duraliler Drinking Water Springs located 35 km northeast of the project site.

The closest tourism areas to the project site are; Beldibi Tourism Area located 10 km south of the project site and Kundu Tourism Area 23 km east.

The Hurma Treatment Sludge Incineration and Energy Recovery Facility Project, which is planned to be realized, will not have a negative impact on the Special Environmental Protection Areas, Drinking and Potable Water Basins, Tourism Areas and centers mentioned above.

4.10. FLORA AND FAUNA

4.10.1. Vegetation

Mediterranean climate prevails in Antalya province. Summers are hot and dry. In the summer, the beaches cool a bit with the breeze in the afternoon. Winter is rainy. It snows on the mountains. Antalya is one of the few cities in the world where you can ski on the mountains while swimming on the coast. Its temperature varies between -4.3°C and 43.4°C. Cold below 10 degrees in winter is very rare. The average precipitation is 1070 millimeters per square meter.

60% of Antalya's land is forested. It is one of the provinces with the most forests. Pine trees are in the majority (Red pine and larch). There are cedar trees between Kaş and Elmalı. There are maquis 500 m below. There are oak trees between the maquis and pine forests. Ivy, bay tree, nut tree, yellow wood, myrtle tree, hackberry are very common in the maquis region. Also found are herbs such as lavender, thyme, mint, and veronica. All kinds of Mediterranean products are grown on the plains.

The project area is within the borders of Hurma Neighborhood of Konyaaltı District, located in the Western part of Antalya Province.

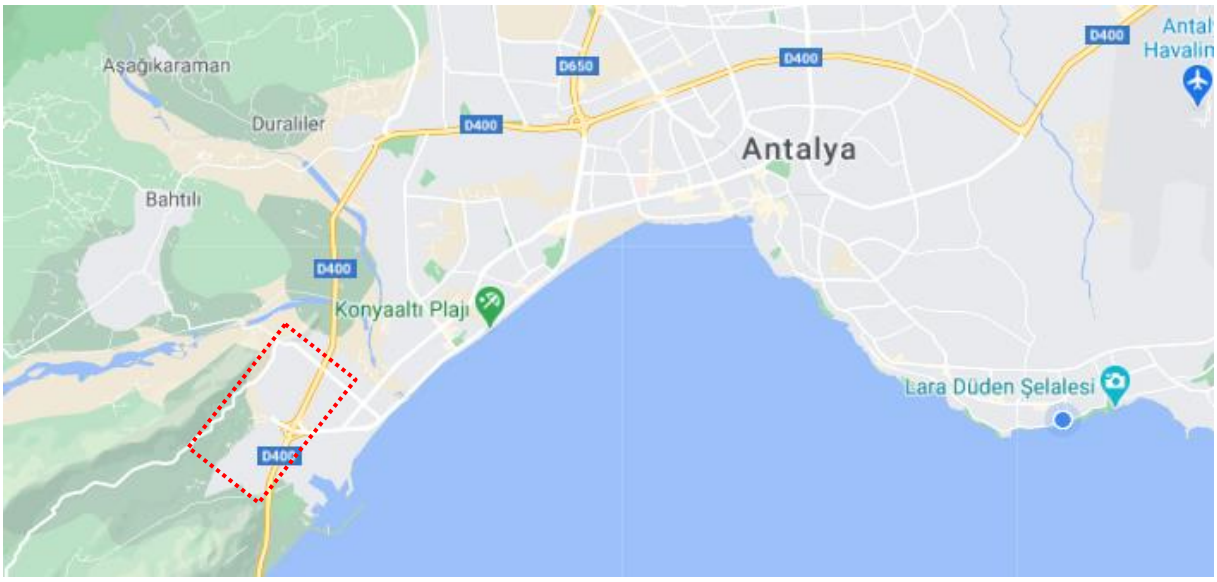


Figure 33: Hurma Neighborhood Boundaries

4.10.2. Flora-Fauna Study

Since the area where the Treatment Sludge Incineration Plant will be constructed is within the area currently being operated as Hurma WWTP, the diversity of flora and fauna within the project area cannot be mentioned. Flora-fauna research was carried out in the project area to determine the species found or likely to be found in the activity area and its immediate surroundings. Within the scope of the research, besides the field study, a literature review was conducted within the immediate surroundings of the project site. The field study in question was carried out by Betül Aydın BOSTANCI, a graduate of Pamukkale University Biology Department, who has sufficient field experience. Observations were made for a total of 6 days in two periods, September and October 2020. Within the scope of the research, besides the field study, a literature review was also carried out.

The TUBIVES system was used to determine the flora species in the project area and its immediate surroundings. The Turkish names of each plant species, if known in the current situation, are also indicated. For the Turkish names of the species, "Turkish Plant Names Dictionary" and "Turkey Plants Data Service" (TÜBİVES) prepared by TÜBİTAK were used.

In the research and listing of flora species, volume 11 of "Flora of Turkey and the East Aegean Islands" (Davis, PH (ed.) Flora of Turkey and the East Aegean Islands, Vol. 1-11, University Press, Edinburgh, 1965-1988.) by Peter Hadland Davis was used.

The hazard categories specified by the IUCN were taken as a basis in the determination of the hazard categories of the Turks. These categories were determined with the help of the "red data book of plants of Turkey".

In order to determine endemic and non-endemic flora species, the up-to-date Turkish Plants Data Service at http:/turkherb.ibu.edu.tr was used.

4.10.2.1. Flora Elements in the Project Area and Its Neighborhood

The area determined for the Hurma Treatment Sludge Incineration and Energy Recovery Facility Project is within the boundaries of the currently operated Hurma Wastewater Treatment

Facility (lot 12131 parcel no. 7), and it is an area of 11133,31 m2 that is not currently used within the scope of treatment plant activity. There are already gas tanks in this planned area and these tanks will be removed from the site. For this reason, there is little to no vegetation in the area. However, the vegetation in the immediate vicinity of the project area consists of annual herbaceous plants and widely distributed species that form the maquis communities, which are the natural vegetation of the Mediterranean.

Photographs showing the vegetation in the project area and its immediate surroundings are presented in Images 6, 7 and 8 below.



Image 6: Project Area Vegetation Image 1



Image 7: Project Area Vegetation Image 2

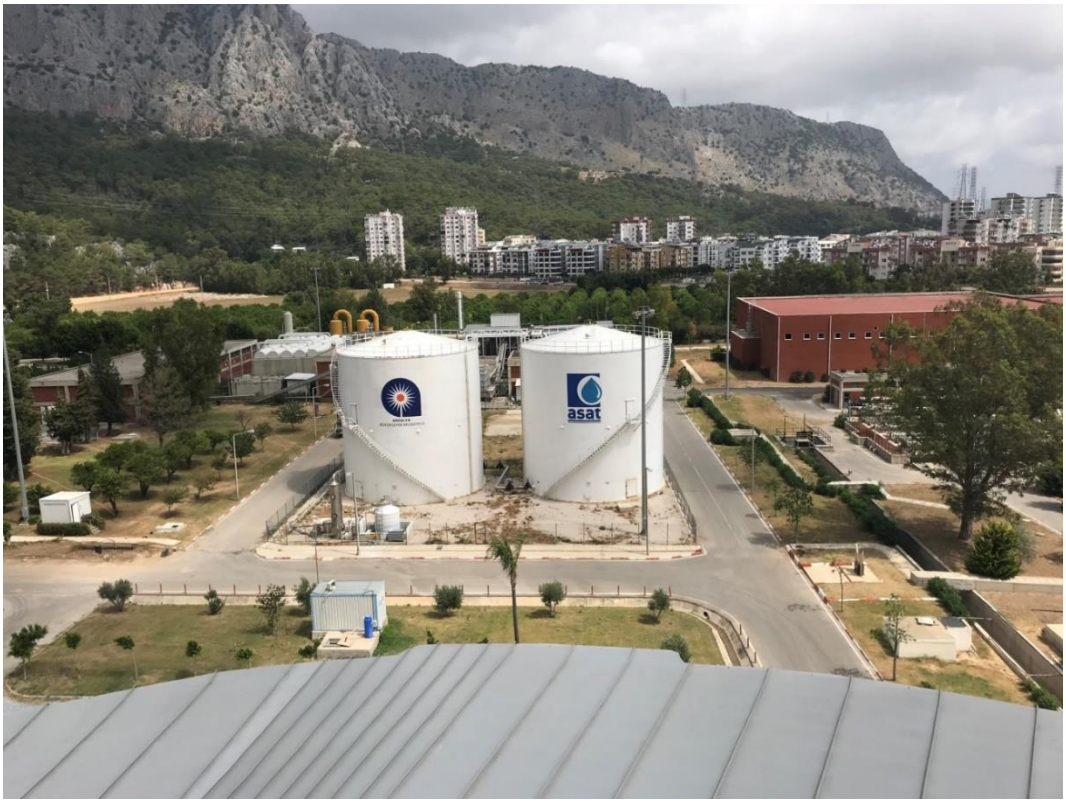


Image 8: Project Area Vegetation Image 3

As a result of the studies carried out in the field and the literature review, the plant species in the project area and its vicinity are listed in Table 17.

Below are explanations of the protection status defined as IUCN (International Union for Conservation of Nature and Natural Resources) and the scope of Bern Convention Annex-1 list.

IUCN: International Union for Conservation of Nature and Natural Resources

IUCN (International Union for Conservation of Nature and Natural Resources); It is a Voluntary Organization (NGO) that carries out important work for the protection of species and nature.

Within the IUCN formation, the Species Survival Commission tries to determine and evaluate the conservation status of species and subspecies globally. According to their findings, they collect species under the categories of extinct, endangered, vulnerable and similar. The IUCN publishes the information it obtains about the species in a book known as the Red Data Book. IUCN includes in its Red Data Book information from scientists working on species in each country. In this way, it has created an important database about the species, including the whole world. Categories determined and used by IUCN (EX, EW, CR, EN, VU, NT, LC, DD); These hazard categories and their meanings are given below (version 2012.1).

EX (extinct): Completely extinct, both in captivity and in the wild.

EW (extinct in the wild): Extinct in the wild.

CR (critically endangered): Nearly extinct in the wild.

EN (endangered): Species that are in great danger of extinction in the wild.

VU (vulnerable): Big species that are in danger of extinction in the wild.

NT (near threatened): Species that are not currently endangered but are candidates for VU, EN, or CR in the near future.

LC (Least Concern) (Least threatened): Commonly found species.

DD (Data defficient) (Types with Information Deficiency): Species whose status has not yet been determined.

Bern Convention

BERN: According to the Bern convention (Convention for the Conservation of Europe's Wildlife and Habitats) Annex I: Flora species strictly protected

All plant species presented in Table 19 were scanned in terms of the categories specified by IUCN and Annex-I list of the Bern Convention, and it was determined that none of the plant species distributed in the project area were found in these lists indicating the plant species under protection.

Table 17: Flora Elements in the Project Area and Its Surroundings

Family	Taxon Name	Turkish Name	Local Name	Phytogeographic Region	Endemism	Hazard Class
Amaranthacaceae	*Amaranthus retroflexus*	Foxtail	Hoşkuran	-	-	-
Anacardiaceae	*Pistacia atlantica*	Mastic tree	-	-	-	-
	Pistacia terebinthus	Turpentine Tree	-	-	-	-
Apiaceae	*Tordylium apulum*	-	Mediterranean hartwort	Med.	-	-
	Eryngium creticum	Field eryng		Med.	-	-

	Torilis arvensis subsp. *neglecta*	-	-	-	-	-
	Torilis leptophylla	-	-	-	-	-
	Ferula tingitana	Tangier fennel	Tangier fennel	Med.	-	-
Asteraceae	*Centaurea solstitialis* subsp. *solistialis*	Yellow star-thistle	Golden starthistle		-	-
	Inula graveolens	Stinkwort	Stinkwort	Med.	-	-
	Inula viscosa	False yellowhead	Sticky fleabane, yellow fleabane	Med.	-	-
	Crepis foetida L. subsp. rhoeadifolia	Stinking hawksbeard	Stinking hawksbeard	-	-	-
	Anthemis tinctoria	*Golden chamomile*	Daisy	-	-	-
	Anthemis cotula	*Stinking chamomile*	Daisy	-	-	-
	Senecio vernalis	Groundsel	Spring Groundsel		-	-
	Senecio vulgaris	Groundsel	Spring Groundsel		-	-
	Cichorium intybus	Chicory	Wild chicory		-	-
	Calendula arvensis	Marigold	Field Marig old		-	-
	Scolymus hispanicus	Golden thistle	Spanish oyster thistle	Med.	-	-
	Carthamus dentatus	Toothed Thistle	-		-	-
	Chrysanthemum coronarium	Glebionis coronaria	-		-	-
Boraginaceae	*Echium italicum*	-	-	Med.	-	-
	Heliotropium europaeum	European heliotrope	European turn-sole	-	-	-
Brassicaceae	*Capsella bursa-pastoris*	Shepherd's-purse	-	-	-	-
	Sinapis arvensis	-	-	-	-	-
	Raphanus raphanistrum	Wild radish	White charlock	-	-	-
Capparaceae	*Capparis spinosa var. spinosa*	Caper bush	Flinders rose	-	-	-
Caryophylaceae	*Silene vulgaris var. vulgaris*	Maidenstears	Bladder campion	-	-	-
Cistaceae	*Helianthemum salicifolium*	-	-	-	-	-
	Cistus creticus	Pink rock-rose	Hoary rock-rose	-	-	-
Convolvulaceae	*Convolvulus arvensis*	Bindweed	-	-	-	-
	Canvolvulus galaticus	Bindweed	-	İr-tur.	-	-
Euphorbiaceae	*Euphorbia characias*	Mediterranean spurge	-	Med.	-	-
Fabaceae	*Spartium junceum*	Spanish broom	.	Med.	-	-
	Lathyrus annuus	Annual Pea	-	Med.	-	-
	Scorpiurus muricatus var. subvillosus	-	-	-	-	-
	Ceratonia siliqua	locust bean	-	Med.	-	-
Fagaceae	*Quercus coccifera*	Kermes oak	Oak	Med.	-	-

	Mentha spicata subsp. spicata	Spearmint	-	-	-	-
	Salvia virgata	Southern meadow sage	Wand sage	İr-tur	-	-
	Teucrium polium	Felty germander	-	-	-	-
Liliaceae	*Asphodelus aestivus*	Summer asphodel	-	Med.	-	-
	Asphodelus fistulosus	Summer asphodel	Onionweed	Med.	-	-
	Ornithogalum pyrenaicum	Prussian asparagus	Wild asparagus	-	-	-
Linaceae	*Linum nodiflorum*	Flax	-	Med.	-	-
Malvaceae	*Malva sylvestris*	Common mallow	-	-	-	-
	Alcea pallida	Common hollyhock	-	-	-	-
Oleaceae	*Phillyrea latifolia*	Green olive tree	-	Med.	-	-
	Papaver rhoeas	Flanders poppy	-	-	-	-
	Glaucium flavum	Sea-poppy	-	-	-	-
Thymelaeaceae	*Daphne gnidioides*	Daphne	-	Med.	-	-
Primulaceae	*Anagallis arvensis var. lutea*	Scarlet pimpernel	-	Med.	-	-
Ranunculaceae	*Ranunculus chius*	Eastern Buttercup	-	-	-	-
Resedaceae	*Reseda lutea var. lutea*	Yellow mignonette	Wild mignonette	-	-	-
Rhamnacaea	*Paliurus spina-christi*	Jerusalem thorn	-	-	-	-
Rosaceae	*Poterium spinosum*	Thorny burnet	Prickly burnet	Med.	-	-
	Rosa canina	Common briar	Dog rose	Med.	-	-
Santalaceae	*Thesium billardieri*	-	-	İran-Turan	-	-
Scrophulariaceae	*Verbascum blattaria*	Moth mullein	-	-	-	-
Valerianaceae	*Valeriana dioscoridis*	-	-	Med.	-	-
Zygophyllaceae	*Tribulus terrestris*	Puncture vine	-	-	-	-

The list obtained as a result of the studies carried out in the project site and its immediate surroundings are given in Table 19 above. Accordingly, there are no endemic, endangered or or protected plant species in the project site and its immediate surroundings.

None of the detected species is only included in the LC (Least Concern) (Least Threatened) category among the protection statuses defined as IUCN (International Union for Conservation of Wildlife and Natural Resources).

The area determined for the Hurma Treatment Sludge Incineration and Energy Recovery Facility Project is within the boundaries of the currently operated Hurma Wastewater Treatment Facility (lot 12131 parcel no. 7), and it is an area of 11133,31 m2 that is not currently used within the scope of treatment plant activity. There are already gas tanks in this planned area and these tanks will be removed from the site. For this reason, there is little to no vegetation on the site. As a result, the destruction that will occur in the area as a result of the project activity will not be at a level that can affect the biodiversity of the plant species in the area.

However, the vegetation in the immediate vicinity of the project area consists of annual herbaceous plants and widely distributed species that make up the maquis communities, which are the natural vegetation of the Mediterranean.

As a result of the field and literature studies, it has been observed that the project area does not remain within any Important Plant Areas. Among the plant species identified in the project area and its immediate surroundings, there are no plant species whose distribution area is very narrow, rare, endemic, locally endemic, endangered and requiring protection measures.

Fauna Elements in the Project Area and its Surroundings

The fauna elements identified in the project site and its immediate surroundings have been examined under 3 different headings, namely Mammals (Mammalia), Birds (Aves), Amphibia (Expansives) and Reptiles (Reptilia) as presented below. The fauna elements, phylums, classes, orders, families, Latin names and Turkish/English names, if any, determined as a result of field studies and literature research are presented together in tables.

Fauna Species in the Area that may be Affected within the scope of the project, for all fauna elements that are likely to be in the area where the project will be studied and in its immediate vicinity; Distribution of Fauna Species in the Region, Abundance Quantities, Threat Categories According to IUCN Criteria, Endemism Situations, Protection Status According to National and International Agreements (Bern Convention etc.), Rare and Endangered Species, if any, The list, which includes their Habitats and Hazard Categories according to the Red Data Book, are presented in Tables 18, 19, 20 and 21.

For the animal classes listed under the titles and that are within the scope of Bern Convention Annex-2 and Annex-3, the protection measures of the Bern Convention and the provisions of Articles 6 and 7 of this convention will be followed.

There are no rare and endangered fauna species in the project area.

The study of the species identification process in the project area and its immediate surroundings was carried out using field and literature research methods, and the detection methods are indicated separately in the tables presented below.

Explanation of the Categories in the tables given below for Mammals (Mammalia), Birds (Aves), Amphibia (Exoplanets) and Reptiles (Reptilia)

Bern Convention:

BERN: According to the Bern convention (Convention for the Conservation of Europe's Wildlife and Habitats): ANNEX II: Species under absolute protection. ANNEX III: Species that are under protection.

The Bern Convention is a convention that protects species along with their habitats. For this reason, the habitats of the species included in the annex lists must also be protected in accordance with the Bern Convention.

For the species under the scope of Bern Convention Annex-2 and Annex-3, the protection measures of the Bern Convention and the provisions of Articles 6 and 7 of this convention will be followed.

Article 6

Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of wild fauna species specified in Annex II. In particular, the following will be prohibited for these species.

a) All kinds of deliberate capture and detention, deliberate killing;

b) Deliberately damaging or destroying breeding or resting places;

c) Deliberately disturbing wild fauna, particularly during breeding, development and hibernation periods, which is contrary to the purpose of this Convention;

d) Collecting or deliberately destroying eggs from the wild or keeping these eggs even if they are empty;

e) The possession and internal trade of these animals, alive or dead, including embalmed animals and any easily recognizable part obtained from animals or the material from which they are used, where this will contribute to the effectiveness of the provisions of this article.

Article 7

1. Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the protection of the wild fauna specified in Annex III.

2. All kinds of operation of the wild fauna specified in the Annex III list shall be arranged in such a way as not to endanger the existence of their populations, taking into account the conditions of the 2nd Article. Such a way as not to endanger the existence of their populations, taking into account the conditions of the 2nd Article.

3. Measures to be taken,

a) Other principles regulating closed hunting seasons and/or business,

b) Temporary or regional prohibition of the enterprise, where appropriate, in order to bring the wild fauna to adequate population levels,

c) It shall cover the issues of proper regulation of the sale of wild animals, alive or dead, their keeping for sale, their transport or putting them up for sale.

Evaluation according to the Decision of the Central Hunting Commission for the 2020-2021 Hunting Period

It has been evaluated according to the Decision of the Central Hunting Commission for the 2020-2021 Hunting Period, dated 21.06.2019 and numbered 30808, published by the Ministry of Agriculture and Forestry.

Species included in Annex List-I (The Game Animals Determined by the Ministry of Agriculture and Forestry Under Protection by the Central Hunting Commission), Annex-II list (Hunting Animals Allowed for Hunting During the Periods Determined by the Central Hunting Commission) of "Central Hunting Commission Decisions for 2020-2021 Hunting Period" are listed in the table.

Wild animals in the Annex-I list, based on Articles 2 and 4 of the Land Hunting Law No. 4915, in the hunting period of 2020-2021 (except those whose hunting is allowed within the scope of

hunting tourism), wild animals taken under protection by the Ministry of Agriculture and Forestry and wild animals determined as game animals by the Ministry are protected by CHCD. Hunting of captured game animals is prohibited.

Birds and mammals in the Annex-II list are included in the Annex-II list of game animals that are allowed to be hunted by CHC, among the game animals determined by the Ministry in the 2020-2021 hunting period in accordance with the 1st paragraph of Article 4 of the Law No. 4915 on Land Hunting.

A-Mammals (Mammalia)

As a result of field studies and literature research, all of the mammals identified to exist in the field were found in the literature and added to the mammal inventory of the field.

None of the mentioned species is in the IUCN category. None of the species is in sensitive, endemic, locally endemic or endangered species groups.Sus scrofa (Wild Boar) and Vulpes vulpes (Fox), these two species, which are under protection according to the decisions of the Central Hunting Commission, could not be observed in the area during the field studies, although it is seen in the literature that they may be from the immediate vicinity of the activity area. Information on a total of seven species observed in the area and thought to exist are given in Table 18.

Table 18: Mammal Species Found and Possible to be Found in the Project Area and Its Surroundings

ORDER/ Family	**Latin Name**	**Turkish Name**	**ERL (=IUCN)**	**Relative degree of abundance**	**BERN Convention**	**AVL**	**SOURCE**	**Habitat**	**Research area**
ARTIODACTYLA									
Suidae									
	Sus scrofa	Pig Feral	LC	--	--	Annex -II	L	Woodlands	Whole Area
FISSIPEDIA									
Canidae									
	Vulpes vulpes	Fox	LC	stable	--	Annex -II	L	All types of terrestrial habitats	Whole Area
INSECTIVORA									
Erinaceidae									
	Erinaceus concolor	Hedgehog	LC	--	--	--	L	Gardens, Forests	Whole Area
Talpidae									
	Talpa europaea	European Mole	LC	stable	--	--	L	Agricultural areas, steppes	Whole Area
RODENTIA									
Muridae									
	Mus macedonicus	House Mice	LC	stable	--	--	L	Open land	Whole Area

	Microtus guentheri	Guenther's Vole	LC	stable	--	--	L	Agricultural areas, steppes	Whole Area
	Rattus rattus	Black Rat	LC	stable	--	--	L	All types of terrestrial habitats	Whole Area

No mammal species were identified in the project area during the field surveys. However, as a result of the literature research, some species may exist in the immediate vicinity of the project area. According to the determinations made in the literature, only the species in the LC (Least Concern) (Least Threatened) category are among the protection statuses defined as IUCN (International Union for Conservation of Natural Life and Natural Resources). In this context, all necessary measures will be taken to ensure that the related species and all other wildlife species are not affected by the project activity.

For the species within the scope of Bern Convention Appendix-II list, the protection measures of the Bern Convention and the provisions of Articles 6 and 7 of this contract will be followed.

There are 2 species in the category of Annex-II (game animals that are allowed to be hunted by CHC) among the mammal species found in the project area to the Decisions of the Central Hunting Commission for the 2020-2021 Hunting Period.

Within the scope of the project, the provisions of the Central Hunting Commission Decisions for the 2020-2021 Hunting Period will be complied with.

B-Birds (Aves)

Field studies and literature surveys were carried out to determine the species in the project area and its immediate surroundings. Considering the hazard categories, none of the species detected by observation in the field are covered by the IUCN and Red Data Book (RDB). However, within the data obtained from the literature, 10 of the 12 species identified in the immediate vicinity of the project area are in the LC (Reported Species) category in the IUCN (Red List of Endangered Species) list. Other species do not fall into any category in the IUCN list.

Of the 12 species, only Columba palumbus, Carduelis carduelis and Athena noctua are in the RDB category.

Among the detected species, no species included in the Bern Convention and Central Hunting Commission Decisions Lists appear.

Explanation of the Categories in Table 19

RDB "Red Data Book Criteria for Birds of Turkey (2008)

- *A.3= The population of these species in Turkey generally varies between 26-250 pairs (52-500 individuals) in the regions where they are observed. These, too, are susceptible to extinction and are at high risk of extinction in the wild. There are 2 species with this status in the area.*
- *A.4= Although the densities of these species according to IUCN and ATS criteria have not yet been threatened with extinction in the regions where they are observed, there is*

a local decrease in their populations and they are candidates for extinction over time. The populations of these species vary between 501-5000 pairs (=1002-10 000 individuals) in the regions where they are observed. There are 1 species with this status in the area.

IUCN: International Union for Conservation of Nature and Natural Resources

- *LC (Least Concern) (Least threatened): Commonly found species.* There are 10 species with this status in the area.

BERN: According to the Bern convention (Convention for the Conservation of European Wildlife and Habitats)

- *Annex II: Species under absolute protection.* There are no species with this status in the area.
- *Annex III: Species that are under protection.* There are no species with this status in the area.

CHC: Central Hunting Commission Decision (2020-2021 Hunting Period)

- *Annex I:* Wild animals taken under protection by the Ministry of Agriculture and Forestry. There are no species with this status in the area.
- *Annex List II: These are the game animals that are allowed to be hunted by CHC.* There are no species with this status in the area.

Table 19: Bird Species Found or that can be Found in the Project Area and Its Surroundings

Family	Latin Name	Turkish Name	English Name	RDB	IUCN	Relative Abundance	END	Bern	CHCD	SOURCE
Alaudidae										
	Alauda arvensis	Tarla kuşu	Skylark	-	LC	decreasing	-	--	--	G
Hirundinidae										
	Hirundo rustica	Kır Kırlangıçı	Barn swallow	-	LC	--	-	--	--	L
Ciconidae										
	Ciconia ciconia	Leylek	White Stork	-	LC	increasing	-	--	--	L
Corvidae										
	Corvus corax	Kuzgun	Raven	-	LC	Increasing	-	--	--	L
	Garrulus glandarius	Bayağı Alakarga	Eurasian jay	-	LC	stable	-	--	--	L
Laridae										
	Larus minutus	Küçük Martı	Little Gull	-	LC	increasing	-	--	--	L
Passeridae										
	Passer domesticus	Serçe	House Sparrow	-	LC	decreasing	-	--	--	G
Columbidae										
	Columba palumbus	Tahtalı güvercin	Woodpigeon	A4	LC	increasing	-	--	--	L
	Streptopelia decaocta	Kumru	Collared Dove	-	-	-	-	--	--	G

Fringillidae										
	Carduelis carduelis	Saka	Goldfinch	A4	LC	stable	-	--	--	L
	Carduelis chloris	Florya	Greenfinch	-	LC	increasing	-	--	--	G
Strigidae										
	Athena noctua	Kukumav	Little Owl	A3	-	-	-	--	--	L

For the species under the scope of Bern Convention Annex-2 and Annex-3, the protection measures of the Bern Convention and the provisions of Articles 6 and 7 of this convention will be followed.

According to the Decisions of the Central Hunting Commission for the 2020-2021 Hunting Period, there are no bird species found in the project area in the Annex-I (Wild Animals Protected by the Ministry of Agriculture and Forestry) and Annex-II (game animals allowed to be hunted by CHC) categories.

Wild animals in the Annex-I list have been taken under protection by the Ministry of Agriculture and Forestry in accordance with the first paragraph of Article 4 of the Law No. 4915 on Land Hunting. Hunting, keeping dead or alive and transporting wild animals in this list is prohibited.

Wild animals in the Annex-II list have been taken under protection by the Central Hunting Commission within the framework of the authorization given by the first paragraph of Article 4 of the Land Hunting Law No. 4915. It is forbidden to hunt, keep dead or alive and transport the game animals in this list.

At every stage of the activity, the provisions of the 2020-2021 Hunting Period Central Hunting Commission Decisions will be respected.

C- Amphibia (Exoplanets) and Reptiles (Reptilia)

Amphibians (exoplanets) and reptiles spend most of their time hiding in stones and burrows. They prefer cool and humid environments. Therefore, it is very difficult to observe, detect and capture them in the field. In addition to the direct observations, data and information such as the traces they left on the animals indirectly, their nests, etc. were collected.

No amphibian species were encountered in the research area, but literature information indicates that Bufo viridis (Green Toad) and Pelobates syriacus (Eastern Spadefoot) may be present in the area (Table 20). On the other hand, one of the five reptile species was determined by observation (Ophisops elegans- the snake-eyed lizard) and the other four species were determined from the literature (Table 21). Among the detected species, Anatololacerta danfordi is within the scope of IUCN category LC (Least Concern) (Common species).

None of the detected reptile and amphibian species are included in any supplementary list of the 2020-2021 Central hunting commission decisions (CHCD).

Table 20: Amphibian (exoplanets) species likely to be found in the Project Area and its Surroundings

Family	Latin Name	Turkish Name	IUCN	Relative Degree Of Abundance	Bern Convention	AVL	End.	SOURCE	Habitat	Research area
AMPHIBIA										
Bufonidae										
	Bufo viridis	Green Toad	--	--	--	--	--	L	Wet areas, Under the stones, soil cavities	Whole Area
Pelobatidae										
	Pelobates syriacus	Syrian spadefoot	--	--	--	--	--	L	Lives buried in loose and soft soil	Whole Area

Bufo viridis (Green Toad) and *Pelobates syriacus* (Syrian spadefoot), which are likely to be in the project area, are not on any list according to the Decisions of the Central Hunting Commission for the 2020-2021 Hunting Period. Species are not included in any of the Bern Convention supplement lists and IUCN categories.

Table 21: Reptilia (reptile) Species Likely to be in the Project Area and its Surroundings

Family	Latin Name	Turkish Name	IUCN	Relative Degree Of Abundance	Bern	AVL	Source	End.	Habitat	Research area
REPTILIA										
Lacertidae										
	Ophisops elegans	Snake-eyed lizard	--		--	--	G	--	Rural-Maquis	Whole Area
	Anatololacerta danfordi	Anatolian Rock Lizard	LC		--	--	L	--	Woodland, maquis, rocky and stony areas	Whole Area
Colubridae										
	Eirenis modestus	Dwarf snake	--		--	--	L	--	Maki-Under the Forest	Whole Area
	Coluber jugularis	Large Whip Snake	--		Annex-II	--	L	--	Stony creek edges, Rocky slopes	Whole Area
	Elaphe quatuerlineata	Four-lined snake	--		Annex-II	--	L	--	Sparse Forest Maquis, stony areas	Whole Area

Among the detected species, Anatololacerta danfordi is within the scope of IUCN category LC (Least Concern) (Common species). No other species fall within the IUCN category. As a result of the research carried out in the project area and its surroundings, it was determined that two species (Coluber jugularis (Large Whip Snake) and Elaphe quatuerlineata (Four-lined snake) remained on the Annex-II list within the scope of the BERN Convention.

According to the conclusion reached from the literature sources, it has been determined that none of the species thought to exist is in the list of the 2020-2021 Hunting Period Central Hunting Commission Decisions.

At every stage of the activity, all necessary measures will be taken to ensure that all identified wildlife species will not be affected by the project activity.

National Parks Law No. 2873, Land Hunting Law No. 4915 and Regulations, and the provisions of Bern and CITES contracts, to which we are a party, will be complied with both during operation and construction phases.

For the species within the scope of Bern Convention Appendix-II, the protection measures of the Bern Convention and the provisions of Articles 6 and 7 of this convention will be followed.

None of the reptile species thought to exist in the project area are included in the annex lists of the Central Hunting Commission Decisions for the 2020-2021 Hunting Period.

At every stage of the activity, the provisions of the 2020-2021 Hunting Period Central Hunting Commission Decisions will be respected.

All of the species identified from reptiles and amphibians are widely distributed. There are no endemic, rare or endangered species.

4.11. FOREST AREAS

Antalya province is rich in forest resources. In the study of vegetation, mixed forest zone or hillside forests emerge. Between 1,200 and 2,100 meters, there is a forest belt called high forests, consisting of cedar, fir, yellow pine, beech and various juniper species. There are pure cedar forests, especially in the Western Taurus Mountains.

There are no areas under protection for special purposes such as forest areas, afforestation areas, wildlife and vegetation protection within the project area. The project area is marked as the treatment plant area in the 1/100,000 Scale Environmental Plan published by the Ministry of Environment and Urbanization General Directorate of Spatial Planning.



Figure 34: Representation of the Project Area in the Environmental Plan

The closest forest land to the project area is 310 m away. The project area is also located at a distance of 520 m from the forest land of 2B qualification.



Figure 35: Distance of the Project Area to Forest Areas

A forest-like area will not be used within the project and there will be no tree cutting.

The fertile and degraded forest areas near the planned incineration plant can be seen in the stand map obtained by using the application on the "http://geodata.ormansu.gov.tr" web page of the Ministry of Agriculture and Forestry.

In the stand map created specifically for the project area and presented below, green areas represent fertile forests and pink areas represent degraded forests.



Figure 36: Stand map of Project Area (source: http://geodata.ormansu.gov.tr)

The project will not have any negative impact on areas under protection for special purposes such as forest areas, afforestation areas, wildlife, and vegetation protection.

The 1/25,000 scaled Homeland Map (Topographic Map) related to the project area is presented in Annex-4.

5. GEOLOGICAL FEATURES

5.1. REGIONAL GEOLOGY

Beydağları autochthonous, Antalya nappes, Lycian nappes and Yeşilbarak nappes crop out in and around the study area located to the west of Antalya Bay in the Western Taurus Mountains.

Beydağları autochthonous is represented by Beydağları formation consisting of Malm-Upper Cretaceous neritic limestones, Söbütepe formation, consisting of Paleocene aged limestone-sandy limestones, Upper Lutetian-Priabonian calcarenite, Küçükköy formation consisting of sandstone, claystone, etc. rock types, The Karabayır formation, which consists of Lower Miocene aged algal limestones, Karakuştepe formation consisting of sandstone and silt stones and the Kasaba formation consisting of Upper Burdigalian-Langian aged conglomerates and sandstones.

Antalya nappes are segmented as Çataltepe nappe, consisting of Upper Triassic-Upper Cretaceous rocks, Alakırçay nappe, consisting of Upper Permian-Upper Cretaceous rocks, Tahtalıdağ nappe consisting of Middle Cambrian-Upper Cretaceous Rocks and Tekirova ophiolite nappe consisting of Tekirova ophiolite and Kırkdirek formation according to their structural and stratigraphic features.

The Lycian nappes are represented in this area only by the Gülbahar nappe, which consists of Jurassic-Cretaceous aged cherty limestones.

In addition, the Yeşilbarak nappe is located in the region, which is composed of Upper Lutetian-Lower Miocene clastic lithologies, offering continuity in lateral directions between the Beydağları autochthon and the Lycian nappes.

The nappes (from bottom to top, Çataltepe nappe, Alakırçay nappe, Tahtalıdağ nappe and Tekirova ophiolite nappe) that came together in the Upper Campanian-Maastrichtian time interval were emplaced on the Beydağları autochthon in Danian. Lycian nappes originating from the northwest and north in the Lower Langhian were emplaced on the Beydağları autochthon by taking the Yeşilbarak nappe under them. The Antalya nappes, which were also affected by the horizontal movements at the end of the Eocene, were reattached from east to west in the Langhian. In the probable Pliocene after the Middle Miocene, large-scale dip-slip normal faults and vertical-slip normal faults developed in the region, and depending on these ruptures, large-scale depressions and elevations developed in the region.

ANTALYA NAPPES

Allochthonous rock units in the region were named Antalya nappes by Lefevre (1967). Antalya nappes, which were previously classified as Base nappe (Çataltepe unit), Middle nappe (Alakırçay unit) and Upper nappe (Tahtalıdağ unit) by Brunn et al. (1971), were repartitioned as Çataltepe nappe, Alakırçay nappe, Tahtalıdağ nappe and Tekirova ophiolite nappe according

to its structural and stratigraphic features (Şenel et al., 1992, 1996). Çataltepe nappe, which is the lowest structural unit of Antalya nappes, is not observed in the field.

ALAKIRÇAY NAPPE

Alakırçay nappe structurally overlies Çataltepe nappe and below Tahtalıdağ nappe. In the region, Alakırçay nappe is mounted on Beydağları autochthon without Çataltepe nappe. Alakırçay nappe, consisting of Upper Permian and Scythian-Lower Anisian platform origin, Middle-Upper Triassic (Upper Anisian-Norian) aged slope, basin, rift, etc., Jurassic-Cretaceous platform and basin origin rocks, consists of two structural units, Kumluca and Alakırçay units, whose stratigraphic features are more or less different from each other. The formations of the Alakırçay nappe were mixed with each other as a result of excessive folding and faulting and took a chaotic appearance in places. For this reason, it is difficult to distinguish the formations in the Alakırçay nappe in most areas. The Alakırçay unit includes, from bottom to top, the Upper Permian aged Dinek formation, the Scythian-Lower Anisian aged Kesköprü formation and the Upper Anisian-Norian aged Alakırçay group. The Alakırçay group consists of Tesbihli formation, Karadere formation, Gökdere formation and Çandır formation, which are transitional to each other in the lateral and vertical directions. Kumluca unit is represented by Ladinian aged Tesbihli formation, Upper Triassic aged Gökdere and Çandır formations and Jurassic-Cretaceous aged Ballık formation. Upper Campanian-Maastrichtian aged Keçili formation overlies both successions.

Dinek Formation (Permian)

The unit, which consists of neritic limestones, was named by Kalafatçıoğlu (1973). The Dinek formation, which is generally found in the Tahtalıdağ nappe, is also rarely found at the base of the Alakırçay nappe. The Dinek formation consists of medium-thick bedded, dark gray, black, gray colored limestones. It is known for their Mizzian nature. It has abundant macrofossil remains and is interbedded with fine shale and local dolomite and dolomitic limestone. It is hard and densely cracked. Cracks include calcite and asphaltite fillings.

In the study area, the lower relation of the unit in Alakırçay nappe is tectonic. In the Tahtalıdağ nappe, it is found unharmoniously beyond the Ordovician rocks. It is unharmoniously overlain by the Kesköprü formation at the top. It is about 280 meters thick. Dinek formation containing macrofossils such as brachiapod, coral, Mizzia sp., Permocalculus sp., Geinitzina sp., Schwagerina sp., Stafella sp., Globivalvulina sp., Pachyphloia sp., Kamurana sp., etc. (det.; T. Süer; from Şenel et al., 1981) are Upper Permian in age. The unit was deposited in a shallow carbonate shelf environment.

Kesköprü Formation (Trke)

The formation, which consists mainly of mottled marls, was named by Marcoux (1977). Ayan (1968), on the other hand, defined this unit as the Variegated Marls in their studies in the Finike region. The Kesköprü formation spreads over a small area. The unit consists of thin-medium bedded, dirty yellow, green, gray, pink, red, beige colored fine limestone interbedded marl, claystone and argillaceous limestone. In places, gypsum covers lenses. There are vermicular limestone levels of varying thickness within the formation. Thin limestone layers have abundant lamellar shell accretion. It contains traces of dwarf gastropods in places. The Kesköprü

formation, which is locally unharmoniously covered by the Gökdere formation from the top, is approximately 350 m thick. The age of the formation is accepted as Anisian-Schitian (Middle-Lower Triassic) age according to its fossil content. The unit was deposited in a shallow self (tidal environment) environment.

Alakırçay Group (TRa)

The group consisting of basic volcanite, bedded chert, pelagic limestone, vegetated sandstone and things intertwined laterally and vertically was named by Şenel et al. (1981). Basic volcanics, Karadere formation, stratified cherts, Tesbihli formation, halobia limestones, Gökdere formation, vegetated sandstones and things are distinguished as Çandır formation within the unit. The unit has gained a very mixed and chaotic structure due to excessive folding and faulting. It is therefore difficult to distinguish between formations.

Tesbihli Formation (Trat)

The unit, which generally consists of layered cherts, was named by Kalafatçıoğlu (1973). Although it is mostly found at the base of the Alakırçay group, it can occasionally be found in other formations as thinner layers. In some areas it is difficult to distinguish it from the Jurassic-Cretaceous bedded cherts. Tesbihli formation is seen in Alakırçay and Kumluca units, sometimes in Tahtalıdağ nappe. The Tesbihli formation consists of thin-medium bedded, mostly red, reddish brown, terrestrial green, gray, dirty yellow, black, blue colored radiolarite, chert and things. In some areas it contains abundant traces of Daonella and rare traces of halobia. Chert limestones are common on the floor and ceiling of the unit. It contains terrestrial sedimentary folds. Laterally and vertically, it is transitive with Çandır Gökdere formations, and is primarily related to Karadere formation. Its thickness varies between 20-70 m.

Gökdere Formation (TRag)

The formation, which consists of plaque-like halobia limestones, was named by Kalafatçıoğlu (1973). It can be seen in the Alakırçay group, on the Tesbihli formation and sometimes at other levels. It is found in both successions of the Alakırçay nappe. In the Tahtalıdağ nappe, Upper Anisian-Norian rocks are generally represented by the Gökdere formation.

The Gökdere formation consists of thin-medium bedded, beige, cream, gray colored, plaque-like, mostly chert nodules, abundant radiolarian, terrestrial halobia, micritic limestones. It contains intermediate levels of sparse fine calcarenite, shale, bedded chert, tuffite, pillow lava. In places, it contains a red limestone level in ammonitico-rosso facies (Hallstatt facies). The unit is transitively related with Tesbihli and Çandır formations in lateral and vertical directions and primary with Karadere formation. The formation transitions with the Ballık formation at the top in the Kumluca unit and with the Tekedağı formation in the Tahtalıdağ nappe. Its thickness varies between 10-350 meters. The Gökdere formation was deposited in a basin environment where volcanism is active from time to time.

Çandır Formation (TRaç)

The formation, consisting of vegetated sandstone and things, was named by Kalafatçıoğlu (1973). It is found in both successions of the Alakırçay nappe. The formation consists of fine-medium-thick bedded, gray, light gray, green, yellowish-brown sandstone, siltstone and

claystone. It is locally conglomerate, limestone, clayey-sandy limestone band and lensed, is locally volcanic interfaced. Sandstones are sometimes plant clustered and consist of quartz, quartzite, carbonate and volcanic elements. Silt and claystones are sometimes foliated and have a shale appearance. Halobia in limestone levels and silicified tubes (Torlessia) in sandstones are common.

There are conglomerate levels from place to place within the unit. Çandır formation, which consists of turbiditic clastic rocks, covers larger areas than other formations in the Alakırçay group. Laterally and vertically, it is transitive with the Gökdere and Tesbihli formations and interverted with the Karadere formation. It shows varying thickness between 150-450 meters. Except for limestone lenses with Halobia traces and locally silicified tubes in sandstones, no fossiliferous levels were found in the unit. Due to the intrusion of the Alakırçay group with other formations, it is considered to be Upper Anisian-Norian aged. The formation, which is turbiditic in nature, was deposited in the basin environment where volcanism is active.

Karadere Formation (Trak)

This unit consists of alcaline volcanics. It usually consists of dark brown, pillow-shaped, basic submarine lava flows. It shows spilitization in places. They are generally bean-shaped and their size is around 20-70 cm. In places, they contain the Gökdere, Tesbihli and Çandır Formations in the form of lenses. In addition, the formations in question are seen as they are removed from the bottom and engulfed during their flow. The observable binder is chlorite and carbonate.

The Karadere Formation, the base of which cannot be observed generally, is seen in some places as a primary relationship with the Çandır, Tesbihli and Gökdere Formations. It is laterally transitive with the Çandır, Tesbihli and Gökdere Formations. The Alakırçay Group, which consists of Gökdere, Tesbihli, Çandır and Karadere Formations, is unharmoniously overlain by the Kesköprü Formation. Partially, its base cannot be observed (Karadere Formation). It unharmoniously overlies the Dinek Formation to the north of Koldurum Tepe. It shows transition with Tekedağı Formation at the top.

Ballık Formation (JKba)

The unit consisting of layered cherts was named by Robertson and Woodcock (1981b). It is the typical formation of the Kumluca unit. It is difficult to distinguish the Ballık formation, which is the typical formation of the Kumluca unit (Alakırçay nappe), from the Tesbihli formation.

The unit consists of thin-medium bedded, red, reddish brown colored, locally green, gray, dirty yellow, blue, etc. colored radiolarite, chert and shales. Sometimes these cherts contain manganese lumps. Basalts with a thickness of about 1 meter can rarely be seen in the unit. The Ballık formation, which is overlying the Gökdere formation transitively, is overlain by the Keçili formation, possibly unharmoniously.

It reaches a thickness of about 130 meters. It is considered to be Jurassic-Cretaceous in age. The unit was deposited under the carbonate melting limit in the basin environment.

TAHTALIDAĞ NAPPE

Tahtalıdağ nappe structurally overlies Alakırçay nappe. Marcoux (1977,1979) states that the Upper nappe (Tahtalıdağ nappe) consists of three structural units, namely Kemer, Tahtalı Dağ

and Bakırlı Dağ, which show some differences from each other. However, the separation of this structural unit could not be done in the west of Antalya Bay. The Tahtalıdağ nappe is similar to the Jurassic-Cretaceous aged platform type carbonates which are generally associated with the Karadere formation in general in the Alakırçay nappe and Jurassic-Cretaceous aged platform type carbonates of Tahtalıdağ nappe. For this reason, these are also reviewed within the Tahtalıdağ nappe. In the Tahtalıdağ nappe in the region, from bottom to top, Ordovician (Upper) aged Sarıyardere formation, The Upper Permian Dinek formation, Scythian-Lower Anisian aged Kesköprü formation, The Upper Anisian-Norian aged Gökdere formation, Rhaetian-Senonian aged Tekedağı formation and Upper Campanian-Maastrichtian aged Keçili formation are found.

Tekedağı Formation (JKt)

This formation, consisting of thick bedded, uniform, neritic carbonates, has been named separately by different researchers. Colin (1955) defined it as the Lycian Series and the Elmalı Series. Tolun (1965), Zaralıoğlu (1967) and Ayan (1968), in their research in the Finike region, named the Finike Limestone Formation as Finike Limestones. Marcoux (1978) stated that Jurassic-Cretaceous aged neritic carbonates were found in the tectonic units that they distinguished as "Beydağları Unit, Tahtalıdağ Unit, Kemer Unit and Bakırlıdağ Unit" in his studies in the region and did not name them. The Jurassic-Cretaceous aged limestones cropping out in the region contain the same rock type and fossil. Since it gives a type-section in Tekedağı, it is named as Tekedağı Formation.

It begins with whitish, grayish, reddish, beige colored, medium-thick bedded, locally cherty, massive-looking dolomitic limestone and limestone at the bottom. Beige, light gray, cream colored, medium-thick bedded limestones are observed on this level, which has many cracks and macro shells. They are algae, coral, gastropod, lamellar shelled and show dolomitization in places. It is usually pelletized in texture. Light gray, cream-colored, medium-thick bedded, abundantly shelled, hard, usually oolitic, pelletized limestones are found on this pelletized-textured limestone. In the upper levels, lighter colored, medium-thick bedded limestones with abundant shells and dolomitiation are observed in places. On top, there is rudist reef limestone and brecciated limestone. Tekedağı Formation presents a transition with Alakırçay Group at the bottom. It shows incongruity with Keçili Formation at the top. The Barremian-Cenomanian section of this formation at Toçakdağı is approximately 1200 meters. This unit, which contains abundant lamella, gastropod, algae and coral remains, is rich in microfauna. This determines the microfauna a Rhaean-Cenomanian age.

NEO-AUTOCHTHON COVER ROCKS

Quaternary aged Antalya Travertine, Alluviums, dune and beach formations on Antalya nappes are neoautochthonous cover units of the region.

Antalya Travertines “Qa”: Travertines with widespread outcrop in and around the study area and forming the dominant lithology were defined as “Antalya Travertines” by POISSON (1977). This unit, which contains brown-yellow colored, primary and secondary karstic melting structures, has a spread (geometry) of approximately 630 km2. Travertines, which are defined in the literature as the product of a terrestrial and very shallow swamp environment, the calcium

bicarbonate-rich karst waters (Kırkgöz et al. source groups) discharged from the autochthonous Jurassic-Cretaceous aged limestones (Beydağları formation) widely outcropped in the north of the study area were evaluated as secondary carbonates precipitated while flowing from a slightly inclined and partially permeable base during uncontrolled flow periods.

H_2O+CO_2 H_2CO_3 (Carbonic acid)

$H_2CO_3+CaCO_3$ $Ca(HCO_3)_2$ (Calcium bicarbonate)

$Ca(HCO_3)_2$ $CaCO_3$ (travertine) + H_2O + CO_2

Travertines with wide spreads are seen as a total of 3 plateaus, one of which is under the sea. The 17 km long upper plateau (Döşemealtı plateau), located between 250-300 mt elevations, approximately 7.5 km long lower plateau (Düden-Varsak plain) located between 40-150 mt elevations and the 3rd plateau, which continues below the sea level, continues until 2.5-3 km south of the current coastline.

In places where the travertine deposition water makes a waterfall, stalactites and stalagmites as a result of merging with the base present structures with thin layers in shallow waters where the water source is laminar, thick layered in deep waters, and structures that do not show stratification in places where turbulent flow is present. As a result of the evaluation of the existing deep borehole data for drinking-use and irrigation purposes, it has been shown that at the beginning of the travertines formation, surface waters are effective in the sedimentation basin from time to time and they precipitate the coarse-grained material they carry. In the İsmail-1 well drilled on the Upper Travertine plateau, the presence of conglomerates up to 9 meters thick was detected 37.5 meters above the travertine floor. In another borehole drilled near the Düden waterfall, sand-gravel levels between 82-106 meters and 134-151 meters were exceeded.

In the study area, where the primary and effective porosity is widely observed, together with the Mediterranean type karstification developed as a result of the effect of the Mediterranean climate, travertines, which still continue to form today, present different types of texture as physically massive, plant-textured, spongy and oolitic according to the shape of the old topography, different ecological (temperature, depth) conditions in the deposition environment, carbonate density, flora and fauna changes. Therefore, tracing more than one tissue type in a very short distance within the study area makes it impossible to produce a detailed tissue-facies map.

During the period until the calcium bicarbonate waters, which overflowed from Kırkgöz and source groups, were taken under control by humans, the travertines reached a spread of approximately 630 km2 and a thickness varying between 150-250 meters. Kırkgöz springs precipitate 56 mg/lt up to the sea, and 20 mg/lt Ca (calcium) from the waters coming out of Düdenbaşı.

In particular, the difference between Kırkgöz springs and Düdenbaşı in terms of calcium ions up to a maximum of 36 mg/lt per liter indicates that the current continuing underground by sinking through the Bıyıklı and sinkholes of Kırkgöz springs does not melt $CaCO_3$ (calcium carbonate) (ÖZÜŞ, 1992). In this case, it is wrong to connect the karstic melting gaps observed in the travertines to the spring waters. The previous gaps tend to be closed by new stalactites

and stalagmites to be formed later, with the formations continuing today. It is possible to see this feature in the stalactites and stalagmites of the travertines, which are the products of the last 15-20 years in Düden waterfall.

Since the formation of secondary dissolution cavities observed in the travertines as well as the primary cavities observed in the travertines cannot be attributed to the spring waters, these types of structures are caused by the weak carbonic acid rain waters and acidic wastewater s that enter the travertine by taking the CO2 of the atmosphere and soil and do not carry any Ca (calcium).

Today, travertine formation generally continues its sedimentation in high flow waterfalls, small flow rivers and especially in the upper travertine (Döşemealtı) plateau where underground water flow develops. The unit is chronologically accepted as Upper Pliocene-Quaternary age based on the finding of Condora sp (AKAY et al., 1985) that it contains, albeit rarely.

Ancient Stream Terrace Fillings (Qt):

This unit, which is old fluvial sediments, mostly consists of conglomerates. These conglomerates cover in blocks. It also contains sand depots. It is of fastened quality and shows a maximum thickness of 80 meters. The unit is generally in the form of an alluvial fan.

Slope Debris and Debris Cones (Qym):

It is found on mountain slopes and foothills. It is partially fastened and partially loose. In some areas it also includes debris cones.

Beach Formations “Qp”:

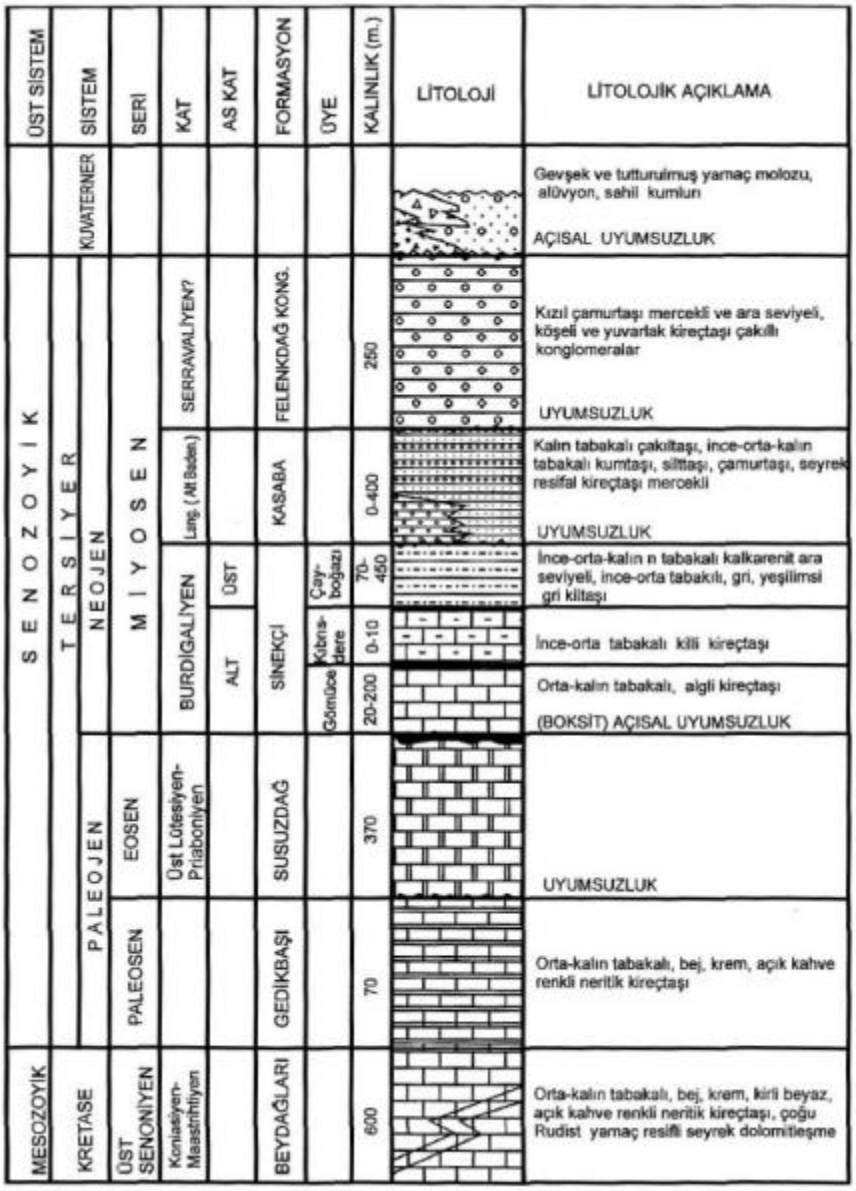
They are sand and gravel deposits formed by the wave function along the coast.

Alluvial Fans (Qay):

Especially in dry estuaries, alluvial fans of different sizes have developed. Debris cones are also developed in this area.

Alluvial “Qal”:

Quaternary aged alluvial ground consists of irregular agglomerations of block-gravel-sand-clay type lithologies of different sizes. In areas where rivers and streams reach the sea, alluvial deposits expand and turn into small delta formations.



Şek. 8- Beydağları otoktonunun genelleştirilmiş stratigrafi kesiti (Şenel ve diğerleri, 1994'den yararlanılmıştır).

Figure 37: General Stratigraphic Section

The 1/25,000 Scaled Geological Map of the project area is presented in Annex-14.

5.2. PROJECT AREA AND GEOLOGY OF THE IMPACT AREA

Different deformation phases are observed in the field and in the Western Taurus region. One of the oldest deformation phases in the region is the thrusting of the 'Antalya Complex' units by faults with lateral slip during the Upper Cretaceous period. These patches are observed in the close vicinity of the study area. The very high angle of the thrust planes indicates that the thrust planes also have lateral offset. One of the most important formation phases in the region is the Late Halocene deformation period, although its traces are not observed in the study area. Geological map of the project site and its immediate surroundings is presented in Figure 38.

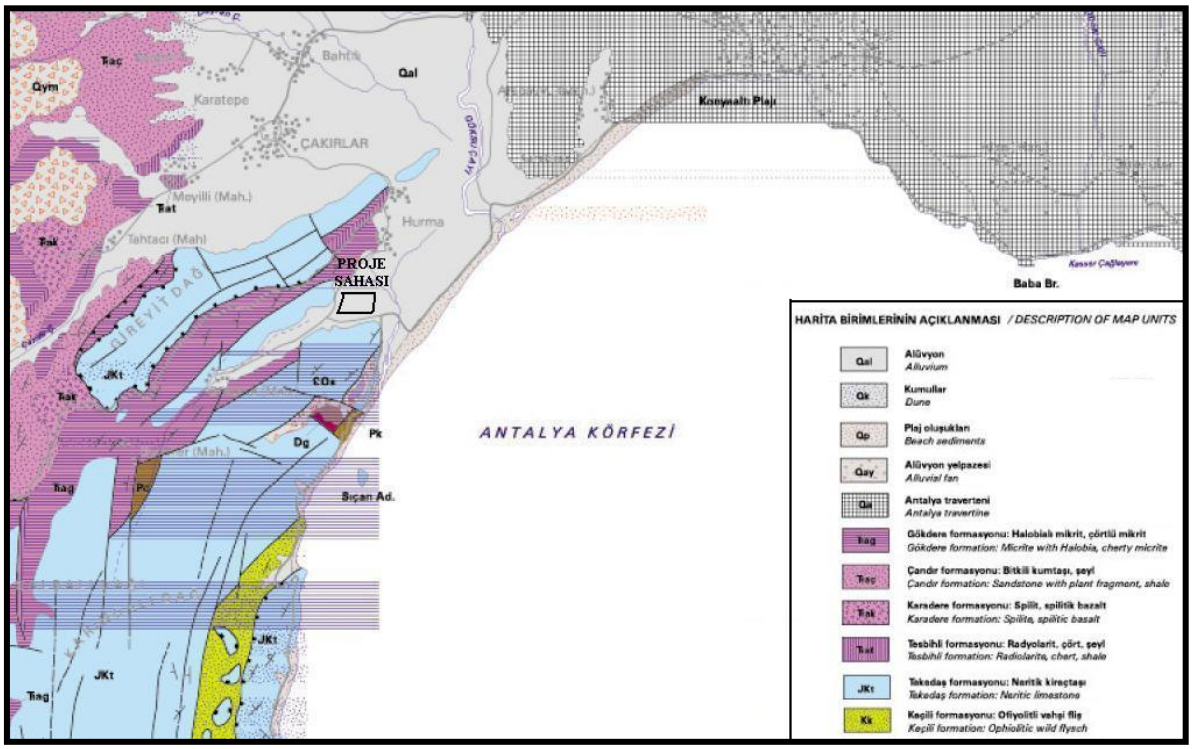


Figure 38: Geological Map of the Project Site and Its Surroundings

Quaternary aged sand and sandy gravel are widely observed in the study area, and a unit consisting of irregular agglomerations (Alluvial-Quaternary) of sand, silty sand, sandy gravel and coarse-block gravel type units has been detected in the terrestrial environment. Coarse blocky slope debris and a beige clay-banded limestone unit belonging to the Tekedag formation (Jkt) were identified under the alluvium unit.

Drilling was carried out at 5 locations within the examined parcel. The units determined as a result of the drilling works are presented in Table-22.

Table 22: Units Detected in the Field

Drilling No	Depth (m)	Lithology	Formation
SK-1	0.00-2.50	Kahverengi Siltli Kum	Alüvyon Qal
	2.50-7.00	Kahverengi, Siltli kumlu kil	
	7.00-33.00	Gri renkli Siltli Kil	
	33.00-36.00	Kireçtaşı Parçalı Kil Dolgulu Yamaç Molozu	
SK-2	0.00-4.00	Kahverengi az kumlu çakıllı Kil birimi	Alüvyon Qal
	4.00-6.00	Kahverengi, çakıllı killi kum	
	6.00-22.00	Gri renkli **Siltli Kil**	
	22.00-27.00	Kahverengi az çakıllı kumlu kil	
SK-3	0.00-4.00	Kahverengi az çakıllı Kil birimi	Alüvyon Qal
	4.00-7.00	Kahverengi Kum Birimi	
	7.00-30.00	Gri renkli Siltli Kil	
	30.00-31.50	Gri renkli çakıllı kil	
	31.50-39.00	Kahverengi iri kireçtaşı bloklu kil dolgulu yamaç molozu	
SK-4	0.00-2.50	Dolgu Malzeme	Alüvyon Qal
	2.50-4.00	Kahverengi Kil	
	4.00-6.00	Kahverengi Killi, Kum Birimi	
	6.00-27.00	Gri renkli Siltli Kil	
	27.50-30.50	Gri renkli az çakıllı Kil	
	30.50-39.00	Bej renkli, yer yer Kil Bantlı Kireçtaşı	Jkt-Tekedağ fm.
SK-5	0.00-0.50	Dolgu Malzeme	Alüvyon Qal
	0.50-3.00	Kahverengi Kil	
	3.00-5.50	Kahverengi çakıllı kum	
	5.50-7.00	Gri renki az kumlu, Siltli Kil Birimi	
	7.00-21.00	Gri renkli Siltli Kil	
	21.00-23.00	Gri renkli, çakıllı Kil Birimi	
	23.00-28.00	Kahverengi kireçtaşı parçalı kil birimi	
	28.00-37.50	Kahverengi az çakıllı kumlu kil birimi	
	37.50-39.00	Bej renkli, yer yer Kil Bantlı Kireçtaşı	Jkt-Tekedağ fm.

5.3. GEOLOGICAL SECTION

Quaternary aged sand and sandy gravel are widely observed in the study area, and a unit consisting of irregular agglomerations **(Alluvial-Quaternary)** of sand, silty sand, sandy gravel and coarse-block gravel type units have been detected in the terrestrial environment. Coarse-blocked slope debris and a beige clay-banded limestone unit belonging to the Tekedag formation **(Jkt)** were found under the alluvium unit.

The 1/25,000 scaled Geological Map of the project area is given in Annex-14, the 1/100,000 scaled Geological Map and the geological section made according to the units determined in the examination are given in Annex-15.

5.4. STATE OF NATURAL DISASTER

In the project area, there is no risk situation in terms of disasters such as landslides, rockfalls, avalanches, etc., within the scope of the Law No. 7269 on "Aids to be Taken with Measures to Be Taken Due to Disasters Affecting Public Life".

No mass movements such as rockfalls and landslides are expected within the scope of the law numbered 7269 in the field and its immediate surroundings. No environmental events such as landslides, avalanches, rockfalls, floods etc. affecting the field were encountered.

During the field studies, no unit was encountered in the study area that would cause swelling and collapse potential due to the ground structure. The closest landslide area to the project site is located 2 km south of the project site and is presented in Figure-39.



Figure 39: The Closest Landslide Area to the Project Site

There is no "Judgment of Disaster-Prone Area" taken before in the project area.

Sarısu Stream passes 1 km east of the activity area, and the facility area remains within the Sarısu Stream Flood Area. (See. Figure-40)

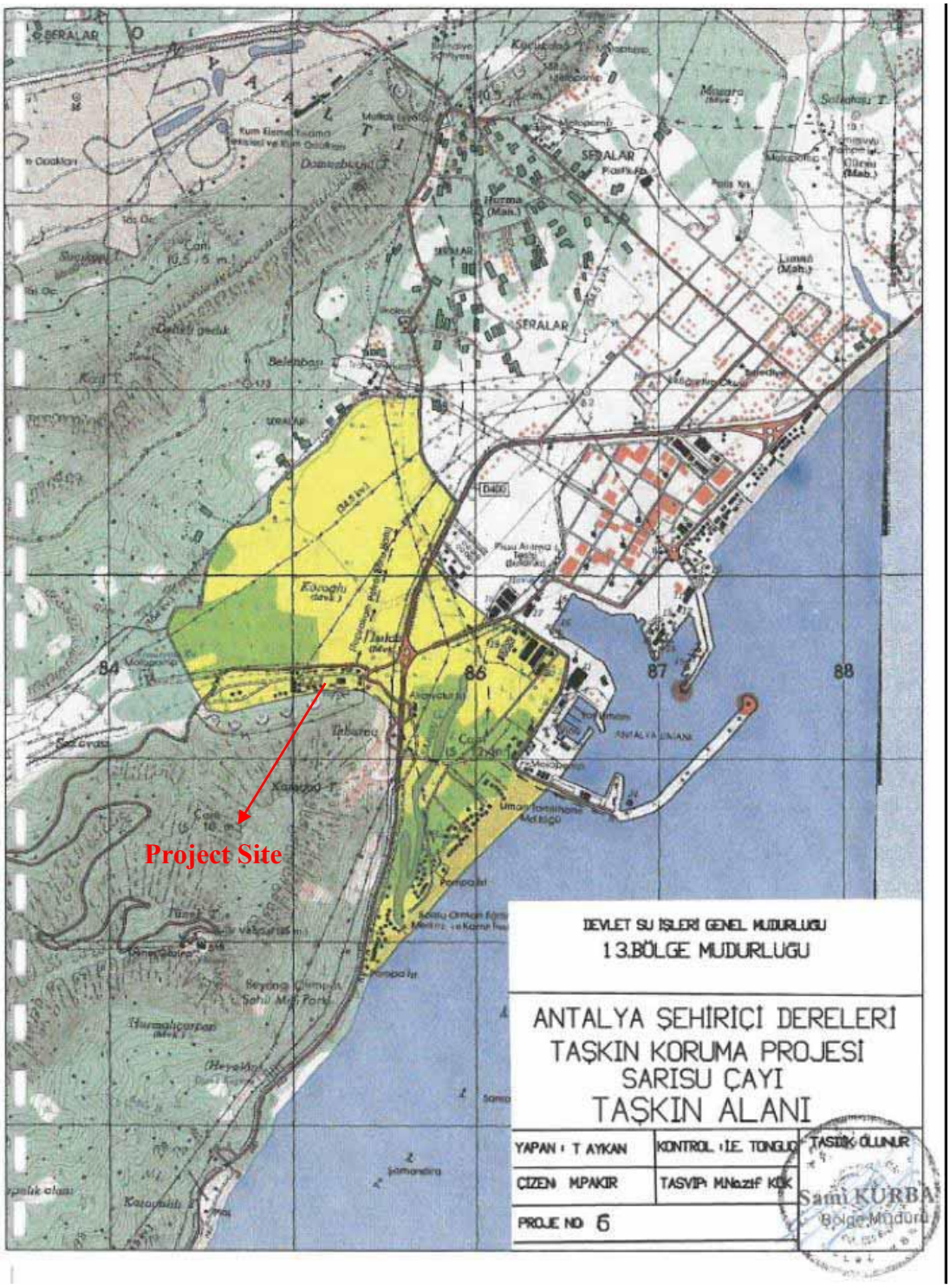


Figure 40: Sarısu Stream Flood Area

In the Antalya Basin Flood Management Plan published in 2016 by the Ministry of Forestry and Water Affairs General Directorate of Water Management, there are flood scenarios for Sarısu Stream and depth maps were created for floods repeating in 50, 100 and 500 years. (See Figure-41)

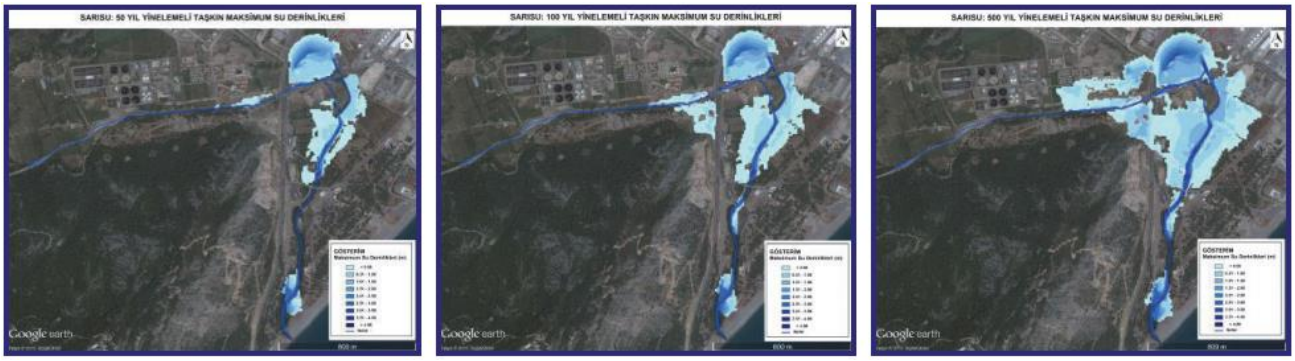


Figure 41: Maximum Water Depths in Sarisu Stream Flood Scenarios

As can be seen from the 500-year iterative maximum water depth scenario of the Sarısu Stream, it is not possible for the flood to reach the activity area in case of possible flooding. In addition, as a result of the improvement and flood control works carried out by the SHW 13 Regional Directorate and the Antalya Metropolitan Municipality, the flooding situation on the Sarısu Stream has been eliminated.

At every stage of the activity, the relevant provisions of the Prime Ministry Circular no. 2006/27 and other relevant legislation published under the name of Stream Beds and Floods, dated 09.09.2006 and numbered 26284 will be complied with.

5.5. SEISMICITY

The structural (tectonic) and historical geology of the region has been evaluated by previous researchers within the framework of different views and is summarized below.

The basement rocks in the Tauride belt tried to complete their sedimentology with clastic and carbonate rocks, apart from the discontinuities that developed within themselves from Paleozoic to Cretaceous. In the rifting region immediately after the Lower Triassic, without the expected inclusion as a result of an opening, the Mesozoic shallow marine carbonates on one side and hemipelagic - pelagic deposits in the semi-deep and deep parts of the basin on the other hand, pre-settlement sedimentary communities were formed, continuing sedimentation until the Upper Cretaceous - Lower Paleocene, and the ophiolite branch of the southern branch of Neotethys. While the area to the south of the Homa – Balçıkhisar - Hoyran lake - Anamasdağı line uplifted after the Upper Cretaceous-Lower Paleocene and showed a discontinuity in its deposition, the region along the specified line and just north of this line continued to be deposited in deep sea characteristics. Ophiolites outcropping in the northern branch of Neotethys, which constitutes a different parameter of the same event, crossed the Menderes massif in the company of the Upper Cretaceous sea and settled to the north of the Homa - Anamasdağı line. The Paleocene sea, which continued its deposition along the specified line, accompanied the transfer of ophiolites to the south by moving south in the Upper Paleocene-Lower Eocene and exceeding all Beydağları. The entire post-Lower Eocene uplift region was later covered by the Lutetian (middle Eocene) sea, and at the end of the Lutetian the complex series of ophiolites made its last advance from north to south.

The Antalya nappes (Çataltepe, Alakırçay, Tahtalıdağ) have ophiolitic mélange characteristics, that they are the products of a submerged oceanic crust, and that the Upper Triassic submarine

basalts in the Alakırçay unit are found in Anatolia and Anatolia. It is stated that they are the oldest rocks showing the first fragmentation between the African-Arabian plate margins.

There was no ocean development south of the Taurus autochthon during the Mesozoic, when the Antalya Union was the product of subduction in the north; The research group ŞENGÖR and YILMAZ (1982) argued that there was an ocean opening in the south, the Antalya Union was deposited on the slope of this ocean and was subsequently pushed to the north. By the same researchers, in the Upper Eocene-Middle Miocene, the Arabian-African plate and the Anatolian plate collided, so the southern Tethys branch was closed, today's Eastern Mediterranean was formed as a remnant, subduction was prevented due to the continent-continent collision and the rocks in the collision zone formed mountain ranges. In the phase following this collision,

It was stated that the Anatolian plate was pushed west along two newly formed transform faults (North and East Anatolian faults).

By KOÇYİĞİT (1984), the north-south compressions are NE-SW, NW-SE directional strike-slip faults, formed by north-south directional tension fractures and east-west oriented thrusts. It is stated that widespread ophiolitic melange nappes were also emplaced in the region as a result of horizontal compressional tectonics during these thrusts.

The Antalya nappes, which were brought together by ŞENEL (1997) due to the thrust of the oceanic crust to the continental crust in the Upper Campanian - Maestrichtian (Upper Cretaceous), extend to the east and northeast of the Beydağları autochthon in the Danian (Lower Paleocene), stated to be located to the south of the Anamas-Akseki autochthon. Also by the same researcher, the Antalya nappes, which were also affected by the end-Eocene horizontal movements, were reattached from east to west in the Langhian (Middle Miocene), in the probable Pliocene after the Middle Miocene, large-scale dip-slip normal and vertical-slip normal faults developed in the region. It has been stated that large-scale depression areas and elevations have developed in the region due to these fractures.

The tectonic structure of the study area is characterized by numerous faults, reattachments, and thrusts. It is seen that tectonic units, namely anticlines and synclines, alternate in bundles and are more or less parallel to the west coast of Antalya Bay in their general direction. The sequence shapes, facies, fold axis and strikes of the layers show that the tectonics in the region do not have a more complex structure than a simple folded region. According to M Blumenthal (1963) The movements in the Taurus tectonic unit in the east of the Antalya region ended before the Oligocene, that is, folds and folds took their places before the Oligocene. In the west, tangential tectonic movements in Korkuteli, east of Bey Mountains and Fethiye region are bordered between Lower Miocene and Plio-Quaternary. The tectonics of the field generally match the tectonic structure of the Alpine region.

Numerous normal and reverse faults, thrusts, seams, and even minor thrusts are noticeable. And if there are large-scale nappes and thrusts in the Western Taurus region, only parts of them or under the influence of those large movements have been exposed to tectonic movements to a certain extent in our region. Otherwise, it does not show a nappe structure directly as claimed.

Turkey is under the influence of three big plates in terms of earthquake movements. These are Eurasian, African and Arabian plates. The Anatolian plate, on which most of Anatolia is located, is a small part of the Eurasian plate.

The interaction of these plates on the Mediterranean is as followsİ the African plate subducting under the Eurasian (or Anatolian, which is a part of it) plate in the region called the Hellenic-Cypriot Arc in the Mediterranean. The Arabian plate, on the other hand, moves northward due to the opening in the Red Sea and compresses the Anatolian plate. Earthquakes occur at the borders of the Anatolian plate shifting to the west as a result of the compression of the Arabian plate, and in the Mediterranean as a result of the African plate subducting under the Eurasian plate. Earthquake plates affecting Turkey are shown in Figure 42.

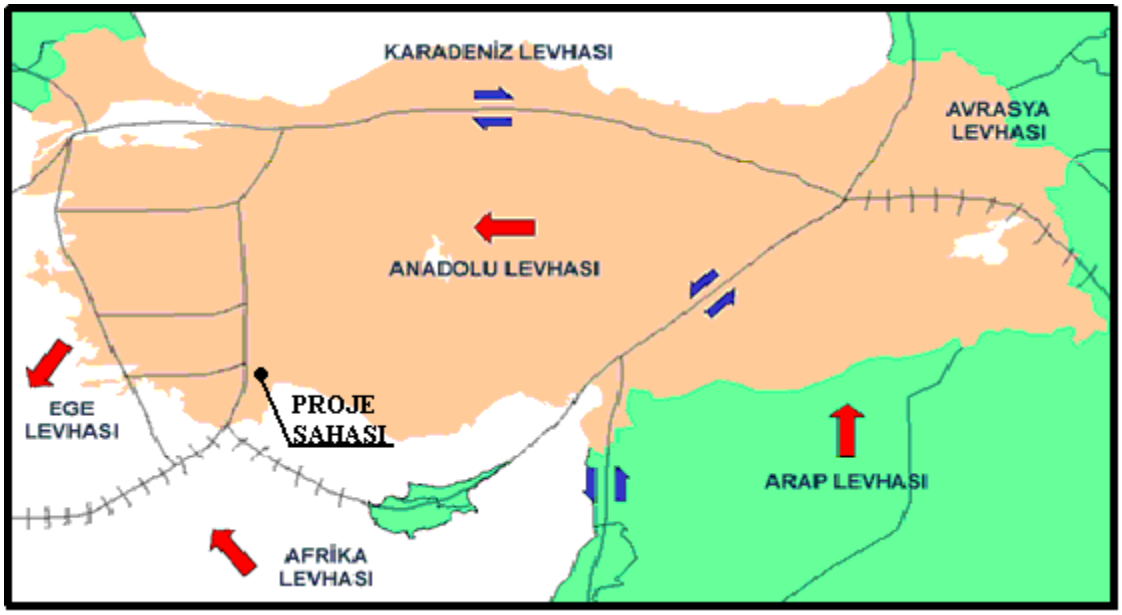


Figure 42: Turkey Earthguake Plates

According to the active fault map prepared by MIE from the borders of the study area in 2012, the closest faults to the area are the Kale fault, approximately 45 km away in the southwest direction and approximately 20 km long. Again, at a distance of 55 km in the southwest direction, there is a 20 km long Kekova fault zone. In addition, at a distance of approximately 90 km in the northwest direction, there is the Eşen fault with a length of approximately 50 km (see Figure-43)



Figure 43: Active Fault Lines Near the Project Site

The Northwest and Southwest parts of Antalya are in the 1st degree earthquake zone, the Antalya region is in the 2nd degree earthquake zone, and the east of Antalya is in the 3rd and 4th degree earthquake zone. The records of earthquakes with a magnitude of 5 Ms and above that occurred in the region in the last century and the numerical magnitudes of these earthquakes are given in Table 23 below.

Table 23: Table of Earhquake Reports

Year	Latitude	Longitude	Depth	Type	M	City	District	Yıl	Enlem	Boylam	Derinlik (km)	Tip	M	Şehir	İlçe
1927	36,19	31,08	10	5,5	Ms	AKDENİZ		1975	36,18	30,77	56	5,6	mb	AKDENİZ	
1929	36,5	31	15	4,9	Ms	ANTALYA		1975	36,1938	30,7381	60,8	5,6	Mb	AKDENİZ	
1930	37,39	31,18	80	5,9	Ms	ANTALYA	MANAVGAT	1977	36,243	31,344	67	5,7	Mb	ANTALYA	
1939	36,3	30,7	0	5,3	MS	ANTALYA		1977	36,24	31,34	67	5,7	mb	ANTALYA	
1951	36,83	30,54	120	5,4	Ms	ANTALYA	ANTALYA	1977	36,91	30,7343	90,3	4,7	Mb	ANTALYA	ANTALYA
1952	36,9	29,58	10	4,7	Ms	MUĞLA	FETHİYE	1977	36,93	30,68	93	4,6	mb	ANTALYA	ANTALYA
1963	36,6	30	226	5,6	Mb	ANTALYA	ELMALI	1978	37,58	30,01	16	4,6	ML	BURDUR	BURDUR
1963	37,5	30	20	5,1	Mb	BURDUR	KEMER	1978	37,58	30,009	16	4,6	Mb	BURDUR	BURDUR
1963	37,07	29,68	60	4,7	Ms	BURDUR	ÇAVDIR	1979	36,41	31,75	98	5,9	mb	ANTALYA	
1964	37,41	29,89	59	5,3	Mb	BURDUR	KARAMANLI	1979	36,409	31,751	98	5,9	Mb	ANTALYA	
1964	37,34	29,93	5	4,5	Mb	BURDUR	KARAMANLI	1979	36,18	31,51	79	5,3	mb	AKDENİZ	
1965	36,8	30,9	110	5,3	Mb	ANTALYA		1979	36,184	31,51	79	5,3	Mb	AKDENİZ	
1966	37	30,9	118	5	Mb	ANTALYA	SERİK	1979	36,9877	30,2909	31,7	4,6	Mb	ANTALYA	KORKUTELİ
1966	36,2	30,9	33	4,6	Mb	AKDENİZ		1979	37	30,2	10	4,6	mb	ANTALYA	KORKUTELİ
1967	37,59	30,44	49	4,5	Mb	BURDUR	AĞLASUN	1981	36,56	30,71	70	5,4	mb	ANTALYA	
1969	36,963	31,075	109	5	Mb	ANTALYA	SERİK	1981	36,559	30,712	70	5,4	Mb	ANTALYA	
1970	36,74	29,55	44	4,5	Mb	MUĞLA	FETHİYE	1981	36,184	30,376	53,7	5	Mb	FİNİKEI	
1971	37,588	29,757	23	5,9	Ms	BURDUR	YEŞİLOVA	1981	36,18	30,38	53	5	mb	FİNİKEI	
1971	37,526	29,725	33	5,5	Mb	BURDUR	YEŞİLOVA	1981	37,085	29,694	10	4,7	Mb	BURDUR	ÇAVDIR
1971	37,3	30,235	23	5,3	Mb	ANTALYA	KORKUTELİ	1981	37,08	29,69	10	4,7	mb	BURDUR	ÇAVDIR
1971	37,569	29,736	33	5	Ms	BURDUR	YEŞİLOVA	1983	36,6889	30,5406	7,4	4,7	Mb	ANTALYA	
1971	37,2411	30,2979	46,9	5	Mb	ANTALYA	KORKUTELİ	1984	36,874	30,356	80	4,9	Mb	ANTALYA	ANTALYA
1971	37,2169	30,1217	6	4,9	Mb	ANTALYA	KORKUTELİ	1984	36,87	30,36	80	4,9	mb	ANTALYA	ANTALYA
1971	37,458	29,889	28	4,9	Mb	BURDUR	KARAMANLI	1984	36,62	31,37	96	4,5	mb	ANTALYA	
1971	37,548	29,819	7	4,9	Mb	BURDUR	YEŞİLOVA	1984	36,62	31,3683	101,3	4,5	Mb	ANTALYA	
1971	37,511	29,651	7	4,9	Mb	BURDUR	YEŞİLOVA	1984	36,7322	31,0145	81,7	4,5	Mb	ANTALYA	
1971	37,2705	30,169	42,2	4,8	Mb	ANTALYA	KORKUTELİ	1984	36,73	31,02	80	4,5	mb	ANTALYA	
1971	37,55	29,755	11	4,8	Mb	BURDUR	YEŞİLOVA	1985	37,5588	30,8401	10	4,7	Mb	ISPARTA	SÜTÇÜLER
1971	37,5534	29,7916	11,1	4,8	Mb	BURDUR	YEŞİLOVA	1985	37,51	30,7	33	4,5	mb	BURDUR	BUCAK
1971	37,4751	29,8094	20,7	4,8	Mb	BURDUR	YEŞİLOVA	1985	37,49	30,91	38	4,5	mb	ISPARTA	SÜTÇÜLER
1971	37,5757	29,9782	22,7	4,8	Mb	BURDUR	BURDUR	1985	37,486	30,909	38,1	4,5	Mb	ISPARTA	SÜTÇÜLER
1971	37,495	29,876	36	4,8	Mb	BURDUR	YEŞİLOVA	1986	36,5976	31,7283	129,5	4,7	Mb	ANTALYA	
1971	37,493	29,835	35,7	4,8	Mb	BURDUR	YEŞİLOVA	1986	36,62	31,76	130	4,6	mb	ANTALYA	ALANYA
1971	37,478	29,829	33	4,8	Mb	BURDUR	YEŞİLOVA	1987	36,7399	31,0985	110,8	4,7	Mb	ANTALYA	
1971	37,2138	30,1487	32,3	4,7	Mb	ANTALYA	KORKUTELİ	1987	36,76	31,11	109	4,7	mb	ANTALYA	
1971	37,1618	29,6368	33,7	4,7	Mb	BURDUR	ÇAVDIR	1988	36,629	30,397	28	5,2	Mb	ANTALYA	KEMER
1971	37,55	29,904	33	4,7	Mb	BURDUR	YEŞİLOVA	1988	36,63	30,4	28	5,2	mb	ANTALYA	KEMER
1971	37,5385	29,9493	18,1	4,7	Mb	BURDUR	BURDUR	1988	37,2184	30,6004	9,7	4,6	Mb	ANTALYA	ANTALYA
1971	37,576	29,957	28	4,7	Mb	BURDUR	BURDUR	1990	36,99	29,59	17	5,5	Mw	BURDUR	ÇAVDIR
1971	37,572	29,846	27	4,6	Mb	BURDUR	YEŞİLOVA	1990	36,99	29,595	17,2	5,2	Mb	BURDUR	ÇAVDIR
1971	37,555	29,9311	32,6	4,6	Mb	BURDUR	YEŞİLOVA	1990	37,0267	29,6006	18,5	5	Mb	BURDUR	ÇAVDIR
1971	37,156	30,579	37	4,6	Mb	ANTALYA	ANTALYA	1990	37,18	29,61	24	4,7	mb	BURDUR	ÇAVDIR
1971	37,275	30,241	33	4,5	Mb	ANTALYA	KORKUTELİ	1990	37,02	29,53	25	4,5	ML	BURDUR	ALTINYAYLA
1971	37,2393	30,1925	23,5	4,5	Mb	ANTALYA	KORKUTELİ	1991	37,1211	29,4809	1	5,3	Mb	BURDUR	GÖLHİSAR
1971	37,5463	29,777	23,8	4,5	Mb	BURDUR	YEŞİLOVA	1991	37,01	30,99	112	5,2	Mw	ANTALYA	SERİK
1971	37,4758	29,8926	2	4,5	Mb	BURDUR	YEŞİLOVA	1991	37,1183	29,5519	6,5	4,9	Mb	BURDUR	GÖLHİSAR
1971	37,526	29,795	33	4,5	Mb	BURDUR	YEŞİLOVA	1991	37,29	29,74	22	4,5	MD	BURDUR	TEFENNİ
1971	37,538	29,91	33	4,5	Mb	BURDUR	YEŞİLOVA	1991	37,08	30,83	24	4,5	Md	ANTALYA	ANTALYA
1971	37,5442	29,7713	27,6	4,5	Mb	BURDUR	YEŞİLOVA	1992	37	31	11	5	Md	ANTALYA	SERİK
1971	37,6122	29,9562	33,9	4,5	Mb	BURDUR	BURDUR	1992	37,34	30,99	19	4,8	ML	ANTALYA	MANAVGAT
1971	37,514	29,8348	0	4,5	Mb	BURDUR	YEŞİLOVA	1992	36,74	30,45	41,9	4,6	Mb	ANTALYA	KEMER
1971	37,5936	30,063	13,2	4,5	Mb	BURDUR	BURDUR	1992	36,74	30,45	41	4,6	mb	ANTALYA	KEMER
1971	37,5601	30,089	15	4,5	Mb	BURDUR	BURDUR	1996	36,9038	30,3498	82,9	4,5	Mb	ANTALYA	ANTALYA
1971	37,1279	30,2784	29,8	4,5	Mb	ANTALYA	KORKUTELİ	1997	36,63	31,41	124	4,5	mb	ANTALYA	
1972	37	31	0	4,6	MI	ANTALYA	SERİK	1999	36,28	31,16	10,6	4,6	Md	AKDENİZ	
1973	36,68	30,14	15	4,6	ML	ANTALYA	KUMLUCA	2002	37,1	30,85	124	4,5	mb	ANTALYA	ANTALYA
1973	36,68	30,141	15	4,6		ANTALYA	KUMLUCA	2002	37,07	30,878	123,4	4,5	Mb	ANTALYA	SERİK
1973	37,32	29,63	25	4,5	Mb	BURDUR	TEFENNİ	2003	36,88	31,54	135	5,5	Mw	ANTALYA	MANAVGAT
1973	37,32	29,63	25	4,5	mb	BURDUR	TEFENNİ	2003	36,84	31,49	15,8	4,6	Md	ANTALYA	MANAVGAT
1974	37,52	29,8	25	4,6	mb	BURDUR	YEŞİLOVA	2003	36,72	30,94	16,1	4,6	Md	ANTALYA	

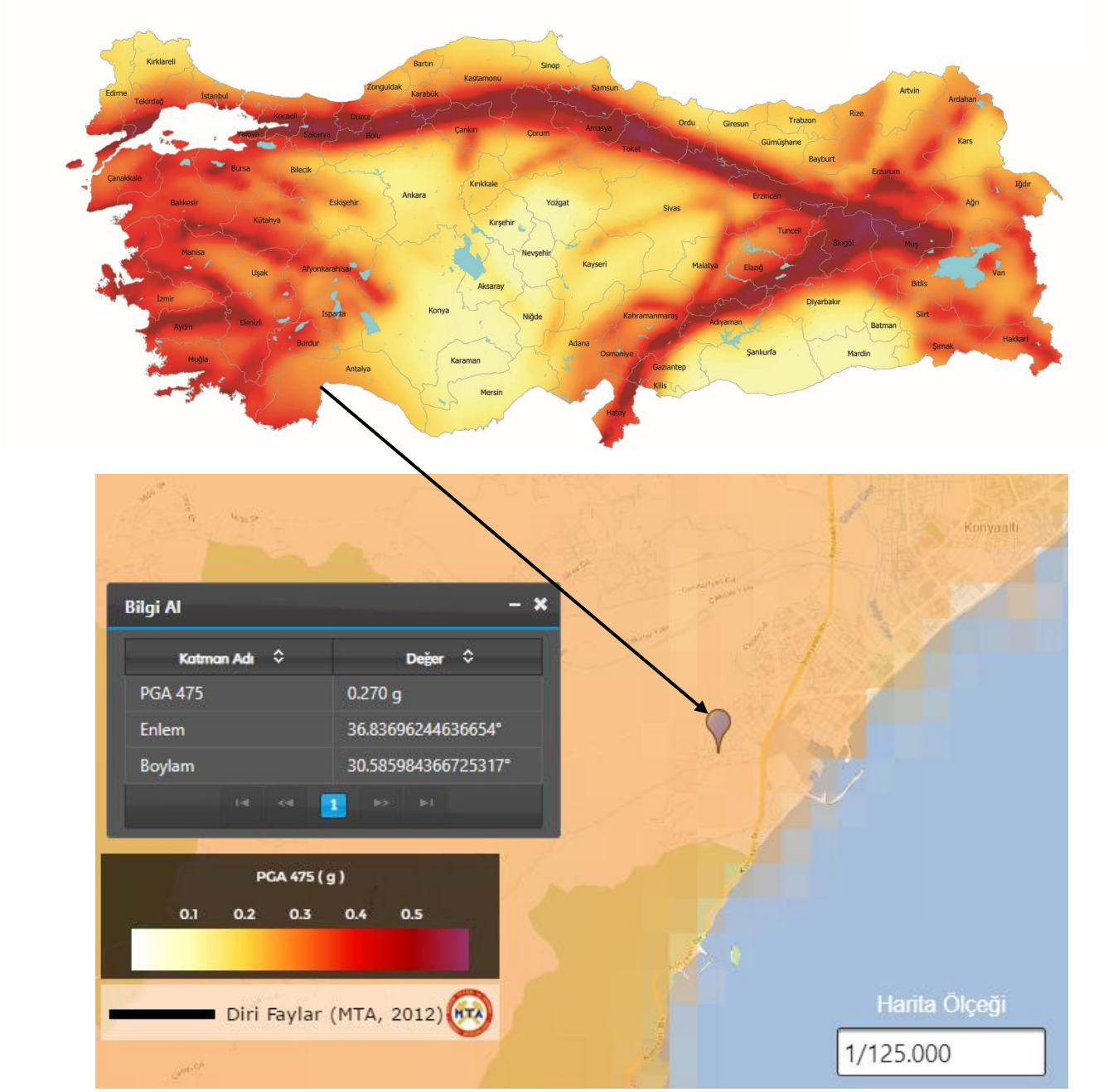


Figure 44: Turkey Earthquake Hazard MAp (AFAD, 2018) (a) and Seismicity of Activitiy Area (b)

The Turkey Earthquake Zones Map, which was effectuated in 1996, was renewed by AFAD Earthquake Department and published in the Official Gazette dated 18 March 2018 and numbered 30364 (repeated). The new map was effectuated on January 1, 2019. In the Earthquake Hazard Map prepared by AFAD Earthquake Department, the project site is in the medium danger class (PGA 475: 0.270 maximum ground acceleration (g)). Earthquake Hazard Map for the Project site is presented in Annex-17.

5.6. HYDROLOGICAL FEATURES

Surface Water Resources in the Region

Surface water resources in the Antalya (Central Mediterranean) Basin, where the project area is located, were investigated. The data taken from the Wastewater Treatment Action Plan (2008 – 2012) published by the Ministry of Environment and Forestry, General Directorate of Environmental Management, are presented in Table 24 below.

Table 24: Basin Potential and Streams in the Central Mediterranean Basin (Source: Ministry of Environment and Forestry General Directorate of Environmental Management of Mülga, Wastewater Treatment Action Plan (2008-2012))

Basin Name	Rain Area (km^2)	Average Annual Flow (km^3)	Potentional Participation Rate (%)	Average Annual Efficiency ($l/s/km^2$)	River Names
Antalya	14.518	11,06	5,9	24,2	Aksu S, Köprü S, Manavgat S and Miscellaneous Waters

There are eight dams in the basin. One of them is used for multi-purpose in the form of electricity generation, irrigation and flood control, two are used for irrigation and flood control, one is used only for irrigation, and four are used only for electricity generation.

Table 25: Dams in the Basin (Source: Ministry of Environment and Forestry General Directorate of Environmental Management of Mülga, Wastewater Treatment Action Plan (2008-2012))

		Usage Purpose of the Dam				
Basin Name	Reservoir Name	Energy	Potable Water	Irrigation	Flood Control	Other
Antalya	Oymapınar	E	0	0	0	0
Antalya	Manavgat	E	0	0	0	0
Antalya	Korkuteli	0	0	I	F	0
Antalya	Karacaören II	E	0	0	0	0
Antalya	Karacaören I	E	0	0	0	0
Antalya	Yalvaç	0	0	I	0	0
Antalya	Uluborlu	0	0	I	F	0
Antalya	Sorgun	E	0	I	F	0

Major water sources in the basin, their lengths and average flow rates are as listed below:

Düden Stream: Its total length is 14 km and its flow rate is 25.19 m3 /sec

Aksu Stream: Its total length is 112 km and its flow rate is 20 m3 /sec

Köprü Stream: Its total length is 119 km and its flow rate is 97.98 m3 /sec

Manavgat Stream: Its total length is 93 km and its flow rate is 126 m3 /sec

Alara Stream: Its total length is 82 km and its flow rate is 31.2 m3 /sec

Karpuz Stream: Its total length is 30 km and its flow rate is 4.7 m3 /sec

Kargı Stream: Its total length is 45 km and its flow rate is 7.81 m3 /sec

Oba Stream: Its total length is 12 km and its flow rate is 1.96 m3 /sec

Dim Stream: Its total length is 28 km and its flow rate is 15.61 m3 /sec

Sedre Stream: Its total length is 21 km and its flow rate is 2.83 m3 /sec

Salamur Stream: Its total length is 20 km and its flow rate is 1.12 m3 /sec

Alakır Stream: Its total length is 22 km and its flow rate is 3.38 m3 /sec

Başgöz Stream: Its total length is 30 km and its flow rate is 5.00 m3 /sec

Eşen Stream: Its total length is 112 km and its flow rate is 48.23 m3 /sec

Korkuteli Stream: Its total length is 35 km and its flow rate is 1.16 m3 /sec

The distance of the Project Area to the dams near it is presented in Figure 45 With the map created using the application on the "http://geodata.ormansu.gov.tr" web page of the Ministry of Agriculture and Forestry.

According to Figure 45, the project area is

- 63 km from Manavgat Beşkonak Dam and HPP,
- 50 km to Küçüksu Dam,
- 55 km to Karacaören Dam,
- 47 km to Korkuteli Dam,
- 80 km to Çavdır Dam
- 77 km to Yazır Dodurgalar Dam
- 59 km to Korkuteli Kozağacı Çağman Pond.



Figure 45: Distance of Hurma Sludge Incineration and Energy Recovery Facility to Dams

The distance of the Project Area to the nearby lakes is presented in Figure 45 with the map created using the application on the "http://geodata.ormansu.gov.tr" web page of the Ministry of Agriculture and Forestry.



Figure 46: The Distance of the Project Area to the Lake

There are several streams or streams in the area where the porous travertine (Al) layer on which most of the city is built. The only stream that can be considered important in the lower travertine plateau is the Düden Stream.

On the border between the lower travertine plateau and the alluvial plains, there are many springs feeding small streams. Apart from these springs, many springs feeding small streams also originate from the carstic limestones forming the high topography in the west of the Antalya Plain.

The main streams fed by Travertine and Carstic Limestone Springs in the region are Arapsuyu I and II, Kopak Stream and Sarısu Stream.

Sarısu Stream is located in the southeast of the project site and reaches the sea from the north of the port. Although the average flow of Sarısu Stream is 500-600 liters, this stream becomes dry in summers.

The Travertine formation of Antalya is bounded from the west and east by the alluvial plains of Aksu Stream and Boğaçay, which are constantly flowing.

Aksu Stream, located in the east of Antalya, is the largest stream in the region. Boğaçay is formed by the combination of Doyran, Çandır, Göksu and Karaman rivers. Çandır and Doyran Streams have water only in rainy seasons. Karaman Stream is fed by springs in the north.

The Project Site is 1.06 km from Sarısu Stream. (Figure 47) It is also 2.3 km from Çandır Stream and 3.83 km from Boğaçayı. (Fig. 48)

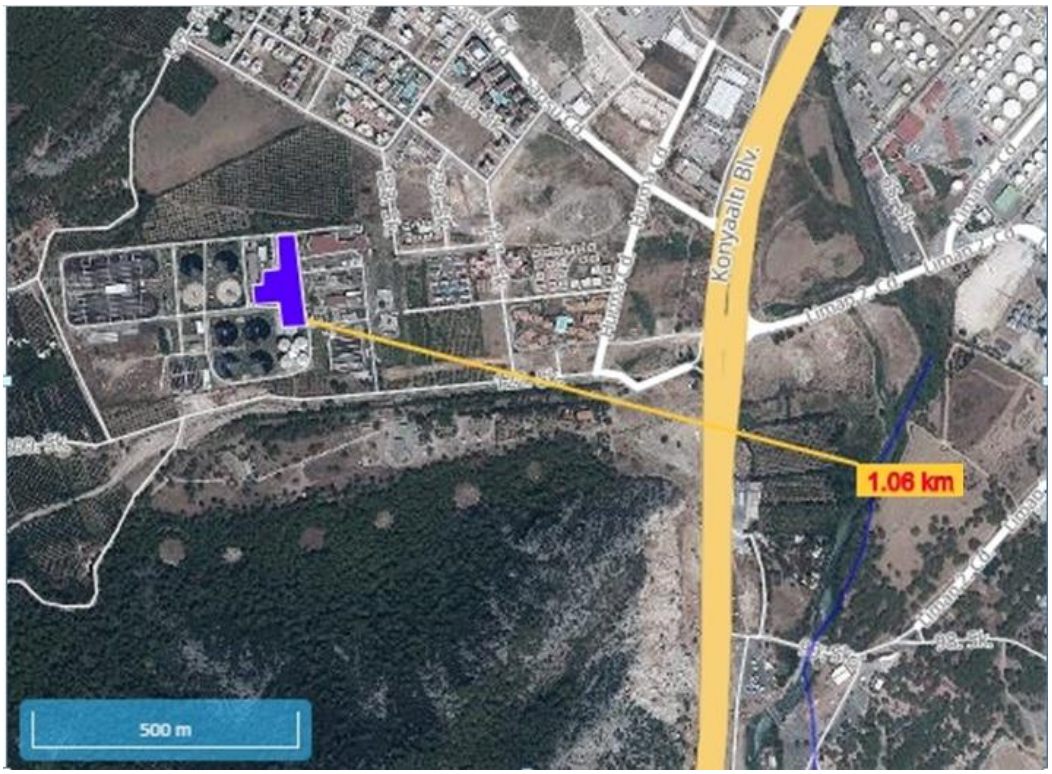


Figure 47: The Distance of the Project Site to Sarisu Stream



Figure 48: The Distance of the Project Site to Çandır Stream and Boğaçayı

Water Resources Throughout Antalya

Antalya is a very rich city in terms of groundwater. These underground water resources are used to meet the water needs of the province and for irrigation.

Kırkgöz Springs: It is a spring originating from the Taurus Mountains.

Gürkavak Spring: "Gürkavak Spring", one of the oldest springs from which the city supplies water, is located in Düzlerçamı National Park in the northwest of Antalya.

Mağara (Cave) Spring: This spring, which emerges from the cliffs opposite Konyaaltı Beach, is the closest source to the city and the city's drinking water is supplied from here.

Duraliler Spring: This spring, which is located in the settlement and agricultural areas of Duraliler Village, is used for irrigation.

İskele Spring (Masjid Area): Local drinking water needs are met from this source, which comes out of the masjid area in the marina.

Hurma Springs: This spring, which is located in the Hurma Village in the west of Antalya and has very high-quality water, has been used to meet the city's drinking water needs until recently.

However, with the effect of drought in recent years, it is now neglected and abandoned.

Arapsuyu Springs: Arapsuyu I and II springs, located in the west of Antalya, reach the sea after flowing on the surface for 2 km.

Boğaçayı Keson Wells: They are located in the alluviums in the Boğaçayı basin and are used to meet the drinking and utility water needs.

Düden Waterfall Spring: It comes out from under the Düden Waterfall.

Duraliler Well: Located in the north of Duraliler Village, outside the residential and agricultural areas, these wells are used for irrigation.

Meydan Wells: Located in the Meydan district of Antalya, these wells are in the middle of residential areas. Some of the city's drinking water is supplied from here.

Other natural areas:

Antalya Düden Waterfalls

Antalya Kurşunlu Waterfall

Antalya Manavgat Waterfall

Antalya Cleopatra Beach

Antalya East Beach

Other Beaches of Antalya with Natural Beauty

Antalya Karain Cave

Antalya Damlataş Cave

Antalya Dim Cave

Other Caves of Antalya with Natural Beauty

Antalya Ovacık Plateau

Antalya Saklikent Plateau

Water surfaces cover 52,080 decares of Antalya Province with a rate of 0.025% of the total surface area. Antalya province area intersects with the precipitation areas of the 3 big basins, which are grouped by their subdivisions in Table 26 below.

Table 26: Antalya Province Basins

Western Mediterranean Division	Antalya Division	Eastern Mediterranean Division
Eşen-Karaçay Basin	Kırkgözler Basin	Sedre Basin
Demre Basin	Düden Basin	Bıçkıcı Basin
Finike-Karasu Basin	Aksu Basin	Others
Finike-Başgöz Basin	Köprüçay Basin	
Finike-Tekkepınarı Basin	Manavgat Basin	
Finike-Alakır Basin	Karpuz Basin	
Finike-Salur Basin	Alara Basin	
Others	Kargı Basin	
	Dim Basin	

The water potential of the Antalya Province basin is 16,211 hm3/year. 15,846 hm3/year of it consists of surface water and 365 hm3/year consists of underground water resources. It has the country's 5th largest water resources in terms of water potential. The water potential of Antalya province is given in Table 27.

Table 27: Antalya Province Water Potential

Antalya Province Water Potential	Annual Usable Surface Water Potential	15,8 billion m^3
	Annual Usable Groundwater Potential	0,365 billion m^3
	Annual Total Water Potential	16,2 billion m^3
Ratio of Turkey's overall water potential		9%

Söğüt Lake, Karagöl Marshes and Avlan Lake are within the provincial borders. Lakes in Antalya are generally small lakes located in the western part of the province, and they usually dry up in summer. For example, Karagöl is found as a lake in 8-10 months of the year, while Avlan lake is found only in 6-7 months of the year. Lakes of Antalya province are given in Table 28.

Table 28: Lakes in Antalya Province

Lake Name	Area	Location
Avlan	8 Km^2	Elmalı
Karagöl Marshes	10 Km^2	Elmalı
Söğüt Lake	40 Km^2	Korkuteli
Eğri Lake	3 Km^2	Gündoğmuş

(Source: www. Antalya.gov.tr)

The important rivers of the province are: Manavgat, Köprü, Aksu, Düden, Dim, Kargı, Alara, Karpuz, Başgöz, Karaman and Korkuteli Streams. Since the summers are hot and dry, the waters of these streams are much reduced, and many of them even dry up. Flow rates of streams and creeks rise with autumn rains. With the melting of the snow in the Taurus Mountains in the spring, the flow rates of the rivers reach their highest level. Streams, Rivers and Brooks of Antalya are given in Table 29.

Table 29: Streams, Rivers and Brooks of Antalya Province and their Lengths

Stream	Length Measure Point	km
Aksu Stream	Eğridir Lake - Mediterranean	162
Köprü River	Sarıidris Mountain - Mediterranean	183
Manavgat Stream	Akdağ - Mediterranean	93

(Source: www. Antalya.gov.tr)

Drinking and utility water in Antalya, which has rich water resources, is generally met from spring waters. The most important springs in the region, which is rich in groundwater are; Kırkgöz Springs, Gürkavak Springs, Duraliler Springs, İskele Spring, Hurma Springs, Arapsuyu I-II, Düden Waterfall Spring, Meydan Wells.

Hurma springs located around the project site are one of the quality sources that do not carry the risk of contamination. However, it is not used as a source of drinking and utility water today.

5.7. HYDROGEOLOGICAL CHARACTERISTICS

Field Hydrogeology

Jurassic-Kratase aged limestone constitutes a significant part of the mountainous part in the west and northwest of the Antalya Plateau. This karst limestone of the Jurassic-Cratesea carries a large amount of water, creating a rich water source in the region. The groundwater bearing karst limestone is fed not only by rainwater but also by sinkholes in the upper basin.

Groundwater in the Karst limestone formation rises to the surface via Karst springs seen in the upper (eg Kırkgöz Spring) and lower (eg Gürkavak, Hurma) Travertine plateaus. In areas in contact with Travertine, groundwater flows directly from limestone to Travertine formations. In addition, groundwater discharges directly into the sea in the southern part of the Karst limestone mass.

Travertine unit covers an area of approximately 630 km2 around Antalya. This unit consists of two plateaus separated from each other by a 100 m high cliff. The city of Antalya was built on the lower plateau.

Groundwater discharges: The Düdenbaşı Spring is formed by the springs on the edge of the lower plateau (Duralis, Kemerağzı) and by hundreds of springs under the sea. Currently, a relatively small part of the water potential in the travertine is used by pumping from the wells.

Streams carved travertine both in the west and east of the project site and formed alluvial plains. The main alluvial aquifer in the project area is the alluvium of Boğaçay. The material that forms the alluvium along the valley consists of large blocks and gravels. As you get closer to the sea, the material gets thinner and appears to contain more sand, silt and clay.

In the research carried out by the State Hydraulic Works in the areas close to the area where the Batı Antalya Wastewater Treatment Plant is built, it is stated that the underground formation is limestones under the alluvium and their depth is approximately 31 meters. Geology and hydrogeology map of the project site and its surroundings is presented in Figure 49.

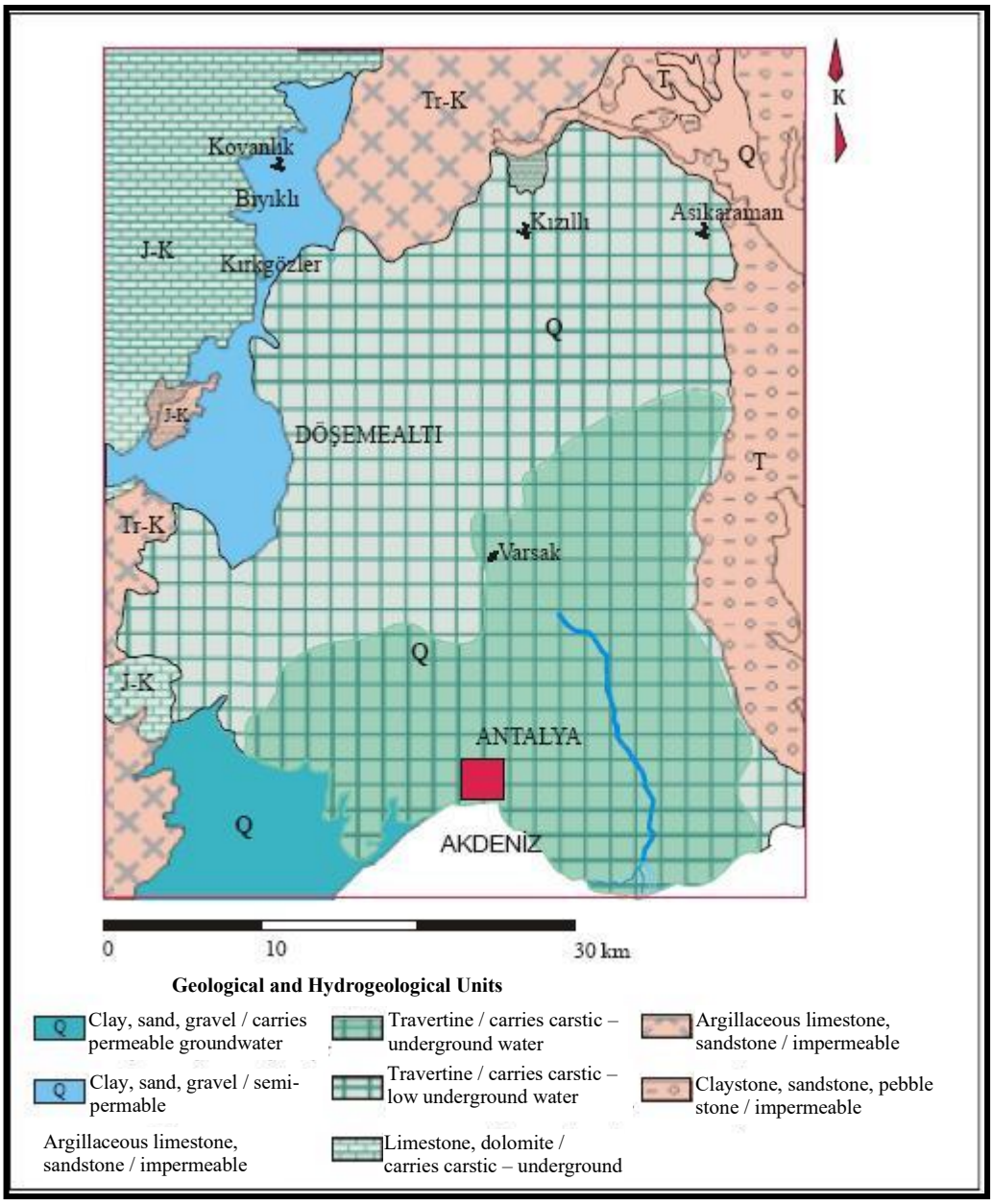
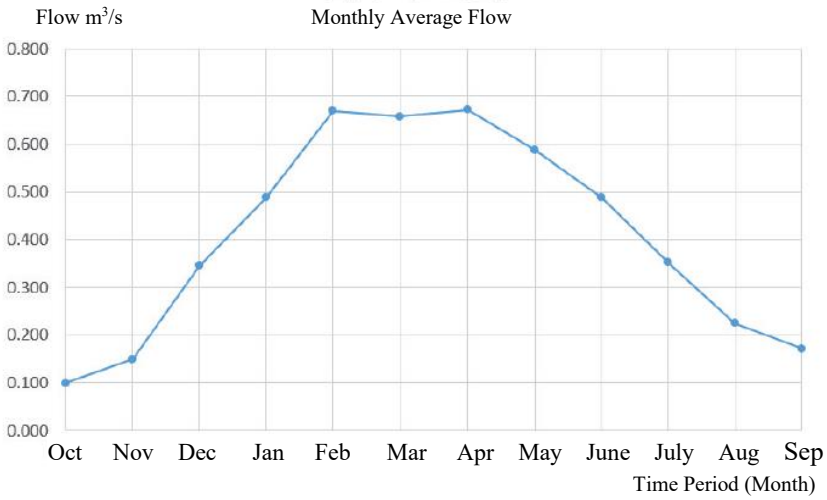


Figure 49: Geology and Hydrogeology Map (SHW, 1985b)

Hurma springs are located in the west of Boğaçay plain, in the south of Hurma Neighborhood, Küçüktepe. The spring empties from more than one cell and emerges from the contact of the alluvium and Tekedağı Formation. The discharge level of the springs is between 10-12 m. The springs are fed by the Tekedağı Formation consisting of limestones and alluvium. Along the valley where the Çandır Stream, which is a tributary of the Boğaçayı, flows, the alluvium, which is generally composed of coarse material, has high porosity and permeability. In the feeding zone of the date palm springs, it is in contact with the Çandır valley alluvium and the limestones (Tekedağı formation) that drain the sources, and the alluvial aquifer feeds the limestone aquifer.

Hurma springs were put to use as drinking water in the 1960s and 1970s. The source discharge (Graph 2) is not actively used at the moment, and drinking-use and irrigation water is taken from the source by the residents. Other discharges are partially used for irrigation and feed the Boğaçayı.



Graphic 2: Flow Rate Change According to Months in Hurma Spring

According to monthly measurements between 1964 and 2015 water years, the average flow rate of the spring is 409 liters/sec. This amount means approximately 13 million m3/year of groundwater. Accordingly, it has a remarkable potential and it is important to protect it today and in the future.

From Graph 2, it is seen that the source has maximum flow in February, March and April. After this month, a decrease is observed in resource discharges until October, and after this month, it starts to increase again depending on the precipitation.

The discharge coefficient of the source is α = 0.0133 1/day. In the calculations made by considering the maximum flow in April and the minimum flow in October, the reserve of the source is calculated as 4.36 hm3 and 0.64 hm3, respectively.

Groundwater was encountered as a result of ground drilling works within the parcel under study, and the groundwater depths are shown in Table 30, and the schematic study showing the groundwater is shown in figure-50.

Table 30: Groundwater Levels Obtained from Drilling Works

WELL NO	GROUNDWATER LEVEL
SK-1	3.05 m
SK-2	3.60 m
SK-3	3.45 m
SK-4	2.90 m
SK-5	3.20 m

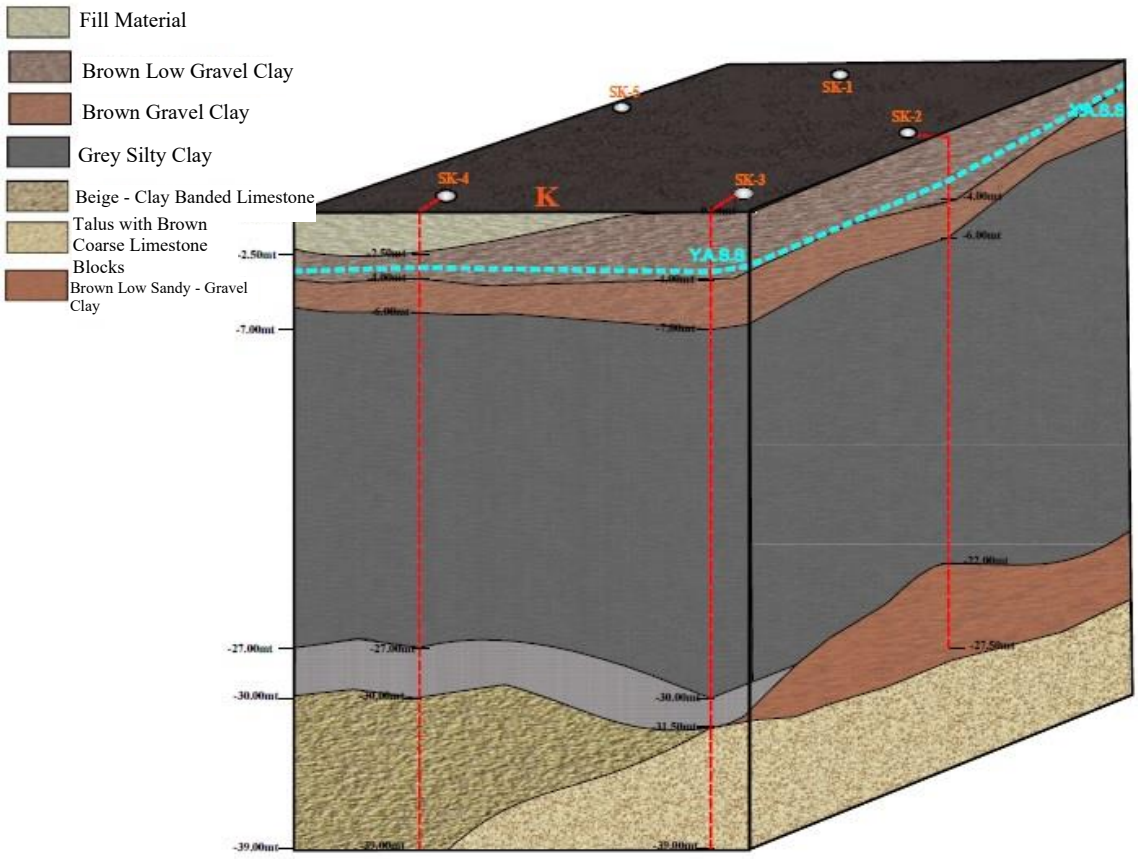


Figure 50: Hurma Wastewater Plant Sludge Combustion Unit Area Geological Section Shows Groundwater Level

All units within the project will be built on a concrete floor and will be in a leak-proof structure. All kinds of waste that will arise from the project will be stored in the temporary storage area in the existing facility, and the aforementioned storage area has a ground impermeability and rainproof feature that is enclosed. There is no possible negative impact on the aquifer structure, springs, water boreholes, which may be capable of carrying groundwater from the aforementioned wastes.

When the operation phase is started in the activity area, the nearest groundwater in the project impact area; Necessary chemical analyzes will be made by taking water samples from water sources, water boreholes, fountains, catchments, etc. points, the analysis results will be accepted as a reference and repeated for control purposes at 3-month intervals, and any changes that may occur in groundwater quality are monitored and will be reported to Antalya SHW 13 Regional Office. All measures will be taken to ensure that groundwater resources (if any, springs, boreholes, etc.) are not adversely affected in terms of quantity and quality, and it is committed to comply with all legislation in force within the framework of the protection of groundwater and resources and all matters specified in this EIA Report.

5.8. SOIL PROPERTIES AND LAND USE STATUS

Antalya province covers an area of 2,072,731.7 hectares. Specified as other geographical data in the database of digital soil maps, settlements 10,521.3 ha, industrial areas 501.9 ha, tourism areas 504.0 ha, national park areas 77,696.8 ha, airports 524.8 ha, lake areas 378.7 ha, a total area of 90,779.2 ha as private farms and coastal dunes 4178.5 ha, given as terrain types in the

database of digital soil maps, bare rocky land 338,658.3 ha and river beds as 8,290.8 ha make up a total area of 351.127,6 ha. Other geographical data and land types cover 17.5% of Antalya with a total area of 532,034.3 ha.

Table 31: Spatial Distribution in Antalya Province Soil Map

AREAS	AREA (Ha)	PROPORTION (%)
Residential Areas	10.521,3	1.9
Industrial Areas	501.9	0.9
Tourism Areas	504	0.9
National Parks	77.696,8	14.6
Airports	524.8	0.9
Lake Areas and River Beds	8.669,5	1.6
Private Farms	90.779,2	17
Beach Dunes	4.178,5	0.7
Bare Rock Terrains	338,658.3	63.6
Total	532,034.3	100

(Source: Database, Soil Maps Made in Geographic Information Systems)

In Antalya, according to the data obtained from the digital soil maps and the 1938 American Soil Classification System; There are lands belonging to 15 different Great Soil Groups, namely: Alluvial Soils, Chestnut Soils, Salty Alkaline Soils, Reddish Brown Mediterranean Soils, Reddish Brown Soils, Hydromorphic Alluvial Soils, Colluvial Soils, regosols, Brown Forest Lands, Limeless Brown Forest Soils, Organic Soils, Rendzina Lands, Alluvial Marshes, Red Mediterranean Lands, the High Mountain Meadow Soils. In the digital soil maps database, large soil groups are distributed in 82.5% of Antalya province. The distribution of Antalya Province Major Soil Groups is given in Table 32.

Table 32: Distribution of MAjor Soil Groups in Antalya Province

MAJOR SOIL GROUPS	AREA (Ha)	PROPORTION (%)
Alluvial Soil	121.771.6	5.8
Chestnut Colored Soils	72.956.8	3.5
Reddish Brown Mediterranean Soil	243.282.2	11.7
Reddish Brown Soil	37.4	0.1
Hidromorfik Alüviyal Toprak	1.286.6	0.1
Colluvial Soil	52.655.5	2.5
Regosols	7.050.5	0.3
Brown Forest Soil	314.928.4	15.2
Limeless Brown Forest Soil	224.474.7	10.8
Organic Soil	3.405.8	0.2
Rendzina Soil	51.731.5	2.5
Alluvial Marshes	489,0	0.1
Red Mediterranean Soil	613.540.7	29.5
High Mountain Meadow Soil	1.014.3	0.1
Salty Alkaline Soil	400,8	0.1

Non-Agricultural Areas	363,705.9	17.5
Total	2.072.731.7	100,0

(Source: Database, Soil Maps Made in Geographic Information Systems)

Soils in the project site and its immediate surroundings are alluvial soils. Currently, citrus and cereals are cultivated around the project site, and since the fields very close to the project site have been abandoned or opened for development, there is no agricultural land in the immediate vicinity. The area around the project site has a flat and nearly flat topography, and its average elevation is between 15-25 m. The activity area is medium bodied alluvial and well drained.

5.9. METEOROLOGICAL AND CLIMATIC FEATURES

It has been prepared by the Meteorological Engineer of the Meteorological and Climatic Features Department, and the Diploma and Chamber Registration Copies of the Meteorological Engineer have been uploaded to the "Additional files we do not want to be seen" section.

5.9.1. General climatic conditions of the region;

5.9.1.1. General climatic conditions of the region

The activity will take place in Antalya Province, Konyaaltı District Hurma Neighborhood. Since the Mediterranean climate prevails in Hurma Neighborhood, summers are hot and dry, and winters are warm and rainy. As you go inland from the coast, the effect of the continental climate is seen and the temperature decreases.

The meteorological data needed in the preparation of the project were obtained from the Antalya Regional Meteorology Station 2002-2019 Bulletin, which was obtained from the Meteorological Data Processing Department of the Ministry of Agriculture and Forestry, General Directorate of Meteorology.

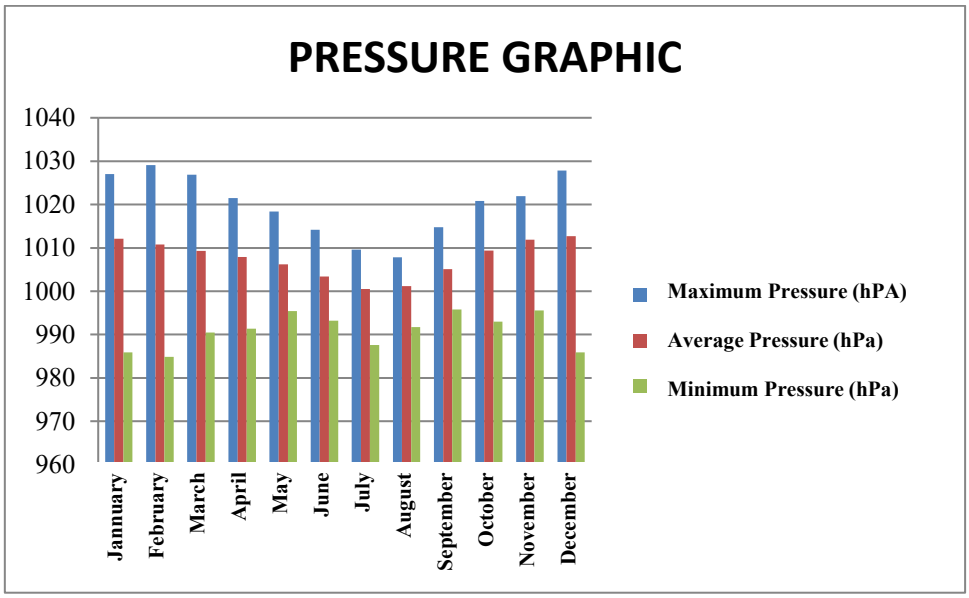
The climatic and meteorological characteristics of the project area and the distribution of the parameters during the year are given below as tables, graphics and written expressions.

5.9.1.2. Pressure (Average pressure, Maximum pressure, Minimum pressure)

According to the data of the Meteorology Station of the Antalya Regional Directorate of Meteorology, the annual average pressure value recorded between 2002 and 2019 was measured as 1007.5 hPa. The highest pressure was observed in February with a value of 1029.1 hPa. The lowest pressure was observed in February with a value of 984.9 hPa. Graph-3 was created by using the pressure values in Table-33 below for the region.

Table 33: Meteorology Antalya Regional Directorate Meteorology Station Pressure Values (2002-2019)

Parameter	Observation Period, (YEAR)	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Highest pressure (hPa)	13	1027	1029.1	1026.9	1021.5	1018.4	1014.2	1009.6	1007.8	1014.8	1020.8	1021.9	1027.8	1029.1
Average pressure (hPa)	13	1012.1	1010.8	1009.3	1007.9	1006.2	1003.4	1000.5	1001.2	1005.1	1009.4	1011.9	1012.7	1007.5
Lowest pressure (hPa)	13	985.9	984.9	990.5	991.4	995.4	993.2	987.6	991.7	995.8	993	995.6	985.9	984.9



Graphic 3: Antalya Regional Directorate of Meteorology Meteorology Station Pressure Graph Created with 13 Year Observation Period

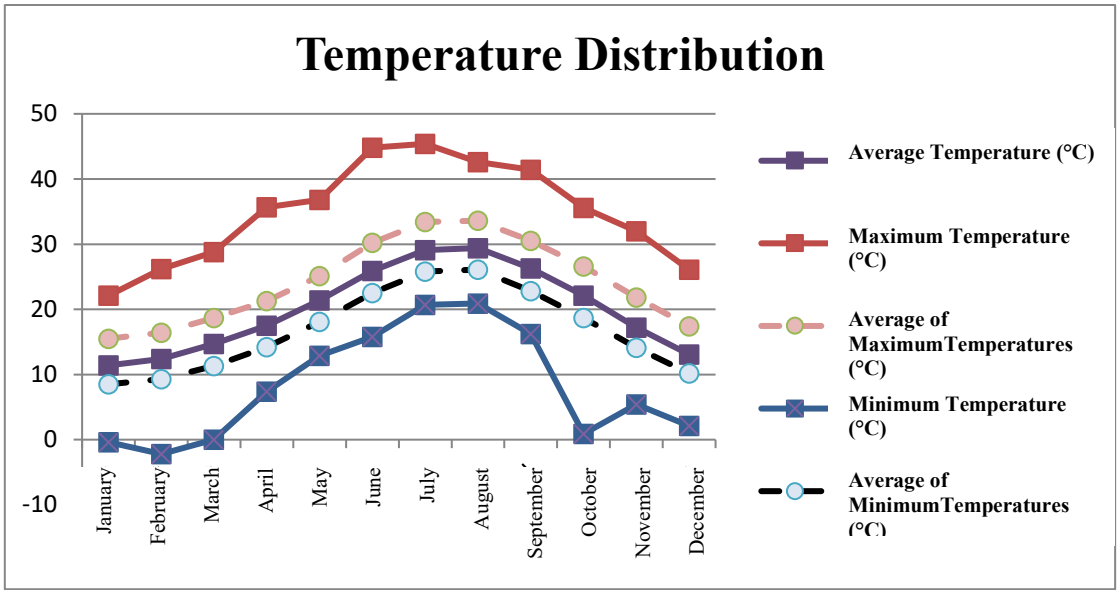
5.9.2. Temperature

According to the 2002-2019 observation records of the Meteorology Station of the Antalya Regional Directorate of Meteorology, the annual average temperature is 20ºC, the annual average of the maximum temperatures is 24.2 ºC, the annual average of the minimum temperatures is 16.8 ºC. The highest temperature measured is 45.4 ºC in July, and the lowest temperature is -2.2 ºC in February.

The month with the lowest monthly average temperature is January with 8.5 ºC, and the month with the highest monthly average temperature is August with 33.6 ºC.

Table 34: Meteorology Antalya Regional Directorate Meteorology Station Temperature Values (2002-2019)

	Observation P	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average Temperature (°C)	18	11.4	12.4	14.7	17.5	21.4	25.9	29.1	29.4	26.3	22.1	17.2	13.1	20
Maximum Temperature (°C)	18	22.1	26.2	28.8	35.7	36.8	44.8	45.4	42.6	41.4	35.6	32	26.1	45.4
Average Maximum Temperatures (°C)	18	15.5	16.4	18.7	21.3	25.1	30.2	33.4	33.6	30.5	26.6	21.8	17.4	24.2
Minimum Temperature (°C)	18	-0.4	-2.2	0	7.4	12.9	15.8	20.7	20.9	16.2	0.9	5.4	2.1	-2.2
Average Minimum Temperatures (°C)	18	8.5	9.3	11.3	14.2	18.1	22.5	25.8	26.1	22.8	18.7	14.1	10.2	16.8



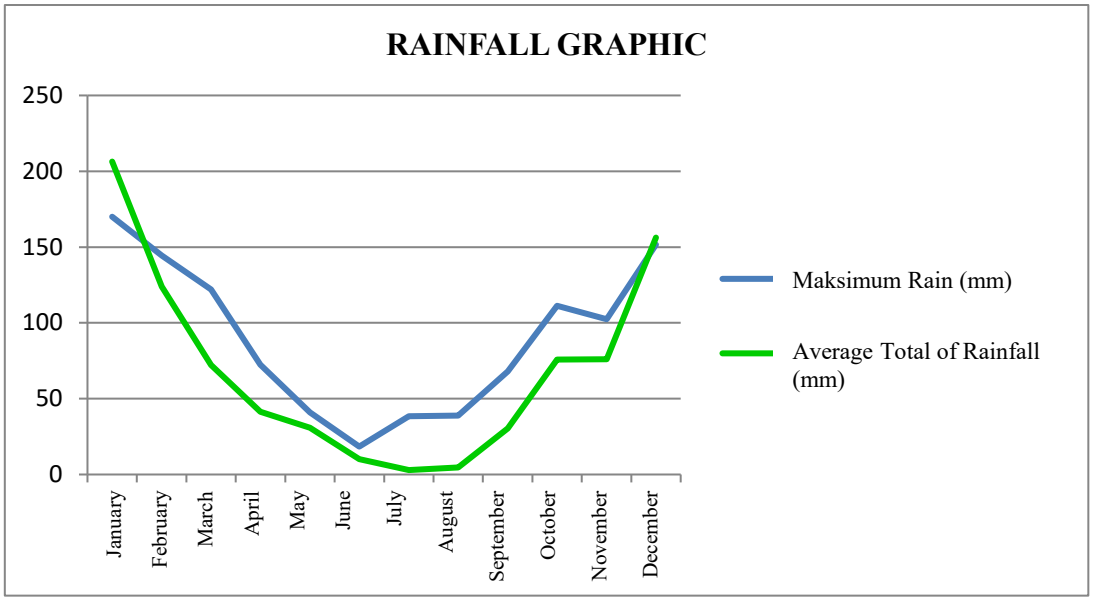
Graphic 4: Antalya Regional Directorate of Meteorology Meteorology Station Temperature Graph Created with an Observation Period of 18 Years

5.9.3. Precipitation

According to the data of Antalya Regional Meteorology Station 2002-2019, the annual total precipitation average is 830.66 mm. During the observation period taken as a basis in the project, the maximum observed daily precipitation is in January with 170 mm. The month with the lowest monthly maximum precipitation is June with 18.4 mm, and the highest month is January with 170 mm.

Table 35: Meteorology Antalya Regional Directorate Meteorology Station Precipitation Data

	Observation P	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Maximum Monthly Precipitation (mm)	15	170	144.4	122	72.4	41	18.4	38.4	38.8	68	111.2	102.4	151.6	170
Average Monthly Total Precipitation (mm)	15	206.38	123.89	72.13	41.49	30.88	10.05	2.92	4.55	30.31	75.83	76.03	156.21	830.66



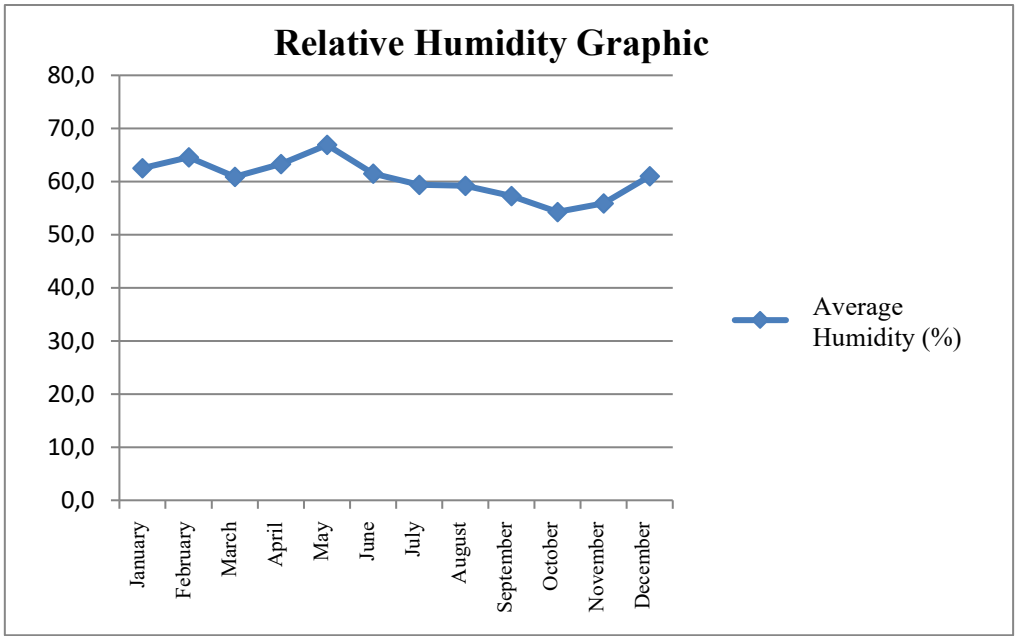
Graphic 5: Graph of Precipitation Amonunts Created by Meteorology Antalya Regional Directorate Meteorology Station Data

5.9.4. Average relative humidity

According to the data of the Meteorology Station of the Antalya Regional Directorate of Meteorology, the annual average humidity is 60.6%.

Table 36: Antalya Regional Meteorology Station Humidity Data

	Observation P	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average Humidity (%)	13	62.5	64.6	60.9	63.3	66.9	61.5	59.4	59.2	57.3	54.3	55.9	61.0	60.6



Graphic 6: Humidity Rates Chart Created for Meteorology Antalya Regional Directorate Meteorology Station

5.9.5. Numbered days

Since Antalya Regional Directorate of Meteorology Meteorology Station observation records do not contain "Monthly Average Number of Foggy Days, Monthly Average Number of Monthly Frosty Days and Monthly Average Number of Dew Days", these data were obtained from Antalya Meydan Meteorology Station observation records.

According to the Meteorology Station observation records of the Antalya Regional Directorate of Meteorology, the number of annual snowy days is 0.08, the annual number of snow-covered days is 0, and the annual number of thunderstorm days is 31.48 days.

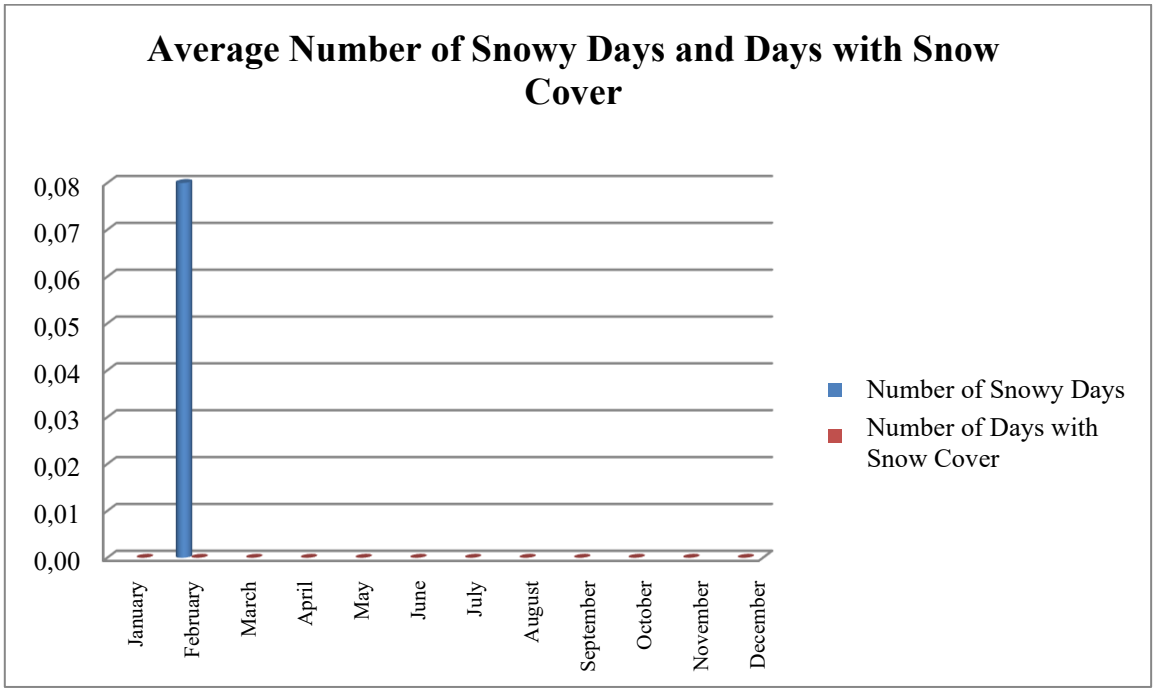
According to the observation records of Antalya Meydan Meteorology Station, the annual total number of foggy days is 1.51, the annual total number of frosty days is 0.55 and the annual total number of dew days is 21.9.

The numbered days data are presented in Table-39 below, and the graphical representation of the data is presented in the following chart-7, 8, 9, 10, 11 and 12.

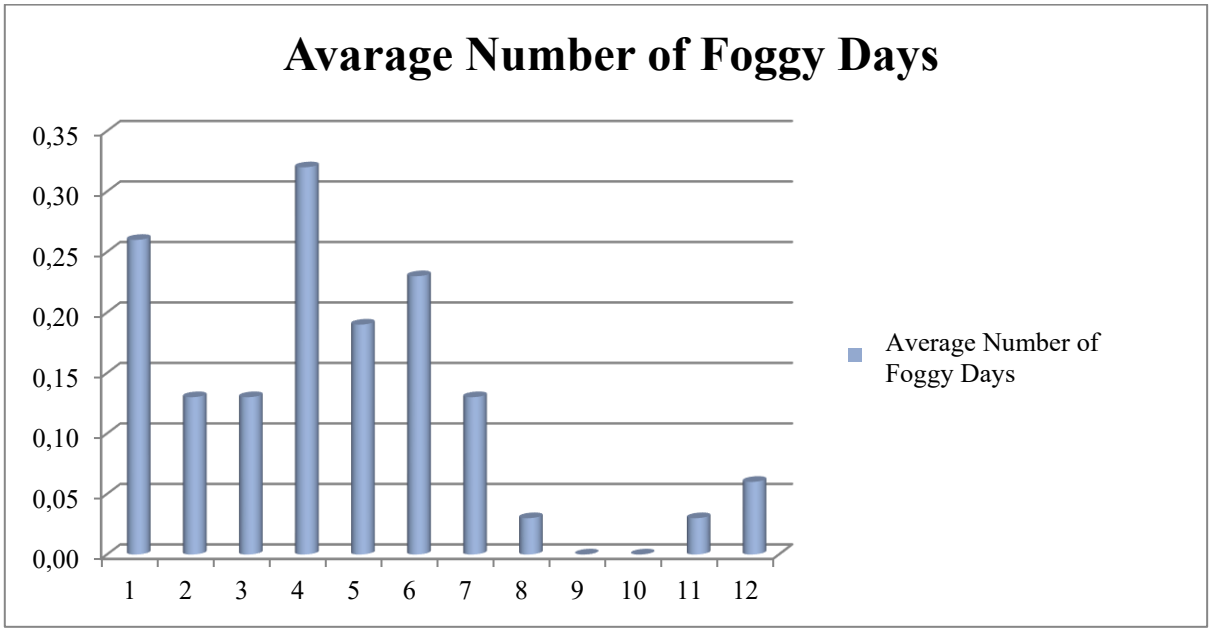
Table 37: Antalya Regional Directorate of Meteorology and Antalya Meydan Meteorology Station Numbered

	Observation P	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Number of Snowy Days	13	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
Number of Snow Covered Days	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Number of Foggy Days	31	0.26	0.13	0.13	0.32	0.19	0.23	0.13	0.03	0.00	0.00	0.03	0.06	1.51
Average Number of Hail Days	13	0.54	0.31	0.23	0.23	0.23	0.08	0.00	0.00	0.08	0.00	0.08	0.08	1.86

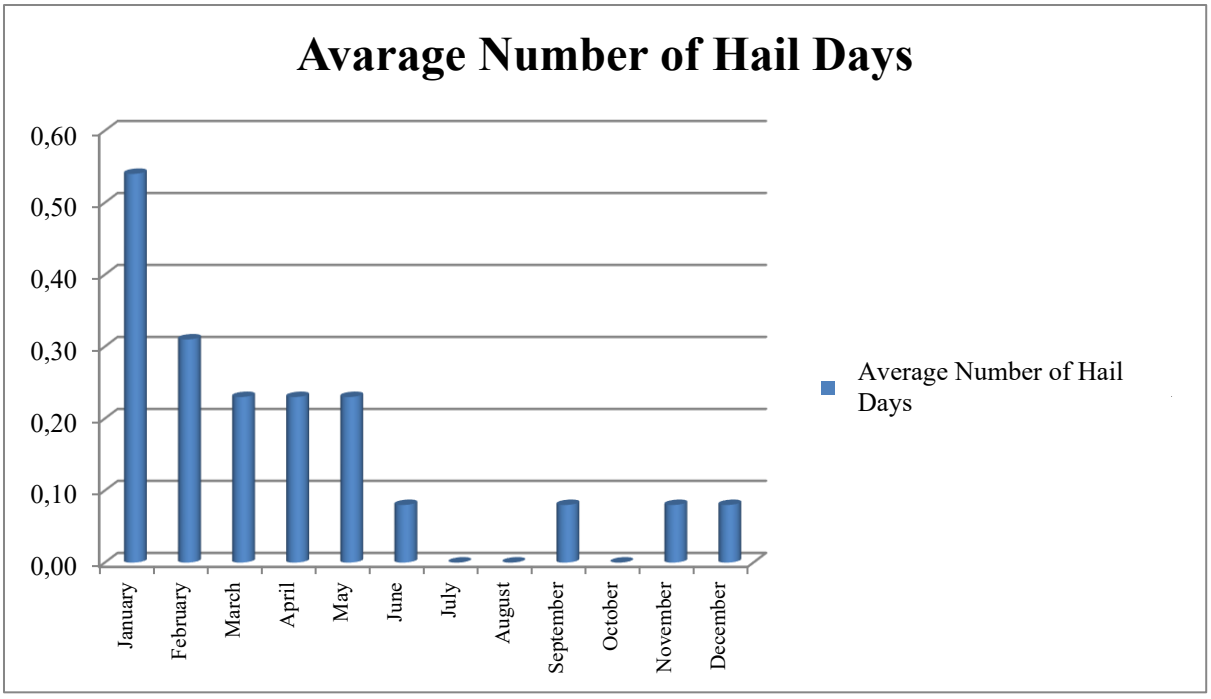
Average Number of Frosted Days	31	0.39	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.55
Average Number of Dew Days	31	1.81	1.74	2.97	3.35	2.61	0.71	1.19	1.10	1.29	1.06	1.81	2.26	21.90
Average Total Number of Thunderstorm Days	13	4.92	3.08	1.85	2.08	3.62	2.92	0.31	0.85	2.31	3.77	2.54	3.23	31.48



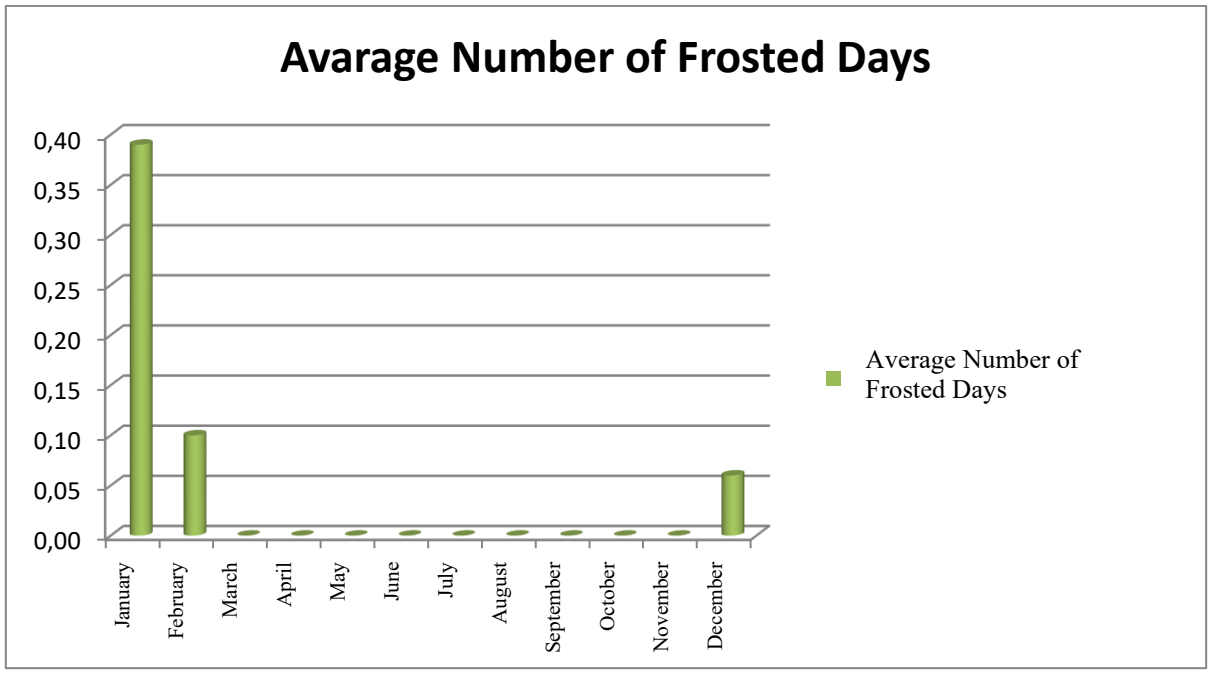
Graphic 7: Antalya Regional Directorate of Meteorology Meteorology Station Data and Average Number of Snowy and Snow Covered Days Graph



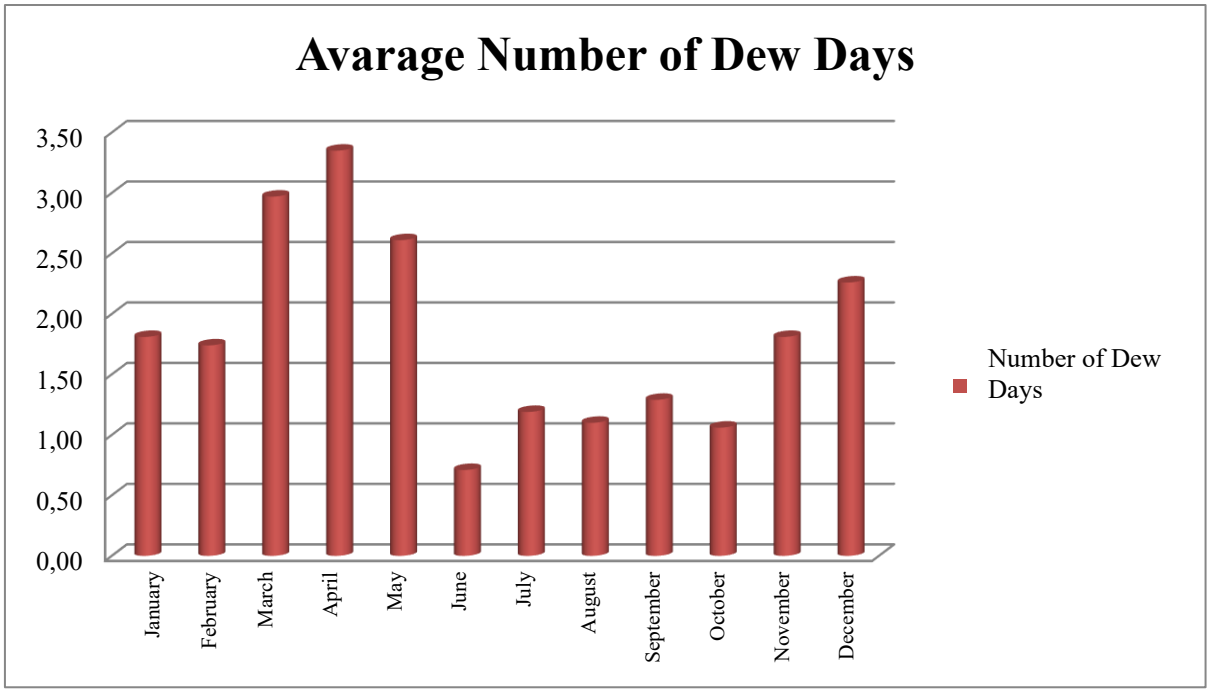
Graphic 8: Antalya Regional Directorate of Meteorology Meteorology Station Data and Average Number of Foggy Days



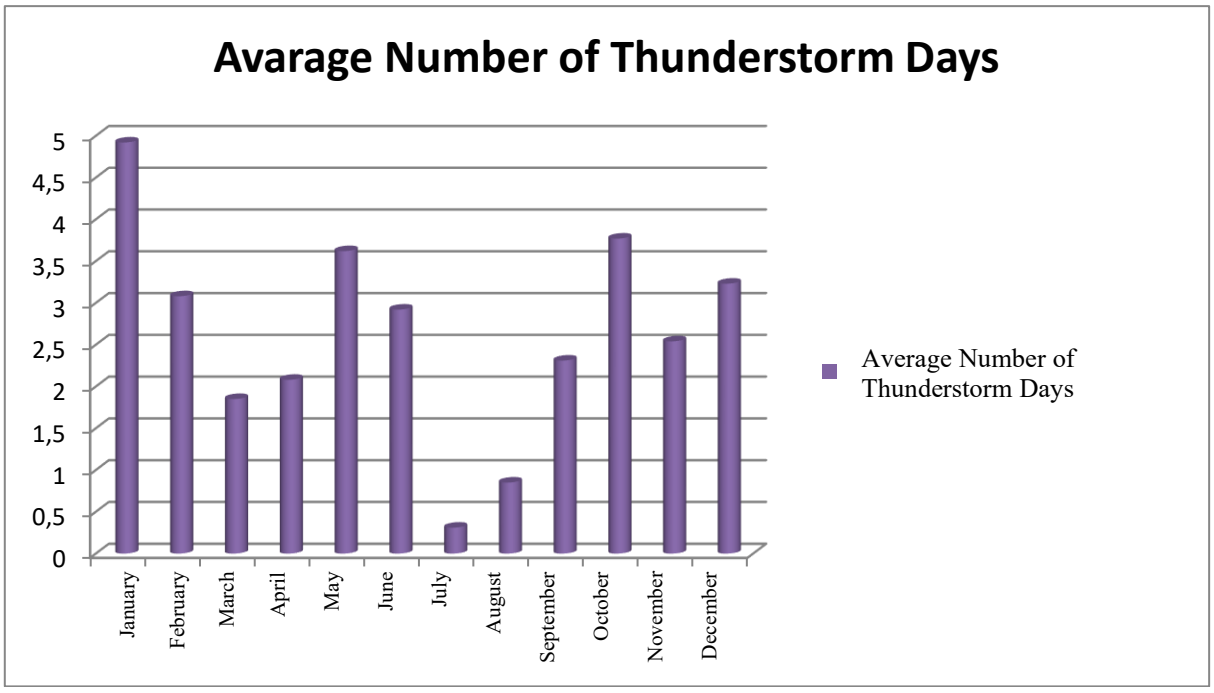
Graphic 9: Antalya Regional Directorate of Meteorology Meteorology Station Data and Average Number of Hail Days



Graphic 10: Antalya Regional Directorate of Meteorology Meteorology Station Data and Average Number of Frosted Days



Graphic 11: Antalya Regional Directorate of Meteorology Meteorology Station Data and Average Number of Dew Days



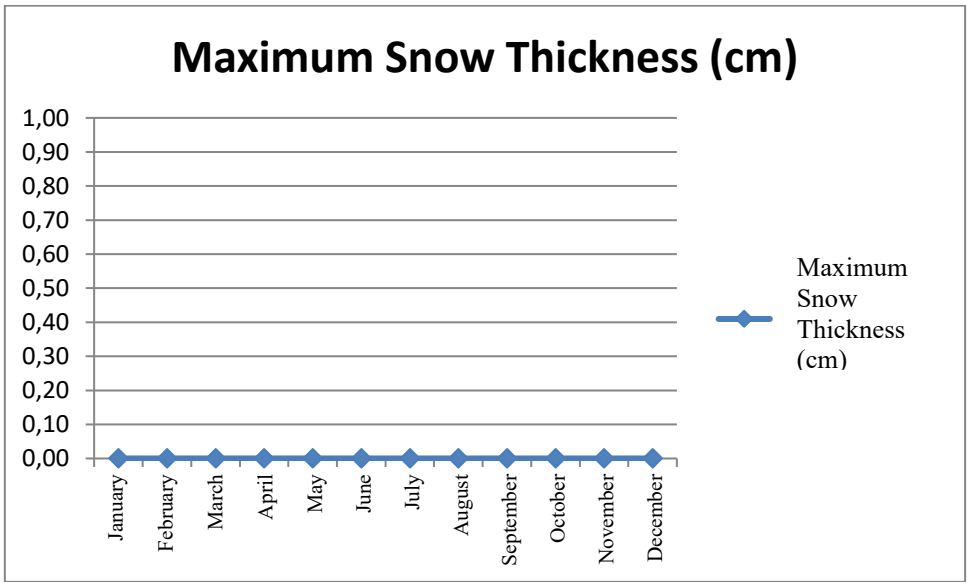
Graphic 12: Antalya Regional Directorate of Meteorology Meteorology Station Data and Average Number of Thunderstorm Days

5.9.6. Maximum snow thickness

According to the Meteorology Station observation records of the Antalya Regional Directorate of Meteorology, the maximum snow thickness is 0 cm.

Table 38: Meteorology Antalya Regional Directorate Meteorology station Numbered Days Data

	Observation P	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Maximum snow thickness (cm)	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Graphic 13: Antalya Regional Meteorology Station Data Maximum Snow Thickness Graph

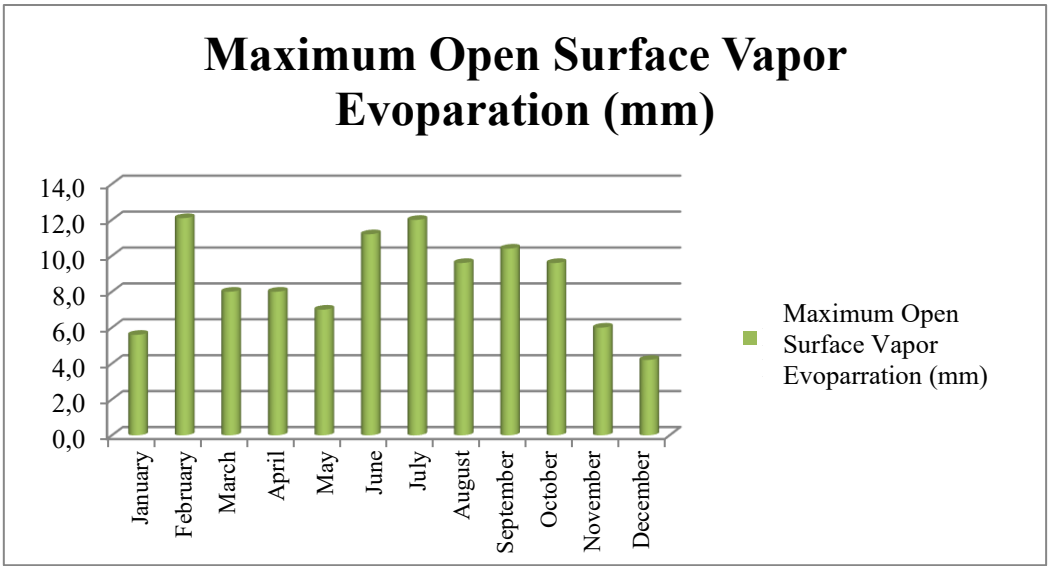
5.9.7. Evaporation

According to the Meteorology Station observation records of the Antalya Regional Directorate of Meteorology, the annual average open surface evaporation is 1186.5 mm. The daily maximum open surface evaporation observed to date has been determined as 12.1 mm.

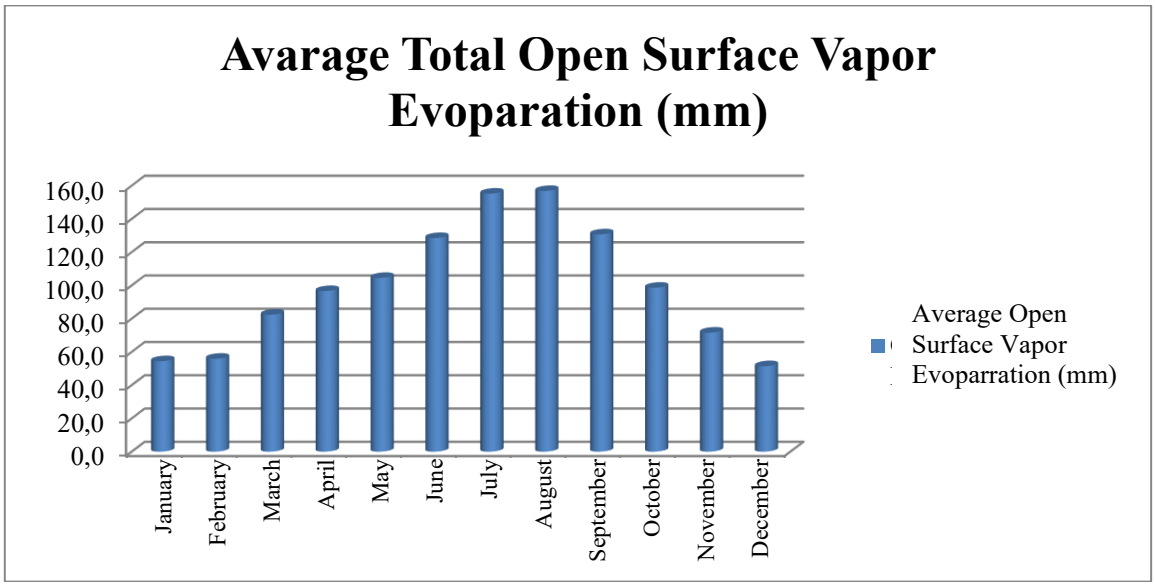
Graph-14 and Graph-15 prepared according to Table-39 showing the evaporation values of Meteorology Antalya Regional Directorate Meteorology Station are presented below.

Table 39: Meteorology Antalya Regional Directorate Meteorology Station Open Surface Evaporation

Parameter	Observation P	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average Open Surface Evaporation (mm)	18	54.4	55.9	82.4	96.6	104.5	128.5	155.2	156.8	130.7	98.6	71.6	51.4	1186.6
Maximum Open Surface Evaporation (mm)	10	5.6	12.1	8.0	8.0	7.0	11.2	12.0	9.6	10.4	9.6	6.0	4.2	12.1



Graphic 14: Maximum Open Surface Vapor Evaporation Graph Created for MEteorology Antalya Regional Directorate Meteorology Station



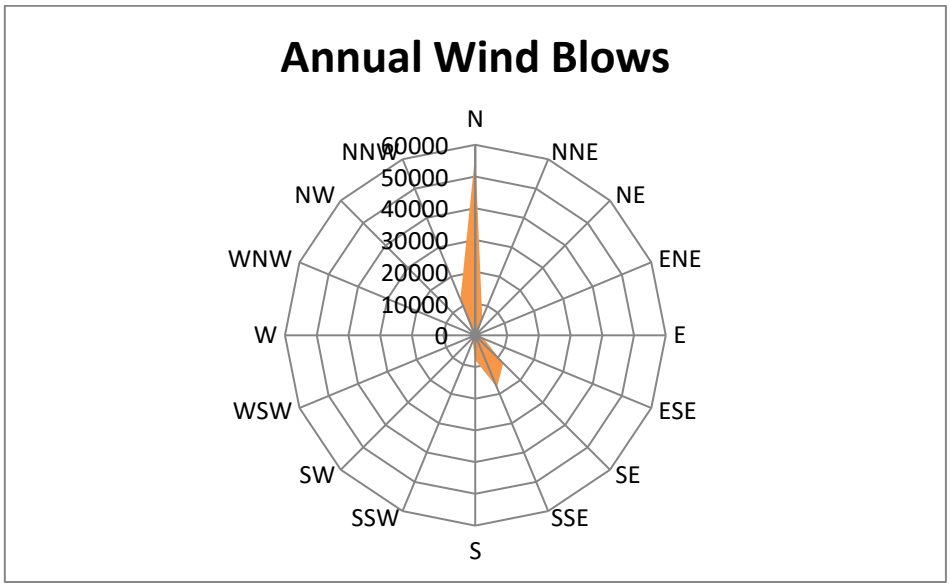
Graphic 15: Average Total Open Surface Vapor Evaporation Graph Created for Meteorology Antalya Regional Directorate Meteorology Station

5.9.8. Wind

According to the observation data of the Meteorology Station of the Antalya Regional Directorate of Meteorology, the first-degree prevailing wind direction is N (North), the second-degree prevailing wind direction is SSE (South-South-East), and the third degree prevailing wind direction is SE (Southeast). Graph-16 was created by using the wind blow numbers in Table-40 below for the district.

Table 40: Meteorology Antalya Regional Directorate Meteorology Station Total Values of Wind Blows According to Directions (2002-2019)

NUMBER OF WIND BLOWS (2002-2019)														
Parameter	**Observation P**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
N	17	6854	5324	5073	4018	3346	3201	2809	3028	4257	5860	6391	7010	57171
NNE	17	469	439	528	591	417	418	387	358	469	544	497	522	5639
NE	17	69	67	108	101	129	120	177	188	117	110	78	68	1332
ENE	17	57	56	59	106	60	86	101	165	87	89	51	35	952
E	17	63	65	92	102	111	143	189	193	120	143	67	52	1340
ESE	17	105	139	191	265	335	339	431	311	324	276	139	66	2921
SE	17	332	514	797	1116	1723	1743	1927	1809	1221	623	341	279	12425
SSE	17	728	1139	1548	1777	1964	1998	1974	1921	1894	1408	838	622	17811
S	17	499	659	933	880	807	708	607	561	508	583	554	502	7801
SSW	17	176	174	185	215	253	232	272	209	109	148	188	170	2331
SW	17	98	136	123	120	138	152	170	146	73	96	110	120	1482
WSW	17	56	46	59	84	93	104	151	85	34	45	52	54	863
W	17	34	33	35	64	100	98	109	80	49	44	26	29	701
WNW	17	40	31	66	73	98	103	112	93	67	42	34	38	797
NW	17	78	93	92	129	175	168	172	178	135	94	78	96	1488
NNW	17	1361	1110	1178	1084	973	836	892	858	853	854	937	1385	12321



Graphic 16: Graph of Annual Wind Blows According to Observations Made at MEteorology Station of Antalya Regional Directorate of Meteorology in 2002-2019

Table 41: Sum of Winter Season Blowing Numbers

Parameter	**December**	**January**	**February**	**Total**
N	7010	6854	5324	19188
NNE	522	469	439	1430
NE	68	69	67	204
ENE	35	57	56	148
E	52	63	65	180
ESE	66	105	139	310

SE	279	332	514	1125
SSE	622	728	1139	2489
S	502	499	659	1660
SSW	170	176	174	520
SW	120	98	136	354
WSW	54	56	46	156
W	29	34	33	96
WNW	38	40	31	109
NW	96	78	93	267
NNW	1385	1361	1110	3856

Table 42: Sum of Spring Season Blowing Numbers

Parameter	March	April	May	Total
N	5073	4018	3346	12437
NNE	528	591	417	1536
NE	108	101	129	338
ENE	59	106	60	225
E	92	102	111	305
ESE	191	265	335	791
SE	797	1116	1723	3636
SSE	1548	1777	1964	5289
S	933	880	807	2620
SSW	185	215	253	653
SW	123	120	138	381
WSW	59	84	93	236
W	35	64	100	199
WNW	66	73	98	237
NW	92	129	175	396
NNW	1178	1084	973	3235

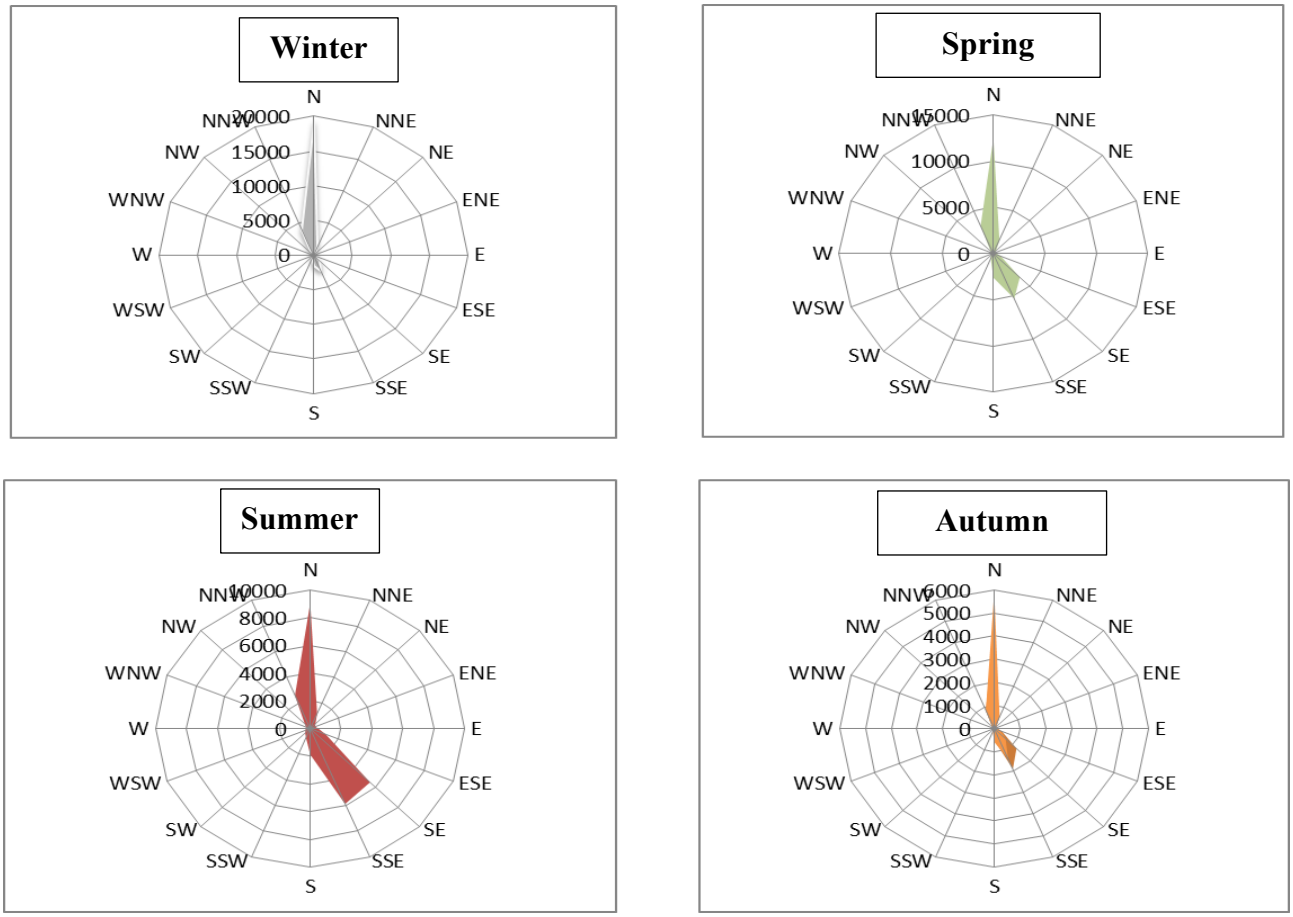
Table 43: Sum of Summer Season Blowing Numbers

Parameter	June	July	August	Total
N	3201	2809	3028	9038
NNE	418	387	358	1163
NE	120	177	188	485
ENE	86	101	165	352
E	143	189	193	525
ESE	339	431	311	1081
SE	1743	1927	1809	5479
SSE	1998	1974	1921	5893
S	708	607	561	1876
SSW	232	272	209	713
SW	152	170	146	468
WSW	104	151	85	340
W	98	109	80	287
WNW	103	112	93	308
NW	168	172	178	518
NNW	836	892	858	2586

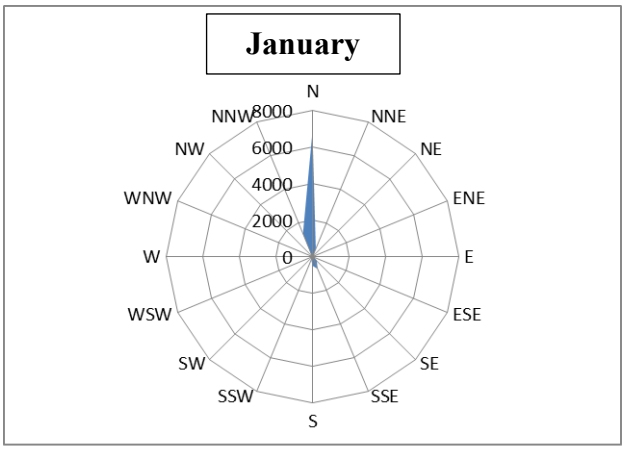
Table 44: Sum of Fall Season Blowing Numbers

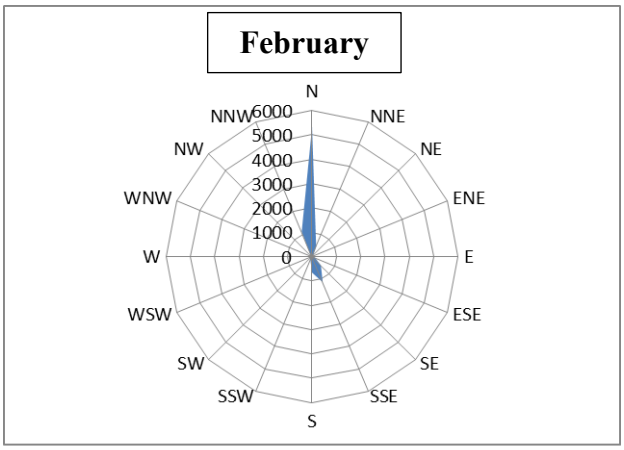
Parameter	September	October	November	Total
N	4257	5860	6391	16508
NNE	469	544	497	1510
NE	117	110	78	305
ENE	87	89	51	227
E	120	143	67	330
ESE	324	276	139	739
SE	1221	623	341	2185
SSE	1894	1408	838	4140
S	508	583	554	1645
SSW	109	148	188	445
SW	73	96	110	279
WSW	34	45	52	131
W	49	44	26	119
WNW	67	42	34	143
NW	135	94	78	307
NNW	853	854	937	2644

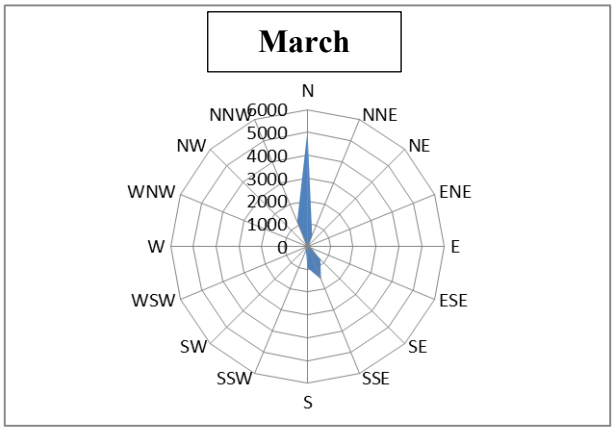
Annual, Seasonal, Monthly Wind Direction Distribution

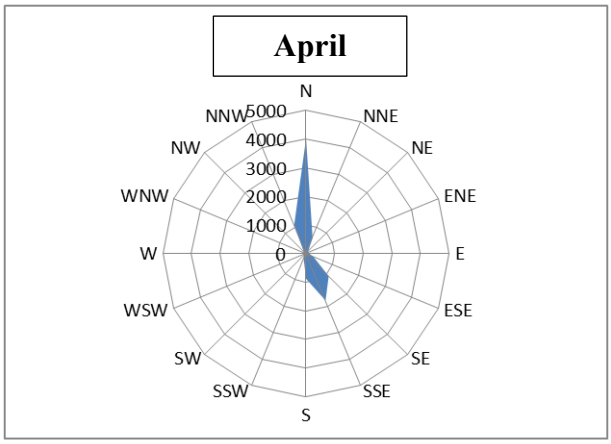


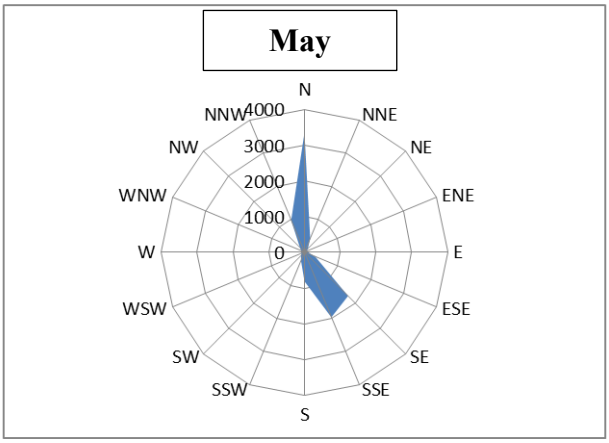
Graphic 17: Meteorology Antalya Regional Directorate Meteorology Station Radar Graph of the Seasonal Blow Numbers of the Wind According to the Observations Made in 2002-2019

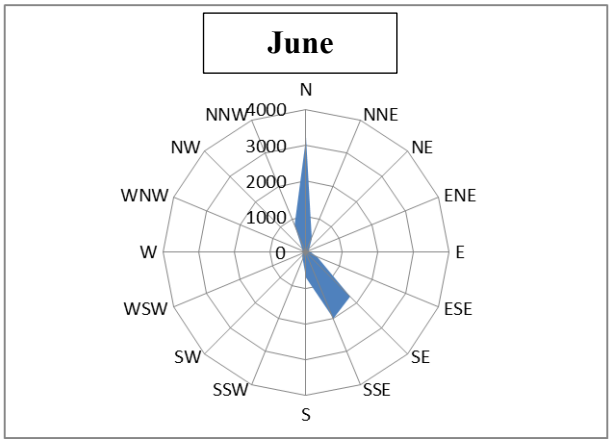

January
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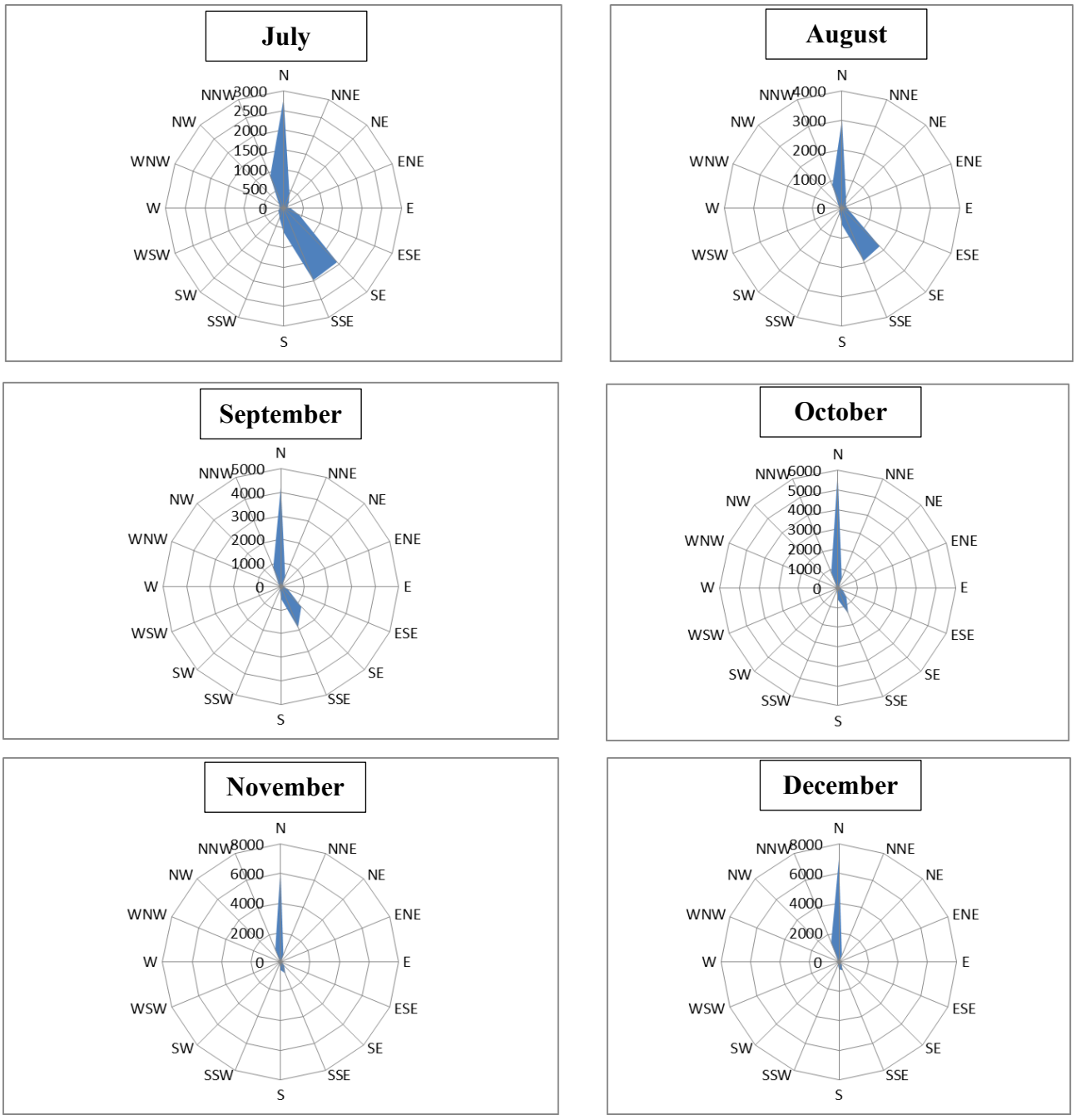

February
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March
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April
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May
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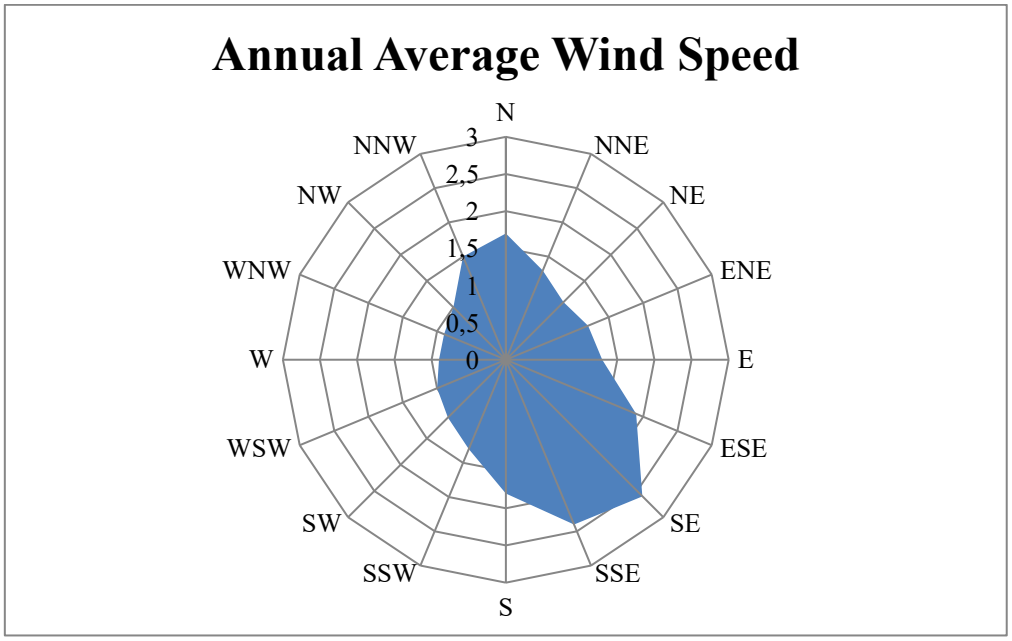
Graphic 18: Meteorology Antalya Regional Directorate Meteorology Station Radar Graph of the Monthly Blow Numbers of the Wind According to the Observations Made in 2002-2019

Average Wind Speed Distribution

According to the Meteorology Station observation records of the Antalya Regional Directorate of Meteorology, the average wind speed according to the directions is given in Table 45. A radar chart (see Graph 19) was created by using the annual average wind speed values in Table 46 for the Meteorology Station of the Antalya Regional Directorate of Meteorology.

Table 45: Antalya Regional Directorate of Meteorology Meteorology Station Wind Speed Values by Direction (2002-2019)

AVERAGE SPEED OF THE WIND BY DIRECTIONS (2002-2019)														
Parameter	**Observation Period**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
N	18	2.1	2	1.9	1.7	1.5	1.6	1.5	1.4	1.6	1.8	1.8	1.9	1.7
NNE	18	1.5	1.4	1.4	1.2	1.2	1.2	1.3	1.2	1.2	1.3	1.4	1.4	1.3
NE	18	1.2	1.2	1.2	1	1	1	1.1	1.1	1.1	1.1	1.1	1.2	1.1
ENE	18	1.4	1.3	1.2	1.1	1.1	1.1	1	1.1	1.1	1.2	1.1	1.3	1.2
E	18	1.5	1.5	1.4	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.1	1.3	1.3
ESE	18	3	2	2	1.9	1.9	1.8	1.7	1.7	1.6	1.7	1.5	1.7	1.9
SE	18	3.5	3	2.6	2.7	2.7	2.6	2.6	2.5	2.4	2.3	1.8	2.5	2.6
SSE	18	2.8	2.8	2.6	2.5	2.4	2.4	2.4	2.4	2.5	2.2	1.9	2.1	2.4
S	18	2.3	2.2	2.2	1.8	1.6	1.5	1.4	1.6	1.7	1.7	1.7	1.8	1.8
SSW	18	1.7	1.7	1.6	1.2	1.1	1.1	1	1.1	1.1	1.4	1.5	1.5	1.3
SW	18	1.4	1.4	1.4	1.1	1	0.9	0.8	0.8	1.1	1.2	1.2	1.4	1.1
WSW	18	1.4	1.2	1.2	1	0.9	0.8	0.8	0.7	1	1.1	1.1	1.3	1
W	18	1.2	1	1	0.8	0.8	0.8	0.7	0.7	1	1	0.9	1	0.9
WNW	18	1.2	1.2	1	0.9	0.8	0.8	0.8	0.8	0.8	1	1	1	0.9
NW	18	1	1.1	1	1	0.9	0.9	0.9	0.8	1	1.1	1	1.1	1
NNW	18	1.8	1.8	1.6	1.5	1.3	1.3	1.3	1.2	1.4	1.5	1.6	1.7	1.5



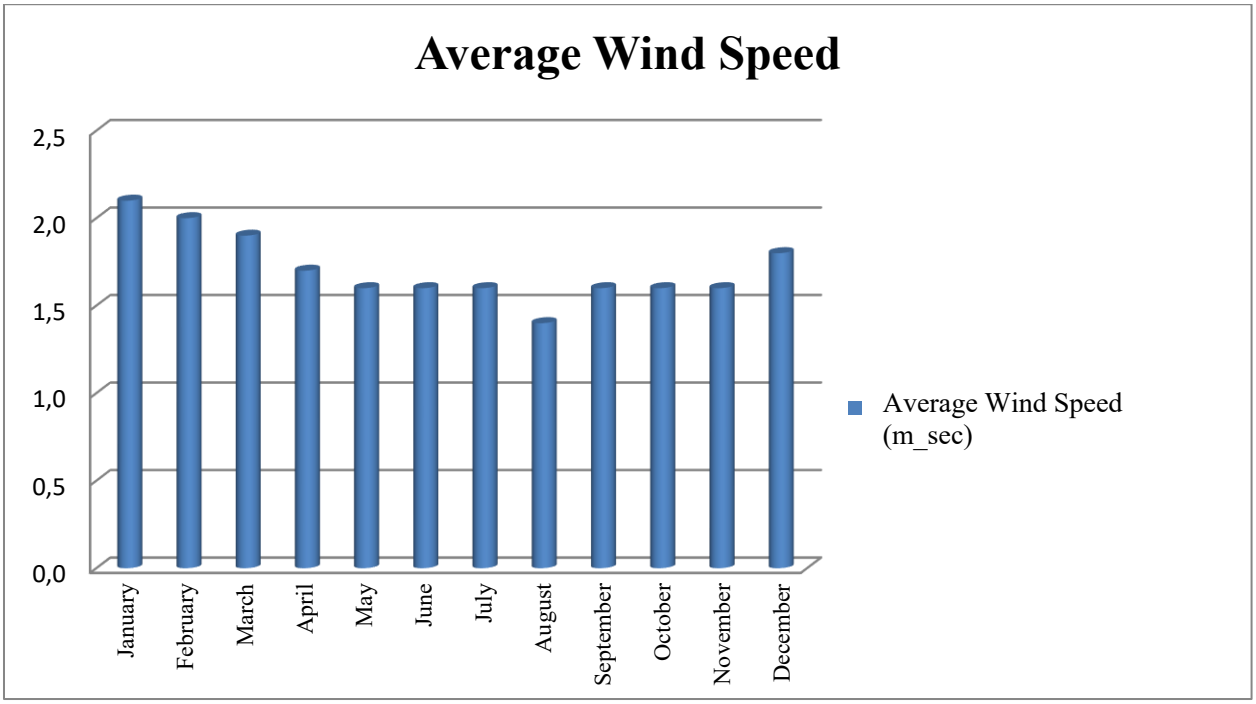
Graphic 19: Antalya Regional Directorate of Meteorology MEteorology Station Annual Average Wind Speed Radar Chart According to Observations Made Between 2002-2019

Average Wind Speed, Fastest Wind Direction and Speed

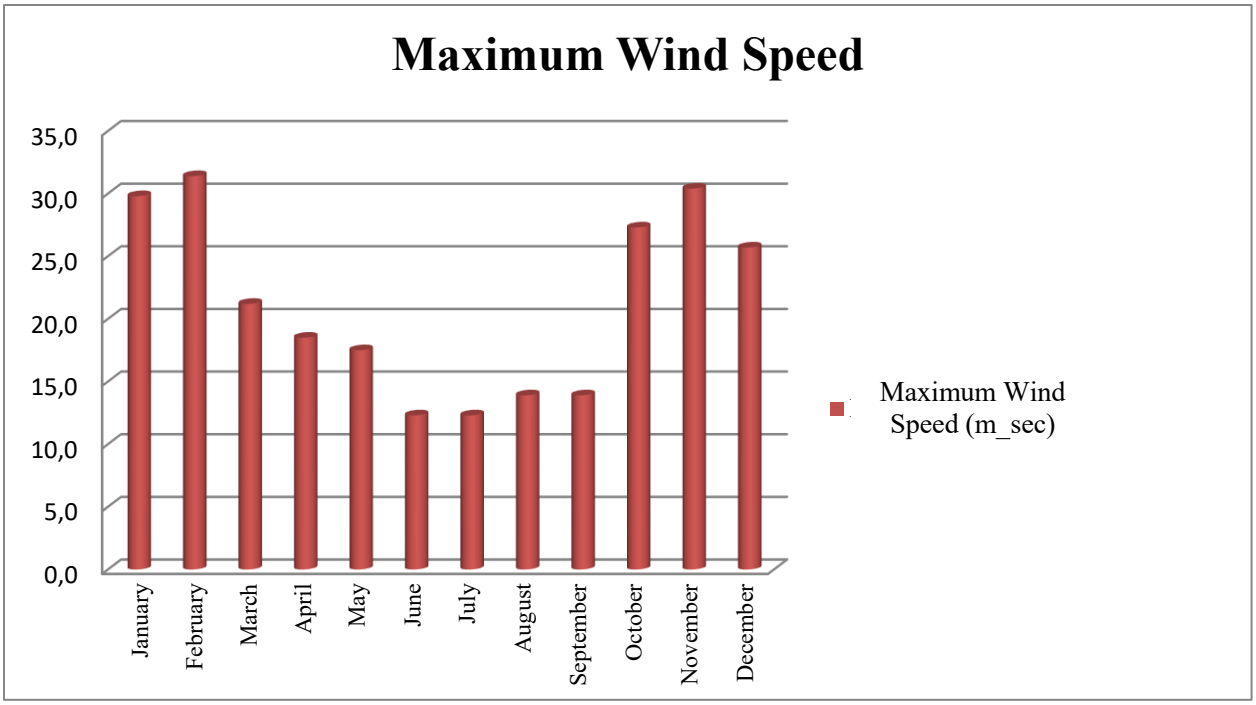
According to the Meteorology Station observation records of the Antalya Regional Directorate of Meteorology, the annual average wind speed is 1.7 m/s. and the strongest wind was observed as 31.4 m/sec in February. Graphs 20 and 21 were created by using the wind speed values in Table-46, where Meteorology Monthly Average Wind Speed Values are given.

Table 46: Meteorology Antalya Regional Directorate Meteorology Station Average Wind Speed Values

Parameter	Observation Period	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average Wind Speed (m/s)	17	2.1	2.0	1.9	1.7	1.6	1.6	1.6	1.4	1.6	1.6	1.6	1.8	1.7
Maximum Wind Speed (m/s)	12	29.8	31.4	21.2	18.5	17.5	12.3	12.3	13.9	13.9	27.3	30.4	25.7	31.4
Direction of Maximum Wind Speed	12	SE	ESE	S	S	ESE	NW	NW	N	E	ESE	ESE	ESE	ESE



Graphic 20: Average Wind Speed Graph According to Observations Made by Antalya Regional Directorate of Meteorology Meteorology Station Between 2002-2019



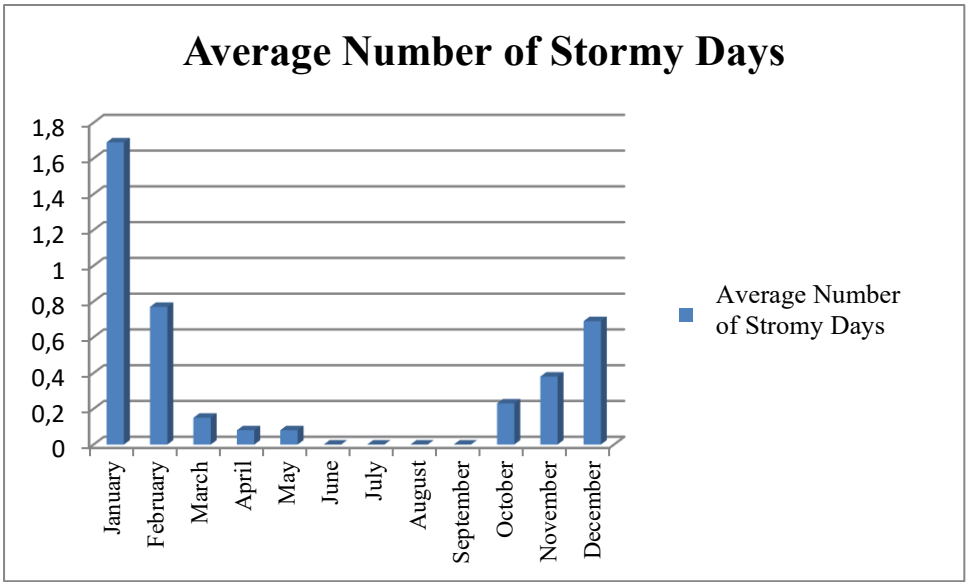
Graphic 21: Maximum Wind Speed Graph According to Observations Made by Antalya Regional Directorate of Meteorology Meteorology Station Between 2002-2019

Average Number of Stormy Days, Average Number of Strong Windy Days

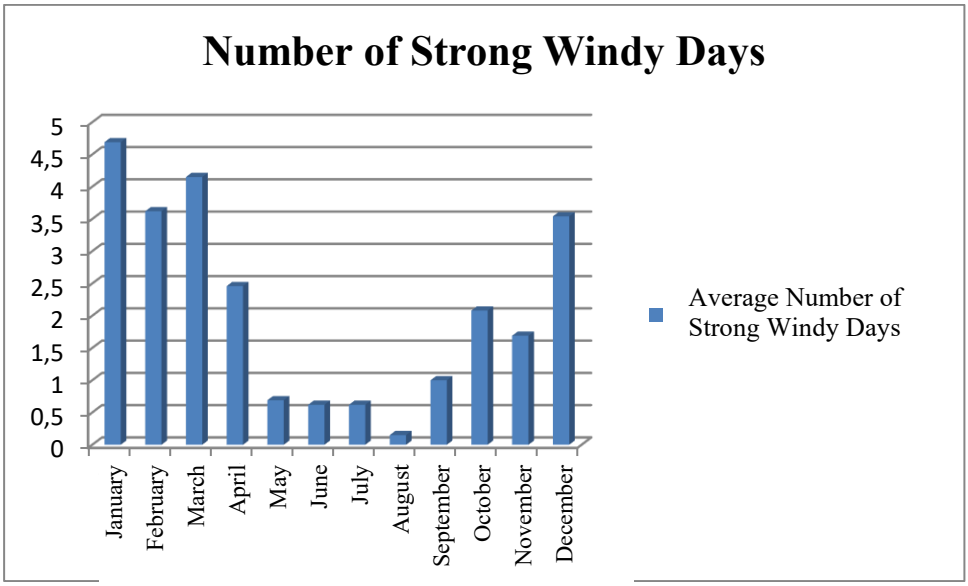
Meteorology Antalya Regional Directorate Meteorology Station According to the observation records of the years 2002-2019, the total annual average number of stormy days is 0.09 days. The total annual average number of days with strong winds is 25.31. The data on the number of days with stormy and strong winds are presented in Table-47 and their graphical representation is presented in graphs 22 and 23.

Table 47: Antalya Regional Meteorology Station Average Number of Stormy and Strong Windy Days (2002-2019)

Parameter	Observation Number	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average Number of Stormy Days	13	1.69	0.77	0.15	0.08	0.08	0	0	0	0	0.23	0.38	0.69	4.07
Average Number of Days with Strong Wind	13	4.69	3.62	4.15	2.46	0.69	0.62	0.62	0.15	1	2.08	1.69	3.54	25.31



Graphic 22: Average Number of Stormy Days Graph for Meteorology Data of Antalya Regional Directorate of Meteorology Meteorology Station 2002-2019



Graphic 23: Number of Strong Windy Days Graph for Meteorology Data of Antalya Regional Directorate of Meteorology Meteorology Station 2002-2019

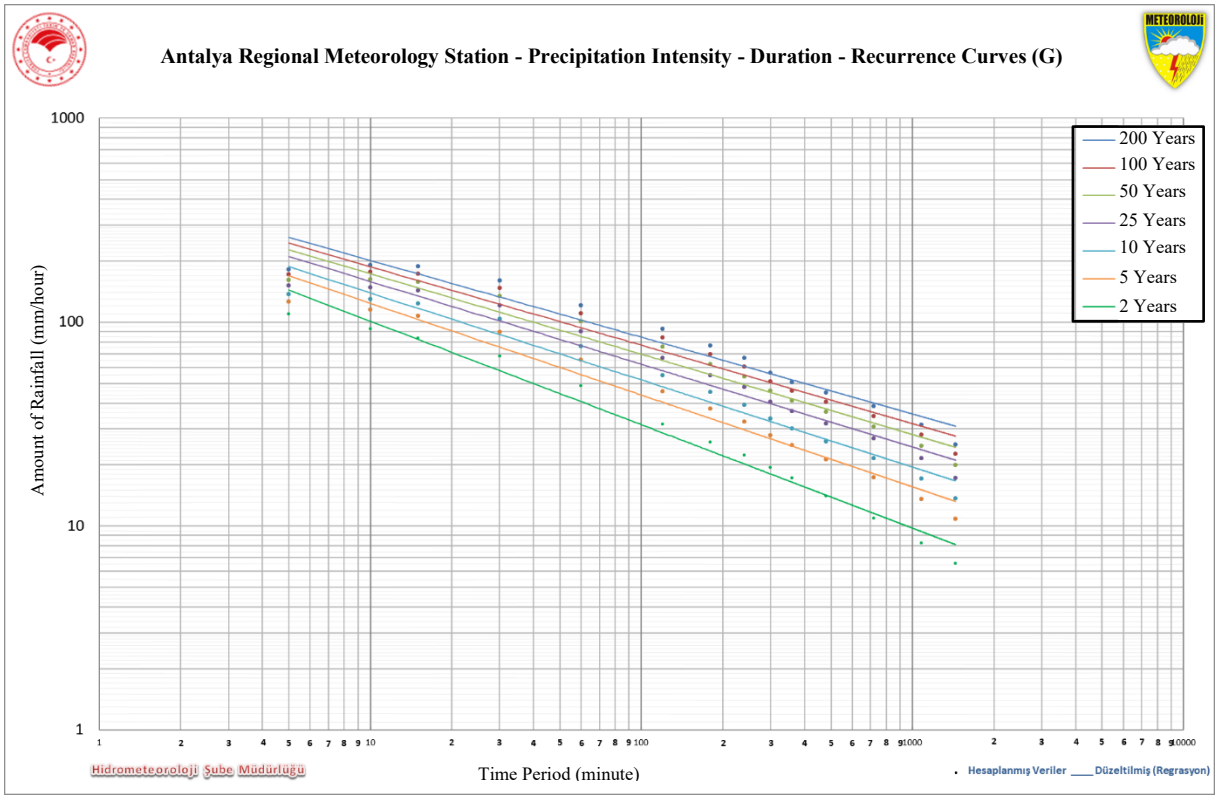
5.10. EXTRAORDINARY EVENT OBSERVATIONS

The data showing the Maximum Precipitation Values Observed in Standard Times and the Precipitation-Intensity-Duration Recurrence Curves obtained from the Meteorological Data Processing Department of the General Directorate of Meteorology of the Ministry of Agriculture and Forestry, and the Long-Year Unusual (Extraordinary Event) Events are presented. These events will be taken into account during the land preparation and operation phase.

According to the observation records of the Meteorology Station of the Antalya Regional Directorate of Meteorology, the highest precipitation values observed in standard times are given in Table 48. Precipitation-Intensity-Time graphs created with the help of these values are given in Graph 24.

Table 48: The Highest Precipitation Values Observed in Standard Times According to the Observation Records of the Antalya Regional Directorate of Meteorology Meteorology Station 2002-2019

OBSERVATION	MINUTE				HOUR										
YEAR	5	10	15	30	1	2	3	4	5	6	8	12	18	24	24 +
2015	10.1	14.4	20.1	33.6	50.7	51.1	72.4	79.3	82.2	82.6	83.0	125.6	125.8	126.0	
2014	9.4	18.2	24.9	45.3	73.8	114.8	144.1	162.0	169.1	169.9	172.9	198.4	203.2	205.5	
2013	9.3	14.9	18.5	27.7	38.3	49.4	67.9	70.0	71.7	77.3	82.3	84.5	91.4	97.8	
2012	7.9	15.3	18.6	29.9	33.5	41.9	48.8	60.3	70.0	76.2	83.1	87.0	102.4	113.5	
2011	8.7	16.9	21.4	36.5	40.3	44.1	75.6	80.8	80.8	80.8	81.4	95.3	95.6	95.7	
2010	8.7	11.4	13.5	21.0	28.0	30.4	47.1	52.5	59.0	67.8	77.4	87.3	118.0	132.7	
2009	10.1	18.1	23.9	37.8	58.7	80.5	89.5	106.8	115.7	139.1	145.9	146.6	170.5	170.8	
2008	10.7	17.8	25.9	40.6	56.7	63.2	66.0	67.2	67.2	67.2	67.3	68.8	69.0	69.0	
2007	7.8	10.1	13.3	23.9	38.5	65.2	78.6	83.3	84.8	84.9	88.1	92.2	94.2	98.9	
2006	10.2	20.4	30.5	51.2	59.1	59.1	59.2	70.7	89.1	96.6	114.2	145.9	169.8	176.7	
2005	6.5	10.2	16.0	27.4	43.1	45.7	50.0	65.2	72.1	76.0	77.9	94.6	139.4	169.0	
2004	10.7	18.9	25.1	43.6	70.8	97.8	120.4	144.4	151.0	166.0	167.1	167.3	167.3	167.4	
2003	8.9	16.8	23.0	39.8	66.5	94.7	97.4	118.5	138.2	155.5	204.2	267.7	306.1	322.9	
2002	10.2	20.4	30.5	48.9	67.7	101.3	142.5	165.2	173.9	183.1	225.1	298.8	384.8	418.1	
2001	10.6	14.5	18.0	24.8	37.1	60.5	71.2	85.9	103.6	111.8	124.9	148.8	177.6	191.8	



Graphic 24: Meteorology Precipitation-Intensity-Time Graphs of Antalya Regional Meteorology Station

5.11. AGRICULTURE AND LIVESTOCK ACTIVITIES

The province of Antalya, with its Antalya Plain, has an important place in Turkey's agriculture in terms of agricultural potential and ecological suitability. Various agricultural products are grown on its fertile lands. Wheat, barley and oats are the most common agricultural products. In addition, cotton, sesame, onions, peanuts, chickpeas, vegetables are grown on 35 thousand hectares. It is the most advanced city in greenhouse cultivation. Tomatoes, peppers, beans, eggplants, cucumbers, melons and watermelons are grown in greenhouses of 32 thousand hectares. It is sold domestically and abroad. It is very advanced in fruit growing. Antalya is the province where the most bananas and oranges are grown. Tangerines, lemons and grapefruits are Antalya's leading source of income. Olive cultivation is highly developed. It is very

advanced in fruit growing. Apple, pear, plum, quince, peach, apricot, grape, oleaster, carob, cranberry and other fruits are grown.

It is at the highest level in irrigation, fertilization, spraying and using modern vehicles in agriculture. It is rich in forest products. Antalya provides one fourth of the resin production. Log and pole production is high. Efforts are being made to grow avocados and pecans.

Animal husbandry is an economic activity that is not very common in the city of Antalya. Small cattle farming is more common in villages connected to the center because the land structure is suitable for sheep and goat farming. Poultry farming is also a common economic activity. Cattle raising is mostly done in high areas outside the city center. Apart from these, beekeeping is carried out in the form of migatory beekeeping.

There is no agricultural activity within the planned project area and impact area.

5.11.1. Agricultural Activities

The area subject to the project is currently operated as a wastewater treatment plant. There is no agricultural land in the area. Since the areas very close to the project site have been abandoned or opened for development, there is no agricultural land in the immediate vicinity.

For the project area, there is an opinion letter dated 05.11.2020 and numbered E-88977526-3104850 by the Antalya Governorship Provincial Directorate of Agriculture and Forestry, stating that there is no harm in carrying out the project, provided that the commitments are complied with and the necessary precautions are taken, since it is understood that it remains in the planned area. (See Annex-19)

5.11.2. Livestock Activities

In the Muratpaşa District, which is adjacent to the Hurma Neighborhood, animal husbandry is of secondary importance compared to agriculture. According to the records of the District Directorate of Agriculture, there are 2000 ovines, 934 bovines, 25 single-hoofed and 1,500 cats and dogs in the district.

The province of Antalya, which is the subject of the project, is far from the parts where animal husbandry is made, and there is no livestock activity in the project area and its immediate surroundings.

5.11.3. Project Area, Area of Influence and Areas Covered by the Fisheries Law No. 1380 in the Inspection Corridor

There are no areas within the scope of the Fisheries Law No. 1380 in the project area, impact area and inspection corridor.

Within the scope of the planned project, the opinion of the Antalya Governorship Provincial Directorate of Agriculture and Forestry, dated 05.11.2020 and numbered E-88977526-3104850, is available, and it is stated in the aforementioned opinion letter that there is no action to be taken within the scope of Law No. 1380. (See Annex. 19)

5.11.4. Places with High Landscape Value and Recreation Areas

The vegetation of the Mediterranean Region is mostly xerophytic due to the hot and dry summers. For this reason, in the Mediterranean Sub-Division, dense and glossy leaves, evergreen shrubs and/or shrub communities and coniferous forests are common. In the higher parts of the region, forests consisting of coniferous trees are seen. For this reason, there are different plant belts along the Taurus Mountains in the Mediterranean Region. The natural vegetation of the Mediterranean Mountain Section of the region consists of cedar, larch and abies forests, especially on the north-facing slopes. The habitats of the forests in the Mediterranean Mountain Region, and therefore their floristic compositions, are different.

The project area is not located within the forest areas, and there are forests of the general nature of the Antalya region on the mountains located on 3 sides of the area, approximately 300 m north, northwest and south.

The areas within the facility area, except for the parts where the wastewater treatment units are installed, are afforested as much as possible and care is taken for landscaping within the wastewater treatment plant. Within the scope of the Hurma Treatment Sludge Incineration and Energy Recovery Plant Project, attention will be paid to landscaping.

The total area of the block 12131 and parcel number 7 where the Treatment Sludge Incineration and Energy Recovery Facility will be established is 174.658,00 m2; The Hurma Wastewater Treatment Facility, which is currently in operation, is on an area of 163,524.70 m2. Within the scope of incinerating the treatment sludge originating from the treatment plants under the responsibility of ASAT and obtaining heat energy from the said incineration process, it is planned to build an incineration plant in the 11133,31 m2 part of the parcel no. 7 on block 12131, which is not used within the scope of the treatment facility activity.

There is an existing wastewater treatment plant in the area planned for the project. There are no areas with high landscape value and recreation areas in and around the project area.

5.12. CURRENT POLLUTION LOAD OF THE REGION

There is an air quality monitoring station in Antalya Province and the monitoring of the region can be followed. According to the daily observation data obtained from the National Air Quality Observation Network application of the Ministry of Environment and Urbanization, the values showing the change of air quality parameters over the years are given in Table 49.

Table 49: Change of Air Quality Parameters by Years According to Observation Data

Years	Pm10 (ug/m^3)	SO_2 (ug/m^3)	O_3 (ug/m^3)	CO (ug/m^3)	NO_2 (ug/m^3)
2015	51	14	0	0	0
2016	15	2	0	0	0
2017	43	10	0	0	0
2018	15	14	0	0	0
2019	33	2	62	0	11
2020	35	5	60	924	17

In the wastewater treatment plant area, where a sewage sludge incineration and energy recovery plant is planned to be established, nitrogen gas is released into the atmosphere as a result of the process that takes place in the ventilation pools. In addition, natural gas is used as fuel in the facility. The facility has a valid wastewater discharge and air emission environmental permit.

There is an Emission Measurement Report of the Hurma Wastewater Treatment Plant with the approval date of 15.12.2020. (See Annex-20)

The environmental impact of the emission sources in the facility is controlled by making emission measurements every two years, and it is observed that the emission measurement results are below the limit values. In addition, there is an odor removal unit in the field to eliminate the odor in the treatment plant.

Table 50: Existing Wastewater Treatment Plant Emission Measurement Results

Emission Source Name	**Parameter**				
	CO	SO_2	NO	Nitrogen Dioxide (NOx(in form of NO_2))	DUST
Hot Water Boiler Chimney-1	0.1562	0.1625	0.0543	0.0005	0.0154
Hot Water Boiler Chimney-2	0.1499	0.5470	0.0517	0.0005	0.0161
Sludge Drying Unit Chimney	0.0332	0.0132	0.2614	0.0009	0.0305
Gas Engine Chimney	-	-	-	-	-
Total	0.3393	0.7227	0.3674	0.0019	0.0620
Limit Values					
IAPCR Annex-3	5/50	60	20	-	10
IAPCR Annex-2	500	60	-	40	10
EU Standarts	250	200	200	-	50

After the planned Sludge Incineration and Energy Recovery Facility installation, the necessary permits will be obtained within the scope of the Environmental Permit License Regulation and a set of Continuous Emission Measurement System (CEMS) will be installed in the chimney for continuous emission control.

The water treated at the Hurma Wastewater Treatment Plant, which is currently in operation, is discharged to the Mediterranean Sea by providing the parameters of the Urban Wastewater Treatment Regulation, with the amendment made in the Official Gazette dated 08.01.2006 and numbered 26047 (with the amendment made in the Official Gazette dated 10.01.2016 and numbered 29589). Hurma Wastewater Treatment Plant has an Environmental Permit with a start date of 23.05.2019 and an end date of 23.05.2024. (See Annex-21)

In the planned project, the discharge criteria of the wastewater resulting from the cleaning of the flue gases to the receiving environment will not exceed the limit values given in Annex-4.

Within the scope of the project, only wastewater will be generated from the flue gas treatment system. There is no wastewater generation from any other process. The flue gas treatment water will be sent to Hurma Wastewater Treatment Plant to be disposed of.

Within the scope of the treatment sludge incineration and energy recovery facility project, the treatment sludge will be collected in impermeable bunkers and silos, burned with a fluidized bed sludge incinerator, and energy will be gained as a result of this incineration process. Since sludge will not be applied to the soil at any stage of the process, soil pollution will not occur.

5.13. POLLUTION RISKS OF SITE AND INFLUENCE AREA

The most important chemical risks in the existing site at Hurma Wastewater Treatment Plant are gases which are produced from wastewater and sludge. Especially, there are dangerous and harmful gases especially in pre-treatment units such as coarse grids, fine grids, grit, and oil chamber tanks, in close environments such as pumping stations, wastewater channels and chimneys, and sludge dewatering and sludge drying units. Because of this reason, it is ensured that such toxic gases are removed from the environment by making measurements with special gas detectors during the odour control systems, ventilation system, etc. During the maintenance of treatment plant, all personnel work with special breathing tubes and a separate team, independently of the environment to be maintained, controls the work of these personnel. The employees are trained regularly about chemicals and gases. Furthermore, outlet parameters of odour control units are controlled regularly for monitoring of air quality of residences and workplaces around the treatment plant.

During the treatment process, chemicals are used in the sludge dewatering system and odor control system. These chemicals are kept in insulated warehouses in the treatment plant, preventing soil and groundwater pollution. However, during the use of chemicals, the personnel wear special protective masks and clothes, and measures related to occupational health are taken. The contaminated packaging wastes of the chemicals used are collected in temporary storage areas that are routinely controlled by the Ministry of Environment, and then sent to licensed disposal facilities.

Maintenance procedures of all construction machinery, tools and equipment used in the facility are routinely followed, and necessary maintenance measures are taken to control noise levels during any complaints or physical controls.

The units and sludge bunkers in the facility are designed as closed systems as much as possible. This stuation eliminates both odor control and visual pollution.

Within the facility, wastewater and sludge are transported by closed piping and conveyor system. Due to this situation, soil and groundwater pollution is not observed during wastewater treatment and sludge disposal.

In addition, the treated wastewater is discharged to the Mediterranean by the deep sea discharge system and is monitored online by the Ministry of Environment and Urbanization. Water pollution is prevented by taking frequent samples for the treatment efficiency of the facility and the water quality at the discharge point.

In the new project, one of the most important parameters added within the scope of environmental pollution is flue gas emission. Detailed information on flue gas emission can be found in the section 6.4.Pollutant Emissions During Operation. Related to controling of flue gas emissions, emission control units such as; a) multi cyclone filter b) Activated carbon and lime dosing unit c) Mixing Unit d) NaOH Dosing Unit e) Filter Unit/Ceramic Filter unit f) Filled Bed Washing Unit with by-pass g) Bag filter h) Flue gas suction fan i) Chimney j) CEMS (Continuous Emission Measurement System) and k)Flue Gas Washing Water Treatment System will be installed

Sensors will be used for gas parameters and flow measurement in the chimney and CEMS system. Gas analyzers will measure the hydrocarbon content in the air, CO, CO2, NO, SO2, CH4, HCl, HF parameters and flow rate measurement. Measurement will be done daily.

The Incineration Plant will be operated in such a way that the total organic carbon (TOC) content of the slag and bottom ash will be less than 3% or the combustion loss will be less than 5% of the dry weight of the material. Measurement will be done daily.

The new project will not have any impact on the functioning of the existing wastewater treatment plant. Since it is related to the final disposal of the sludge from the treatment plant, there is no situation that will reduce the efficiency of wastewater treatment.

It is expected that operational cost of wastewater treatment will decrease rather than increase. Because reduction in the operational cost of sludge treatment and supplying of energy from the new energy recovery facilitiy. Also, it is not expected any negative impact of new project on the wastewater efficiency and this new stuation will not affect to wastewater treatment tariffs.

Regarding the incineration project, it is planned to reduce the current operating costs of Hurma WWTP, with energy recovery.

Due to this situation, it is planned to increase the income of General Directorate of ASAT with the existing tariffs without creating any additional operating expenses.

5.14. TRANSPORT, MOBILITY AND SECURITY OF THE PROJECT SITE AND THE AREA OF INFLUENCE

Construction activities are always be considered high-risk. Safe environment will be provided for all people and employees on traffics and along roads (especially on roads that will be used by trucks on a regular basis) at the project area and surroundings. The safe and effective management of traffic and the processes needed to keep road-users safe during the project, are as below:

The routes of the construction machinery and trucks to be used within the project will be determined from the roads with less traffic and the route directions will be arranged with the necessary traffic information signs. Speed limits and transport tonnage limits determined by the relevant Municipality for construction machinery and trucks will be complied with and transportation will be provided in a safe and healthy way. Measures will be taken by covering the trucks with tarpaulin system in order to prevent emissions during transportation. In the settlements where construction machinery will move, transition frequency restrictions will be applied.

Furthermore, The wastewater of the sewerage network system belonging to the eastern region of Antalya reaches the Hurma Wastewater Treatment plant. The wastewater is treated at the treatment plant and discharged to the Mediterranean Sea via the deepsea discharge line. Waste sludge generated as a result of the treatment process, on the other hand, is transferred to the cement factory, which is a licensed disposal facility, by trucks after being subjected to dewatering process. Sludge is currently transported on the Antalya-Alanya-Istanbul-Ankara main arterial highway.

In the current situation, dewatered sludge (not dried) is conveyed to the cement factory from the treatment plants. Due to this situation, sludge rotation and circulation will not increase in the new project. On the contrary, the amount of sludge to be transferred will be reduced, since more than half of Antalya City's waste sludge generated from the Hurma Wastewater Treatment Plant. In addition, it was planned that there will be waste sludge acceptance and bunker areas in the new Incineration facility.

Hurma WWTP is the central treatment plant with the largest waste sludge production capacity in Antalya City. Since more than half of Antalya City's waste sludge is generated from the Hurma WWTP, the amount of sludge to be transferred will decreased in new project. In addition, when the location of the Hurma WWTP is compared with the location of the Cement Factory, it has been calculated that the transfer distance to the Hurma WWTP is shorter. While the sludge transfer distance is approximately 140,048 km/month in the current situation, this value is expected to decrease to 76,260 km/month within the scope of the new project. Within the scope of the project, waste sludge will be transported in the same main arterial road direction.

In the current situation, the sludge formed in Antalya Province is transferred to the licensed transport companies and disposal companies. Since these transport companies also carry many products other than sludge, with the decrease in the carrying capacity of the sludge, personnel will be shifted towards the transportation of different products

At the same time, in the current situation, there are problems regarding the transportation and disposal of sludge, both with the cement factory and with transportation and also related to its tender and the regulations of the waste sludge.

Due to this situation, it is planned to solve all these problems by planning the incineration system.

5.15. IMPORTANCE OF THE PROJECT FOR ANTALYA CITY

Within the scope of the project, the central population feeding the 2 central treatment plants will be affected. This central population constitutes 76% of the total population.

It will be ensured that the quality of sea water of Antalya coastline is protected and the tourism sector will be kept alive.

Hurma WWTP Existing Capacity			
Region	**Q (m^3/day)**	**PE**	Ratio %
WestTurism Region (Hotels, Otels)	3.750,00	15.000	2%
Household Connection	129.000,00	860.000	80%
Commercial Connection	17.400,00	87.000	11%
Leakege Flow	10.510,50		
TOTAL	160.660,50	962.000,00	

As stated in the table above, the total capacity consists of 11% commercial wastewater, 80% domestic household connection and 2% tourism wastewater.

With the Hurma Waste Mud Incineration Plant and Energy Recovery Project, it is planned to treat the sludge from not only the two central treatment plants mentioned above, but also 30 wastewater treatment plants located in the whole city of Antalya. It is planned to eliminate the long-standing sludge disposal problem of the city of Antalya.

Problems related to sludge disposal of treatment plants affect the efficiency of treatment plants negatively. This means a serious threat to the city of Antalya, which is a tourism city. Thanks to the project, the city's coastline and sea water quality will be protected, and therefore the project will greatly contribute to the socio-economic situation and public health of Antalya City.

5.16. SOCIO-ECONOMIC CHARACTERISTICS OF THE PROJECT IMPACT AREA

The current economic, social and cultural characteristics of the area of the project planned to be realized are important. In this context, the demographic characteristics of the region, economic activity types, employment opportunities to be created within the scope of the project and the unemployment situation in the region are examined under the following headings.

5.16.1. Economic Characteristics

Tourism, commerce and agriculture are at the forefront of the economy of the city of Antalya, and industrial activities are among the activities that have developed recently. Apart from this, business activities are also carried out in branches such as animal husbandry and mining, which are less focused on than others. Antalya's economy is based on agriculture and tourism.

Within the scope of the project, it is important to determine the beneficial use alternatives (use for agricultural purposes, use as additional fuel, etc.) of the Sewage Sludge as a raw material and energy source in accordance with the conditions of our country and bring it to our country's economy. The cost of processing and disposal of treatment sludge has a significant proportion in the total cost of the treatment plant. It is important both technically and legally to reduce the amount of treatment sludge formed from the wastewater treatment process and to process it with appropriate methods (stabilization, minimization, conditioning, and dewatering, etc.).

5.16.2. Population

Due to the fact that Antalya is a tourism region, it is highly dependent on tourism activities during 8 months of the year. Foreign and domestic tourism activity is dynamic throughout the year. It is in the first place in the ranking of the provinces receiving migration throughout the country. As a result of these features, annual population growth is around 4%.

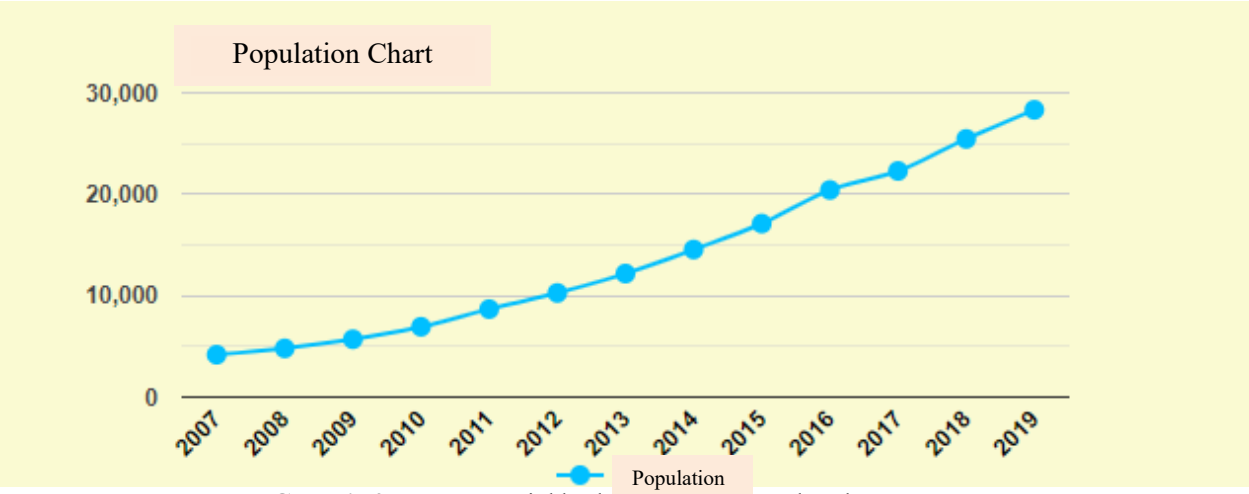
Antalya is the fifth most populous city in Turkey. It is entirely located in the west of the Mediterranean Region. As of the end of 2019, the population of the province is 2,511,700. In Antalya, which has a surface area of 20,909 km2, there are 120 people per square kilometer. The population density of Antalya is 120/km2. There are 19 districts and municipalities in the province of Antalya, and a total of 910 quarters in these municipalities.

Antalya Province, where the project area is located, has a denser population in Hurma Neighborhood compared to other districts. Population data of the District from the Address Based Population Registration System between 2007 and 2019 are given in Table 51. (TUIK, 2019).

Table 51: Konyaaltı District Hurma Neighborhood Population Data (TUIK, 2019)

YEAR	TOTAL POPULATION
2019	28.327
2018	25.458
2017	22.300
2016	20.423
2015	17.112
2014	14.550
2013	12.183
2012	10.268
2011	8.676
2010	6.933
2009	5.703
2008	4.805
2007	4.180

Hurma Neighborhood is the most crowded settlement among the District Neighborhoods. The population of the quarter is 28,458 people in total according to the 2019 TUIK data. Of this population, 13,891 are men and 14,436 are women.



Graphic 25: Hurma Neighborhood Population Chart by Years

Hurma Neighborhood is a preferred region due to its location and its population is increasing every year. The rate of increase in the population of Hurma Mahallesi in 2019 compared to the previous year is 11.27%, and the amount of increase is 2,869.

5.16.3. Employment Opportunities and Unemployment

There are 78 personnel working at the existing wastewater treatment plant. It is planned to employ 55 personnel during the construction phase of the project and an additional 10 personnel during the operation phase.

According to the data announced by the Turkish Statistical Institute (TSI) in the "labor force statistics" for 2019, the unemployment rate in the region covering Antalya, Isparta and Burdur is 13.3 percent, while the employment rate is 49.2 percent.

Table 52: Unemplotment and Employment Rates in Antalya-Isparta-Burdur Provinces (TURKSTAT)

Years	Unemployment Rate (%)	Employment Rate (%)
2019	13.3	49.2
2018	11.6	50.3
2017	12.1	49.7
2016	11.5	50.1
2015	9.6	50.2
2014	8.3	51.4

5.16.4. Health (endemic diseases present in the region)

When a goiter frequency of more than 10 percent is detected in any geographical area, it is called 'endemic goiter'. Since there is severe iodine deficiency in Antalya, Isparta Burdur triangle, goiter disease associated with iodine deficiency is seen more in these regions.

In the 11-year period between 2001-2011 in Antalya, malaria parasites were found in 66 of the 131,989 blood samples taken during active and passive surveillance studies, and the positivity rate was determined to be 0.0005%. Of the 66 positive cases detected in this process, 49 (74%) were men and 17 (26%) were women. The parasite causing the disease was P. falciparum in 9 (14%) of the total malaria cases, and P. vivax in 57 (86%). All of the P. falciparum cases

originated from abroad and were seen in people from countries such as Burkina Faso, Ghana, Cameroon and Senegal. Only 3 of the cases caused by P. vivax originated from abroad (Ghana, Mozambique and India), while the remaining 54 cases were of domestic origin. Malaria parasites were found in 41 blood samples in total between 2001 and 2003, and the positivity rate was found to be 0.0012% only in this 3-year period. There has been a significant decrease in the number of cases since 2004.

A total of 220 cases of Cutaneous Leishmaniasis were detected in the 8-year period between 2005-2012 in Antalya. The highest number of cases were reported in 2006 (45 cases), and the least cases were reported in 2005 (2 cases). It was determined that 129 (58.64%) of the reported cases were male, 91 (41.36%) were female, and 118 (53.64%) were under the age of 20. Although cases are reported in every age group, it was observed that the least report was in the 0-11 months group with 1 case. Considering the distribution of cases by months; It was seen that it was reported the most in May (33 cases, 15%) and the least in July (11 cases, 5%). Looking at the seasonal distribution; It was determined that the most cases were reported in the spring (75 cases, 34.09%) and the least in the summer (46 cases, 20.91%). Although the number of cases varies according to the months, it has been observed that case reports are made in all months of the year. Considering the distribution of cases by districts, it was determined that Alanya was in the first place with 168 (76.36%) cases, followed by Gazipaşa district with 38 (17.27%) cases, and no notification was made from 10 districts.

Within the scope of the literature studies, the endemic diseases experienced in the province of Antalya are listed above, and there is no endemic disease situation.

6. ENVIRONMENTAL IMPACTS OF THE PROJECT DURING PRE-CONSTRUCTION CONSTRUCTION AND OPERATION PHASE AND MEASURES TO BE TAKEN

Under the title of Chapter 6, environmental impacts are examined as the effects of the facility activities and human activities within the project. Facility activity and human-induced impacts were also evaluated separately during the construction phase and operation phase. All environmental calculations made in this section have been evaluated cumulatively, taking into account the existing Hurma Wastewater Treatment Plant, existing personnel and personnel to be recruited within the planned project.

There are 78 personnel currently working at the facility. It is planned to employ 55 personnel during the construction phase of the project and an additional 10 personnel during the operation phase. The personnel that are planned to be added within the scope of the planned project will use the administrative building, workshop and social facility units in the wastewater treatment plant.

The environmental impacts during the construction phase include excavation, construction and demolition wastes, polluting emissions, environmental noise and vibration, liquid wastes and solid waste types, quantities and disposal methods.

Within the scope of environmental impacts during the operation phase, the planned plant pollutant emissions, odor emissions, liquid wastes and solid waste types, quantities and disposal methods are included.

Apart from these, the cumulative effects of the facility activity within the project, effects on surface and groundwater resources and precautions to be taken, effects on livestock activities and measures to be taken, effects on Flora-Fauna and precautions to be taken, effects on sensitive areas and measures to be taken, transactions to be carried out within the scope of cultural and natural assets, effects on vegetation and agricultural lands and measures to be taken, effects on forest areas and measures to be taken, flood and landslide risk and measures to be taken, traffic load, accident risk and precautions to be taken, effects of meteorological conditions on the project and measures to be taken, the actions to be taken to ensure soil safety, natural disasters and earthquakes, and the measures to be taken, as well as landscaping and landscaping studies have been examined separately.

The measures to be taken within the scope of the aforementioned impacts are summarized under the following sub-headings.

6.1. WITHIN THE SCOPE OF PREPARATION OF THE LAND AND THE WORKS TO BE DONE WHERE, IN WHAT QUANTITY AND HOW MUCH AREA WILL BE EXCAVATED, WHERE EXCESS EXCAVATION MATERIAL WILL BE TRANSPORTED, WHERE THEY WILL BE STORED OR FOR WHAT PURPOSES THEY WILL BE USED (INDICATION OF EXCESS EXCAVATION MATERIAL AND TOPSOIL STORAGE AREAS WITH THEIR COORDINATES, EXPLANATION OF HOW TO EVALUATE VEGETATIVE SOIL), HOW TO DISPOSE OF CONSTRUCTION WASTES THAT WILL BE OCCURRED AS A RESULT OF CONSTRUCTION SITE WORKS

The total area of the 12131 block and parcel number 7 where the Treatment Sludge Incineration and Energy Recovery Facility will be established is 174.658,00 m2 and the Hurma Wastewater Treatment Facility, which is currently in operation, is on an area of 163,524.70 m2. Within the scope of incinerating the treatment sludge and obtaining heat energy from the said incineration process originating from the treatment facilities under the responsibility of ASAT, it is planned to construct an incineration facility on an area of 11133,31 m2 on block 12131 parcel number 7.

There is a Thermal Sludge Drying Facility currently used within the borders of Hurma Wastewater Treatment Facility.

Currently, the amount of sludge generated from the operation of the Hurma Wastewater Treatment Facility is 240 tons/day on average. In the Incineration Facility, an average of 140 tons/day of the 240 tons/day sludge that will originate from the Hurma Wastewater Treatment

Facility will be processed. The remaining average of 100 tons/day and sludge from other Wastewater Treatment Facilities up to an additional 50 tons/day (150 tons/day in total) can be processed and dried in the Thermal Drying Facility with a capacity of 150 tons/day, which is currently located within the Hurma Wastewater Treatment Facility. In the existing thermal drying facility in question, the waste heat generated in the Hurma Sludge Incineration Facility will be utilized. This will not affect the planned Incineration Facility capacity.

The tanks (gas tanks) in the part where the Combustion Plant will be built will be displaced to another area. The existing Thermal Drying Facility will remain on site and will continue to be used. (Fig. 51)

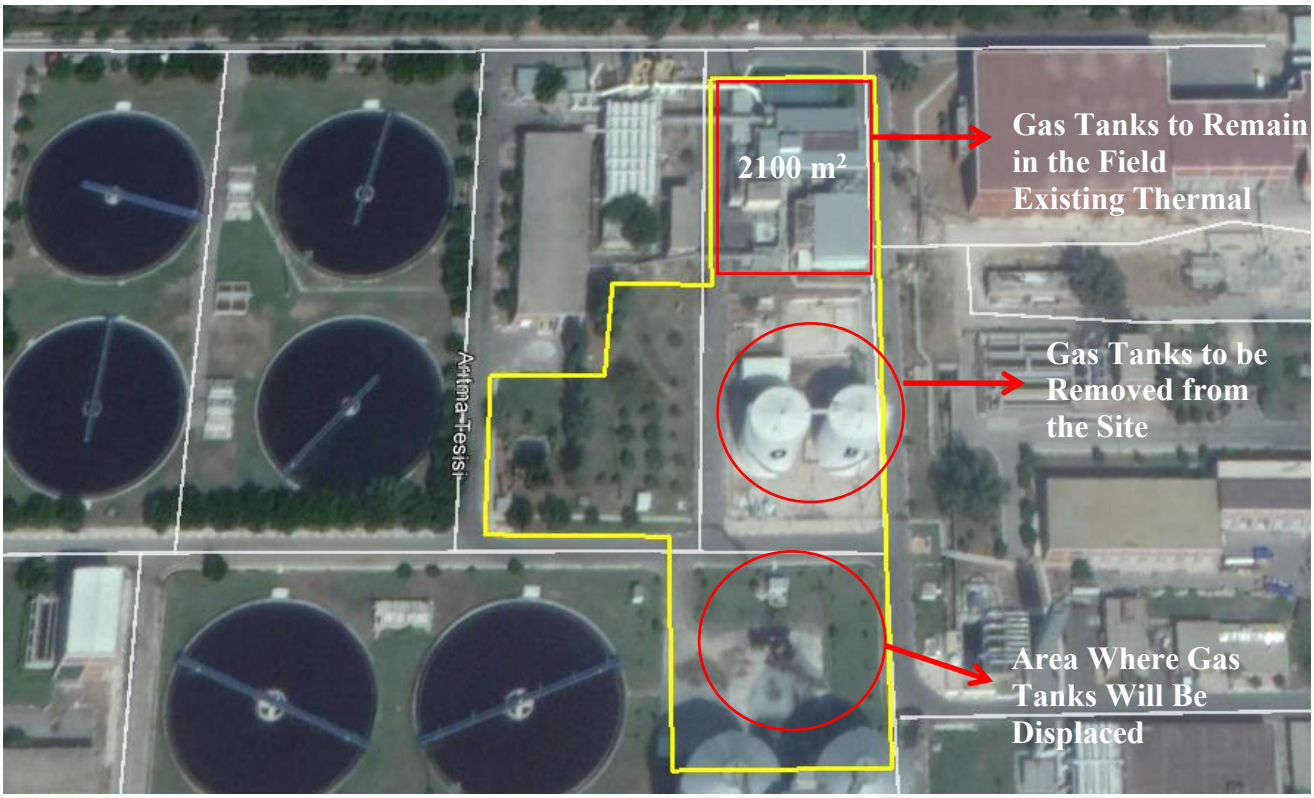


Figure 51: Structures Planned to be Removed and Remained on the Site

Excavated Soil, which will be separated according to the type of construction and demolition wastes to be generated within the scope of the mentioned dismantling process, will be recycled/disposed in accordance with the provisions of the Construction/Wreckage Waste Control Regulation.

In addition, a total of 22.728.91 m3 of excavation will be carried out for the unit settlements in the field, and the total amount of excavation is given in Table 53 together with the relevant account items. Within the scope of the project, there may be a small amount of vegetative soil formation in the area where the incineration plant will be located and the area where the gas tanks will be displaced. The vegetative soils to be formed will be evaluated in landscaping studies within the borders of the existing treatment plant.

Table 53: The Amount of Excavation and Calculation Calculated Considering the Depths Depending on the Location of the Units and the Land Condition

Rank No	Unit Name	Width (m)	Length (m)	Excavation depth (m)	Excavation Amount (m^3)
1	Pre-Drying Unit	31	25.44	2	**1577.28**
2	Biofilter and Bunker Units	31.23	28.31	2	**1768.24**
3	Sludge silos	13	20.3	4.5	**1187.55**
4	Combustion Unit (Combustion Unit equipment, Ash Silo, Combustion Tower, generator unit, blowers etc.)	46	47	2	**4324.00**
5	Turbine Building	26.57	20.08	2	**1067.05**
6	Administrative Building	38	20.8	1.2	**948.48**
7	Product Acceptance Unit	18	51	9	**8262.00**
8	External Areas Outside Buildings	4792.4131		0.75	**3594.31**
				TOTAL EXCAVATION (m^3):	**22.728,91**

At every stage of the activity, the provisions of the "Regulation on Control of Excavated Soil, Construction and Demolition Wastes", published in the Official Gazette dated 18.03.2004 and numbered 25682, will be complied with.

Since the project is located within the existing treatment plant area, no additional administrative buildings, social facilities, etc. will be built, and most units will be used in common. Construction-wreckage waste and 22.728.91 m3 of excavation soil will be formed in the works to be carried out in the field, and all of the construction-wreckage wastes to be formed with the entire excavation soil will be transported to the sites allowed by the Antalya Metropolitan Municipality in accordance with the provisions of the provisions of the "Regulation on Control of Excavated Soil, Construction and Demolition Wastes" published in the Official Gazette dated 18.03.2004 and numbered 25406, and the "Waste Management Regulation" published in the Official Gazette dated 02.04.2015 and numbered 29314. by authorized trucks.

In accordance with the acceptance of Excavation Soil, Construction and Wreckage Wastes, Environmental Law and Excavation Soil, Construction/Wreckage Waste Control Regulation and the letter of Antalya Governorship dated 08.08.2019 and numbered 61393, all constructions to be made within the borders of Antalya province, including all public institutions and organizations, maintenance and repair activities are provided on the condition that the Waste Transport and Acceptance Certificate is obtained and the wastes are transported by vehicles with Waste Transport Permit.

In the letter of the Antalya Metropolitan Municipality Environmental Protection and Control Department dated 10.12.2020 and numbered 94707, there is an obligation to bring the excavation soil, construction and demolition wastes to be produced during the production of the facility to the Kızıllı Excavation Soil, Construction / Rubble Waste Disposal Site, within the scope of the relevant regulations, it has been reported that there is no inconvenience in its introduction. The aforementioned permission letter is presented in Annex-22.

In order to prevent the negative effects of excavation soil, construction and demolition wastes on the environment and human health during the construction and operation phase of the project, the Regulation on Control of Excavated Soil, Construction and Demolition Wastes,

which was published in the Official Gazette dated 18.03.2004 and numbered 25406, and dated 08.06.2010 and the provisions of the Regulation on Control of Soil Pollution and Point Source Contaminated Sites, was effectuated after being published in the Official Gazette No. 27605, will be complied with.

6.2. FUEL TYPES, CONSUMPTION AMOUNTS, EMISSIONS TO BE USED IN LAND PREPARATION, CONSTRUCTION AND OPERATION PHASES

Within the scope of the construction activities of the project a total of 32 construction machines, including, 3 crawler excavators, 3 loaders with wheels, 2 mini loaders, 12 trucks, 2 30-ton cranes, 2 waterers, 2 cylinders of 30 tons, 2 butt welding machines, 1 tower crane with a length of 60 meters, 2 argon welding machines and 1 generator, will be in operation. Within the scope of operational activities, 28 trucks are planned to be used for the transfer of sludge.

There will be gas emissions arising from the use of fuel in construction equipment. Mainly NOx, CO, PM and HC emissions will occur due to the use of diesel (diesel) fuel in construction machinery. SO2 emissions will be negligible in new generation fuels. Therefore, legal regulations require the emission level to be within certain limits.

All necessary measures will be taken to ensure that the emissions from the construction equipment to be used within the scope of the project do not exceed the limit values of the regulation. For this purpose, new and well-maintained vehicles will be used during the works, and the provisions of the "Exhaust Gas Emission Control Regulation", which was published in the Official Gazette dated 11.03.2017 and numbered 30004, will be complied with.

Construction machinery and exhaust gas emissions to be used within the scope of construction processes are discussed below.

Table 54: Data of Construction Equipment to be Used in Construction Activities

Noise Source	SOURCE	Number of Construction Equipments	Engine Power (kW)
Crawler Excavator	Dot	3	125
Loader with wheels	Dot	3	95
Mini Loader	Dot	2	75
Truck	Linear	12	110
30-Ton Crane	Dot	2	50
Loader with wheels	Linear	2	80
30-Ton Cylinder	Linear	2	85
Butt-Welding Machine	Dot	2	6.5
Tower crane (60 m)	Dot	1	70
Argon Welding Machine	Dot	2	7
Diesel Generator	Dot	1	80

Emission factors based on engine power were used to calculate the emission values originating from the machinery and equipment used during the construction activities.

Gas emissions and mass flow rates from machinery and equipment are calculated considering that all equipment will operate at the same place and at the same time. The calculated mass gas emission values are given compared with the limit values in the Annex-2 of the “IAPCR”,

published in the Official Gazette dated 03.07.2009 and numbered 27277 (amendment: Official Gazette dated 20.12.2014 and numbered 29211) and shown in Table 55.

Table 55: Annex-2 list of IAPCR Table 2.1 Mass Flow Rates

Exhaust Emission Gases	Mass flow rates (kg/h) for operating hours under normal operating conditions and weekly working days	
	From the chimney	From Places Other Than The Chimney
Carbon Monoxide	500	50
Sulfur Dioxide	60	6
Nitrogen Dioxide [NO_x (in terms of NO_2)]	40	4
Total Organic Compounds	30	3

Emission factors given by EPA (Environmental Protection Agency) for heavy construction machinery are given in Table 56.

Table 56: 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)	NOx (g/Kwh)	PM (g/Kwh)
56 ≤ kW < 130 (75 ≤ hp < 175)	2012 and later	3.5	0.19	0.40	0.02
130 ≤ kW ≤ 560 (175 ≤ hp ≤ 750)	2011 and later	5.0	0.19	0.40	0.02

Exhaust gas emissions calculated using the emission factors given in Table 56 are presented in Table 57 and Table 58.

Table 57: Expected Contaminant Values from Pollutant Gases

Pollutant	Number of Construction Equipments	Polluting Gases	Expected pollutant value (kg / h)	
Crawler Excavator	3	PM	0,02 g/Kwh x 125 Kw x 3 pcs x kg/1000 g	0.0075
		NO_X	0,4 g/Kwh x 125 Kw x 3 pcs x kg/1000 g	0.15
		CO	3,5 g/Kwh x x 125 Kw x 3 pcs x kg/1000 g	1.3125
		HC	0,19 g/Kwh x 125 Kw x 3 pcs x kg/1000 g	0.07125
Loader with wheels	3	PM	0,02 g/Kwh x 95 Kw x 3 pcs x kg/1000 g	0.0057
		NO_X	0,4 g/Kwh x 95 Kw x 3 pcs x kg/1000 g	0.114
		CO	3,5 g/Kwh x 95 Kw x 3 pcs x kg/1000 g	0.9975
		HC	0,19 g/Kwh x 95 Kw x 3 pcs x kg/1000 g	0.05415
Mini Loader	2	PM	0,02 g/Kwh x 75 Kw x 2 pcs x kg/1000 g	0.003
		NO_X	0,4 g/Kwh x 75 Kw x 2 pcs x kg/1000 g	0.06
		CO	3,5 g/Kwh x 75 Kw x 2 pcs x kg/1000 g	0.525
		HC	0,19 g/Kwh x 75 Kw x 2 pcs x kg/1000 g	0.0285
Truck	12	PM	0,02 g/Kwh x 110 Kw x 12 pcs x kg/1000 g	0.0264
		NO_X	0,4 g/Kwh x 110 Kw x 12 pcs x kg/1000 g	0.528
		CO	3,5 g/Kwh x 110 Kw x 12 pcs x kg/1000 g	4.62
		HC	0,19 g/Kwh x 110 Kw x 12 pcs x kg/1000 g	0.2508
30-Ton Crane	2	PM	0,02 g/Kwh x 50 Kw x 2 pcs x kg/1000 g	0.002
		NO_X	0,4 g/Kwh x 50 Kw x 2 pcs x kg/1000 g	0.04
		CO	3,5 g/Kwh x 50 Kw x 2 pcs x kg/1000 g	0.35
		HC	0,19 g/Kwh x 50 Kw x 2 pcs x kg/1000 g	0.019
Loader with wheels	2	PM	0,02 g/Kwh x 80 Kw x 2 pcs x kg/1000 g	0.0032
		NO_X	0,4 g/Kwh x 80 Kw x 2 pcs x kg/1000 g	0.064
		CO	3,5 g/Kwh x 80 Kw x 2 pcs x kg/1000 g	0.56
		HC	0,19 g/Kwh x 80 Kw x 2 pcs x kg/1000 g	0.0304
30-Ton Cylinder	2	PM	0,02 g/Kwh x 85 Kw x 2 pcs x kg/1000 g	0.0034
		NO_X	0,4 g/Kwh x 85 Kw x 2 pcs x kg/1000 g	0.068

		CO	3,5 g/Kwh x 85 Kw x 2 pcs x kg/1000 g	0.595
		HC	0,19 g/Kwh x 85 Kw x 2 pcs x kg/1000 g	0.0323
Butt-Welding Machine	2	PM	0,02 g/Kwh x 6,5 Kw x 2 pcs x kg/1000 g	0.00026
		NO_X	0,4 g/Kwh x 6,5 Kw x 2 pcs x kg/1000 g	0.0052
		CO	3,5 g/Kwh x 6,5 Kw x 2 pcs x kg/1000 g	0.0455
		HC	0,19 g/Kwh x 6,5 Kw x 2 pcs x kg/1000 g	0.00247
Tower crane (60 m)	1	PM	0,02 g/Kwh x 70 Kw x 1 pc x kg/1000 g	0.0014
		NO_X	0,4 g/Kwh x 70 Kw x 1 pc x kg/1000 g	0.028
		CO	3,5 g/Kwh x 70 Kw x 1 pc x kg/1000 g	0.245
		HC	0,19 g/Kwh x 70 Kw x 1 pc x kg/1000 g	0.0133
Argon Welding Machine	2	PM	0,02 g/Kwh x 70 Kw x 2 pcs x kg/1000 g	0.00028
		NO_X	0,4 g/Kwh x 70 Kw x 2 pcs x kg/1000 g	0.0056
		CO	3,5 g/Kwh x 70 Kw x 2 pcs x kg/1000 g	0.049
		HC	0,19 g/Kwh x 70 Kw x 2 pcs x kg/1000 g	0.00266
Diesel Generator	1	PM	0,02 g/Kwh x 80 Kw x 1 pc x kg/1000 g	0.0016
		NO_X	0,4 g/Kwh x 80 Kw x 1 pc x kg/1000 g	0.032
		CO	3,5 g/Kwh x 80 Kw x 1 pc x kg/1000 g	0.28
		HC	0,19 g/Kwh x 80 Kw x 1 pc x kg/1000 g	0.0152

Table 58: Exhaust Gas Emission Values Calculated for the Construction Phase

Pollutant	Total Mass Flow Rate (kg / h)	Regulation Limit Value (kg / h)	Evaluation
PM	0.05474	1	Below The Limit Values
NO_X	1.0948	4	Below The Limit Values
CO	9.5795	50	Below The Limit Values
HC	0.52003	3	Below The Limit Values

When the calculated hourly mass flow (kg/hour) value is compared with the mass flow (kg/hour) (places other than the chimney) values given for the normal operating conditions and weekly working days given in "IAPCR" Table 2.1, the emission mass flow rates are determined. It has been observed that the limit values given in the regulation are below. For this reason, air quality contribution values are not calculated.

Machinery and equipment will be used within the scope of the construction processes of the project, and the exhaust emissions from the machinery and equipment are below the limit values given in the regulation as calculated above. Therefore, the exhaust emissions arising from the machinery and equipment to be operated during the operation phase will not have a negative impact on the residence, which is approximately 230 m away from the bird flight, which is the closest settlement to the project site.

Trucks to be used within the scope of the operation and their exhaust gas emissions are discussed below.

Table 59: Data of Construction Equipment to be Used in Buisness Activities

Noise Source	SOURCE	Number of Construction Equipments	Engine Gücü (kW)
Truck	Linear	28	110

Emission factors based on engine power were used to calculate the emission values originating from the machinery and equipment used during operation activities.

Gas emissions and mass flow rates from machinery and equipment are calculated considering that all equipment will operate at the same place and at the same time. The calculated mass gas

emission values are given in the Annex-2 of the "IAPCR", published in the Official Gazette dated 03.07.2009 and numbered 27277 (amendment: Official Gazette dated 20.12.2014 and numbered 29211) and shown in Table 60 and compared with the limit values.

Table 60: Annex-2 List of IAPCR Table 2.1 Mass Flow Rates

Exhaust Emission Gases	Mass flow rates (kg/h) for operating hours under normal operating conditions and weekly working days	
	From the chimney	From Places Other Than The Chimney
Carbon Monoxide	500	50
Sulfur Dioxide	60	6
Nitrogen Dioxide [NO_x (in terms of NO_2)]	40	4
Total Organic Compounds	30	3

Emission factors given by EPA (Environmental Protection Agency) for heavy construction machinery are given in Table 61.

Table 61: 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)	NOx (g/Kwh)	PM (g/Kwh)
56 ≤ kW < 130 (75 ≤ hp < 175)	2012 and later	3.5	0.19	0.40	0.02
130 ≤ kW ≤ 560 (175 ≤ hp ≤ 750)	2011 and later	5.0	0.19	0.40	0.02

Emission factors given by EPA (Environmental Protection Agency) for heavy construction machinery are given in Table 62.

Table 62: Expected Contaminant Values from Pollutant Gases

Pollutant	Number of Construction Equipments	Polluting Gases	Expected pollutant value (kg / h)	
Truck	28	PM	0,02 g/Kwh x 110 Kw x 28 pcs x kg/1000 g	0.0616
		NO_X	0,4 g/Kwh x 110 Kw x 28 pcs x kg/1000 g	1.232
		CO	3,5 g/Kwh x 110 Kw x 28 pcs x kg/1000 g	10.78
		HC	0,19 g/Kwh x 110 Kw x 28 pcs x kg/1000 g	0.585

Table 63: Exhaust Gas Emission Values Calculated for the Construction Phase

Pollutant	Total Mass Flow Rate (kg / h)	Regulation Limit Value (kg / h)	Evaluation
PM	0.0616	1	Below The Limit Values
NO_X	1.232	4	Below The Limit Values
CO	10.78	50	Below The Limit Values
HC	0.585	3	Below The Limit Values

When the calculated hourly mass flow (kg/hour) value is compared with the mass flow (kg/hour) (places other than the chimney) values given for the normal operating conditions and weekly working days given in "IAPCR" Table 2.1, the emission mass flow rates are determined. It has been observed that the limit values given in the regulation are below. For this reason, air quality contribution values are not calculated.

Transport trucks will be used during the operation period of the project, and the exhaust emissions from these trucks are below the limit values given in the regulation as calculated above. Therefore, the exhaust emissions from the trucks that will operate during the operation phase will not have a negative impact on the transportation routes.

6.3. EMISSION SOURCES, CALCULATIONS, AIR POLLUTION DISTRIBUTION MODELING AND MEASURES TO BE TAKEN DURING CONSTRUCTION AND OPERATION PHASE (TYPES OF MAIN AND AUXILIARY FUELS TO BE USED IN CONSTRUCTION AND OPERATION PERIODS WITHIN THE SCOPE OF THE PROJECT, IN WHICH UNITS IT WILL BE USED, CONSUMPTION AMOUNTS, CHEMICAL ANALYSIS, COMBUSTION SYSTEMS AND EMISSIONS TO BE CREATED FROM THESE WILL BE EXPLAINED UNDER THIS TITLE.)

6.3.1. Pollutant Emissions During Construction

Within the scope of the project, 22.728.91 m3 of material will be taken from the site and all of the excavated soil will be shipped to the sites allowed by Antalya Metropolitan Municipality by authorized trucks in accordance with the provisions of the "Regulation on Control of Excavated Soil, Construction and Demolition Wastes" published in the Official Gazette dated 18.03.2004 and numbered 25406, and the "Waste Management Regulation" which entered into force after being published in the Official Gazette dated 02.04.2015 and numbered 29314.

As there will be excavation, loading and transportation within the scope of the activities to be carried out during the construction of the project, calculations were made using only those specific to these activities among the emission factors given in Table 64.

Table 64: Emission Factors to be Used in Dust Emission Mass Flow Calculations (Amended table: RG-20/12/2014-29211)

Sources	Uncontrolled	Controlled	Unit
Blast	0.080	-	kg/ton
Disassemble	0.025	0.0125	
Loading	0.010	0.005	
Unloading	0.010	0.005	
Primary Crusher	0.243	0.0243	
Secondery Crusher	0.585	0.0585	
Tertiary Crusher	0.585	0.0585	
Storage	5.8	2.9	
Shipping (round trip total distance)	0.7	0.35	kg/km-vehicle

According to this;

Total of Excavation Material : 22.728,91 m3 = 61.822,63 ton (d=2,72 ton/m3)

On-Site Route : 0,10 km

Truck Capacity : 30 tons / truck

Total Number of Trips : 61.822,63 tons / 30tons/truck=2061 truck

Number Of Trucks : 12 trucks

Number of trips : 2061 trucks/ 12 trucks = 172 trips

Total Route (round trip) : 0,10 x 2 x 172 trips= 34,4 km

Excavation Period : 240 days

Daily Working Time : 8 hours

Uncontrolled Calculation Results;

Emissions from Total Material Removal

Hourly production amount x Emission Factor

Emission Flow at Disassemble = 61,822.63 0.025kg powder/ton(1/240day) (1/8h)

= 0,80 kg toz/h

Emission amount to be caused by Loading of Total Material

Excavation M. x Emission Factor x Total Working Time x Daily Working Time

Emission Flow at Loading = 61.822,63ton×0,01kg powder/ton×(1/240day)×(1/8h)

= 0,32 kg toz/h

The amount of emissions to be caused by the Transportation of the Total Material

Total Distance x Emission Factor x Total Working Time x Daily Working Time

Emission Flow at Transport =34,4 km. vehicle × 0,7 kg powder/km vehcile × (1/240day)×(1/8h)

= 0,0125 kg toz/h

Total dust emissions to occur in the facility:

Dust emission from Total Material Disassemble 0.80 kg/h

Dust emission from Loading of Total Material 0.32 kg/h

Dust emission from Shipping of Total Material 0.0125 kg/h

Total **1,132 kg/h**

Controlled Calculation Results;

Emissions from Total Material Removal

Hourly production amount x Emission Factor

Emission Flow at Disassemble =61,822.63 tons 0.0125kg dust/ton(1/240day) ×(1/8h)

= 0,40 kg toz/h

Emission amount to be caused by Loading of Total Material

Excavation M. x Emission Factor x Total Working Time x Daily Working Time

Emission Flow at Loading = 61,822.63 tons□ 0.005 kg powder/ton□(1/240day)□(1/8h)

= 0,16 kg toz/h

The amount of emissions to be caused by the Transportation of the Total Material

Total Distance x Emission Factor x Total Working Time x Daily Working Time

Emission Flow at Transport = 34.4 km□0.35 kg dust/km vehicle□(1/240day)□(1/8h)

= 0,006 kg toz/h

Total dust emissions to be generated at the facility:

Dust emission from Total Material Disassemble 0,40 kg/h

Dust emission from Loading of Total Material 0,16 kg/h

Dust missions to be caused by the Transportation of the Total Material 0,006kg/h

Total 0,566 kg/h

The calculated total controlled emission value is below the value of Annex 2 "Table 2.1 Mass Flow Rates" section of the "Regulation on Control of Industrial Air Pollution Control" dated 03.07.2009 and numbered 27277 (dust emission limit value in places other than the chimney = 1.0 kg/hour).

At every stage of the activity, the provisions of the "Regulation on Control of Excavated Soil, Construction and Demolition Wastes" published in the Official Gazette dated 18.03.2004 and numbered 25682 will be complied with.

The works during the construction phase of the project will be continued in a controlled manner. Within the scope of controlled studies, attention will be paid to load and transport the trucks without tossing them in order to minimize dust emissions that may occur in the project area. Excavation soil loaded on trucks will be transported by covering it with tarpaulin to prevent spilling and dusting. Irrigation will be done on the roads and in the field to prevent dust to be generated within the scope of the activity.

Table 65: Total Dust Emission Information of Sources

Sources	Uncontrolled dust emission values (kg / h)	Controlled dust emission values (kg/h)
Construction Phase	**1.32**	**0.566**

Considering that the emissions caused by the construction equipment and the pollution created at the project site, the construction equipment will not operate continuously, it is thought that the existing air quality will not adversely affect it.

In accordance with the Annex-4 article of the Environmental Law, the motor vehicle owner's vehicle's exhaust gas emission measurements will be made in accordance with the provisions specified in "Exhaust Gas Emission Control Regulation", was effectuated after being published

in the Official Gazette dated 11.03.2017 and numbered 30004 and the limit values will be complied with.

During the construction phase of the project, the limit values in the The Regulation on Control of Industrial Air Pollution, published in the Official Gazette dated 03.07.2009 and numbered 27277, and Air Quality Assessment and Management Regulation published in the Official Gazette dated 06.06.2008 and numbered 26898 Regulation and the Regulations will be complied with, and activities will be carried out under controlled conditions during the construction phase.

6.4. POLLUTANT EMISSIONS DURING OPERATION

Approximately 5 MWh (5,000 kWh) electricity will be produced during the incineration process at the facility. The internal consumption of the Waste Incineration Facility is calculated to be approximately 1.5 MWh (1,500 kWh (kilowatt hour)). The produced energy will meet 100% of the internal consumption of the Incineration Facility. The electricity consumption of the Hurma Wastewater Treatment Facility is approximately 3.5 MWh (3,500 kWh (kilowatt hour))

30,000 Nm³/hour natural gas-biogas mixture will be used in the first firing at the facility, and after the boiler reaches the appropriate temperature, 8929.2 kg/hour waste sludge will be fed. The biogas to be used in the first ignition will be met from the existing treatment plant unit, the biogas tanks.

Specific to the facilities where sludge will be accepted within the scope of the project, an analysis was made by the "Turkish Scientific and Technological Research Council, Marmara Research Center, Environment and Cleaner Production Institute". The minimum analyzes for the composition of the wastes to be accepted to the facility (including the calorific value of the waste, heavy metal, chlorine and fluorine content, moisture, slag and total organic carbon content in base ash) are presented in Annex-7.

In order to calculate the mass flow rate of the emissions that will occur during the combustion of the natural gas/biogas mixture during the initial ignition process, the emission included in EMEP 2019, 1.A.4 Small Combustion 2019 Table 3.28 Tier 2 emission factors for non-residential sources, gas turbines burning natural gas factors are used. These emission factors are as given in Table 66.

Table 66: Emission Factors of Pollutants Caused by Natural Gas Combustion

Fuel Type	PM_{10} (g/GJ)	SO_X (g/GJ)	NO_X (g/GJ)	CO (g/GJ)	NMVOC (g/GJ)
Natural Gas-Biogas Mixture	0.45	0.3	40	30	2

Emission calculations made according to these emission factors are as follows.

Thermal Power for Chimney: 5 MWh= 18 GJh

PM10 = 18 Gj/h x 0,45 g/GJ x 1 kg/ 1000g = 0,0081 kg/hour

SO2 = 18 Gj x 0,3 g/GJ x 1 kg/ 1000g = 0,0054 kg/hour

NOx = 18 Gj x 40 g/GJ x 1 kg/ 1000g = 0,72 kg/hour

CO = 18 Gj x 30 g/GJ x 1 kg/ 1000g = 0,54 kg/hour

NMVOC= 18 Gj x 2 g/GJ x 1 kg/ 1000g = 0,036 kg/hour

The emission mass flow rates calculated above are compared with the limit values given in "Industrial Air Pollution Control Regulation" which entered into force after being published in the Official Gazette dated 03.07.2009 and numbered 27277 (Amendment: Official Gazette dated 20.12.2014 and numbered 29211) ANNEX-2 Table 2.1 (See. Table 71)

In the calculation of the emission values of the waste sludge to be used, the emission factors in Table 3-2 Tier 2 emission factors for source category in the Industrial waste incineration including hazardous waste and sewage sludge document published by EMEP were used. Emission factors for waste sludge incineration are given in Table 67.

Table 67: Sludge Emission Factors

Pollutant	**Emission Factor**
NO_X	0.25 kg/tons waste
CO	1,55 kg/tons waste
SO_2	1,4 kg/tons waste
PM_{10}	0,41 kg/tons waste
Pb	5,0 g/tons waste
VOC	0,084 kg/tons waste

Mass flow rates of emissions calculated using the emission factors in Table 69 are given in Table 68.

Table 68: Waste Sludge Emission Mass Flow Rates

Amount of Sludge		8929,2 kg/h = 8,929 ton/h	
Pollutant	**Emission Factor**	**Calculation Of Mass Flow Rate**	**Mass flow rate (kg / h)**
NO_X	0.25 kg/tons waste	0,25 kg/tons waste x 8,929 tons/h	2.23
CO	1,55 kg/tons waste	1,55 kg/tons waste x 8,929 tons/h	13.83
SO_2	1,4 kg/tons waste	1,4 kg/tons waste x 8,929 ton/h	12.5
PM_{10}	0,41 kg/tons waste	0,41 kg/tons waste x 8,929 ton/h	3.66
Pb	5,0 g/tons waste	5 g/tons waste x 8,929 ton/h x 1kg/1000g	0.044
VOC	0,084 kg/tons waste	0,084 kg/tons waste x 8,929 ton/h	0.75

Table 69: Comparison of Calculated Emissions with IAPCR Table 2.1

Emissions	Mass flow rates (kg/h) for operating hours under normal operating conditions and weekly working days		Mass Flow Rate of Emissions from Natural Gas-Biogas Mixture at First Ignition (kg / h)	Mass Flow of Emissions from Waste Sludge (kg / h)
	From the chimney	From Places Other Than the Chimney		
Dust	10	1	0.0081	3.66
Lead	0.5	0.05	-	0.044
Cadmium	0.01	0.001	-	-
Thallium	0.01	0.001	-	-
Chlorine	20	2	-	-
Hydrogen chloride and Gaseous Inorganic Chloride Compounds	20	2	-	-
Hydrogen fluoride and Gaseous Inorganic Fluoride Compounds	2	0.2	-	-
Hydrogen Sulfide	4	0.4	-	-
Carbon Monoxide	500	50	0.54	13.83
Sulfur Dioxide	60	6	0.0054	12.5
Nitrogen Dioxide [NO_x (in terms of NO_2))	40	4	0.72	2.23
Total Organic Compounds	30	3	0.036	0.75
Note: Emissions in the table are hourly mass flow rates from the entire facility (total of chimneys).				

In the comparison made with the limit values of the regulation for emissions originating from the chimney in Table 71, air quality modeling study was not carried out since the limit values specified in Regulation on Control of Industrial Air Pollution, published in the Official Gazette dated 03.07.2009 and numbered 27277 were not exceeded.

There will be a continuous emission measurement system (CEMS) at the emission outlet chimney. A continuous measurement system will be established within the scope of Article 15 of the Regulation on the Incineration of Wastes in the boiler chimney. The measurement system in question shall have the equipment to perform the measurements specified in Article 15. Periodic measurements of heavy metal concentrations at the facility will be made twice a year.

All processes in the facility, temperature sensors, differential pressure sensors, level sensors, automatic spirals, motorized valves, automatic ignition systems and driven motors will be controlled by the plc and scada system in the facility.

To control flue gas emissions a) multi cyclone filter b) Activated carbon and lime dosing unit c) Mixing Unit d) NaOH Dosing Unit e) Filter Unit/Ceramic Filter unit f) Filled Bed Washing Unit with by-pass g) Bag filter h) Flue gas suction fan i) Chimney j) CEMS (Continuous Emission Measurement System) and k) Emission control units such as Flue Gas Washing Water Treatment System will be installed.

Sensors will be used for gas parameters and flow measurement in the chimney and CEMS system. Gas analyzers will measure the hydrocarbon content in the air, CO, CO2, NO, SO2, CH4, HCl, HF parameters and flow rate measurement.

Emission control system at the facility will be established in such a way as to provide emission values within the criteria of the relevant Law, Regulation and European Union Directive. The emission control system will be automatically controlled and operated from the Facility Control and Command Center during start-up, operation and shutdown. Equipment requiring regular maintenance will be accessible from permanent walkways and will be made of easily replaceable parts. Spare parts will be provided as well as necessary lifting beams and special tools so that replacement can be quick, safe and reliable.

At every stage of the activity, the provisions of the Regulation on Incineration of Wastes dated 06.10.2010 and numbered 27721 will be complied with.

The facility will be designed to meet the physical and technical conditions specified in Articles 10, 11 and 12 of the Regulation on Incineration of Wastes.

- The pre-combustion process is carried out in a fluidized bed boiler at a temperature of 850°C, and all organic parts are oxidized and passed into the gas phase. Afterwards, all remaining wastes and inorganic particles will be burned in the 2nd combustion chamber for 4-6 seconds at 850 oC. Wastes with halogen content below 1% will be accepted to the facility. When the analysis reports presented in Annex-4 are examined, it is seen that the halogen content in the analysis results is below 1%. Thanks to the burners in the combustion chambers, the heat will be kept constant in these rooms. In order to provide the pilot flame, 30,000 m3 natural gas and/or biogas-natural gas mixture will be fed to the system at the first feed. An effective combustion process will be realized by waiting in sufficient amount at high temperature and by sufficient air mixture. In this way, organic compounds and carbon monoxide will decompose and be destroyed at a very high rate. As a result, the facility will be able to meet the emission limit values specified in the “Regulation on Incineration of Wastes”.
- Incineration Plant will consist of two lines and each line will be equipped with a spare burner. If, after the last injection of combustion air, the temperature of the combustion gases falls below 850 °C, this burner will be activated automatically. This burner will also be used in the start-up and shutdown activities of the plant to ensure that the temperature is maintained at 850 °C during start-up and shutdown activities and throughout the time the unburned waste is in the combustion chamber. In the facility to be established, the gas resulting from the process will remain in the second combustion chamber for 4-6 seconds at a temperature of 850 °C, depending on the halogen content. It will be ensured that the second combustion chamber is equipped with a spare burner and the burners will be activated automatically.
- The chimney height of the Treatment Sludge Incineration Plant will be 40 m and the said value is not below the lower limit values specified in the "Regulation on Control of Industrial Air Pollution". In the “Industrial Air Pollution Control Regulation”; Plants with a rated thermal power of 1.2 MW and above are called “In cases where the volumetric flow value (R) does not cut the Q/S (kg/hour) value and the height of the chimney cannot be determined, if there are no rough terrain or existing or planned buildings and elevations in the facility impact area (if the J' value is determined as zero), it is sufficient that the actual height of the chimney is at least 10 m from the floor and at least 3 m above the roof.” Within the scope of chimney heights, the relevant provision

of the "Industrial Air Pollution Control Regulation", which was published in the Official Gazette dated 03.07.2009 and numbered 27277, will be complied with.

- Wastewater resulting from the cleaning of flue gases will be treated at Hurma Wastewater Treatment Plant, and the limit values in the "Emission limit values for the discharge of wastewater from the cleaning of flue gas emissions" included in Annex-4 of the Regulation on Incineration of Wastes, was effectuated after being published in the Official Gazette dated 06.10.2010 and numbered 27721.table will be provided.

Operating Conditions

Article 10

(1) The Incineration Plant will be operated in such a way that the total organic carbon (TOC) content of the slag and bottom ash will be less than 3% or the combustion loss will be less than 5% of the dry weight of the material. Appropriate techniques will be used for the pre-treatment of waste, if necessary.

All sludge fed within the scope of the project will be sent to the ash and waste gas waste heat recovery system after burning for 4-6 seconds in the fluidized bed. There will be waste ash, slag and fluidized bed sand to be generated within the project. Detailed information on possible wastes is presented under the title of *"Section 6.9. Solid Wastes to be Generated During Construction and Operation of the Project and Measures to be Taken".*

The Fluidized Bed Incinerator consists of a steel body and a structure covered with thermal insulation and refractory layers of firebrick of appropriate thickness. Combustion takes place on the sand inside the incinerator. Hot air at 588 ˚C degrees, which is sent by hot air blowers to the hot air chamber located under the bed and heated by inert heat, blisters and fluxes the sand bed located on the refractory belt through tuyeres (air supply nozzles). The sludge, which is fed into the incinerator and has an average calorific value of 4000 kcal/kg, mixes with the hot sand and combustion air in the sand bed of the reactor and completely burns into an inert ash in a residence time of over 5 seconds. The ash-containing waste gas produced in the reactor at a temperature of 900˚C is first sent to the waste heat recovery system and then to the flue gas treatment system.

In the Incineration Plant, the ashes resulting from the sludge, which is subjected to the combustion process for more than 5 seconds in the fluidized bed furnace, turns into inert ash as complete combustion will take place. In the design within the scope of the project, the residence time in the furnace is between 4-6 seconds, and the residence time in the project operation will be over 5 seconds in order to ensure that the residues originating from the process will turn into inert waste. For this reason, the plant will have been operated in such a way that the total organic carbon (TOC) content will be less than 3% or the loss during ignition will be less than 5% of the dry weight of the material.

(2) In the combustion plant, the gas resulting from the combustion process will remain in the second combustion chamber at a temperature of 850 °C for 4-6 seconds. It has been designed to equip the spare burner and the second combustion chamber, and the burners will be activated automatically during the operation phase.

In the design within the scope of the project, the residence time in the furnace is between 4-6 seconds, and the residence time in the project operation will be over 5 seconds in order to ensure that the residues originating from the process will turn into inert waste.

The combustion system is equipped with an auxiliary fuel support system:

- Fuel injection nozzles,
- Start-up and auxiliary burners.

During the start-up-start-up phase (with the start-up burner and fuel injectors), additional fuel is required to raise the bearing temperature to the required combustion temperature.

In the project, 30,000 m3 natural gas and/or biogas-natural gas mixture will be used as fuel within the scope of commissioning and initial operation.

(3) Each line of the combustion plant is equipped with a spare burner. If the temperature of the combustion gases drops below 850 °C after the last injection of the combustion air, this burner will be activated automatically. This burner will also be used in the start-up and shutdown activities of the plant to ensure that the temperature is maintained at 850 °C during start-up and shutdown activities and throughout the time the unburned waste is in the combustion chamber.

During the start-up-start-up phase (with the start-up burner and fuel injectors), additional fuel is required to raise the bearing temperature to the required combustion temperature.

In addition, in order to keep the temperature in the upper air share area at min 850°C, additional fuel will be given with natural gas and/or natural gas-biogas mixture injection system from 7 points in this zone.

In addition, the thermal reactor is equipped with a water spray system fixed to the ceiling to keep the temperature in the upper air section constant at 850°C – 870°C during the combustion of the sludge.

Natural gas and/or biogas (30,000 m3) will be used as additional fuel in the burner during the initial commissioning and operation of the furnace. The amount of bed sand lost in the waste gas during combustion is automatically determined and will be supplemented. The system will automatically control the temperature with water spraying when necessary for cooling.

Treatment sludge contains elements such as heavy metals, toxic compounds, pathogens, phosphorus and nitrogen. If effective control technologies are not used to reduce the emission of combustion gases, air quality can deteriorate significantly after sludge incineration. When properly designed and operated, the organic materials in the treatment sludge will be completely burned by incineration and mainly gases such as carbon dioxide, water and sulfur dioxide will be produced. During the sludge incineration process, there is a high probability of significant particulate release into the atmosphere.

After the filter, the waste gas will not exceed 140 C before entering the chimney.

The emission control system will consist of, but not limited to, lime addition unit, filter unit/ceramic filter unit and a wet Washing Unit with bypass and a Filled Bed Washing Unit after the economizer at the steam boiler outlet. Packed Bed Scrubber Unit shall be produced by the input value of 200 ppm SO2. NaOH can be added to the Scrubber Unit to purify the acidic

gases in the waste gas. In the event that NOx levels in the flue gas increase, a device will be made to add urea/NH3 to the fluidized bed incineraton boiler.

There will be a continuous emission measurement system (CEMS) at the emission outlet chimney.

All processes in the facility, temperature sensors, differential pressure sensors, level sensors, automatic spirals, motorized valves, automatic ignition systems and driven motors will be controlled by the plc and scada system in the facility.

To control flue gas emissions a) multi cyclone filter b) Activated carbon and lime dosing unit c) Mixing Unit d) NaOH Dosing Unit e) Filter Unit/ceramic filter unit f) Filled Bed Washing Unit with by-pass g) Bag filter h) Flue gas suction fan i) Chimney j) CEMS (Continuous Emission Measurement System) and k) Emission control units such as Flue Gas Washing Water Treatment System will be installed.

Sensors will be used for gas parameters and flow measurement in the chimney and CEMS system. Gas analyzers will measure the hydrocarbon content in the air, CO, CO2, NO, SO2, CH4, HCl, HF parameters and flow rate measurement.

Emission control system at the facility will be established in such a way as to provide emission values within the criteria of the relevant Law, Regulation and European Union Directive. The emission control system will be automatically controlled and operated from the Facility Control and Command Center during start-up, operation and shutdown. Equipment requiring regular maintenance will be accessible from permanent walkways and will be made of easily replaceable parts. Spare parts will be provided as well as necessary lifting beams and special tools so that replacement can be quick, safe and reliable.

6.4.1. In order to ensure the distribution of emissions and air quality limit values in the determination of the chimney heights, as well as to eliminate possible errors in the calculation

The main pollutants that will occur as a result of the activities to be carried out during the operation phase of the Treatment Sludge Incineration and Energy Recovery Facility will originate from the chimney, and PM10, SO2, NOx, CO, HCL, HF and TOC (total organic compounds) emissions. A 40-meter-high chimney will be built at the facility, and the technical specifications of the chimney and the mass flow rates of the emissions to be released from the chimney to the atmosphere are given in the tables below.

Table 70: Boiler Flue Technical Specifications

Parameter	Unit	Value
Chimney Height	m	40
Flue Gas Output Temperature	°C	140
Chimney Diameter	m	1.4
Flue Gas Output Velocity	m/sn	13.91

Industrial Air Pollution Control Regulation Annex-4;

Determination of Chimney Height and Velocity In Facilities Subject to Permission:

In Facilities Subject to Permission:

a) Flue Gas Velocity:

1) Flue gas velocities from incineration plants;

The waste gases should be discharged to the atmosphere with a vertical outlet in such a way that they can be carried unhindered by the free air flow. For this purpose, a chimney should be used, and the exit velocity of the gases from the chimney should be at least 4 m/s for facilities with a rated thermal power above 500 kW."

Since the exit velocity of the flue gas in the facility will be 13.91 m/sec, the limit value of 4 m/sec specified in the regulation is provided.

“b) Chimney Height;

3) Minimum Flue Height in Large Scale Facilities

In plants with a rated thermal power of 1.2 MW and above, the height of the chimney is determined according to the principles given below and using Abak. In cases where the volumetric flow value (R) does not cut the Q/S (kg/hour) value and the height of the chimney cannot be determined, if there are no rough terrain or existing or planned buildings and elevations in the facility impact area (if the J' value is determined as zero), it is sufficient that the actual height of the chimney is at least 10 m from the floor and at least 3 m above the roof. If the J' value is different from zero, H' is taken as 10 and the height of the chimney is determined using Abak.

The values given at the height of the Abak,

H' m : The height of the chimney determined using Abak,

d m : Chimney inner diameter or chimney cross-section equivalent diameter,

t -°C : The temperature of the waste gas at the flue inlet,

R Nm3/h : The volumetric flow of the waste flue gas under normal conditions,

Q kg /h : Mass flow rate of air pollutants coming out of the emission source,

S: The factor used to determine the chimney height (S values in Table 4.1, Table 4.2 will be used.)

Table 71: S Value for New Facilities

EMISSIONS	S-VALUES	
Dust Suspended in Air		0.08
Hydrogen chloride (shown as Cl)		0.1
Chlorine		0.09
Hydrogen fluoride and gaseous inorganic fluorine compounds (shown as F)		0.0018
Carbon monoxide		7.5
Sulfur dioxide		0.14
Hydrogen Sulfide		0.003
Nitrogen dioxide		0.1
Items in Table 1.1:		

	Class	I		0.02
	Class	II		0.1
	Class	III		0.2
	Lead	:		0.005
	Cadmium	:		0.0005
	Mercury	:		0.005
	Thallium	:		0.005
Items in Table 1.2:				
	Class	I		0.05
	Class	II		0.2
	Class	III		1.0
Items in Table 1.3:				
	Class	I		0.0001
	Class	II		0.001
	Class	III		0.01

The flue gas flow rate and temperature were used in the abak calculation.

R =77138,72 Nm3/hour (7,71 x 104 Nm^3/hour)

t = 140OC

d = 1,4 m

Q value and S values are given in Table 72.

Table 72: Calculated Q/S Values for Pollutants

Pollutant	Q (Mass Flow)	S	Q/S
NO_X	2.23225	0.1	22.3225
CO	13.83995	7.5	1.845327
SO_2	12.5006	0.14	89.29
PM_{10}	3.66089	0.08	45.76113
Pb	0.044645	0.005	8.929

As can be seen from Table 72, the maximum Q/S value that should be taken as a basis in determining the height of the chimney belongs to SO2 emissions with 89.29 kg/hour. In addition to this Q/S value determined by the use of the pollutant emissions to be given to the atmosphere from the facility chimney, the physical structure of the chimney and the use of the flue gas properties above, the chimney height was determined on the Abak given in Appendix-4 of the IAPCR and the Abak used in the calculation is given in figure 52.

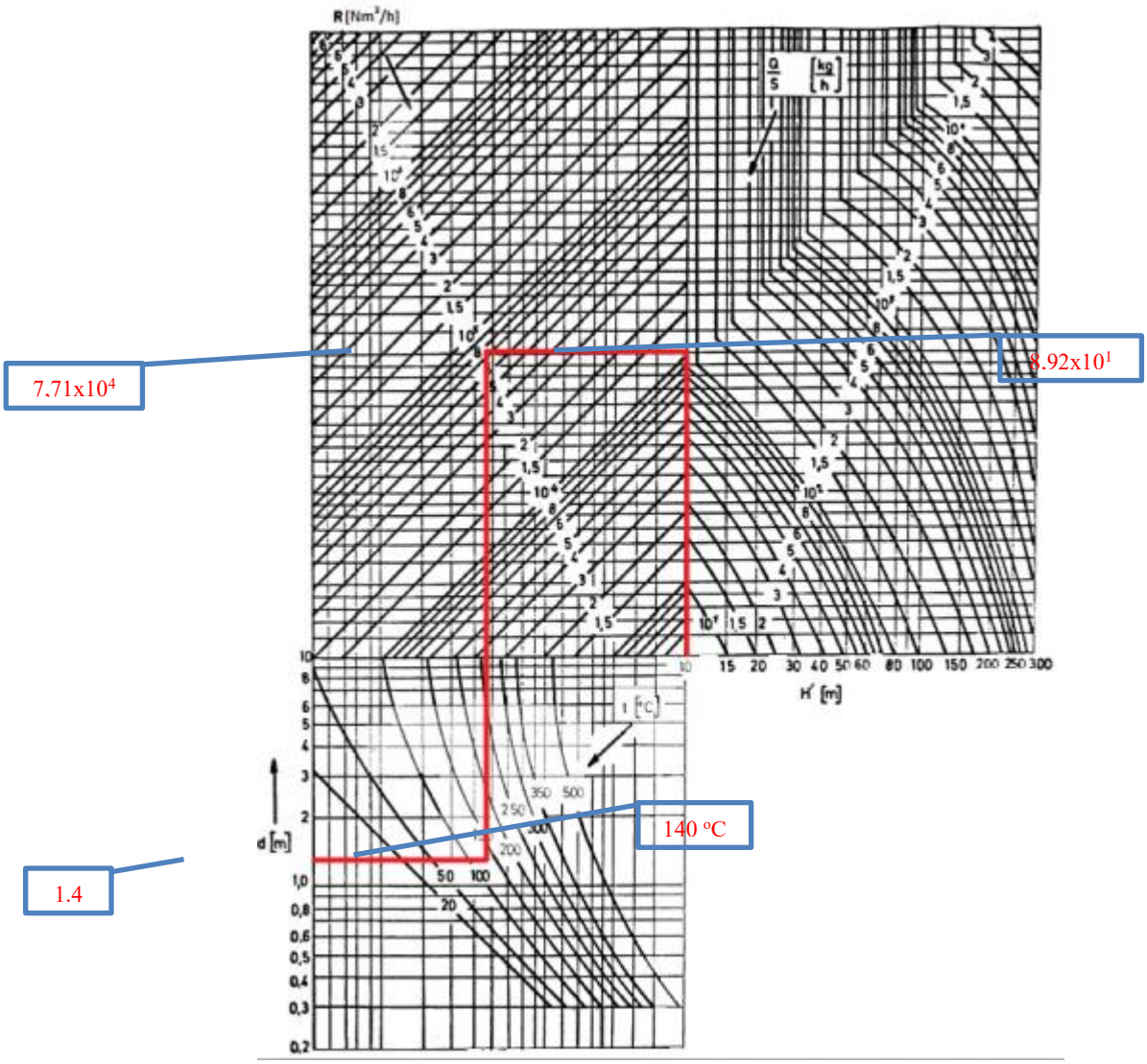


Figure 52: Abac Calculation for PM10

The height of the chimney (H') determined using the chart is 10 m.

In addition, the height of the chimney, which is determined in IAPCR Annex-4 and taking into account the topographic conditions, is calculated with the formula H = H' + J. The J value in this formula is calculated using the diagram given in IAPCR Annex-4. The average elevation difference of an area with a radius of 10H' where the chimney location forms the center is expressed with the value J'.

In this project area, the J' value was calculated by taking the elevation difference of the chimney location from the average of the height values of an area with a radius of 10H' (100 m) where the chimney location forms the center.

The elevation of the chimney of the facility planned to be established is 6 m and the average elevation in the area within the radius of 10H is 7.3 m. In the light of these data, the elevation difference (J' value) was calculated as 1.3 m.

Accordingly, the J'/H' value (1.3/10=0.13) was used to obtain the J'/H' value by using the chart given in IAPCR Annex-4 (see. Figure 53). As seen in Figure 53, the J/J' value was found as 0.42. From here, the J value is calculated as 0.546 m.

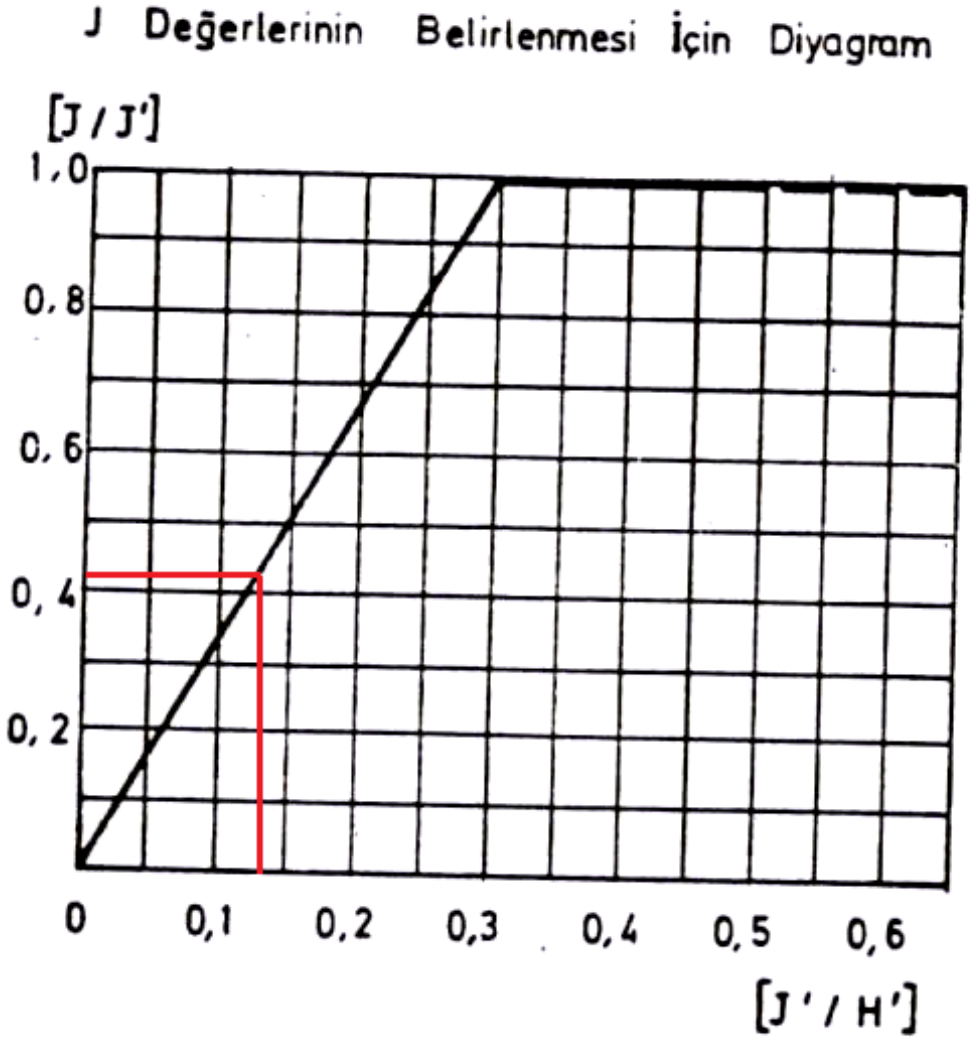


Figure 53: Abac Used for Calculating J/J' Value

The incinerator within the scope of the project is 40 m. Since the height read from Abak is 10.5 m (H+J), it provides the standard values of the regulation.

6.4.2. If the mass flow values of the emissions that may occur in the facility exceed the threshold values specified in IAPCR

A detailed explanation of the emissions expected to occur during the construction and operation periods of the planned activity is given under the heading "6.3. Emission Sources to be Occurred during Construction and Operation Phase, Calculations, Air Pollution Distribution Modeling and Measures to be Taken". Calculated mass flow rates were compared with the limit values of IAPCR Annex-2 Table 2.1. The calculated emission flow values are below the mass flow limit values given in the regulation. For this reason, it was not necessary to calculate the

Air Pollution Contribution Value (APCV) of the emissions in the facility impact area on an hourly, daily, monthly, and annual basis, and no emission distribution modeling was performed.

6.4.3. Examination of the facility by the relevant articles of IAPCR (Annex-1, Annex-3, Annex-4, Annex-5),

There will be 1 emission chimney in the Fluidized Bed Reactors to be installed in the facility. The provisions of the "Regulation on Control of Industrial Air Pollution, Annex-1, Annex.3, Annex-4, Annex-5, which was effectuated after being published in the Official Gazette dated 03.07.2009 and numbered 27277, shall be complied with.

➢ **Regulation on Control of Industrial Air Pollution Annex.1;**

If there is no emission limitation in Annex 5 for a facility subject to environmental permit, it is obligatory to comply with the emission limits given in Annex-1 and the principles specified in Annex-4.

Facility; IAPCR Annex-5 "B) SECOND GROUP FACILITIES: Facilities where Wastes are Eliminated

2) Waste recovery and final disposal facilities are subject to these terms:

2.2) Provisions and limit values specified in the relevant legislation in facilities where solid wastes are disposed of and recovered by incineration,

2.3) In waste recovery facilities, it must also obtain a License Permit by providing the provisions and limit values specified in the relevant legislation.

2.5) The principles that are not found in the legislation mentioned above are subject to the provisions and principles specified in this regulation.

IAPCR Annex 1;

d) Transport and storage of dust-forming combustion and production residues:

Closed transport systems are used in the transport of dusty combustion and production residues, if the transported material is not moist enough to prevent dusting. Precautions in subparagraph (c) are taken for their storage in the open. The areas where the storage process is completed are covered with soil and greened.

Excavation material to be formed during the construction phase of the project will be removed from the site under controlled conditions (by moistening) and will be transported to the municipality's authorized dumping sites by trucks. Dust and scattering will not be allowed by covering the trucks with canvas. It is not possible to store the excavation material in the field.

Ashes to be generated within the scope of the project will be loaded from silos to trucks and stored in the temporary waste storage area. These stored ashes will be delivered to licensed companies for disposal. Storage and transportation of ash will be carried out in a closed system, dusting and scattering will not be allowed.

e) Condition of roads within the facility:

The roads within the facility should be cleaned regularly, all precautions should be taken against dusting (irrigation, sweeping, treatment with dust binding agents, etc.) and the roads should be covered with bituminous coating materials (asphalt, etc.) and/or concrete materials.

During the construction phase of the project, dusting will be prevented by irrigation with sprinkler inside the facility and on the roads. During the operation phase, there will be no dust formation as the roads will be covered with asphalt.

f) Emptying the filters:

In order to prevent dust emission when discharging the filters that hold the dust in the form of emission, the dust is discharged with a closed system or moistened during discharge.

There will be a filter system in the facility and the filters will be emptied with a closed system.

g) Limits for specific dust emissions in waste gases:

According to the production process of the facility, these emissions are measured while the facility is operating at the highest capacity, taking into account the period of formation and discharge to the atmosphere.

There will be flue gas treatment systems at the facility and a continuous emission measurement system (CEMS) will be present at the emission outlet chimney.

➢ **Regulation on Control of Industrial Air Pollution Annex.3;**

d) Continuous Monitoring of Emission:

"3) Continuous Measurement of Gas Emissions, provisions will be complied with:

If a facility emits more than the specified amount of emissions against any of the substances given below, the substances exceeding these limits should be measured continuously with printed measuring instruments or controlled by an automatic computer system and the measurement results should be recorded. In order to determine the mass flow originating from the facility, it is necessary to measure the volumetric flow continuously."

There will be flue gas treatment systems at the facility and a continuous emission measurement system (CEMS) will be present at the emission outlet chimney.

Table 73: IAPCR Annex-3.d) 3) Limit Values

Sulfur dioxide	60 kg/h
Chlorine	1 kg/h
Organic compounds (given as carbon)	10 kg/h
Nitrous oxide (given as NO)	20 kg/h
Chloride compounds in inorganic gaseous form (given as $C1^-$)	2 kg/h
Hydrogen sulfide	1 kg/h
Inorganic gaseous fluoride compounds (given as F^-)	2 kg/h
Carbon monoxide (For Incineration Facilities)	5 kg/h
Carbon monoxide (For Other Facilities)	50 kg/h

➢ **Regulation on Control of Industrial Air Pollution Annex.4;**

Determination of Chimney Height and Velocity In Facilities Subject to Permission:

In Facilities Subject to Permission:

"a) Flue Gas Velocity:

1) Flue gas velocities from incineration plants;

The waste gases should be discharged to the atmosphere with a vertical outlet in such a way that they can be carried unhindered by the free air flow. For this purpose, a chimney should be used, for facilities with a rated thermal power above 500 kW, the exit velocity of the gases from the chimney should be at least 4 m/s. Due to the production and design of the facility, the flue gas velocity should be at least 3 m/s in cases where the diameter of the chimney cannot be narrowed and forced draft cannot be applied. In plants with a rated thermal power of 300 kW and 500 kW, the flue gas velocity must be at least 2 m/s. In plants with a rated thermal power below 300 kW, the flue gas velocity may be below 2 m/s."

Since the exit velocity of the flue gas in the facility will be 13.91 m/sec, the limit value of 4 m/sec specified in the regulation is provided.

In the first combustion, in cases where the treatment sludge has not started to be fed to the reactor yet and in cases where it is necessary (humidity rate variability, calorific value variability, etc.), natural gas-biogas mixture will be used instantly.

In this case;

➢ Regulation on Control of Industrial Air Pollution Annex.5;

"2. Combustion Plants with Rated Thermal Power Below 50 MW

2.5. Gas fueled incineration plants, Table 5.2. For plants with a combustion thermal power below 50 MW, the provisions of "limit values of flue gas emissions" will be complied with.

Table 74: IAPCR Table 5.2. Limit values of flue gas emissions for plants with a combustion thermal power below 50 MW*

Fuels	Sulphur mg/Nm^3	Carbon monoxide mg/Nm^3	Nitrogen dioxide mg/Nm^3	Dust mg/Nm^3
Natural Gas, LPG, Refinery gas	100	100	800	10
Coke Oven Facility Gas	800	100		100
Biogas	800	100		100

*The volume of oxygen in flue gases is predicted as 3%.

➢ Regulation on Control of Industrial Air Pollution Annex.5;

"B) SECOND GROUP FACILITIES: Waste Disposal Facilities

2) Waste recovery and final disposal facilities are subject to these terms:

2.2) Provisions and limit values specified in the relevant legislation in facilities where solid wastes are disposed of and recovered by incineration,

2.3) In waste recovery facilities, it must also obtain a License Permit by providing the provisions and limit values specified in the relevant legislation.

2.5) The principles that are not found in the legislation mentioned above are subject to the provisions and principles specified in this regulation.

These provisions will be complied with.

In this context, the 11th Regulation on Incineration of Wastes, which was effectuated by being published in the O.G. dated 06.10.2010 and numbered 27721. Limit values specified in Annex-5 will be complied with.

➢ Annex-5 Emission Limit Values of the Regulation on Incineration of Wastes

Table 75: AYİY Annex-5 (a) Daily Average Values

Total dust	10 mg/m^3
Gaseous and vaporous organic substances are expressed as total organic carbon.	10 mg/m^3
Hydrogen chloride (HCI)	10 mg/m^3
Hydrogen fluoride (HF)	1 mg/m^3
Sulfur dioxide (SO_2)	50 mg/m^3
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2) are expressed as nitrogen dioxide for existing combustion plants or new incineration plants with a rated capacity exceeding 6 tons per hour	200 mg/m^3 (*)
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2) are expressed as nitrogen dioxide for existing incineration plants with a rated capacity of 6 tons per hour or less	400 mg/m^3 (*)

Table 76: AYİY Annex-5 (B) Half-Hourly Average Values

	A (%100)	B (% 97)
Total dust	30 mg/m^3	10 mg/m^3
Gaseous and vaporous organic substances are expressed as total organic carbon.	20 mg/m^3	10 mg/m^3
Hydrogen chloride (HCI)	60 mg/m^3	10 mg/m^3
Hydrogen fluoride (HF)	4 mg/m^3	2 mg/m^3
Sulfur dioxide (SO_2)	200 mg/m^3	50 mg/m^3
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2) are expressed as nitrogen dioxide for existing combustion plants or new incineration plants with a rated capacity exceeding 6 tons per hour	400 mg/m^3(*)	200 mg/m^3 (*)

Table 77: AYİY Annex-5 (c) All Average Values Over a Sampling Period of at Least 30 Minutes and Maximum 8 Hours

Cadmium and its compounds are denoted as cadmium (Cd)	Total 0.05 mg/ m^3	Total 0,1 mg/ m^3 (*)
Thallium and its compounds are denoted as thallium (Tl)		
Mercury and its compounds are indicated as mercury (Hg)	0,05 mg/ m^3	0,1 mg/ m^3 (*)
Antimony and its compounds are indicated as antimony (Sb)	Total 0,5 mg/ m^3	Total 0,5 mg/ m^3
Arsenic and its compounds are specified as arsenic (As)		
Lead and its compounds are indicated as lead (Pb)		
Chromium and its compounds are denoted as chromium (Cr)		
Cobalt and its compounds are indicated as cobalt (Co)		
Copper and its compounds are indicated as copper (Cu)		
Manganese and its compounds are indicated as manganese (Mn)		
Nickel and its compounds are denoted as nickel (Ni)		

Vanadium and its compounds are denoted as vanadium (V)		

These average values also include the gaseous and vapor states and compounds of the respective heavy metal emissions.

"(d) Average values are measured over a sampling period of a minimum of 6 hours and a maximum of 8 hours. The emission limit value relates to the total concentration of dioxins and furans calculated using the concept of toxicity equivalence in accordance with Annex-1.

Dioxins and Furans	0,1 ng/ m^3

(d) The following emission limit values for carbon monoxide (CO) concentrations in combustion gases must not be exceeded (excluding commissioning and deactivation phases):

— 50 milligrams/m3 of combustion gas, determined as a daily average value;

— At least 95% of all measurements are 150 milligrams/m3 of combustion gas determined as 10-minute average values, or 100 milligrams/m3 of combustion gas, with all measurements determined as half-hourly average values in any 24-hour period"

These provisions will be complied with.

6.4.4. In accordance with the IAPCR Annex-3 and/or Annex-5, the evaluation of which parameter and source of the continuous measurement devices that should be in the enterprise and the installation of the measurement devices are included in the report,

➢ Regulation on Control of Industrial Air Pollution Annex.3;

d) Continuous Monitoring of Emission:

"3) Continuous Measurement of Gas Emissions, provisions will be complied with:

If a facility emits more than the specified amount of emissions against any of the substances given below, the substances exceeding these limits should be measured continuously with printed measuring instruments or controlled by an automatic computer system and the measurement results should be recorded. Continuous measurement of the volumetric flow is required in order to determine the mass flow originating from the facility" provisions will be complied with.

➢ Regulation on Control of Industrial Air Pollution Annex.5;

"2. Combustion Plants with Rated Thermal Power Below 50 MW

2.5. Gas fueled incineration plants, Table 5.2. For plants with a combustion thermal power below 50 MW, the provisions of "limit values of flue gas emissions" will be complied with.

Table 78: IAPCR Table 5.2 Limit Values of Flue Gas Emissions for Plants with a Combustion Thermal Power Below 50 MW*

Fuels	Sulphur mg/Nm^3	Carbon monoxide mg/Nm^3	Nitrogen dioxide mg/Nm^3	Dust mg/Nm^3
Natural Gas, LPG, Refinery gas	100	100	800	10
Coke Oven Facility Gas	800	100		100

Biogas	800	100		100

*The volume of oxygen in flue gases is predicted as 3%.

During the operation phase, CEMS (Continuous Emission Measurement System) will be installed in the chimney of the combustion plant. Sensors will be used for gas parameters and flow measurement in the chimney and CEMS system. Gas analyzers will measure the hydrocarbon content in the air, CO, CO2, NO, SO2, CH4, HCl, HF parameters and flow rate measurement.

6.4.5. A detailed explanation of the emission reduction techniques to be used and to comply with the best available techniques within the framework of Article 6 of IAPCR,

Treatment sludge contains elements such as heavy metals, toxic compounds, pathogens, phosphorus and nitrogen. If effective control technologies are not used to reduce the emission of combustion gases, air quality can deteriorate significantly after sludge incineration. When properly designed and operated, the organic materials in the treatment sludge will be completely burned by incineration and mainly gases such as carbon dioxide, water and sulfur dioxide will be produced. During the sludge incineration process, there is a high probability of significant particulate release into the atmosphere.

Emission control system at the facility will be established in such a way as to provide emission values within the criteria of the relevant Law, Regulation and European Union Directive. The emission control system will be automatically controlled and operated from the Facility Control and Command Center during start-up, operation and shutdown. Equipment requiring regular maintenance will be accessible from permanent walkways and will be made of easily replaceable parts. Spare parts will be provided as well as necessary lifting beams and special tools so that replacement can be quick, safe and reliable.

After the filter, the waste gas will not exceed 140 C before entering the chimney.

After the economizer at the steam boiler outlet, the emission control system will consist of, but not limited to, lime addition unit, filter unit/ceramic filter unit and a wet Washing Unit with bypass and a Packed Bed Scrubber Unit. Packed Bed Scrubber Unit shall be produced by the input value of 200 ppm SO2. NaOH can be added to the Scrubber Unit to purify the acidic gases in the waste gas. In the event that NOx levels in the flue gas increase, a device will be made to add urea/NH3 to the fluidized bed combustion boiler.

Lime Dosing Unit, Activated Carbon Dosing Unit, Mixing Unit, NaOH Dosing Unit, Filter Unit/ceramic filter unit, Filled Bed Washing Unit with bypass will be manufactured, which are the main components of the emission control system, which is one of the system/equipment/unit/instruments.

To control flue gas emissions a) multi-cyclone filter b) Activated carbon and lime dosing unit c) Mixing Unit d) NaOH Dosing Unit e) Filter Unit/ceramic filter unit f) Packed Bed Scrubber Unit with bypass g) Bag type filter h) Flue gas suction fan i) Chimney j) Emission control units such as CEMS (Continuous Emission Measurement System) and k) Flue Gas Washing Water Treatment System will be installed.

6.4.6. Indicating that air quality limit values will be provided in the facility impact area as per Article 6 of the IAPCR, and that the measures to be taken by the Governorship will be complied with,

In accordance with Article 6 of IAPCR, air quality limit values will be provided in the facility area of influence. The measures to be taken by the Governorship in this regard will be complied with.

The provisions and principles in Article 6 of the IAPCR published in the Official Gazette dated 03.07.2009 and numbered 27277 shall be complied with.

6.4.7. If an activity within the scope of the Regulation on the Control of Odor-Creating Emissions (RoCOCE) is planned at the facility, the relevant undertaking should be included in the annex of the EIA Report and the evaluation of the EIA Report within the scope of the COEKY

Construction Phase

There is no situation that will cause odor emission during the construction phase of the project.

Operational Phase

In the facility, the design and manufacturing will be carried out in such a way that the entire truck dump area, where sludge is accepted, stored, and the facility loading bunkers are 100% closed in order to ensure odor isolation. There will be two feeding bunkers. The bunker capacity is planned as 2x500 tons, that is, its volume is 1000 m3. The total bunker area is foreseen as 1000 m2. All areas related to sludge will be isolated from the outside air environment. Sulfate resistant (SRC) C35 concrete will be used in concrete structures with 100% impermeability to be used in this area.

The bunker to be built will be manufactured in accordance with the loading of sludge to the facility by trucks from outside the facility. In the meantime, trucks will be taken into the closed area and sludge will be discharged in order to prevent the odor that will disturb the environment. The odor inside will be removed by the air suction units.

Treatment sludge with a dry matter content of 17-20% at Hurma Wastewater Treatment Plant Decanter Outlet will be transferred by a completely closed Screw Conveyor system to prevent the spread of odor, and from the Hurma Wastewater Treatment Plant to the existing Drying Plant bunker, by truck loading and to the Hurma Treatment Sludge Incineration and Energy Recovery Plant. However, the monopump feeding system in the facility (Treatment Facility) will be kept in operation and will remain as a backup system.

A biofilter is designed as an odor treatment system for silos where wet sludge will be stored.

The sludge pumped from the underground silo will be stored in 2 parallel working 118 tons (118 m3) above ground silos. There will be a hydraulic sliding frame at the bottom of the sludge silos, and each silo will be fed by 2 main screw pumps located under it. Via these pumps, the sludge will be sent into the incinerator with injectors equidistant from each other around the Fluidized Bed Incinerator. Polluted air from sludge tanks and silos will be collected and deodorized with biofilter.

The gases accumulated in the silos will be transferred to the fluidized bed incinerator and a system will be set up to be burned there. In cases where the facility is not operating, an absorption system will be installed for odor control. This system will be installed as a backup for dangerous and explosive gases.

CH4, H2S and CO detectors have been added to the underground sludge bunker and aboveground silos for odor control purposes. These silos are covered however, when mud is poured into the underground silo with a truck, the hydraulic cover on the top of the tank will be opened and the mud can be poured. According to the signal coming from the detectors, the dangerous gas levels in the tank can be monitored.

Vitiated air will be drawn from the silos by fans operated with frequency inverters and will be pumped into the incinerator or biofilter unit.

According to the observation data of Antalya Regional Meteorology Station, the first degree prevailing wind direction is N (North), the second degree prevailing wind direction is SEE (South-Southeast), and the third degree prevailing wind direction is SE (Southeast).

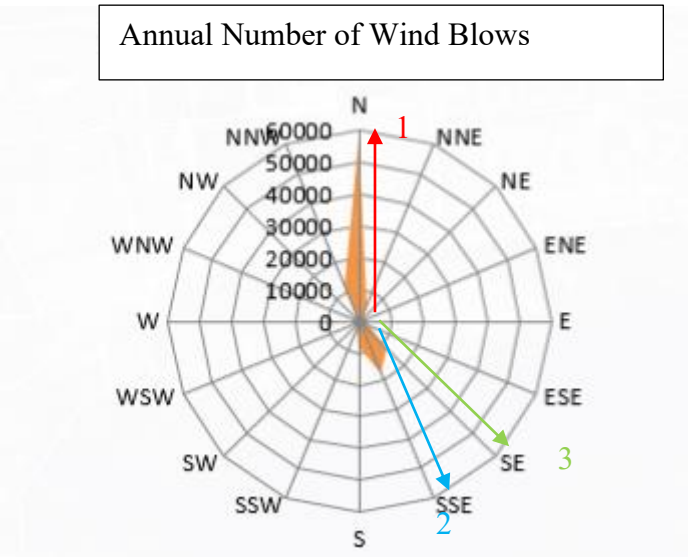


Figure 54: Annual Number of Wind Blows



Figure 55: Directions of Wind Blowing

Cumulative calculations were made within the scope of the Hurma Treatment Sludge Incineration and Energy Recovery Plant Project, taking into account the prevailing wind directions and climatic conditions.

Considering the fact that the project area is located within the Hurma Wastewater Treatment Plant and its distance to settlements, facilities and sensitive areas is sufficient, with the odor removal units to be established, no negative impact is expected within the settlements, facilities etc. areas within the impact area of the project.

Regulation on the Control of Odor-Creating Emissions;

Article 6 – (1) During the establishment and operation of these activities, those who carry out activities that cause odor emission:

a) Preventing the formation of odor by reducing the harmful effects of the enterprise on the public and the environment by applying the best available production or treatment techniques,

b) To take odor prevention measures in accordance with this Regulation,

c) In case of a complaint, taking odor prevention measures/additional measures in accordance with this Regulation,

d) Ensuring that the odor emission limit values specified in this Regulation are not exceeded,

e) If requested by the competent authorities, it is obligatory to have the odor emissions measured in accordance with the procedures and principles specified in this Regulation.

These provisions will be complied with.

The provisions of the "Regulation on the Control of Odor-Creating Emissions", published in the Official Gazette dated 19.07.2013 and numbered 28712, will be complied with at every stage of the activity.

6.5. DETERMINATION OF GREENHOUSE GAS EMISSIONS AND THEIR EFFECTS ON CLIMATE CHANGE,

Within the scope of the project, the provisions of the regulation on the monitoring of greenhouse gas emissions published in the Official Gazette dated 17.04.2014 and numbered 29003 will be complied with.

As a result of the combustion of the fuel to be used in the construction machines that will take part in the realization of the project, there will be exhaust emissions. Diesel fuel will be used as fuel in the construction machines that will be employed within the scope of the project.

In order to determine the amount of greenhouse gas emissions, the greenhouse gas emission values during the construction and operation phases were calculated separately and evaluated in detail under the heading “6.2. Fuel Types to be Used in Land Preparation, Construction and Operation Phases, Consumption Amounts, Emissions”.

When the calculated hourly mass flow (kg/hour) value is compared with the mass flow (kg/hour) (places other than the chimney) values given for the normal operating conditions and weekly working days given in “IAPCR” Table 2.1, the emission mass flow rates are determined. It has been observed that the limit values given in the regulation are below. For this reason, air quality contribution values are not calculated.

Machinery and equipment will be used within the scope of the operation of the project, and the exhaust emissions from the machinery and equipment are below the limit values given in the regulation as calculated above. Therefore, the exhaust emissions arising from the machinery and equipment to be operated during the operation phase will not have a negative impact on the residence, which is approximately 230 m away from the bird flight, which is the closest settlement to the project site.

The relevant provisions of the "Regulation on Control of Industrial Air Pollution", published in the Official Gazette dated 03.07.2009 and numbered 27277, will be complied with.

In addition, the exhaust emission inspections of the construction machinery and vehicles to be used will be carried out regularly, and the provisions of the "Exhaust Gas Emission Control Regulation", which was effectuated by being published in the Official Gazette dated 11.03.2017 and numbered 30004, will be followed for the exhaust gases of the vehicles.

The facility is not within the scope of the Regulation on the Monitoring of Greenhouse Gas Emissions, which was published in the Official Gazette dated 17.05.2014 and numbered 29003. During the construction and operation phase of the project, no activity will be carried out that may cause meteorological and climatic effects on the local and regional climate.

Net greenhouse gas emissions and emission values resulting from energy production in the form of electricity and heat as a result of thermal processes from wastes are lower than fossil fuels

and other disposal methods applied. Fuels with low heating value can also be used in gasification. Emissions resulting from gasification are very low compared to similar methods.

During the operation phase, CEMS (Continuous Emission Measurement System) will be installed in the chimney of the combustion plant. Sensors will be used for gas parameters and flow measurement in the chimney and CEMS system. Gas analyzers will measure the hydrocarbon content in the air, CO, CO2, NO, SO2, CH4, HCl, HF parameters and flow rate measurement.

The incineration plant will be designed, equipped, constructed and operated in such a way that the air emission limit values determined in Annex-5 of the Regulation on Incineration of Wastes regarding flue gas emissions are not exceeded.

It is not thought that the project will have a negative impact on the air quality in the region during the construction and operation phases.

At every stage of the activity, the provisions of the "Regulation on the Monitoring of Greenhouse Gas Emissions", published in the Official Gazette dated 17.05.2014 and numbered 29003, will be complied with. Detailed calculation about the carbon foot prints has been enclosed to Annex 23.

6.6. EVALUATION OF ENVIRONMENTAL NOISE AND VIBRATION AND MEASURES TO BE TAKEN

Noise will be generated from the construction machinery to be used during the construction phase of the project.

The closest settlement to the project area is the residence located at a distance of approximately 230 m from the project area. Noise level distribution calculations were interpreted considering the nearest settlement.

Within the scope of the project, the equivalent noise level that may occur during the operation phase has been calculated considering the worst possibilities and assuming that the construction machinery and equipment to be used will operate at the same time. In order to minimize the noise level that may occur in the environment during the planned activities, care will be taken not to operate machinery and equipment simultaneously.

For the calculation of the total sound power levels in the four octave bands between 500Hz-1000Hz-2000Hz-4000Hz of the machinery-equipment that will be used in the open area and that will cause noise during the works within the scope of the project, the formulas, according to the engine power levels, given in article 5, Permissible Sound Power Levels and Noise Marking and Standards of "Regulation on Noise Emission in the Environment Created by Equipment Used in Outdoor", of the Official Gazette dated 30.12.2006 and numbered 26392 which was effectuated after being published, were used, and the relevant formulas are given in Table 79.

Table 79: Sound Power Levels Defined According to Equipment Type and Net Power Levels

Type of equipment	Net installed power P (kW), Electric power Pel (1) (kW), Application mass m (kg), Cutting width L (cm)	Permissible sound power level dB/1 pW	
		From July 3, 2004 in I. Phase	From January 3, 2006 in II. Phase
Compaction machines (vibrating rollers, vibratory plates, vibratory hammers)	P ≤ 8	108	105(2)
	8 < P ≤ 70	109	106(2)
	P > 70	89 + 11 log P	86 + 11 log P(2)
Caterpillar bulldozers, tracked loaders, tracked backhoe loaders	P ≤ 55	106	103(2)
	P > 55	87 + 11 log P	84 + 11 log P(2)
Wheel dozers, wheel loaders, wheel backhoe-loaders, dump trucks, graders, loader-type earth-fill compactors, internal combustion engine driven counterbalanced hydraulic lift trucks, mobile cranes, compaction machines (non-vibration rollers), pavement trowels, hydraulic power generation machines	P ≤ 55	104	101(2)(3)
	P > 55	85 + 11 log P	82 + 11 log P(2)(3)
Excavators, hoists for hauling goods, construction cranes, motor tillers	P ≤ 15	96	93
	P > 15	83 + 11 log P	80 + 11 log P
Hand-held concrete breakers and drills	m ≤ 15	107	105
	15< m < 30	94 + 11 log m	92 + 11 log m(2)
	m ≥ 30	96 + 11 log m	94 + 11 log m
Tower cranes		98 + log P	96 + log P
Power supply and generators	Pel ≤ 2	97 + log Pel	95 + log Pel
	2 < Pel ≤ 10	98 + log Pel	96 + log Pel
	Pel > 10	97 + log Pel	95 + log Pel
Compressors	P ≤ 15	99	97
	P > 15	97 + 2 log P	95 + 2 log P
Lawn mowers, lawn trimmers/lawn edging machines	L ≤ 50	96	94(2)
	50< L ≤ 70	100	98
	70< L ≤ 120	100	98(2)
	L > 120	105	103(2)

Sound power levels are calculated separately for each vehicle and equipment by means of the formulas in the table above, based on the engine power or application mass of the vehicles and equipment that are intended to be used. The number of machinery and equipment to be used and their engine power levels are given in Table 80.

Table 80: Data of Construction Equipment to be Used in Field Activities

Noise Source	SOURCE	Number of Construction Equipments	Engine Gücü (kW)
Crawler Excavator	Dot	3	125
Loader with wheels	Dot	3	95
Mini Loader	Dot	2	75
Truck	Linear	12	110
30-Ton Crane	Dot	2	50
Loader with wheels	Linear	2	80
30-Ton Cylinder	Linear	2	85
Butt-Welding Machine	Dot	2	6.5
Tower crane (60 m)	Dot	1	70
Argon Welding Machine	Dot	2	7
Diesel Generator	Dot	1	80

The kW engine powers calculated above are calculated using the formulas given in the Regulation on Noise Emission in the Environment Created by Equipment Used in Outdoors and the Sound Power Levels table. (Table 81)

Table 81: Noise Sources and Sound Power Levels

Noise Source	Number of Noise Sources	Engine Power (kW)	Permissible sound power level (dB/1 pW)	Lw Sound Power (dBA)
Crawler Excavator	3	125	84 + 11 log P	107.07
Loader with wheels	3	95	82 + 11 log P	103.75
Mini Loader	2	75	82 + 11 log P	102.63
Truck	12	110	82 + 11 log P	104.46
30-Ton Crane	2	50	80 + 11 log P	98.69
Loader with wheels	2	80	82 + 11 log P	102.93
30-Ton Cylinder	2	85	86 + 11 log P	107.22
Butt-Welding Machine	2	6.5	96 + log Pel	96.81
Tower crane (60 m)	1	70	96 + log P	97.85
Argon Welding Machine	2	7	96 + log Pel	96.85
Diesel Generator	1	80	95 + log Pel	96.90

The distribution of the sound power level of each noise source in 4 octave bands, 500Hz-1000Hz-2000Hz-4000Hz, is shown in the table below by calculating the sound power level in each octave band. The following formula was used while calculating the sound level power. (Table 82)

$$Lw(i)= 10*Log(10^{(Lw\ /10}/4)$$ Lw=Sound power level of the source (dB)

Table 82: Distribution of Sound Power Levels of Noise Sources by Octave Bands

Noise Sources	Sound Level Power (dB)				
	Total	500 Hz	1000 Hz	2000 Hz	4000 Hz
Crawler Excavator	107.07	105.82	105.82	105.82	105.82
Loader with wheels	103.75	102.75	102.75	102.75	102.75
Mini Loader	102.63	99.62	99.62	99.62	99.62
Truck	104.46	109.23	109.23	109.23	109.23
30-Ton Crane	98.69	95.68	95.68	95.68	95.68
Loader with wheels	102.93	99.92	99.92	99.92	99.92
30-Ton Cylinder	107.22	104.21	104.21	104.21	104.21
Butt-Welding Machine	96.81	93.80	93.80	93.80	93.80
Tower crane (60 m)	97.85	91.82	91.82	91.82	91.82

Argon Welding Machine	96.85	93.83	93.83	93.83	93.83
Diesel Generator	96.90	110.69	110.69	110.69	110.69

When calculating Sound Level Pressure according to distances in 4 octave bands,

THe formula Lp=Lw+10*Log(Q/4Πr2) is used. In the formula;

Lp=Noise pressure levels of sources in free space at distance r (dB)

Lw= Sound power level of the source (dB)

Q= Land reduction factor (the land is considered flat and 1 is taken)

R= Distance from source (m)

Table 83: Sound Pressure Levels of Noise Sources

Noise Sources	Distance (m)	Sound Level Power (dB)			
		500 Hz	1000 Hz	2000 Hz	4000 Hz
Crawler Excavator	50	60.85	60.85	60.85	60.85
	100	54.82	54.82	54.82	54.82
	230	47.59	47.59	47.59	47.59
	250	46.87	46.87	46.87	46.87
	500	40.85	40.85	40.85	40.85
	750	37.32	37.32	37.32	37.32
	1000	34.82	34.82	34.82	34.82
	2000	28.80	28.80	28.80	28.80
Loader with wheels	50	57.53	57.53	57.53	57.53
	100	51.51	51.51	51.51	51.51
	230	44.28	44.28	44.28	44.28
	250	43.55	43.55	43.55	43.55
	500	37.53	37.53	37.53	37.53
	750	34.01	34.01	34.01	34.01
	1000	31.51	31.51	31.51	31.51
	2000	25.49	25.49	25.49	25.49
Mini Loader	50	54.64	54.64	54.64	54.64
	100	48.62	48.62	48.62	48.62
	230	41.39	41.39	41.39	41.39
	250	40.66	40.66	40.66	40.66
	500	34.64	34.64	34.64	34.64
	750	31.12	31.12	31.12	31.12
	1000	28.62	28.62	28.62	28.62
	2000	22.60	22.60	22.60	22.60
Truck	50	64.26	64.26	64.26	64.26
	100	58.23	58.23	58.23	58.23
	230	51.00	51.00	51.00	51.00
	250	50.28	50.28	50.28	50.28
	500	44.26	44.26	44.26	44.26
	750	40.73	40.73	40.73	40.73
	1000	38.23	38.23	38.23	38.23
	2000	32.21	32.21	32.21	32.21
30-Ton Crane	50	50.71	50.71	50.71	50.71
	100	44.69	44.69	44.69	44.69
	230	37.45	37.45	37.45	37.45
	250	36.73	36.73	36.73	36.73
	500	30.71	30.71	30.71	30.71
	750	27.19	27.19	27.19	27.19
	1000	24.69	24.69	24.69	24.69
	2000	18.67	18.67	18.67	18.67
Loader with wheels	50	54.95	54.95	54.95	54.95
	100	48.93	48.93	48.93	48.93
	230	41.70	41.70	41.70	41.70
	250	40.97	40.97	40.97	40.97
	500	34.95	34.95	34.95	34.95

	750	31.43	31.43	31.43	31.43
	1000	28.93	28.93	28.93	28.93
	2000	22.91	22.91	22.91	22.91
30-Ton Cylinder	50	59.24	59.24	59.24	59.24
	100	53.22	53.22	53.22	53.22
	230	45.99	45.99	45.99	45.99
	250	45.26	45.26	45.26	45.26
	500	39.24	39.24	39.24	39.24
	750	35.72	35.72	35.72	35.72
	1000	33.22	33.22	33.22	33.22
	2000	27.20	27.20	27.20	27.20
Butt-Welding Machine	50	48.83	48.83	48.83	48.83
	100	42.81	42.81	42.81	42.81
	230	35.58	35.58	35.58	35.58
	250	34.85	34.85	34.85	34.85
	500	28.83	28.83	28.83	28.83
	750	25.31	25.31	25.31	25.31
	1000	22.81	22.81	22.81	22.81
	2000	16.79	16.79	16.79	16.79
Tower crane (60 m)	50	46.85	46.85	46.85	46.85
	100	40.83	40.83	40.83	40.83
	230	33.60	33.60	33.60	33.60
	250	32.87	32.87	32.87	32.87
	500	26.85	26.85	26.85	26.85
	750	23.33	23.33	23.33	23.33
	1000	20.83	20.83	20.83	20.83
	2000	14.81	14.81	14.81	14.81
Argon Welding Machine	50	48.86	48.86	48.86	48.86
	100	42.84	42.84	42.84	42.84
	230	35.61	35.61	35.61	35.61
	250	34.88	34.88	34.88	34.88
	500	28.86	28.86	28.86	28.86
	750	25.34	25.34	25.34	25.34
	1000	22.84	22.84	22.84	22.84
	2000	16.82	16.82	16.82	16.82
Diesel Generator	50	65.72	65.72	65.72	65.72
	100	59.70	59.70	59.70	59.70
	230	52.46	52.46	52.46	52.46
	250	51.74	51.74	51.74	51.74
	500	45.72	45.72	45.72	45.72
	750	42.19	42.19	42.19	42.19
	1000	39.70	39.70	39.70	39.70
	2000	33.68	33.68	33.68	33.68

The correction factors for the frequency range of 500 Hz to 4000 Hz are given in Table 84.

Table 84: Correction Factors by Frequencies

Center Frequency (Hz)	Correction Factor
500	-3.2
1000	0
2000	1.2
4000	1

It is assumed that the sound pressure levels of the noise sources are equally distributed over the 4 octave band. The correction factors given in Table 84 were used to calculate the sound pressure levels of the noise sources in the activity area. As a result of the calculation made with correction factors, the sound levels of each noise source were found for 4 octave bands. Calculations with correction factors are given in Table 85.

Since the operating frequency range of construction machines is in the range of 500-4000 Hz, the sound pressure level of each point is approximately equivalent to the noise level.

Table 85: Distribution of Noise Caused by Construction Equipment by Distance

Noise Sources	Distance (m)	Sound Level Power (dB)			
		500 Hz	1000 Hz	2000 Hz	4000 Hz
Crawler Excavator	50	57.65	60.85	62.05	61.85
	100	51.62	54.82	56.02	55.82
	230	44.39	47.59	48.79	48.59
	250	43.67	46.87	48.07	47.87
	500	37.65	40.85	42.05	41.85
	750	34.12	37.32	38.52	38.32
	1000	31.62	34.82	36.02	35.82
	2000	25.60	28.80	30.00	29.80
Loader with wheels	50	54.33	57.53	58.73	58.53
	100	48.31	51.51	52.71	52.51
	230	41.08	44.28	45.48	45.28
	250	40.35	43.55	44.75	44.55
	500	34.33	37.53	38.73	38.53
	750	30.81	34.01	35.21	35.01
	1000	28.31	31.51	32.71	32.51
	2000	22.29	25.49	26.69	26.49
Mini Loader	50	51.44	54.64	55.84	55.64
	100	45.42	48.62	49.82	49.62
	230	38.19	41.39	42.59	42.39
	250	37.46	40.66	41.86	41.66
	500	31.44	34.64	35.84	35.64
	750	27.92	31.12	32.32	32.12
	1000	25.42	28.62	29.82	29.62
	2000	19.40	22.60	23.80	23.60
Truck	50	61.06	64.26	65.46	65.26
	100	55.03	58.23	59.43	59.23
	230	47.80	51.00	52.20	52.00
	250	47.08	50.28	51.48	51.28
	500	41.06	44.26	45.46	45.26
	750	37.53	40.73	41.93	41.73
	1000	35.03	38.23	39.43	39.23
	2000	29.01	32.21	33.41	33.21
30-Ton Crane	50	47.51	50.71	51.91	51.71
	100	41.49	44.69	45.89	45.69
	230	34.25	37.45	38.65	38.45
	250	33.53	36.73	37.93	37.73
	500	27.51	30.71	31.91	31.71
	750	23.99	27.19	28.39	28.19
	1000	21.49	24.69	25.89	25.69
	2000	15.47	18.67	19.87	19.67
Loader with wheels	50	51.75	54.95	56.15	55.95
	100	45.73	48.93	50.13	49.93
	230	38.50	41.70	42.90	42.70
	250	37.77	40.97	42.17	41.97
	500	31.75	34.95	36.15	35.95
	750	28.23	31.43	32.63	32.43
	1000	25.73	28.93	30.13	29.93
	2000	19.71	22.91	24.11	23.91
30-Ton Cylinder	50	56.04	59.24	60.44	60.24
	100	50.02	53.22	54.42	54.22
	230	42.79	45.99	47.19	46.99
	250	42.06	45.26	46.46	46.26
	500	36.04	39.24	40.44	40.24
	750	32.52	35.72	36.92	36.72
	1000	30.02	33.22	34.42	34.22
	2000	24.00	27.20	28.40	28.20
Butt-Welding Machine	50	45.63	48.83	50.03	49.83

	100	39.61	42.81	44.01	43.81
	230	32.38	35.58	36.78	36.58
	250	31.65	34.85	36.05	35.85
	500	25.63	28.83	30.03	29.83
	750	22.11	25.31	26.51	26.31
	1000	19.61	22.81	24.01	23.81
	2000	13.59	16.79	17.99	17.79
Tower crane (60 m)	50	43.65	46.85	48.05	47.85
	100	37.63	40.83	42.03	41.83
	230	30.40	33.60	34.80	34.60
	250	29.67	32.87	34.07	33.87
	500	23.65	26.85	28.05	27.85
	750	20.13	23.33	24.53	24.33
	1000	17.63	20.83	22.03	21.83
	2000	11.61	14.81	16.01	15.81
Argon Welding Machine	50	45.66	48.86	50.06	49.86
	100	39.64	42.84	44.04	43.84
	230	32.41	35.61	36.81	36.61
	250	31.68	34.88	36.08	35.88
	500	25.66	28.86	30.06	29.86
	750	22.14	25.34	26.54	26.34
	1000	19.64	22.84	24.04	23.84
	2000	13.62	16.82	18.02	17.82
Diesel Generator	50	62.52	65.72	66.92	66.72
	100	56.50	59.70	60.90	60.70
	230	49.26	52.46	53.66	53.46
	250	48.54	51.74	52.94	52.74
	500	42.52	45.72	46.92	46.72
	750	38.99	42.19	43.39	43.19
	1000	36.50	39.70	40.90	40.70
	2000	30.48	33.68	34.88	34.68

At each distance, the pressure levels damped by the atmosphere were calculated. Absorption values of the atmosphere according to each frequency were calculated according to the formula Aatm=7,4*10-8*(f2*r/ϕ). Used in the formula;

Aatm = Atmospheric Absorption
f = frequency of the noise source (or center frequency of the frequency band in question)
R= Distance from source (m)
ϕ= Relative Humidity of Air (%)
(Relative humidity is taken as approximately 60.6%* for Konyaaltı region.)
*(*source: GDM Antalya Regional Meteorology Station Data)*

Table 86: Atmospheric Absorption Values by Distance in 4 Octave Bands

Frequency (Hz)	Distance (m)	Atmospheric Absorption
500	50	0.02
	100	0.03
	230	0.07
	250	0.08
	500	0.15
	750	0.23
	1000	0.31
	2000	0.61
1000	50	0.06
	100	0.12
	230	0.28
	250	0.31
	500	0.61

	750	0.92
	1000	1.22
	2000	2.44
2000	50	0.24
	100	0.49
	230	1.12
	250	1.22
	500	2.44
	750	3.66
	1000	4.88
	2000	9.77
4000	50	0.98
	100	1.95
	230	4.49
	250	4.88
	500	9.77
	750	14.65
	1000	19.54
	2000	39.08

After deducting the atmospheric absorption values, the net sound level of each noise source in the 4 octave band was calculated. Table 87 was created by using the formula L=L-Aatm while calculating.

Table 87: Distance-Dependent Net Sound Levels of Each Noise Source to be Used in the Field of Activity

Noise Sources	Piece	Distance (m)	Sound Level Power (dB)				Total sound level (dbA)
			500 Hz	1000 Hz	2000 Hz	4000 Hz	
Crawler Excavator	3	50	57.63	60.78	61.80	60.87	66.54
		100	51.59	54.70	55.54	53.87	60.18
		230	44.32	47.31	47.67	44.10	52.17
		250	43.59	46.56	46.84	42.98	51.35
		500	37.49	40.23	39.60	32.08	44.30
		750	33.89	36.41	34.86	23.67	40.05
		1000	31.32	33.60	31.14	16.29	36.98
		2000	24.99	26.36	20.23	-9.27	29.32
Loader with wheels	3	50	54.32	57.47	58.49	57.56	63.23
		100	48.28	51.39	52.23	50.56	56.86
		230	41.01	44.00	44.36	40.79	48.86
		250	40.28	43.25	43.53	39.67	48.04
		500	34.18	36.92	36.29	28.77	40.99
		750	30.58	33.10	31.55	20.36	36.74
		1000	28.01	30.29	27.83	12.98	33.67
		2000	21.68	23.05	16.92	-12.58	26.00
Mini Loader	2	50	51.43	54.58	55.60	54.67	60.34
		100	45.39	48.50	49.33	47.67	53.97
		230	38.12	41.11	41.47	37.89	45.97
		250	37.39	40.36	40.64	36.78	45.15
		500	31.29	34.03	33.40	25.87	38.10
		750	27.69	30.21	28.66	17.47	33.85
		1000	25.12	27.40	24.94	10.09	30.78
		2000	18.79	20.16	14.03	-15.47	23.11
Truck	12	50	61.04	64.19	65.21	64.28	69.95
		100	55.00	58.11	58.95	57.28	63.59
		230	47.73	50.72	51.08	47.51	55.58
		250	47.00	49.97	50.25	46.39	54.76
		500	40.90	43.64	43.01	35.49	47.71
		750	37.30	39.82	38.27	27.08	43.46
		1000	34.73	37.01	34.55	19.70	40.39
		2000	28.40	29.77	23.64	-5.86	32.73
30-Ton Crane	2	50	47.49	50.65	51.66	50.73	56.41
		100	41.46	44.56	45.40	43.73	50.04
		230	34.18	37.17	37.53	33.96	42.04
		250	33.45	36.42	36.71	32.84	41.21

		500	27.35	30.10	29.46	21.94	34.16
		750	23.76	26.27	24.72	13.53	29.91
		1000	21.18	23.47	21.00	6.15	26.84
		2000	14.86	16.22	10.10	-19.41	19.18
Loader with wheels	2	50	51.74	54.89	55.91	54.98	60.65
		100	45.70	48.81	49.64	47.98	54.28
		230	38.43	41.42	41.77	38.20	46.28
		250	37.70	40.67	40.95	37.09	45.45
		500	31.60	34.34	33.71	26.18	38.41
		750	28.00	30.51	28.97	17.78	34.16
		1000	25.43	27.71	25.25	10.39	31.09
		2000	19.10	20.47	14.34	-15.16	23.42
30-Ton Cylinder	2	50	56.03	59.18	60.20	59.26	64.94
		100	49.99	53.10	53.93	52.27	58.57
		230	42.72	45.71	46.06	42.49	50.57
		250	41.99	44.96	45.24	41.38	49.74
		500	35.89	38.63	38.00	30.47	42.70
		750	32.29	34.80	33.26	22.07	38.45
		1000	29.72	32.00	29.54	14.68	35.38
		2000	23.39	24.76	18.63	-10.88	27.71
Butt-Welding Machine	2	50	45.62	48.77	49.79	48.85	54.53
		100	39.58	42.69	43.52	41.86	48.16
		230	32.31	35.30	35.65	32.08	40.16
		250	31.58	34.55	34.83	30.97	39.33
		500	25.48	28.22	27.59	20.06	32.28
		750	21.88	24.39	22.85	11.66	28.04
		1000	19.31	21.59	19.13	4.27	24.97
		2000	12.98	14.35	8.22	-21.29	17.30
The Tower Crane (60 m)	1	50	43.64	46.79	47.81	46.88	52.55
		100	37.60	40.71	41.54	39.88	46.18
		230	30.33	33.32	33.67	30.10	38.18
		250	29.60	32.57	32.85	28.99	37.36
		500	23.50	26.24	25.61	18.08	30.31
		750	19.90	22.42	20.87	9.68	26.06
		1000	17.33	19.61	17.15	2.29	22.99
		2000	11.00	12.37	6.24	-23.26	15.32
Argon Welding Machine	2	50	45.65	48.80	49.82	48.89	54.56
		100	39.61	42.72	43.55	41.89	48.19
		230	32.34	35.33	35.68	32.11	40.19
		250	31.61	34.58	34.86	31.00	39.37
		500	25.51	28.25	27.62	20.09	32.32
		750	21.91	24.43	22.88	11.69	28.07
		1000	19.34	21.62	19.16	4.30	25.00
		2000	13.01	14.38	8.25	-21.25	17.33
Diesel Generator	1	50	62.50	65.66	66.67	65.74	71.42
		100	56.47	59.57	60.41	58.74	65.05
		230	49.19	52.18	52.54	48.97	57.05
		250	48.46	51.43	51.72	47.85	56.22
		500	42.36	45.11	44.47	36.95	49.17
		750	38.77	41.28	39.73	28.54	44.92
		1000	36.19	38.47	36.01	21.16	41.85
		2000	29.86	31.23	25.11	-4.40	34.19

"Environmental Noise Limit Values for the Construction Site" are given in Annex 7 Table 5 of the "Regulation on the Evaluation and Management of Environmental Noise", which was published in the Official Gazette dated 04.06.2010 and numbered 27601.

Table 88: Environmental Noise Limit Values for the Construction Site

Type of activity (construction, demolition and repair)	Lday (dBA)
Building	70
Road	75
Other Sources	70

*(**Source:** Regulation on Evaluation and Management of Environmental Noise, Table 5)*

As can be seen from Table 90, the noise level for the work to be carried out in the field is defined as 70 dBA in Annex 7 Table 5 of the "Regulation on the Evaluation and Management of Environmental Noise". The noise level likely to occur during the works to be carried out in the field should not exceed this limit value in the nearest settlement. Although it is not possible to use all machinery-equipment at the same time in the field, noise levels have been calculated by assuming that in the worst case all machines will operate at the same time.

LT=Total Sound Level (dBA)

It was calculated from the formula LT=10Log∑10Li/10.

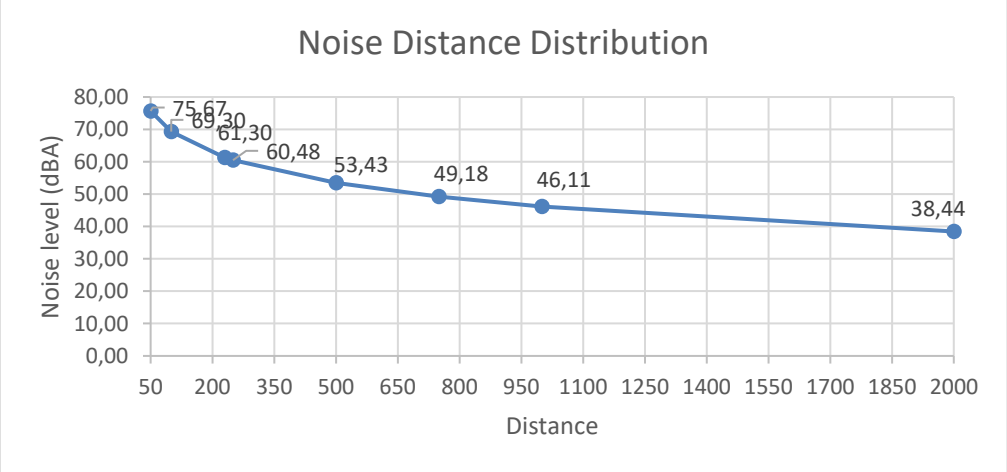
In this formula;

Li=Sound power level of each source (dBA)

Equivalent noise levels (Leq=Lday) were calculated using the formula Leq=10*Log∑10Lt(i)/10

Table 89: Environmental Noise Limit Values for the Construction Site

Distance	Day (dBA)
50	75.67
100	69.30
230	**61.30**
250	60.48
500	53.43
750	49.18
1000	46.11
2000	38.44



Graphic 26: Noise Distance Distribution Graph

While calculating the noise levels, the assumption that all equipment will operate at the same time has been made and the worst-case scenario has been evaluated. However, in the real situation of the project planned to be realized, considering the realization stages of the project, the structure and size of the land, it will not be possible for all of the machines to operate at the same time.

With the timely and regular maintenance of the work machines and equipment that will work in the field, the possible noise will be reduced so that the workers, local people and animals around the working points are not affected.

The works will be limited to daylight hours, and it will be ensured that the possible noise will remain during the daytime hours, thus minimizing the environmental impact.

Arrangements will be made to limit the frequency of transit in residential traffic and residential areas on the routes where construction machinery will move, and to comply with tonnage and speed limits.

As can be seen from the calculations, even in the worst conditions (all vehicles work continuously at the same time and during working hours) according to the noise levels arising from the construction machinery and equipment to be used in the project, it is **69.30 dBA after approximately 100 meters from the source** and which is below 70 dBA specified for "Other Sources" in the Table 5 "Environmental Noise Limit Values for the Construction Site" of the Regulation on the Evaluation and Management of Environmental Noise.

The 70 dBA limit value given in Article 23 of the Regulation on the Evaluation and Management of Environmental Noise **is provided. Within the scope of the project, there are no urban settlements within 100 meters that will be exposed to noise.** The area within the scope of the project **is located approximately 230 m away from the nearest residence. The value calculated for the nearest house at a distance of 230 m is approximately 61.30 dBA.**

Within the scope of the construction operations of the project, the construction site activities will be carried out during the daytime and will not be carried out in the evening and night time periods, except during the daytime hours.

It will be ensured that the noise values are monitored during the activities, especially in the settlements, and additional measures will be taken in case of exceeding the limit.

Within the scope of the project, work will be done in single shifts and during the day, and if night work is in question, the provisions of the Regulation on the Evaluation and Management of Environmental Noise will be complied with.

Environmental noise will not occur, as equipment that creates noise during operation, such as gas engines and generators, will be in a closed environment and sound insulation of the said area will be made. Since the sludge trucks to be used during the operation period will arrive at the facility in different time zones, they will not be on site at the same time. For this reason, noise emission has not been calculated for the operational period.

For the noise that may occur at every stage of the activity, the provisions of "Regulation on Evaluation and Management of Environmental Noise", which was published in the Official Gazette dated 04.06.2010 and numbered 27601 and “Regulation Amending the Regulation on

the Evaluation and Management of Environmental Noise", published in the Official Gazette dated 27.04.2011 and numbered 27917 will be complied with.

6.7. WATER SUPPLY SYSTEM PLAN FOR THE CONSTRUCTION AND OPERATION PHASE OF THE PROJECT, WHERE TO GET WATER, THE AMOUNT OF WATER TO BE TAKEN FROM THE SOURCES FROM WHICH WATER WILL BE PROVIDED AND THE AMOUNTS OF THESE WATERS ACCORDING TO THE PURPOSES OF USE, INFORMATION ON THE COOLING SYSTEM

There are 78 personnel currently working at the facility. It is planned to employ 55 personnel during the construction phase of the project and an additional 10 personnel during the operation phase. The water requirement at the facility has been calculated cumulatively with 78 people. The daily amount of water per person to be used was taken as 329 lt/person-day, which is the TUIK 2018 Antalya data.

Construction Phase

Water requirement = amount of water per person x Population

Population = 78 people + 55 people = 133 people

Amount of water per person = 329 lt /person-day

Amount of water to be used = 133 × 329

= 43.757 lt/day

is calculated as = 43,757 m^3/day.

***Source:** (TUIK 2018-Daily Amount of Water Drawn per Capita in Municipalities (329 Liters/Person-Day))*

It is foreseen that there will be a water consumption of 1 m3/day in order to prevent dusting during the construction phase.

The water required for the needs of the personnel who will work during the construction phase of the activity will be supplied from the drinking and utility water network of the General Directorate of Antalya Water and Wastewater Administration (ASAT).

Operational Phase

Water requirement = amount of water per person x Population

Population = 78 people + 10 people = 88 people

Amount of water per person = 329 lt /person-day

Amount of water to be used = 88 × 329

= 28.952 lt/day

is calculated as = 28,952 m3/day.

***Source:** (TUIK 2018-Daily Amount of Water Drawn per Capita in Municipalities (329 Liters/Person-Day))*

There will be a need for washing water for flue gas emission reduction processes during the operation phase. In the process, a total of 160 m3/h water will be required, with 80 m3/h first combustion line and 80 m3/h second combustion line.

The water required for the personnel to be employed during the operation phase of the activity and for the process will be supplied from the drinking and utility water network of the General Directorate of Antalya Water and Wastewater Administration (ASAT).

6.8. LIQUID WASTES TO BE OCCURRED DURING THE CONSTRUCTION AND OPERATION PHASE OF THE PROJECT AND PRECAUTIONS TO BE TAKEN

Within the scope of the project, there will be domestic wastewater expected to originate from the personnel and wastewater likely to be generated from the process. Wastewaters likely to be generated within the scope of the project have been examined under two headings as construction and operation phases. During the construction and operation transportation processes of the project, there will be no dusting as the transportation roads are asphalt. For this reason, irrigation will not be needed for transport routes. However, dusting may occur during the construction operations, in the area where the materials removed from the site are located, and during the correction works carried out in the field. In this context, irrigation will be carried out with a sprinkler in order to prevent dusting.

The types and amounts of wastewater to be generated are given in detail under the following sub-headings.

6.8.1. Type of Liquid Waste

Domestic wastewater will be generated from the use of personnel as liquid waste during the construction phase of the facility, and domestic and process-based wastewater will be generated from the use of personnel as liquid waste during the operation phase.

During the construction phase, there is no wastewater generation from the water used in the irrigation processes to prevent dust formation within the facility. The water used in irrigation will be mixed with the atmosphere by evaporation.

6.8.2. Amount of Liquid Waste (must be calculated separately for each wastewater source)

There are 78 personnel currently working at the facility. It is planned to employ 55 personnel during the construction phase of the project and an additional 10 personnel during the operation phase. The amount of domestic wastewater to be generated at the facility has been calculated cumulatively with 78 people currently working. The daily wastewater amount per person discharged was taken as 290 lt/person-day, which is the data of TUIK 2018 Antalya. Accordingly, the amount of wastewater to be generated;

The amount of domestic wastewater to be generated during the construction of the facility:

Wastewater amount = Unit wastewater production x Population

Population = 78 people + 55 people = 133 people

Unit wastewater production amount = 290 lt /person-day

Wastewater amount = 133 × 290

= 38.570 lt/day

is calculated as = 38,57 m^3/day.

***Source:** (TUIK 2018-Daily Wastewater Per Capita Discharged in Municipalities (290 Liters/Person-Day))*

It is foreseen that there will be a water consumption of 1 m^3/day in order to prevent dusting during the construction phase. However, since the irrigation water in question will be mixed with the atmosphere by evaporation, there will be no water-borne wastewater generation to be used to prevent dusting.

The amount of domestic wastewater to be generated during the operation of the facility:

Wastewater amount = Unit wastewater production x Population

Facility capacity = 78 people + 10 people

Amount of water to be used per person = 290* lt/ person–day

Wastewater amount = 78 people □290 lt/person - day

= 22.620 lt/day

= 22.62 m^3/day of water will be used.

Source: (TUIK 2018-Daily Wastewater Per Capita Discharged in Municipalities (290 Liters/Person-Day))

Domestic wastewater, which will originate from the personnel to be employed during the construction and operation phase of the project, will be disposed of at Hurma Wastewater Treatment Plant in accordance with the provisions of the Water Pollution Control Regulation, which was published in the Official Gazette dated 31.12.2004 and numbered 25687.

The water required for the needs of the personnel who will work during the construction and operation phase of the activity will be supplied from the drinking and utility water network of the General Directorate of Antalya Water and Wastewater Administration (ASAT).

Within the scope of the project, only wastewater originating from the flue gas treatment system will be generated as process-based wastewater. There is no wastewater generation from any other process.

Process-Based Wastewater

Flue Gas Washing Water Treatment System will be installed in the Incineration Facility. Within the scope of the project, only wastewater originating from the flue gas treatment system will be generated. There is no wastewater generation from any other process. The flue gas washing water coming out of the facility will be collected in the existing wastewater manhole and given to the entrance of Hurma Wastewater Treatment Facility, and thus the wastewater generated from the flue gas treatment will be treated.

Analysis of flue gas washing water sent to the entrance of Hurma wastewater treatment facility will be done regularly. Necessary treatment process will be applied to the flue gas washing water treated at the facility, and it will be ensured that it reaches the discharge standards.

160 m3/h wastewater output is expected, 80 m3/h from the first combustion line and 80 m3/h from the second combustion line, originating from the washing water to be used in the flue gas emission reduction processes during the operation phase.

Table 90: Amount of Process-Based Wastewater

Wastewater Source	Amount (m^3/h)	Discharge Place
Washing Waters	160	Hurma Wastewater Treatment Plant

6.8.3. Liquid Waste Disposal Methods and Discharge Environments

Domestic wastewater, which is expected to be generated from the personnel and process within the scope of the project, has been examined under two headings as construction and operation phases. During the construction and operation transportation processes of the project, there will be no dusting as the transportation roads are asphalt. For this reason, irrigation will not be needed for transport routes. However, dusting may occur during the construction operations, in the area where the materials removed from the site are located, and during the correction works carried out in the field. In this context, irrigation will be carried out with a sprinkler in order to prevent dusting.

There are 78 personnel currently working at the facility. It is planned to employ 55 personnel during the construction phase of the project and an additional 10 personnel during the operation phase. The amount of domestic wastewater to be generated at the facility has been calculated cumulatively with 78 people currently working.

Construction Phase

It is foreseen that there will be a water consumption of 1 m3/day in order to prevent dusting during the construction phase. However, since the irrigation water in question will be mixed with the atmosphere by evaporation, there will be no water-borne wastewater generation to be used to prevent dusting.

38.57 m3/day domestic wastewater, which will originate from 133 personnel who will work during the construction phase of the project, will be disposed of at Hurma Wastewater Treatment Plant in accordance with the provisions of the Water Pollution Control Regulation, which was published in the Official Gazette dated 31.12.2004 and numbered 25687.

Operational Phase

- **Domestic Wastewater**

22.62 m3/day domestic wastewater, which will originate from 88 personnel who will work during the operation phase of the project, will be disposed of at Hurma Wastewater Treatment Plant in accordance with the provisions of the Water Pollution Control Regulation, which was published in the Official Gazette dated 31.12.2004 and numbered 25687.

The water required for the needs of the personnel who will work during the construction and operation phase of the activity will be supplied from the drinking and utility water network of the General Directorate of Antalya Water and Wastewater Administration (ASAT).

- **Process-Based Wastewater**

Flue Gas Washing Water Treatment System will be installed in the Incineration Facility. Within the scope of the project, only wastewater originating from the flue gas treatment system will be generated. There is no wastewater generation from any other process. The flue gas washing water coming out of the facility will be collected in the existing wastewater manhole and given to the entrance of Hurma Wastewater Treatment Facility, and thus the wastewater generated from the flue gas treatment will be treated.

Analysis of flue gas washing water sent to the entrance of Hurma wastewater treatment facility will be done regularly. Necessary treatment process will be applied to the flue gas washing water treated at the facility, and it will be ensured that it reaches the discharge standards.

160 m3/h wastewater output is expected, 80 m3/h from the first combustion line and 80 m3/h from the second combustion line, originating from the washing water to be used in the flue gas emission reduction processes during the operation phase.

Table 91: Amount of Process-Based Wastewater

Wastewater Source	Amount (m^3/h)	Discharge Place
Washing Waters	160	Hurma Wastewater Treatment Plant

In the "Regulation on Incineration of Wastes", which came into force after being published in the Official Gazette dated 06.10.2010 and numbered 27721, it is referred to as "Article 12- (1) The discharge criteria of the wastewater s resulting from the cleaning of flue gases to the receiving environment cannot exceed the limit values given in Annex-4." in the discharge of wastewater from flue gases.

Wastewater will be discharged according to the limit values specified in the regulation.

Trace elements and some of the mercury found in the table in Annex-4 of the Regulation on Incineration of Wastes are in the form of particles. Therefore, particles in cyclone and bag filter systems will be purified at an advanced level and will be removed from the environment as solid matter. Therefore, total suspended matter and heavy metals may be found far below the given limits. On the other hand, some of the gaseous dioxins, furans and mercury will be adsorbed on the activated carbon, which will be fed to the system before the bag filter. Afterwards, these activated carbon particles will be kept in the bag filter system and will be removed from the environment in solid form. Potential pollutants remaining in the waste gas will be removed with the washing (Absorption) tower, which is the last step of the gas purification system. The values of the pollutants that will pass into the aquatic environment will be in trace amounts and will be below the regulation value.

(1) The discharge criteria of wastewater resulting from the cleaning of flue gases to the receiving environment shall not exceed the limit values given in Annex-4. Within the scope of the project, only wastewater will be generated from the flue gas treatment system. There is no wastewater generation from any other process. The flue gas treatment water will be sent to Hurma Wastewater Treatment Plant to be disposed of. Hurma Wastewater Treatment Plant,

which is currently operated, has an Environmental Permit with a start date of 23.05.2019 and an end date of 23.05.2024.

(2) The existing wastewater manhole will be used by the operator for the storage of wastewater coming out of the incineration plant. The wastewater resulting from the cleaning of the flue gases will be given to the other wastewater line or lines in the Hurma Wastewater Treatment Plant after the treatment process is completed and these waters will be tested before discharge to the wastewater treatment plant. In addition, at the point of final discharge, compliance with the limit values specified in Annex-4 will be checked and recorded.

(3) Wastewaters resulting from the cleaning of flue gases containing pollutants specified in Annex-4 shall not be treated outside the incineration plant in a treatment plant that only serves the purpose of treating this type of wastewater. Within the scope of the project, only wastewater will be generated from the flue gas treatment system. There is no wastewater generation from any other process. The flue gas treatment waters to be generated from the facility will be sent to Hurma Wastewater Treatment Plant to be disposed of.

(4) In order to comply with the emission limit values set in Annex-4, dilution of wastewater is prohibited under any circumstances. The discharge permit provides emission limit values for the pollutant values mentioned in Annex-4, determines the operational control parameters for pH, temperature and flow rate for wastewater, and the first paragraph of Article 13 is taken into account.

In order to comply with the emission limit values, wastewater will not be diluted under any circumstances.

The wastewater to be generated from the incineration plant will be collected in the existing manhole, and the direct connection to the Hurma Wastewater Treatment Plant will be provided and the treatment will be carried out. Currently, Hurma WWTP effluent values are presented below.

Table 92: Hurma WWTP Effluent Values

COD	: 40 mg/L
BOD	: 15 mg/L
SS	: 10 mg/L
TN	: 10 mg/L
TP	: 1 mg/L
pH	: 6,5-8
Cond	: <1,000-2,000 µS/cm

(5) The design of incinerators, including intermediate storage areas for waste, shall be constructed in such a way as to prevent the unauthorized or accidental spread of pollutants to soil, surface and groundwater.

The wastewater generated in the incineration plant will be collected in the wastewater manhole used for the contaminated rain water or the polluted water resulting from the fire extinguishing activities in Hurma WWTP. Before the said wastewater is treated at Hurma Wastewater

Treatment Plant, the storage capacity in question will be stored in manholes with sufficient capacity, and then it will be discharged to be treated at Hurma WWTP.

6.9. SOLID WASTES TO BE OCCURRED DURING THE CONSTRUCTION AND OPERATION PHASE OF THE PROJECT AND MEASURES TO BE TAKEN

Within the scope of the Treatment Sludge Incineration and Energy Recovery Facility Project, which is planned to be built, the solid wastes to be generated during the construction and operation phases and the precautions to be taken are given in detail under the following headings.

6.9.1. Type of Solid Waste

The type of waste expected to be generated from the planned project has been examined separately as construction and operation phases.

During the construction phase, domestic solid waste, packaging waste, excavation-construction and demolition wastes will be generated.

During the operation phase, domestic solid waste, packaging waste, hazardous wastes, ash and slag wastes, waste oils, waste batteries and accumulators, waste electrical and electronic equipment, end-of-life tires, vegetable waste oils and medical wastes will be generated.

6.9.2. Amount and Characteristics of Solid Wastes

1- The amount of domestic solid waste and packaging waste;

During the construction and operation phase of the project, solid waste and packaging waste are generated from the personnel. The waste code of the possible domestic solid wastes within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314, is 20 03 01.

The waste code of the said packaging waste within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314, is given below.

- ✓ 15 01 01 Paper and cardboard packaging
- ✓ 15 01 02 Plastic packaging
- ✓ 15 01 04 Metallic packaging
- ✓ 15 01 07 Glass packaging

In the project, solid wastes were examined under two headings as construction and operation phases.

Amount of Solid Waste to be Generated During Construction:

Solid waste amount = Unit solid waste production x Population

Population = 78 people + 55 people = 133 people

Unit solid waste production amount = 1,48* kg/person-day

Solid waste amount = 133 people x 1.48 kg / person-day

= 196.84 kg / day

is calculated as = = 0.196 tons/day.

***Source:** (TUIK 2018-Average Municipal Waste Per Capita (1.48 Kg/Per Person-Day))*

Amount of Packaging Waste = Amount of Solid Waste x 20/100

= 196,84 kg/day x 0,20

= 39,37 kg

*(***Source:** According to the Municipality Implementation Guide of the Packaging Waste Control Regulation, the amount of packaging waste has been taken as 20% by weight of solid waste.)*

Amount of Solid Waste to be Generated in Operation Phase:

Solid waste amount = Unit solid waste production x Population

Population = 78 people + 10 people = 88 people

Unit solid waste production amount = 1,48* kg/person-day

Solid waste amount = 88 persons x 1.48 kg/person-day

= 130,24 kg / day

is calculated as = = 0,13 tons/day.

***Source:** (TUIK 2018-Average Municipal Waste Per Capita (1.48 Kg/Per Person-Day))*

Amount Of Packaging Waste = Amount of Solid Waste x 20/100

= 130 kg / day x 0.20

= 26 kg

*(***Source:** According to the Municipality Implementation Guide of the Packaging Waste Control Regulation, the amount of packaging waste has been taken as 20% by weight of solid waste.)*

2- Excavation, Construction and Demolition Wastes

There is a Thermal Sludge Drying Facility currently used within the borders of Hurma Wastewater Treatment Facility.

Currently, the amount of sludge generated from the operation of the Hurma Wastewater Treatment Facility is 240 tons/day on average. In the Incineration Facility, an average of 140 tons/day of the 240 tons/day sludge that will originate from the Hurma Wastewater Treatment Facility will be processed. The remaining average of 100 tons/day and sludge from other Wastewater Treatment Facilities up to an additional 50 tons/day (150 tons/day in total) can be processed and dried in the Thermal Drying Facility with a capacity of 150 tons/day, which is

currently located within the Hurma Wastewater Treatment Facility. In the existing thermal drying facility in question, the waste heat generated in the Hurma Sludge Incineration Facility will be utilized. This will not affect the planned Incineration Facility capacity.

The tanks (gas tanks) in the part where the Combustion Plant will be built will be displaced to another area. The existing Thermal Drying Facility will remain on site and will continue to be used. (Fig. 55)

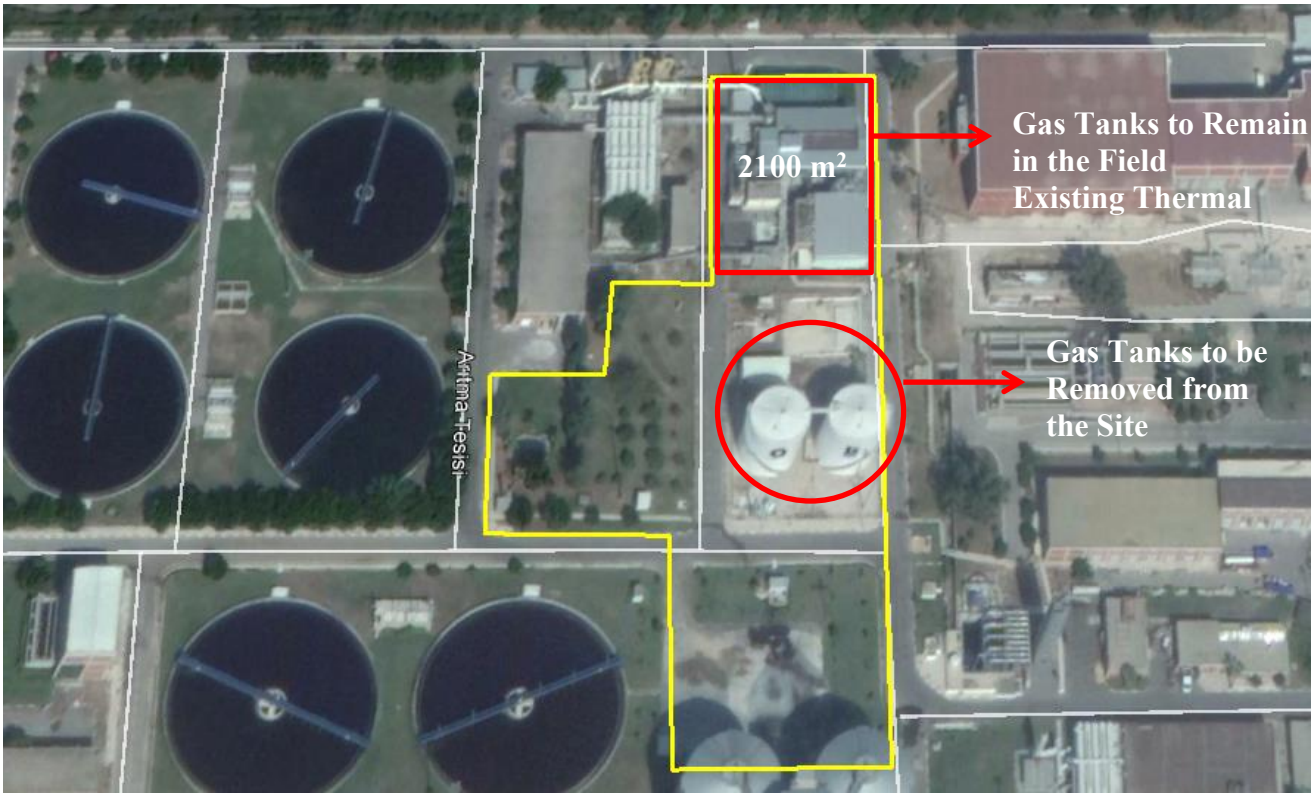


Figure 56: Structures Planned to be Removed and Remained on the Site

Construction and demolition wastes to be generated within the scope of the mentioned dismantling will be separated according to the type, and recycling/disposal will be provided in accordance with the provisions of the Regulation on Control of Excavated Soil, Construction and Demolition Wastes.

Since the project is located within the existing treatment plant area, no additional administrative buildings, social facilities, etc. will be built, and most units will be used in common. Construction-wreckage waste and 22.728.91 m3 of excavation soil will be formed in the works to be carried out in the field, and all of the construction-wreckage wastes to be formed with the entire excavation soil will be transported to the sites allowed by the Antalya Metropolitan Municipality in accordance with the provisions of the provisions of the "Regulation on Control of Excavated Soil, Construction and Demolition Wastes" published in the Official Gazette dated 18.03.2004 and numbered 25406, and the "Waste Management Regulation" published in the Official Gazette dated 02.04.2015 and numbered 29314. by authorized trucks.

In accordance with the acceptance of Excavation Soil, Construction and Wreckage Wastes, Environmental Law and Excavation Soil, Construction/Wreckage Waste Control Regulation

and the letter of Antalya Governorship dated 08.08.2019 and numbered 61393, all constructions to be made within the borders of Antalya province, including all public institutions and organizations, maintenance and repair activities are provided on the condition that the Waste Transport and Acceptance Certificate is obtained and the wastes are transported by vehicles with Waste Transport Permit.

In the letter of the Antalya Metropolitan Municipality Environmental Protection and Control Department dated 10.12.2020 and numbered 94707, there is an obligation to bring the excavation soil, construction and demolition wastes to be produced during the production of the facility to the Kızıllı Excavation Soil, Construction / Rubble Waste Disposal Site, within the scope of the relevant regulations, it has been reported that there is no inconvenience in its introduction. The aforementioned permission letter is presented in Annex-22.

In addition, a total of 22.728.91 m3 of excavation will be carried out for the unit settlements in the field, and the total amount of excavation is given in Table 93 together with the relevant account items.

Table 93: The amount of excavation and calculation calculated considering the depths depending on the location of the units and the land condition

Rank No	Unit Name	Width (m)	Length (m)	Excavation depth (m)	Excavation Amount (m³)
1	Pre-Drying Unit	31	25.44	2	**1577.28**
2	Biofilter and Bunker Units	31.23	28.31	2	**1768.24**
3	Sludge silos	13	20.3	4.5	**1187.55**
4	Combustion Unit (Combustion Unit equipment, Ash Silo, Combustion Tower, generator unit, blowers etc.)	46	47	2	**4324.00**
5	Turbine Building	26.57	20.08	2	**1067.05**
6	Administrative Building	38	20.8	1.2	**948.48**
7	Product Acceptance Unit	18	51	9	**8262.00**
8	External Areas Outside Buildings	4792.4131		0.75	**3594.31**
				TOTAL EXCAVATION (m³):	**22.728,91**

3-Hazardous Wastes

3.1. Contaminated Waste

Contaminated waste will be generated during the construction and operation phase of the project. The waste code of the aforementioned contaminated wastes within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314, is 15 02 02 (absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances).

3.2. Contaminated Packaging Waste

Contaminated packaging waste (paint boxes, chemical barrels, etc.) may occur during the construction and operation phase of the project. The waste code of the aforementioned contaminated packaging waste within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314, is 15 01 10

(Packaging Wastes Containing Residues of Hazardous Substances or Contaminated with Hazardous Substances).

3.3. Wastes from Vehicle Maintenance

During the construction phase of the project, service will be received from the service stations for the maintenance and repair of the construction equipment. During the operation phase, waste will be generated during machinery equipment maintenance and repair activities. The waste code of the said wastes within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314, is 16 01 21, hazardous components other than those mentioned in 16 01 07 to 16 01 11 and 16 01 13 and 16 01 14

3.4. Fluorescent tubes

Fluorescent tubes will be formed during the construction and operation phase of the project. The waste code of the aforementioned fluorescent tubes is 20 01 21 (Fluorescent Tubes and Other Mercury-Containing Wastes) within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314.

3.5. Ink and Cartridge Wastes

Ink and cartridge wastes may occur during the construction and operation phase of the project. The waste code of the said ink and cartridge wastes within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314, is 20 01 27 (Paint, Inks, Adhesives and Resins Containing Hazardous Substances).

4-Ash and Slag Wastes

Possible wastes to be generated after the incineration process and the waste codes for these wastes are presented in Table 94 below.

Table 94: Possible wastes to be generated after incineration and waste codes for these wastes

Codes of Possible Wastes to Be Occurred After Incineration	Description	
19 01 14	fly ash other than 19 01 13	
19 01 06*	Aqueous liquid wastes and other aqueous liquid wastes from gas treatment	A
19 01 12	Bottom ash and slag other than 19 01 11	
19 01 19	Sands from fluidized beds	

All sludge fed within the scope of the project will be sent to the ash and waste gas waste heat recovery system after burning for 4-6 seconds in the fluidized bed.

During the fluidized bed sand combustion process, there will be a reduction in size and shrinkage in the system. This reduction and reduction in size will cause sand loss in the system. The lost sand will be kept in the waste heat boiler, cyclone and bag filter as fly ash in the system. For this reason, the system is equipped to be replenished as much as the lost sand.

In the fluidized bed boiler, it may be possible to discharge the sand due to any possible maintenance and repair. Quarzsand M 32* (Silica) sand will be used as the bed sand in the fluidized bed incinerator. In the sand discharged in the combustion boiler, bottom ash, slag, etc. can be found in a mixed state. If sand is discharged due to any maintenance and repair, the emptied sand will be stored in the Temporary Storage Area located within the boundaries of Hurma Wastewater Treatment Plant and will be disposed of in licensed disposal facilities in accordance with the provisions of the Waste Management Regulation. The amount of waste fluidized bed sand likely to come out as a result of maintenance-repair activities will be 60 tons per furnace. Since there will be two furnaces, 120 tons of waste sand will be generated.

Currently, there is a temporary storage area of 2500 m2 within the Hurma Wastewater Treatment Plant. Waste sand will be stored in the existing temporary storage area and disposed of in accordance with the provisions of the "Waste Management Regulation".

-Amount of Fly Ash:

Fly ash will be kept in the filters in the system for flue gas treatment. The amount of fly ash likely to be formed within the project and the process parts that will occur are presented in Table 95 below.

Table 95: Amount of fly ash likely to be formed within the project and the process parts to be formed

The Processes That Fly Ashes Will Form	Occurrence percentage and Amounts
Waste Heat Boiler	8% (1,872 tons / day)
Cyclone Bottom	62% (14,508 tons/day)
Bag Filter Bottom	30% (7,02 tons/day)
Total Fly Ash	**100% (23.4 tons / day)**

Within the scope of the project, only 19 08 05 waste coded "sludges from the treatment of urban wastewater " will be accepted to the facility, and uniform waste will be received and disposed of.

An ash silo with **a storage capacity of 10 tons**, a storage capacity of 10 tons, **a storage capacity of 25 tons** to collect the ashes at the outlet of the waste heat boiler, and **an ash storage capacity of 25 tons** to collect the ash at the outlet of the bag filter are envisaged. For these ash storage silos, which will be right next to the unit outside the building, necessary platforms have been taken into account so that a truck can enter under the silo.

Currently, there is a temporary storage area of 2500 m^2 within the Hurma Wastewater Treatment Plant. Fluidized bed sand-bottom ash mixture and fly ash to be formed will be collected separately, stored in the existing temporary storage area, and disposed of in accordance with the provisions of the "Waste Management Regulation".

5- Waste Vegetable Oils;

During the construction and operation phase of the project, the food requirement will be met by agreement with the company from the outside, and there will be no waste vegetable oil.

6. Waste Oils;

These are the wastes that may occur during the maintenance and oil change of the construction equipment to be used in the project area and during the maintenance-repair activities of the machinery during the operation phase. These waste oils will be accumulated in the sealed red drum in the hazardous waste storage area. The waste code within the scope of the Waste Management Regulation, published in the Official Gazette dated 02.04.2015 and numbered 29314, is 13 02 08* (Other engine, transmission and lubricating oils).

7. Waste Batteries and Accumulators

During the construction and operation phase, if the vehicles and equipment to be used in the field and the batteries and accumulators to be used for energy supply complete their life, waste batteries and accumulators may be formed. Waste batteries will be procured from the TAP association and stored in the waste battery box to be placed on site. The waste code within the scope of the Waste Management Regulation, published in the Official Gazette dated 02.04.2015 and numbered 29314, is 20 01 34 (waste batteries and accumulators other than those mentioned in 20 01 33).

8. Waste Electrical and Electronic Equipment

Electronic equipment to be used within the scope of the project will be used. Electrical and electronic waste may occur as a result of maintenance, repair and malfunctions of equipment. The electronic waste that will be generated will be stored in the hazardous click storage area. The waste code within the scope of the Waste Management Regulation, published in the Official Gazette dated 02.04.2015 and numbered 29314, is 20 01 35* (discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components).

9. End of Life Tires

End-of-life tires will be formed during the construction and operation phase of the project. The waste code of the end-of-life tires in question is 16 01 03 (End of Life Tires) within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314.

10. Medical Wastes

In case of any accident or similar situation at the facility, the first response will be made at the facility. In this case, sharp wastes will be collected in a yellow locked box, other medical wastes will be collected in a red bag with medical waste inscription at the doctor's office. Waste codes within the scope of the Waste Management Regulation published in the Official Gazette dated 02.04.2015 and numbered 29314; 18 01 01 (sharps (except 18 01 03)), 18 01 03* (wastes whose collection and disposal is subject to special requirements in order to prevent infection).

6.9.3. Solid Waste Disposal Methods

1- Domestic solid wastes and packaging wastes;

During the construction and operation phase of the project, solid waste and packaging waste are generated from the personnel. The waste code of the possible domestic solid wastes within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314, is 20 03 01.

The waste code of the said packaging waste within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314, is given below.

- ✓ 15 01 01 Paper and cardboard packaging
- ✓ 15 01 02 Plastic packaging
- ✓ 15 01 04 Metallic packaging
- ✓ 15 01 07 Glass packaging

The daily solid waste production amount per capita under Chapter 6.8.2 has been calculated using the 2018 Municipal Waste Statistics of the Turkish Statistical Institute (TUIK).

There are 78 personnel currently working at Hurma Wastewater Treatment Facility. It is planned to employ 55 personnel during the construction phase of the Hurma Treatment Sludge Incineration and Energy Recovery Facility Project, and an additional 10 personnel during the operation phase. Waste amounts were calculated cumulatively with the existing personnel.

Accordingly, the amount of domestic solid waste, which was calculated to consist of 133 (78 + 55) personnel who will work during the construction phase, was calculated as 196.84 kg/day (0.196 tons/day). The amount of packaging waste was calculated as 39.37kg.

During the operation phase, 88 (78 + 10) personnel will work. Accordingly, the amount of domestic solid waste to be generated during the operation phase is calculated as 130.24 kg/day (0.130 tons/day). The amount of packaging waste was calculated as 26 kg/day.

Domestic solid wastes that will be generated by the personnel during the construction and operation period will be stored in closed containers in a way that does not create odor, they will be collected by the teams of Konyaaltı Municipality and taken to the Kızıllı Solid Waste Storage area of Antalya Metropolitan Municipality to be disposed of.

Solid wastes (paper, glass, plastic and metal boxes, etc.) that can be reused and recycled in solid wastes are collected separately from domestic solid wastes in accordance with the relevant provisions of “Packaging Waste Control Regulation” published in the Official Gazette dated 27.12.2017 and numbered 30283, and the “Waste Management Regulation” published in the Official Gazette dated 02.04.2015 and numbered 29314, and will be taken regularly with licensed companies Konyaaltı Municipality has contracted for recycling and recycling/disposal will be provided.

2- Excavation, Construction and Demolition Wastes;

Since the project is located within the existing treatment plant area, no additional administrative buildings, social facilities, etc. will be built, and most units will be used in common. Construction-wreckage waste and 22.728.91 m3 of excavation soil will be formed in the works to be carried out in the field, and all of the construction-wreckage wastes to be formed with the entire excavation soil will be transported to the sites allowed by the Antalya Metropolitan Municipality in accordance with the provisions of the provisions of the "Regulation on Control of Excavated Soil, Construction and Demolition Wastes" published in the Official Gazette dated 18.03.2004 and numbered 25406, and the "Waste Management Regulation" published in the Official Gazette dated 02.04.2015 and numbered 29314. by authorized trucks.

In accordance with the acceptance of Excavation Soil, Construction and Wreckage Wastes, Environmental Law and Excavation Soil, Construction/Wreckage Waste Control Regulation and the letter of Antalya Governorship dated 08.08.2019 and numbered 61393, all constructions to be made within the borders of Antalya province, including all public institutions and organizations, maintenance and repair activities are provided on the condition that the Waste Transport and Acceptance Certificate is obtained and the wastes are transported by vehicles with Waste Transport Permit.

In the letter of the Antalya Metropolitan Municipality Environmental Protection and Control Department dated 10.12.2020 and numbered 94707, there is an obligation to bring the excavation soil, construction and demolition wastes to be produced during the production of the facility to the Kızıllı Excavation Soil, Construction / Rubble Waste Disposal Site, within the scope of the relevant regulations, it has been reported that there is no inconvenience in its introduction. The aforementioned permission letter is presented in Annex-22.

Tanks and other structures in the part where the Incineration Plant will be built will be dismantled from the site. Construction and demolition wastes to be generated within the scope of the mentioned dismantling will be separated according to their type and recycled/disposal in accordance with the provisions of the relevant regulation.

At every stage of the activity, the provisions of the "Regulation on Control of Excavated Soil, Construction and Demolition Wastes" published in the Official Gazette dated 18.03.2004 and numbered 25682 will be complied with.

The Regulation on Control of Excavated Soil, Construction and Wreckage Wastes, published in the Official Gazette dated 8.03.2004 and numbered 25406, and the Regulation on Control of Soil Pollution and Point Source Contaminated Fields, which entered into force after being published in the Official Gazette dated 08.06.2010 and numbered 27605 provisions will be followed in order to prevent the negative effects of excavation soil, construction and demolition wastes on the environment and human health during the construction and operation phase of the project.

3-Hazardous Wastes

3.1-Contaminated Waste

Contaminated waste will be generated during the construction and operation phase of the project. The waste code of the aforementioned contaminated wastes within the scope of the Waste Management Regulation, which was published in the Official Gazette dated 02.04.2015 and numbered 29314, is 15 02 02 (absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances) is.

Wastes contaminated with oils such as oily rag, used filters, etc., which may be released after the maintenance and repair processes of vehicles and work machines to be used during the construction and operation phase of the project, will be temporarily collected in a suitable area separately from domestic solid wastes in accordance with the provisions of Waste Management Regulation, published in the Official Gazette dated 02.04.2015 and numbered 29314.

The contaminated wastes in question will be collected in sealed drums, containers or bigbags and will be given to recovery/disposal facilities licensed by the Ministry of Environment and

Urbanization.

3.2 Contaminated Packaging Waste

The aforementioned contaminated packaging wastes will be collected in the temporary waste storage area and sent to the recovery/disposal facilities licensed by the Ministry of Environment and Urbanization.

3.3 Wastes from Vehicle Maintenance

Within the scope of the project, the wastes arising from the maintenance and repair activities will be collected in the temporary waste storage area and will be sent to the recovery/disposal facilities licensed by the Ministry of Environment and Urbanization.

3.4 Fluorescent tubes

The fluorescent tubes in question will be stored in sealed barrels in a closed environment to prevent breakage and will be sent to the recovery/disposal facilities licensed by the Ministry of Environment and Urbanization.

3.5 Ink and Cartridge Wastes

The ink and cartridge wastes in question will be collected in the temporary waste storage area and sent to the recovery/disposal facilities licensed by the Ministry of Environment and Urbanization.

4-Ash and Slag Wastes

Currently, there is a temporary storage area of 2500 m2 within the Hurma Wastewater Treatment Plant. Fluidized bed sand-bottom ash mixture and fly ash to be formed will be collected separately and stored in the existing temporary storage area.

The stored fluidized bed sand-bottom ash mixture and fly ash will be delivered to licensed companies and disposed of in accordance with the provisions of the "Regulation on Regular Storage of Wastes".

5- Waste Vegetable Oils;

During the construction and operation phase of the project, the food requirement will be met from outside and there will be no waste vegetable oil.

In the event that vegetable waste oil occurs during the construction and operation phase of the project, it will be temporarily collected in a suitable area separate from domestic solid wastes in sealed inner and outer surfaces in corrosion-resistant drums, containers or tanks and sent to recovery/disposal facilities licensed by the Ministry of Environment and Urbanization, in accordance with the provisions of regulation on the Control of Waste Vegetable Oils, which entered into force after being published in the Official Gazette dated 06.06.2015 and numbered 29378.

6. Waste Oils;

The maintenance and oil change of the construction equipment to be used in the project area will be carried out at authorized services. If waste mineral oil is formed from the work machines and equipment to be used in the activity area, the waste mineral oils to be generated will be stored in

a covered and ground-proof area in accordance with the provisions of the "Waste Oil Management Regulation" published in the Official Gazette dated 21.12.2019 and numbered 30985, and will be sent to PETDER, which is authorized to collect.

7. Waste Batteries and Accumulators

During the construction and operation phase, if the vehicles and equipment to be used in the field and the batteries and accumulators to be used for energy supply complete their life, waste batteries and accumulators may be formed.

Waste batteries that will be formed in the project area will be collected in the battery piggy bank and will be sent to the Portable Battery Manufacturers and Importers Association (TAP), which is authorized by the Ministry of Environment and Urbanization and is the only authorized organization for waste batteries in Turkey. Batteries to be used for vehicles will be replaced at authorized services and delivered with a report. Within the scope of the project, the provisions of the "Regulation on Control of Waste Batteries and Accumulators" will be complied with.

8. Waste Electrical and Electronic Equipment

During the use of electronic equipment to be used within the scope of the project, the formation of waste electrical and electronic materials may occur as a result of maintenance, repair and breakdown. In the event that waste electrical and/or electronic materials are generated, within the scope of Article 11 of the "Regulation on Control of Waste Electrical and Electronic Equipment" published in the Official Gazette dated 22.05.2012 and numbered 28300, will collect these wastes separately so that they do not mix with other wastes, be taken to the collection points established by distributors, municipalities, manufacturers or processing facilities, and will not be given to those who collect informally. These wastes will be stored separately from other hazardous materials in the "Hazardous Waste Temporary Storage Area" located in the Project area and will be sent to licensed recovery/disposal facilities. During the activity, the provisions of the "Regulation on Control of Waste Electrical and Electronic Equipment", which was published in the Official Gazette dated 22.05.2012 and numbered 28300, will be complied with.

9. End of Life Tires

The maintenance of vehicles and work machines to be used in the construction and operation phase of the project will be carried out at authorized service stations. If the tire change is to be carried out at the project site, until the end-of-life tire wastes that may occur are sent for final disposal, in a suitable place at the project site, in a closed area to be reserved for this work, from other wastes (household solid wastes, packaging wastes, waste oils, etc.) It will be temporarily stored in a completely enclosed space. The floor of the said area will be covered with concrete and it will be covered to prevent it from being affected by rain.

Maintenance-repairs of vehicles and work machines to be used within the scope of the project will be carried out by authorized service stations, and no end-of-life tire formation is expected at the project site. Tire changes can take place in the field as a result of situations such as tire punctures etc. In these cases, the expired tires will be stored in the Hazardous Waste Temporary Storage Area in the project area and then sent to licensed recycling/disposal facilities by licensed vehicles. The provisions of the "Regulation on Control of End-of-Life Tires", which came into force after being published in the Official Gazette dated 25.11.2006 and numbered 26357, shall

be complied with regarding the storage, shipment and disposal of expired tires.

10- Medical Wastes

If medical waste is generated from the personnel to be employed during the construction and operation phase of the project, it will be disposed of within the scope of the "Medical Waste Control Regulation", which was published in the Official Gazette dated 25.01.2017 and numbered 29959.

Hazardous Waste Temporary Waste Storage Area

Hazardous wastes that may arise during the construction and operation phase of the project will arise during the maintenance and repairs of the vehicles and work machines to be used within the scope of the project. No hazardous waste will be generated by the process. Hazardous wastes will be stored within the boundaries of the facility, in accordance with the legal period, separately from domestic solid wastes, in a covered and ground-sealed area, separate from domestic solid wastes, in accordance with the provisions of Waste Management Regulation, published in the Official Gazette dated 02.04.2015 and numbered 29314, and will be sent to licensed recycling/disposal facilities together with licensed vehicles to transport hazardous waste.

Hazardous waste temporary storage area will be constructed during the construction phase of the project. In addition, if more than 1,000 kg of hazardous waste is stored temporarily during the operation phase of the project, a temporary hazardous waste storage area permit will be obtained from the Provincial Directorate of Environment and Urbanization and financial liability insurance will be issued.

6.10. PRECAUTIONS TO BE TAKEN AGAINST ODOR, PEST AND FLY REPRODUCTION THAT MAY OCCUR IN THE FACILITY

The design and manufacture will be made in such a way that the entire dumping area of the truck, where the sludge is accepted, stored, and the facility loading bunkers are 100% closed in order to ensure odor isolation. There will be two feeding bunkers. The bunker capacity is planned as 2x500 tons, that is, its volume is 1000 m3. The total bunker area is foreseen as 1000 m2. All areas related to sludge will be isolated from the outside air environment. Sulfate resistant (SRC) C35 concrete will be used in concrete structures with 100% impermeability to be used in this area.

The bunker to be built will be manufactured in accordance with the loading of sludge to the facility by trucks from outside the facility. In the meantime, trucks will be taken into the closed area and sludge will be discharged in order to prevent the odor that will disturb the environment. The odor inside will be removed by the air suction units.

Before sludge is accepted to the pre-drying plant, sludge transfer will be provided from the underground sludge bunker to the above-ground sludge silos with the help of an above-ground pump.

A biofilter is designed as an odor treatment system for silos where wet sludge will be stored.

The sludge pumped from the underground sludge bunker will be stored in 2 above-ground silos

of 118 tons (118 m3) operating in parallel. There will be a hydraulic sliding frame at the bottom of the sludge silos, and each silo will be fed by 2 main screw pumps located under it. Via these pumps, the sludge will be sent into the incinerator with injectors equidistant from each other around the Fluidized Bed Incinerator. Polluted air from sludge tanks and silos will be collected and deodorized with biofilter.

The gases accumulated in the silos will be transferred to the fluidized bed incinerator and a system will be set up to be burned there. In cases where the facility is not operating, an absorption system will be installed for odor control. This system will be installed as a backup for dangerous and explosive gases.

CH4, H2S and CO detectors have been added to the underground sludge bunker and aboveground silos for odor control purposes. These silos are covered however, when mud is poured into the underground silo with a truck, the hydraulic cover on the tank can be opened and the mud can be poured. According to the signal coming from the detectors, the dangerous gas levels in the tank can be monitored.

Vitiated air will be drawn from the silos by fans operated with frequency inverters and will be pumped into the incinerator or biofilter unit.

At every stage of the activity, the provisions of the "Regulation on the Control of Odor-Creating Emissions", published in the Official Gazette dated 19.07.2013 and numbered 28712, will be complied with.

6.11. EFFECTS OF SURFACE AND GROUNDWATER RESOURCES AS A RESULT OF THE ACTIVITIES TO BE CARRIED OUT WITHIN THE SCOPE OF THE PROJECT AND THE MEASURES TO BE TAKEN

The Project Site is 1.06 km from Sarısu Stream. It is also 2.3 km from Çandır Stream and 3.83 km from Boğaçay.

There will be no negative impact on underground and surface water resources in the region as a result of the project activity. In addition, the project is not expected to have any impact on the groundwater level.

It will be ensured that the natural beds of the dry and flowing streams remaining in the activity and impact area are protected, the natural flow direction of the water in these streams will not be disturbed, and rust and other waste materials will not be left in the stream beds. All kinds of used or unused materials and wastes generated during the activity will be stored in a suitable place, and their transfer to the stream beds in the downstream will be prevented by taking action with heavy rains. During the operation, the provisions of the Regulation on Water Pollution Control and the Regulation on the Protection of Drinking-Double Water Basins will be complied with.

All necessary precautions will be taken for wastewater and solid wastes that will be generated as a result of the process, and they will be disposed of properly, and it will be ensured that there is no risk of pollution in groundwater resources.

During the operation, the provisions of the Regulation on Water Pollution Control and the

Regulation on the Protection of Drinking-Double Water Basins will be complied with.

At every stage of the activity, the provisions of "Law on Groundwater" No. 167 published in the Official Gazette dated 23.12.1960 and numbered 10688 and 07.04. "Regulation on the Protection of Groundwater against Pollution and Deterioration" published in the Official Gazette dated 2012 and numbered 28257 and the issues specified in the EIA Report will be complied with.

At every stage of the project “Water Pollution Control Regulation”, “Regulation on the Protection of Groundwaters Against Pollution and Deterioration”, “Communiqué on Determination of Conservation Areas of Aquifers and Resources from which Drinking Water Supply” and Antalya Water and Wastewater Administration General Directorate's "Water Basin Protection and Control Regulation" will be complied with.

6.12. EFFECTS OF THE PROJECT ON LIVESTOCK ACTIVITIES IN THE ENVIRONMENT AND MEASURES TO BE TAKEN, ANIMAL CROSSINGS, SIZES, DISTANCES BETWEEN CROSSINGS

Animal husbandry is an economic activity that is not very common in the city of Antalya. Small cattle farming is more common in villages connected to the center because the land structure is suitable for sheep and goat farming. Poultry farming is also a common economic activity. Cattle raising is mostly done in high areas outside the city center. Apart from these, beekeeping is carried out in the form of migatory beekeeping.

In the Kepez Fisheries Production Station in the north of the city, studies are carried out to increase the variety of fish.

There are no animal passageways in and around the project site. There is currently a wastewater treatment plant in the project area. It is not expected that the project and the activity in question will have a negative impact on livestock both during the construction and operation processes.

6.13. EFFECTS OF THE PROJECT ON FLORA – FAUNA (EXISTING SPECIES, PLACES WHERE ENDEMIC SPECIES ARE FOUND, PLACES WITH IMPORTANT PLANT AREAS AND HABITATS OF ENDANGERED FAUNA SPECIES, IF ANY) AND ECOSYSTEM DURING THE CONSTRUCTION AND OPERATION PERIOD OF THE PROJECT AND MEASURES TO BE TAKEN

The effects of the project on the flora, fauna and ecosystem during the construction and operation period and the measures to be taken are discussed in detail under the title of "4.10. Flora and Fauna".

Accordingly, there are no endemic, endangered or endangered flora and fauna species in the project site and its immediate surroundings. There is no significant plant area within the project site and impact area.

The planned project is within the boundaries of the treatment facility area belonging to the

General Directorate of ASAT, which is currently in operation. For this reason, since the region where the project area is located is surrounded by the treatment plant units that are already being operated, the flora-fauna diversity cannot be mentioned. For this reason, the realization of the project is not expected to have a negative impact on the ecosystem of the region.

If any protected species is found in the project area and its immediate surroundings during the construction and operation phase of the project, necessary measures will be taken in line with Environmental Law No. 2872, Land Hunting Law No. 4915, European Convention for the Protection of Wildlife and Natural Habitats (Bern Convention), Convention on International Trade in Endangered Species of Wild Plants and Animals (CITES) and CHC Decisions.

6.14. IMPACT OF THE PROJECT'S EIA REGULATION ON SENSITIVE REGIONS IN ANNEX-5 AND MEASURES TO BE TAKEN

The evaluation of the project area and its immediate surroundings, taking into account the Annex-V Sensitive Regions List of the Environmental Impact Assessment Regulation, is as follows.

Sensitivity Degree (Considering the List of Sensitive Regions in ANNEX-5) Similar Features

The Project Area is located within the boundaries of the area where the existing wastewater treatment plant is located, and there is no area near the project area and its immediate surroundings considered as "Nature Conservation Areas", "Natural Monuments", "Nature Parks" item that are within the scope of the National Parks Law. In addition, there are no populated areas, areas with historical, cultural, archaeological and similar importance, erosion areas, agricultural areas, landslide areas, afforested areas, potential erosion and afforestation areas, operated agricultural areas and aquifers that need to be protected in accordance with the Law No. 167 on Groundwater.

The evaluation of the project area and its immediate surroundings, taking into account the Annex-V Sensitive Regions List of the Environmental Impact Assessment Regulation, is as follows.

Areas to be protected by taking into account the Sensitive Regions List in ANNEX-5

The project area is marked as “Treatment Facility Area” in the 1/100,000 Scaled Environmental Plan.

The project area is 310 m to the nearest forest land, 520 m to the forest land of 2B qualification, 1.56 km to Beydaglari Coastal National Park, 3000 m to the center of Hurma Neighborhood, 1700 m to the mosque, 1100 m to the Park Area, 1800 m to the Free Zone, 1200 m to the Fuel Products Storage Area,

2300 m to Port Akdeniz, 1180 m to Gas Station, 1700 m to Marina and 230 m to Nearest Residence 1.06 km to Sarısu Stream, 2.3 km to Çandır Stream, 3,83 km to Boğaçayı, 150 m and 90,58 m from the Energy Transmission Line.

The 1/25,000 Scaled Sensitive Regions Map for the project area is presented in Appendix-11.

The project site is 710 m to the Natural Protected Area, 200 m to the Military Area, 470 m to the Tourism Center, 550 m to the River, 1200 m to the Fuel Products Storage Area, 360 m to the Urban Settlement Area, 150 m to the Energy Transmission Line and 310 m to the Forest Area.

1. Areas to be protected in accordance with the legislations of our country

a) "National Parks", "Nature Parks", "Natural Monuments" and "Nature Protection Areas" defined in Article 2 of the National Parks Law and determined in accordance with Article 3 of this Law,

National Parks are parts of nature with natural and cultural resource values, which are rare in the world in terms of scientific and aesthetics, and protection, recreation and tourism areas.

The project site is not included in national parks, nature parks, natural monuments and nature protection areas.

b) "Wildlife Protection Areas, Wildlife Development Areas and Wild Animal Settlement Areas" determined in accordance with the Land Hunting Law,

The Project site is not included in Wildlife Protection Areas, Wildlife Development Areas and Wildlife Settlement Areas.

c) In the 1st, 2nd, 3rd and 5th sub-paragraphs of sub-paragraph (a) titled "Definitions" of the first paragraph of Article 3 of the Law on the Protection of Cultural and Natural Assets, "Cultural Assets", "Natural Assets", "Site" and Amendment of Some Articles of Law No. 3386 of 17/6/1987 (Law No. 2863 on the Protection of Cultural and Natural Assets) defined as "Conservation Area" and Areas determined and registered in accordance with the relevant articles of the Law on the Addition of Certain Articles to this Law

The project area does not remain within the areas defined as "Cultural Heritage", "Natural Heritage", "Site" and "Conservation Area".

d) Fisheries Production and Breeding Areas within the scope of Fisheries Law

The project area does not remain within the Fisheries Production and Reproduction Areas.

e) Areas defined in the 17th, 18th, 19th and 20th articles of the Water Pollution Control Regulation,

The project area is not included in the areas defined in the 17th, 18th, 19th and 20th articles of the Water Pollution Control Regulation.

f) Areas defined in the Air Quality Assessment and Management Regulation

The project site is not included in the areas defined in the Air Quality Assessment and Management Regulation.

g) Areas determined and declared as "Special Environmental Protection Areas" by the Council of Ministers in accordance with Article 9 of the Environment Law,

The project site does not remain within the areas determined and declared as "Special Environmental Protection Areas".

h) Areas taken under protection according to the Boğaziçi Law,

The project site does not remain within the protected areas according to the Boğaziçi Law.

i) Areas considered as forest areas in accordance with the Forestry Law

The project site is not located within the forest land.

j) Areas where a building ban is imposed in accordance with the Coastal Law,

The area subject to the project does not remain within the areas where the building ban is imposed in accordance with the Coastal Law.

i) Areas specified in the Law on Improvement of Olive Cultivation and Inoculation of Wild Wildlife,

The project area does not remain within the areas specified in the Law on Improvement of Olive Cultivation and Vaccination of Wilds.

i) Areas specified in the Pasture Law,

The project site does not remain within the areas specified in the Rangeland Law.

j) Areas specified in the Wetlands Protection Regulation.

The project site is not included in the areas specified in the Wetlands Protection Regulation.

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

a) I and II Protection Areas, "Mediterranean Seal Habitat and Breeding Areas", which are specified in the "Important Sea Turtle Breeding Areas", which are among the protected areas in accordance with the "Convention on the Conservation of European Wildlife and Habitats" (BERN Convention),

The project area does not remain within the "Mediterranean Seal Habitat and Breeding Areas", the I and II Protection Areas, which are specified in the "Important Sea Turtle Breeding Areas", Which are among the protected areas in accordance with the "BERN Convention".

b) Areas protected in accordance with the "Convention for the Protection of the Mediterranean against Pollution" (Barcelona Convention),

The project site is not covered by the protected areas pursuant to the Barcelona Convention.

1) Areas designated as "Special Protection Areas" in our country in accordance with the "Protocol on the Protection of Specially Protected Areas in the Mediterranean",

The project site is not included in the areas designated as "Special Protection Areas" in our country in accordance with the "Protocol on the Protection of Specially Protected Areas in the Mediterranean".

2) Areas included in the list of "100 Coastal Historic Sites of Common Importance in the Mediterranean" published by the United Nations Environment Program selected in accordance with the Genoa Declaration,

The project site is not included in the list of "100 Coastal Historic Sites of Common Importance in the Mediterranean" list.

3) Coastal areas, which are the living and feeding environment of the "Endangered Marine Species of the Mediterranean" in Article 17 of the Genoa Declaration,

The project site is not located in coastal areas, which are the living and feeding environment of "Mediterranean Endangered Marine Species".

c) Cultural, historical and natural areas that have been given the status of "Cultural Heritage" and "Natural Heritage", which have been taken under protection by the Ministry of Culture in accordance with the 1st and 2nd articles of the "Convention for the Protection of the World Cultural and Natural Heritage",

The project site is not included in the cultural, historical and natural areas that have been given the status of "Cultural Heritage" and "Natural Heritage", which have been taken under protection by the Ministry of Culture in accordance with the 1st and 2nd articles of the "Convention on the Protection of the World Cultural and Natural Heritage".

d) Areas under protection in accordance with the "Convention on the Protection of Wetlands of International Importance, Especially as Waterfowl Habitat" (RAMSAR Convention),

The project site does not remain within the protected areas in accordance with the RAMSAR Convention.

e) European Landscape Convention.

The project site is not covered by the European Landscape Convention.

3. Areas to be protected

a) Areas determined as areas to be protected and prohibited for construction in the Approved Environmental Plans (areas to be protected with natural character, biogenetic reserve areas, geothermal areas, etc.),

There are no areas under protection for special purposes such as forest areas, afforestation areas, wildlife and vegetation protection within the project area. The project area is marked as the treatment plant areain the 1/100,000 Scale Environmental Plan published by the Ministry of Environment and Urbanization General Directorate of Spatial Planning.

b) Agricultural Areas: Agricultural development areas, irrigated, irrigable and land use capability classes I, II, III and IV, I and II classes used in agriculture dependent on precipitation, and all of the special crop plantation areas,

The project site does not remain within Agricultural development areas, irrigated, irrigable and land use capability classes I, II, III and IV, I and II classes used in agriculture dependent on precipitation, and all of the special crop plantation areas,

c) Wetlands: Natural or artificial, Permanent or temporary, stagnant or current, fresh, brackish or salty, covering depths not exceeding 6 meters during the tides of the seas, all waters, which are important as the living environment of living things, especially water

birds, swampy reeds and turbaries and the places that remain ecologically wetlands from the coastal edge line to the land side of these areas,

The project site does not remain within wetlands.

d) Lakes, rivers, groundwater operation areas,

The project site does not remain within the lakes, rivers, and groundwater operation areas.

e) Areas that are important for scientific research and/or endangered or endangered species and habitats of endemic species for our country, biosphere reserve, biotopes, biogenetic reserve areas, areas with unique geological and geomorphological formations.

The project site does not remain within the areas that are important for scientific research and/or endangered or endangered species and habitats of endemic species for our country, biosphere reserve, biotopes, biogenetic reserve areas, areas with unique geological and geomorphological formations.

6.15. ACTIONS TO BE TAKEN WITHIN THE SCOPE OF THE "CULTURAL AND NATURAL HERITAGE PROTECTION LAW" AND RELATED LEGISLATION PUBLISHED IN THE OFFICIAL GAZETTE NO. 2863 OF THE PROJECT

Within the project area, there are no areas defined as cultural assets, natural assets, sites and protection areas within the scope of the "Law on the Protection of Cultural and Natural Assets" published in the Official Gazette No. 2863 and determined and registered in accordance with the relevant articles of the same Law.

6.16. PRECAUTIONS TO BE TAKEN TO ENSURE THAT DUST GENERATED DURING THE TRANSPORTATION OF RAW MATERIALS AND MATERIALS TO BE USED WITHIN THE SCOPE OF THE PROJECT DOES NOT DAMAGE THE SURROUNDING VEGETATION AND AGRICULTURAL LANDS.

During the preparation of the land at the facility site and the construction of the units, irrigation will be carried out with a sprinkler for dusting that will occur on the roads.

Within the scope of the project subject activity, treatment sludge will be used as raw material in incineration processes. Wastes will be brought to the facility with sealed waste transport vehicles (18 tons) and will enter the area after being weighed on the scale at the entrance to the facility. There is no dust formation due to the transportation of raw materials.

6.17. POSSIBLE NEGATIVE IMPACTS ON FOREST AREAS AND MITIGATION MEASURES TO BE TAKEN

The closest forest area to the activity area is approximately 310 m away.

In order to ensure safety against fire hazard during the operation period, fire cabinets, detection systems and fire extinguishers complying with technical norms will be available. The provisions

of the Regulation on Fire Protection of Buildings dated 19.12.2007 and numbered 26735 will be complied with.

Collection systems and filters will be installed in order to contain and reduce the emissions to be generated in the facility. Necessary maintenance and repair works will be carried out in a controlled manner in order to keep the emissions originating from the facility below the limit values of the relevant regulation.

Solid or liquid waste will not be poured into forest areas, and wastes will be disposed of in accordance with the provisions of the relevant regulation.

The operations to be carried out within the scope of the project will not have a negative impact on forest areas.

6.18. MEASURES TO BE TAKEN REGARDING FLOOD AND LANDSLIDE RISK

23.02.2020-29.02.2020 drilling works and geophysical studies were carried out by TOROS Geoteknik Mühendislik Ltd Şti on 25.03.2020 within the given points for the purpose of determining the ground parameters of the Sludge Incineration Unit, which is planned to be built within the borders of the Hurma Wastewater Facility in Antalya Province, Konyaaltı District.

According to the ground survey report for the project area, there is no landslide risk in the project area. The slope in the zoning island is in the range of 0-5 degrees. There are no risks such as mass movement.

There is no "Geological - Geotechnical Survey Report" that will form the basis for the zoning plan of the activity area, and the geological and geotechnical survey reports will be prepared and approved by the relevant institution.

Construction works will be carried out for the project site, taking into account the technical studies to be proposed by geology and geotechnical geoscientists and engineers.

The Project Site is 1.06 km from Sarısu Stream. It is also 2.3 km from Çandır Stream and 3.83 km from Boğaçay.

All measures against the surrounding surface and flood waters that may occur in possible excessive precipitation will be taken by ASAT, no damages will be claimed from SHW in respect of the application of the flood level of the buildings at a sufficient height above the natural ground level, the damages that may be incurred by third parties due to ASAT and the construction on the immovable, SHW will not be held responsible for flood damages.

In case of providing a road crossing over the flowing and dry streams in the project site and its adjacent, the necessary project will be made in line with the principles of the Disaster Regulation for Highway and Roadside Engineering Structures, and It will be constructed in accordance with the scientific procedures and principles after obtaining hydraulic approval from the SHW 13 Regional Directorate.

The minimum culvert size applied in the flood control facilities built by SHW is 2m x 2 m, and the transition structures made in the form of multi-mesh culverts are clogged due to the drifting sediment and plant roots and branches during floods, causing loss of life and property. For this

reason, it will be ensured that all kinds of works related to the streams are within the permission of the SHW 13 Regional Directorate.

No waste material, solid or liquid waste will be poured into the existing stream beds, their sections will not be narrowed, the existing and cadastral width of the stream beds will be preserved. No excavation or filling will be done on the 20-meter strip-like area from the tops of the slopes on both shores of the streams, and no waste, production waste, etc. material arising from production activities will be placed on the stream beds and their sides.

Residue material to be released in the said area and the transfer of sediment to be formed by erosion to the stream beds will be prevented by the measures to be taken in the field.

In accordance with the provisions specified in the Prime Ministry Circular No. 2006/27 on "Stream Beds and Floods", which came into force after being published in the Official Gazette dated September 09, 2006 and numbered 26284, and the Regulation on Flood and Rainfall Control, which entered into force after being published in the Official Gazette dated 03.05.2019 and numbered 30763, provisions will be complied with for the streams in and around the project area.

In all kinds of buildings to be built in the said area, the principles of the 'Regulation on Buildings to be Built in Disaster Areas' and the principles of the 'Turkey Building Earthquake Regulation' will be meticulously complied with.

6.19. TRAFFIC LOAD, ACCIDENT RISK AND MEASURES TO BE TAKEN IN THE CONSTRUCTION AND OPERATION PHASE OF THE PROJECT

General Directorate of Highways 13 Regional Directorates 2019 State Roads Volume Map is presented in Figure-57.

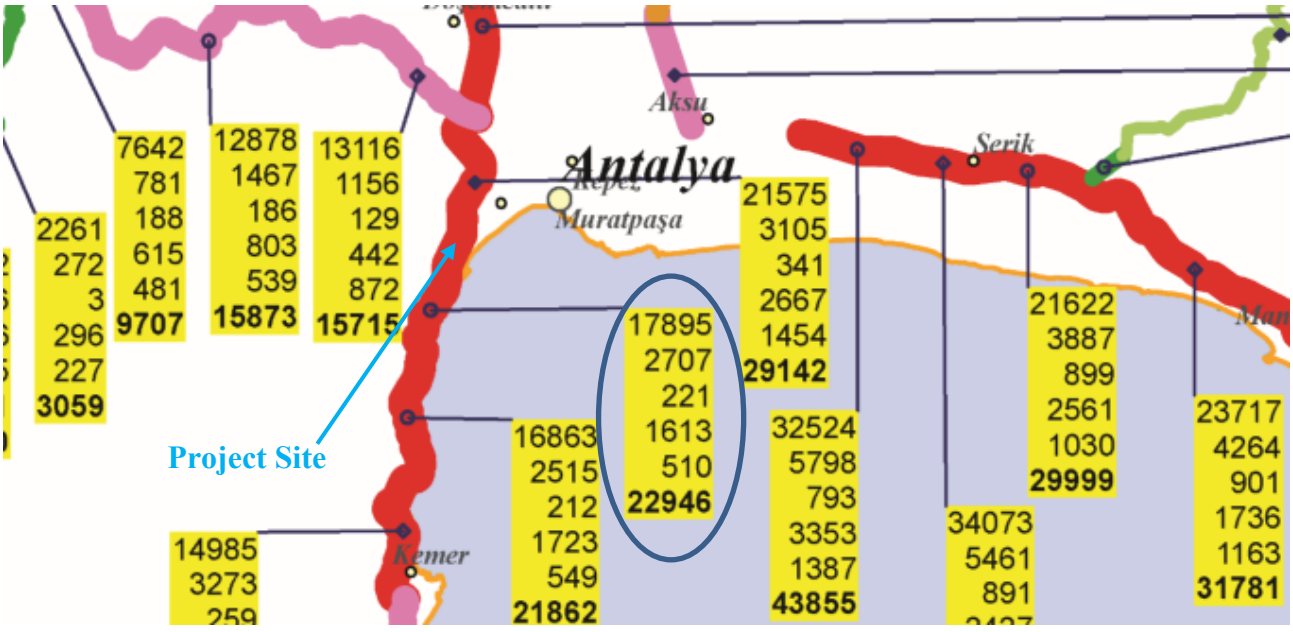


Figure 57: General Directorate of Highways 13 Regional Directorates 2019 State Roads Volume Map (Project Site)

Within the scope of the construction activities of the project a total of 32 construction machines, including, 3 crawler excavators, 3 loaders with wheels, 2 mini loaders, 12 trucks, 2 30-ton cranes, 2 waterers, 2 cylinders of 30 tons, 2 butt welding machines, 1 tower crane with a length of 60 meters, 2 argon welding machines and 1 generator, will be in operation.

All of the construction equipment to be used during the construction period will not be in the project site at the same time. Construction machinery will not leave the project site until the work tasks within the field of activity are completed. For this reason, there will not be a traffic load caused by construction machinery on the highway every day. If it is thought that there will be 12 trucks to be used only during the transportation of excavation, construction and demolition wastes, the traffic load is calculated below.

Current traffic load : 22946 vehicles / day

Number of vehicles to be added within the scope of the project : 12 trucks

Total Vehicles : 22958 vehicles / day

A : % increase

According to this, the effect of 12 trucks on the current traffic load in the event that they hit the road,

12 / 22946 = 0,00052

A = 0,00052

As it can be seen from the calculation, the additional traffic load due to the trucks to be operated during the construction phase is 0.00052%. Considering the regional conditions, this value is negligible.

During the operation period of the project, sludge coming from 30 wastewater treatment plants within the borders of Antalya Province, which is under the responsibility of the General Directorate of ASAT, will be disposed of by coming to the Hurma Treatment Sludge Incineration and Energy Recovery Facility.

The amount of sludge accepted from 30 treatment plants to the incineration plant may differ for each plant. In case the sludge to be brought from the treatment plants with low sludge amount cannot be brought daily according to the filling capacity of the licensed transport vehicles, the sludge amount entering the incineration plant can be brought to 500 tons/day by bringing the sludge from the treatment plants with more sludge production capacity.

The amount of treatment sludge to be transported to the facility by trucks of 18 tons and the number of vehicles that will participate in the traffic due to transportation are presented in Table 96.

Table 96: The Number of Treatment Sludges and Transport Vehicles to be Sourced from the Treatment Plants

AREA		FACILITIES	HURMA WWTP - Transportation Distances (km)	AVERAGE SLUDGE CAKE TO PULL ton / day	Number of Trucks to be Used
WEST	**1**	Kalkan WWTP	197	2	0.11
	2	Kaş WWTP	179	3	0.17
	3	Demre WWTP	127	2	0.11
	4	Elmalı WWTP	124	5	0.28
	5	Finike WWTP	103	1	0.06
	6	Kumluca WWTP	88	10	0.56
	7	Korkuteli WWTP	65	10	0.56
	8	Tekirova WWTP	49	5	0.28
	9	Çamyuva WWTP	39	10	0.56
	10	Kemer Central WWTP	33	10	0.56
	11	Göynük WWTP	24	5	0.28
	12	Beldibi WWTP	18	8	0.44
CENTER	**13**	**Hurma WWTP**	**0**	**140**	7.78
	14	Lara WWTP	41	70	3.89
EAST	**15**	Belek I WWTP	52	15	0.83
	16	Serik WWTP	54	20	1.11
	17	Belek II WWTP	60	15	0.83
	18	Boğazkent WWTP	63	5	0.28
	19	Çolaklı WWTP	80	8	0.44
	20	Kumköy WWTP	84	40	2.22
	21	Manavgat Central WWTP	96	40	2.22
	22	Okçular WWTP	115	10	0.56
	23	İncekum WWTP	124	10	0.56
	24	Türkler WWTP	134	5	0.28
	25	Konaklı WWTP	141	10	0.56
	26	Alanya Central WWTP	147	20	1.11
	27	Oba-Tosmur-Cikcilli WWTP	155	10	0.56
	28	Mahmutlar WWTP	162	9	0.50
	29	Gazipaşa WWTP	196	1	0.06
	30	Akseki WWTP	167	1	0.06
Total			-	**500**	**27.78**

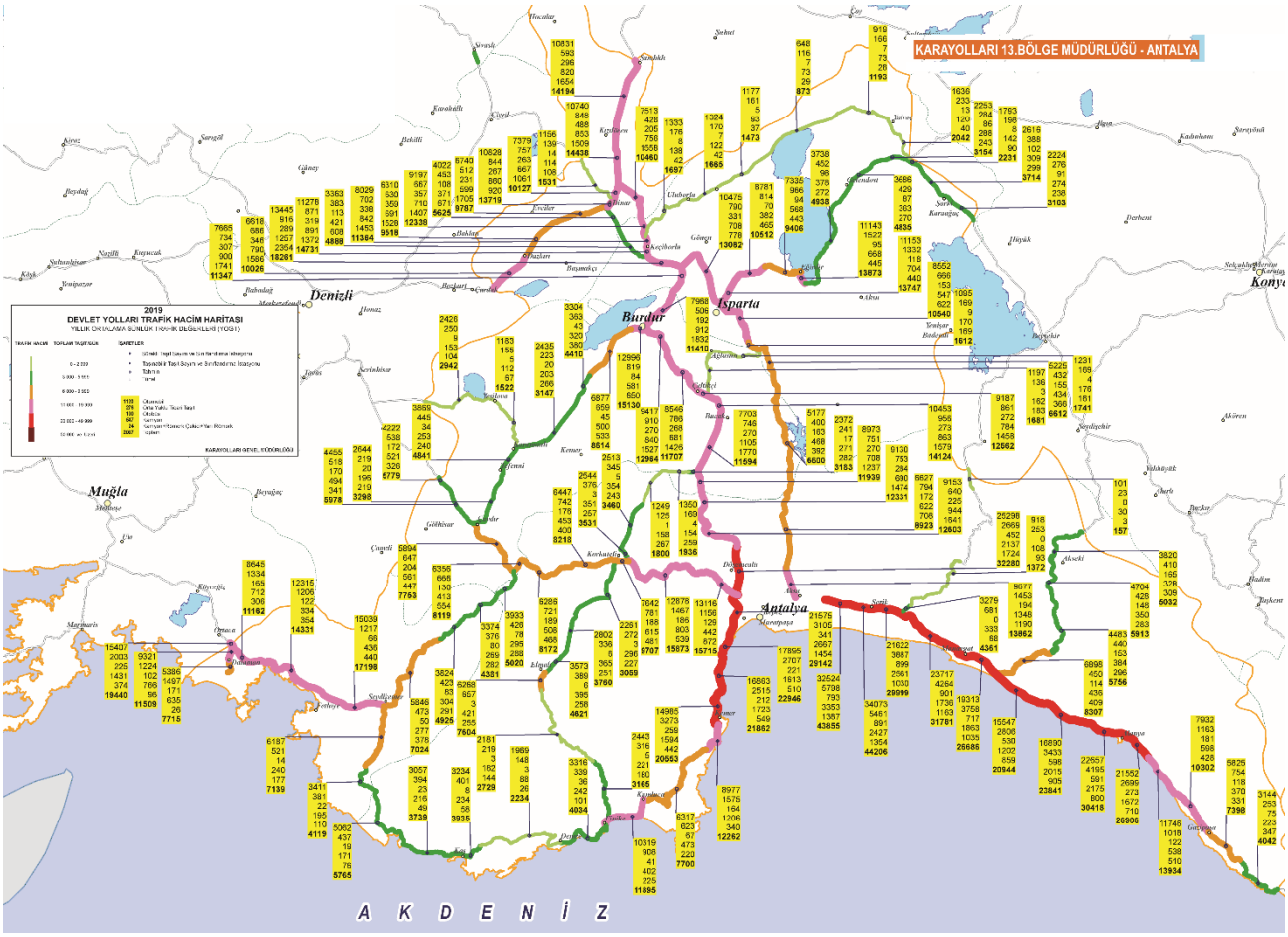


Figure 58: General Directorate of Highways 13 2019 State Roads Traffic Volume Map of the Regional Directorate (Antalya in General)

The traffic loads selected for interaction in terms of density in the Traffic Volume Map are shown in the figure above. Accordingly, the interaction tables as traffic density are given below.

Table 97: Traffic Load to be Caused by the Vehicles to be Used in the Operation Phase

AREA		FACILITIES	Hurma WWTP - KM Distances	AVERAGE SLUDGE CAKE TO PULL ton / day	Number of Trucks to be Used	Current traffic load	Additional Traffic Load
WEST	1	Kalkan WWTP	197	2	0.11	5765	0.0000193
	2	Kaş WWTP	179	3	0.17	3935	0.0000706
	3	Demre WWTP	127	2	0.11	4034	0.0000964
	4	Elmalı WWTP	124	5	0.28	4621	0.0000601
	5	Finike WWTP	103	1	0.06	11895	0.0000607
	6	Kumluca WWTP	88	10	0.56	7700	0.0001659
	7	Korkuteli WWTP	65	10	0.56	9707	0.0000572
	8	Tekirova WWTP	49	5	0.28	12262	0.0001269
	9	Çamyuva WWTP	39	10	0.56	20553	0.0001027
	10	Kemer Central WWTP	33	10	0.56	20553	0.0001297
	11	Göynük WWTP	24	5	0.28	21862	0.0001347
	12	Beldibi WWTP	18	8	0.44	22946	0.0001477

CENTER	**13**	**Hurma WWTP**	**0**	**140**	7.78	0	0.0000000
	14	Lara WWTP	41	70	3.89	29142	0.0005700
EAST	**15**	Belek I WWTP	52	15	0.83	43855	0.0002268
	16	Serik WWTP	54	20	1.11	44206	0.0001873
	17	Belek II WWTP	60	15	0.83	43855	0.0002268
	18	Boğazkent WWTP	63	5	0.28	29999	0.0002389
	19	Çolaklı WWTP	80	8	0.44	29999	0.0002296
	20	Kumköy WWTP	84	40	2.22	43855	0.0002648
	21	Manavgat Central WWTP	96	40	2.22	31781	0.0002028
	22	Okçular WWTP	115	10	0.56	20944	0.0001989
	23	İncekum WWTP	124	10	0.56	23841	0.0001515
	24	Türkler WWTP	134	5	0.28	23841	0.0001282
	25	Konaklı WWTP	141	10	0.56	30414	0.0000913
	26	Alanya Central WWTP	147	20	1.11	30414	0.0000731
	27	Oba-Tosmur-Cikcilli WWTP	155	10	0.56	26906	0.0000413
	28	Mahmutlar WWTP	162	9	0.50	13934	0.0000399
	29	Gazipaşa WWTP	196	1	0.06	10302	0.0000054
	30	Akseki WWTP	167	1	0.06	26686	0.0001582
Total			-	**500**	**27.78**		

Traffic emissions from the vehicles to be used to transport the treatment sludge to the facility during the operation phase are calculated cumulatively in Table 97, taking into account the routes that the vehicles will take. The total amount of sludge that will come from 30 wastewater treatment plants within the borders of Antalya Province, which is under the responsibility of the General Directorate of ASAT, is 500 tons/day. 28% (140 tons/day) of the said treatment sludge will come from the Hurma Wastewater Treatment Plant in the area where the Treatment Sludge Incineration and Energy Recovery Facility will be established, and will not create traffic emissions.

The additional traffic load due to the transfer of sludge, which can also be seen from the traffic emission calculation calculated for the operation phase, is 0.00057% at the highest point. Considering the regional conditions, this value is negligible.

The roads used within the scope of the project will not be damaged and the relevant laws and regulations will be complied with. In order to reduce the traffic load on the highways to be used in the region where the project is located, speed limits will be imposed on the vehicles and warning signs will be placed in the necessary areas.

During the transportation of materials at all stages of the project, the "Traffic Law" numbered 2918 and all laws and regulations regarding highways will be complied with.

6.20. EMISSIONS FROM VEHICLE TRAFFIC TO BE FORMED BY THE REALIZATION OF THE PROJECT, MEASURES TO BE TAKEN

Exhaust Emissions

Within the scope of the construction activities of the project a total of 32 construction machines, including, 3 crawler excavators, 3 loaders with wheels, 2 mini loaders, 12 trucks, 2 30-ton cranes, 2 waterers, 2 cylinders of 30 tons, 2 butt welding machines, 1 tower crane with a length of 60 meters, 2 argon welding machines and 1 generator, will be in operation. Within the scope of operational activities, 28 trucks are planned to be used for the transfer of sludge.

There will be gas emissions arising from the use of fuel in construction equipment. Mainly NOx, CO, PM and HC emissions will occur due to the use of diesel (diesel) fuel in construction machinery. SO2 emissions will be negligible in new generation fuels. Therefore, legal regulations require the emission level to be within certain limits.

All necessary measures will be taken to ensure that the emissions from the construction equipment to be used within the scope of the project do not exceed the limit values of the regulation. For this purpose, new and well-maintained vehicles will be used during the works, and the provisions of the "Exhaust Gas Emission Control Regulation", which was published in the Official Gazette dated 11.03.2017 and numbered 30004, will be complied with.

Hourly mass flow rate (kg/hour) value calculated under the heading “III.2. Fuel Types, Consumption Amounts, Emissions to be Used in Land Preparation, Construction and Operation Phases”, When the mass flow rate (kg/hour) (places other than the chimney) values given for the operating hours on weekly working days and under normal operating conditions given in "IAPCR" Annex-2 Table 2.1 are compared, it has been observed that the mass flow rates of the emissions are below the limit values given in the regulation. For this reason, air quality contribution values are not calculated.

Machinery and equipment will be used within the scope of the operation of the project, and the exhaust emissions from the machinery and equipment are below the limit values given in the regulation as calculated above. Therefore, the exhaust emissions arising from the machinery and equipment to be operated during the operation phase will not have a negative impact on the residence, which is approximately 230 m away from the bird flight, which is the closest settlement to the project site.

6.21. EFFECTS OF METEOROLOGICAL CONDITIONS ON THE PROJECT DURING CONSTRUCTION AND OPERATION PHASE (WIND, FOG, PRECIPITATION, SNOW, ICING ETC.), WORKS TO BE PERFORMED IN BAD WEATHER CONDITIONS

During the construction phase of the project, the work will be carried out after the necessary measures are taken, taking into account the Maximum Precipitation Values Observed in Standard Times and Extraordinary Meteorological Events (FEVK).

During the operation phase, the process conditions will be created in such a way that they will not be affected by the weather conditions. During transportation, waste will be transported by taking into account the meteorological conditions and taking precautions inside and outside the vehicle.

The data showing the Maximum Precipitation Values Observed in Standard Times and the Precipitation-Intensity-Duration Recurrence Curves obtained from the Meteorological Data Processing Department of the General Directorate of Meteorology of the Ministry of Agriculture and Forestry, and the Long-Year Unusual (Extraordinary Event) Events are presented in Annex-20.

6.22. ACTIONS TO ENSURE GROUND SAFETY

23.02.2020-29.02.2020 drilling works and geophysical studies were carried out by TOROS Geoteknik Mühendislik Ltd Şti on 25.03.2020 within the given points for the purpose of determining the ground parameters of the Sludge Incineration Unit, which is planned to be built within the borders of the Hurma Wastewater Facility in Antalya Province, Konyaaltı District. Building and building type structures were evaluated in the 2nd category according to the categorical classification.

The geological and geotechnical studies that are the basis of the zoning plans for the project site will be made and approved by the relevant institution.

Construction works will be carried out for the project site, taking into account the technical studies to be proposed by geology and geotechnical geoscientists and engineers.

Considering the negative impact of groundwater on the foundation and the risk of liquefaction due to the rise in groundwater level as a result of seasonal precipitation, necessary engineering measures will be taken during and after the construction phase, with methods such as drainage line, ground improvement, etc. Foundation excavation and foundation type will be evaluated considering the static water level.

In all kinds of buildings to be built in the said area, the principles of the 'Regulation on Buildings to be Built in Disaster Areas' and the principles of the 'Turkey Building Earthquake Regulation' will be meticulously complied with.

6.23. PRECAUTIONS TO BE TAKEN IN CASE OF NATURAL DISASTERS AND EARTHQUAKES

Natural disasters may occur as a result of fire, earthquake, lightning strike, etc. In order to prevent these situations, an emergency response team will be assigned by ASAT, and these personnel will be given training and their duties will be specified.

In order to ensure the safety of life and property within the scope of the Law No. 7269, a Geological/Geotechnical study report is prepared as a basis for the plan, in order to determine the natural disaster risks of the immovables and take precautions before any kind of planning (building, settlement, etc.), official science board approval will be made, the results of the report and all the precautions and recommendations stated in the report will be strictly followed.

In all kinds of buildings to be built in the said area, the principles of the 'Regulation on Buildings

to be Built in Disaster Areas' and the principles of the 'Turkey Building Earthquake Regulation' will be meticulously complied with.

6.24. LANDSCAPE AND LANDSCAPING STUDIES WITHIN THE SCOPE OF THE PROJECT

The project area is not located within the forest areas, and there are forests of the general nature of the Antalya region on the mountains located on 3 sides of the area, approximately 300 m north, northwest and south. As a result of the examinations made in the project site and its immediate surroundings, the species specified in Table 98 were found.

Table 98: Types of Trees and Shrubs in and Around the Project Site

Pinus brutia	**Turkish Pine**
Quercus spp.	**Oak Types**
Paliarus spina	**Jerusalem thorn**
Citrus sinensis	**Orange**
Mespilus germanica	**Medlar**
Rubus fruticosus	**Blackberry**
Cormus mas	**Cornelian cherry**
Rosa sp.	**Dog rose**
Erica sp.	**Heath**
İlex aguifolux	**English holly**
Pyrus communis	**Pear**
Smilax	**Bindweed**
Pteridium	**Bracken fern**
Mentha sp.	**Spearmint**
Thymus vulgaris	**Thyme**
Salvia officinalis	**Sage**
Hedera helix	**English ivy**
Gramineae	**Grasses**
Bryophyta	**Mosses**

Areas within the facility area, except for the parts where wastewater treatment units are installed, are afforested as much as possible, and care is taken for landscaping and environmental arrangements within the wastewater treatment plant. Within The Scope of The Hurma Treatment Sludge Incineration And Energy Recovery Plant Project, Attention Will Be Paid To Landscaping And Environmental Arrangements.

The total area of the block 12131 and parcel number 7 where the Treatment Sludge Incineration and Energy Recovery Facility will be established is 174.658,00 m2; The Hurma Wastewater Treatment Facility, which is currently in operation, is on an area of 163,524.70 m2. Within the scope of incinerating the treatment sludge originating from the treatment plants under the responsibility of ASAT and obtaining heat energy from the said incineration process, it is planned to build an incineration plant in the 11133,31 m2 part of the parcel no. 7 on block 12131, which is not used within the scope of the treatment facility activity.

There is an existing wastewater treatment plant in the area planned for the project. There are no areas with high landscape value and recreation areas in and around the project area.

6.25. SOCIO-ECONOMIC IMPACTS OF THE PROJECT

There are 78 personnel currently working at Hurma Wastewater Treatment Facility. It is planned to employ 55 personnel during the construction phase of the Hurma Treatment Sludge Incineration and Energy Recovery Facility Project, and an additional 10 personnel during the operation phase.

Within the scope of the planned project, importance will be given to permanent/temporary personnel employment from the region. It is planned that services such as material purchase and nutritional needs will be provided primarily from the region, and it is thought that the project will have a positive impact on the socio-economic structure of the region.

6.25.1. How and Where to Provide Health Services for the Workers Who Will Be in Project Studies, Risky and Dangerous for Human Health and Environment from the Works to be Continued from the Preparation of the Land to the Commissioning of the Project, Emergency Action Plan for Dangerous Situations, Necessary Equipment and First Aid Facilities

Within the scope of the project, the injured person will be referred to the nearest health center and hospital after the first intervention in the construction site in case of accidents and similar situations.

All kinds of measures will be taken to minimize the possibility of work accidents during the construction and operation phases of the project. For this purpose, attention will be paid to the fact that the people who use the construction machinery are trained and have a qualification certificate, During the work, the personal protective equipment and equipment of the workers will be taken into account, Workers will be ensured to use all protective equipment. It will be determined whether the workers comply with the rules or not with the controls made at certain periods. There is an infirmary for the first emergency response in the enterprise, and in case of unexpected discomfort and possible accident, first response can be made.

Occupational health and safety trainings will be given to the employees, and the employees will be informed about occupational health and safety legislation, work accident and situations considered as work accident, occupational risks to the working environment, danger risk concepts, risk factors, emergencies, fire incident and fire protection, health and safety signs.

Within the scope of the project, the provisions of the “Occupational Health and Safety Law” numbered 6331 will be complied with.

6.25.2. Examination of How the Settlements Near the Project will be Affected by the Construction and Operation Phases of the Project

The settlements near the Incineration Plant planned to be established within the scope of the project and their distances to the facilities are specified.

- 3000 m to the center of Hurma Neighborhood,
- 1700 m to the Mosque,
- 1100 m to the Park Area,
- 1800 m to Free Zone,

- 1200 m to the Fuel Products Storage Area,
- 2300 m to Port Akdeniz,
- 1180 m to the Fuel Station,
- 1700 m to the Marina and
- It is 230 m from the nearest Residence.

Machinery and equipment will be used within the scope of the construction processes of the project, and the exhaust emissions from the machinery and equipment are below the limit values given in the regulation. Therefore, the exhaust emissions arising from the machinery and equipment to be operated during the operation phase will not have a negative impact on the residence, which is approximately 230 m away from the bird flight, which is the closest settlement to the project site.

Noise level distribution calculations within the scope of the project have been interpreted considering the nearest settlement. The 70 dBA limit value given in Article 23 of the Regulation on the Evaluation and Management of Environmental Noise is provided. Within the scope of the project, there are no urban settlements within 100 meters that will be exposed to noise. The area within the scope of the project is located approximately 230 m away from the nearest residence. The value calculated for the nearest house at a distance of 230 m is approximately 61.30 dBA.

No adverse effects are expected on the settlements and facilities in the vicinity of the project.

6.26. CUMULATIVE IMPACT ASSESSMENT

Under the title of Chapter III, environmental impacts are examined as the effects of the facility activities and human activities within the project. Facility activity and human-induced impacts were also evaluated separately during the construction phase and operation phase.

The environmental impacts during the construction phase include excavation, construction and demolition wastes, polluting emissions, environmental noise and vibration, liquid wastes and solid waste types, quantities and disposal methods.

Within the scope of environmental impacts during the operation phase, the planned plant pollutant emissions, odor emissions, liquid wastes and solid waste types, quantities and disposal methods are included.

Apart from these, again under the Title of Chapter III, the cumulative effects of the facility activity within the project, effects on surface and groundwater resources and precautions to be taken, effects on livestock activities and measures to be taken, effects on Flora-Fauna and precautions to be taken, effects on sensitive areas and measures to be taken, transactions to be carried out within the scope of cultural and natural assets, effects on vegetation and agricultural lands and measures to be taken, effects on forest areas and measures to be taken, flood and landslide risk and measures to be taken, traffic load, accident risk and precautions to be taken, effects of meteorological conditions on the project and measures to be taken, the actions to be taken to ensure soil safety, natural disasters and earthquakes, and the measures to be taken, as well as landscaping and landscaping studies have been examined separately.

Construction Phase Pollutant Emissions;

Since the project is located within the existing treatment plant area, no additional administrative buildings, social facilities, etc. will be built, and most units will be used in common. Construction-wreckage waste and 22.728.91 m3 of excavation soil will be formed in the works to be carried out in the field, and all of the construction-wreckage wastes to be formed with the entire excavation soil will be transported to the sites allowed by the Antalya Metropolitan Municipality in accordance with the provisions of the provisions of the "Regulation on Control of Excavated Soil, Construction and Demolition Wastes" published in the Official Gazette dated 18.03.2004 and numbered 25406, and the "Waste Management Regulation" published in the Official Gazette dated 02.04.2015 and numbered 29314. by authorized trucks.

The total controlled dust emission value calculated for the construction phase is below the limit (dust emission limit value = 1.0 kg/hour in places other than the chimney) in Annex 2 of "Regulation on Control of Industrial Air Pollution" dated 03.07.2009 and numbered 27277, "Table 2.1 Mass Flow Rates" part.

At every stage of the activity, the relevant provisions of the "Regulation on Control of Excavated Soil, Construction and Debris Wastes" and the "Regulation on Control of Industrial Air Pollution" dated 03.07.2009 and numbered 27277, which came into force after being published in the Official Gazette dated 18.03.2004 and numbered 25682 will be complied with.

The works during the construction phase of the project will be continued in a controlled manner. Within the scope of controlled studies, attention will be paid to load and transport the trucks without tossing them in order to minimize dust emissions that may occur in the project area. Excavation soil loaded on trucks will be transported by covering it with tarpaulin to prevent spilling and dusting. Irrigation will be done on the roads and in the field to prevent dust to be generated within the scope of the activity.

Within the scope of the construction activities of the project a total of 32 construction machines, including, 3 crawler excavators, 3 loaders with wheels, 2 mini loaders, 12 trucks, 2 30-ton cranes, 2 waterers, 2 cylinders of 30 tons, 2 butt welding machines, 1 tower crane with a length of 60 meters, 2 argon welding machines and 1 generator, will be in operation. Within the scope of operational activities, 28 trucks are planned to be used for the transfer of sludge.

There will be gas emissions arising from the use of fuel in construction equipment. Mainly NOx, CO, PM and HC emissions will occur due to the use of diesel (diesel) fuel in construction machinery. SO2 emissions will be negligible in new generation fuels. Therefore, legal regulations require the emission level to be within certain limits.

All necessary measures will be taken to ensure that the emissions from the construction equipment to be used within the scope of the project do not exceed the limit values of the regulation. For this purpose, new and well-maintained vehicles will be used during the works, and the provisions of the "Exhaust Gas Emission Control Regulation", which was published in the Official Gazette dated 11.03.2017 and numbered 30004, will be complied with.

Machinery and equipment will be used within the scope of the construction processes of the project, and the exhaust emissions from the machinery and equipment are below the limit values given in the regulation as calculated above. Therefore, the exhaust emissions arising from the machinery and equipment to be operated during the operation phase will not have a negative

impact on the residence, which is approximately 230 m away from the bird flight, which is the closest settlement to the project site.

Detailed explanation of the emissions expected to occur during the construction period of the planned activity Section "6.3. Emission Sources to be Occurred during Construction and Operation Phase, Calculations, Air Pollution Distribution Modeling and Measures to be Taken". Calculated mass flow rates were compared with the limit values of IAPCR Annex-2 Table 2.1. The calculated emission flow values are below the mass flow limit values given in the regulation. For this reason, it was not necessary to calculate the Air Pollution Contribution Value (APCV) of the emissions in the facility impact area on an hourly, daily, monthly, and annual basis, and no emission distribution modeling was performed.

Operational pollutant emissions;

Transport trucks will be used during the operation period of the project, and the exhaust emissions from these trucks are below the limit values given in the regulation as calculated above. Therefore, the exhaust emissions from the trucks that will operate during the operation phase will not have a negative impact on the transportation routes.

Approximately 5 MWh (5,000 kWh) electricity will be produced during the incineration process at the facility. The internal consumption of the Waste Incineration Facility is calculated to be approximately 1.5 MWh (1,500 kWh (kilowatt hour)). The produced energy will meet 100% of the internal consumption of the Incineration Facility. The electricity consumption of the Hurma Wastewater Treatment Facility is approximately 3.5 MWh (3,500 kWh (kilowatt hour)), and it is anticipated that the electricity produced in the Incineration Facility can also meet the electricity need of the Hurma Wastewater Treatment Facility.

30,000 Nm^3/hour natural gas-biogas mixture will be used in the first firing at the facility, and after the boiler reaches the appropriate temperature, 8929.2 kg/hour waste sludge will be fed.

Detailed explanation of the emissions expected to occur during the operational period of the planned activity Section "6.3. Emission Sources to be Occurred during Construction and Operation Phase, Calculations, Air Pollution Distribution Modeling and Measures to be Taken". Calculated mass flow rates were compared with the limit values of IAPCR Annex-2 Table 2.1. The calculated emission flow values are below the mass flow limit values given in the regulation. For this reason, it was not necessary to calculate the Air Pollution Contribution Value (APCV) of the emissions in the facility impact area on an hourly, daily, monthly and annual basis, and no emission distribution modeling was performed.

There will be a continuous emission measurement system (CEMS) at the emission outlet chimney. A continuous measurement system will be established within the scope of Article 15 of the Regulation on the Incineration of Wastes in the boiler chimney. The measurement system in question shall have the equipment to perform the measurements specified in article 15.

All processes in the facility, temperature sensors, differential pressure sensors, level sensors, automatic spirals, motorized valves, automatic ignition systems and driven motors will be controlled by the plc and scada system in the facility.

To control flue gas emissions, emission control units such as; a) multi cyclone filter b) Activated

carbon and lime dosing unit c) Mixing Unit d) NaOH Dosing Unit e) Filter Unit/Ceramic Filter unit f) Filled Bed Washing Unit with by-pass g) Bag filter h) Flue gas suction fan i) Chimney j) CEMS (Continuous Emission Measurement System) and k) Flue Gas Washing Water Treatment System will be installed.

Sensors will be used for gas parameters and flow measurement in the chimney and CEMS system. Gas analyzers will measure the hydrocarbon content in the air, CO, CO2, NO, SO2, CH4, HCl, HF parameters and flow rate measurement.

Emission control system at the facility will be established in such a way as to provide emission values within the criteria of the relevant Law, Regulation and European Union Directive. The emission control system will be automatically controlled and operated from the Facility Control and Command Center during start-up, operation and shutdown. Equipment requiring regular maintenance will be accessible from permanent walkways and will be made of easily replaceable parts. Spare parts will be provided as well as necessary lifting beams and special tools so that replacement can be quick, safe, and reliable.

At every stage of the activity, the provisions of the Regulation on Incineration of Wastes dated 06.10.2010 and numbered 27721 will be complied with.

The facility will be designed to meet the physical and technical conditions specified in Articles 10, 11 and 12 of the Regulation on Incineration of Wastes.

In accordance with Article 6 of IAPCR, air quality limit values will be provided in the facility area of influence. The measures to be taken by the Governorship in this regard will be complied with.

The provisions and principles in Article 6 of the IAPCR published in the Official Gazette dated 03.07.2009 and numbered 27277 shall be complied with.

Odor Emission

Detailed explanations and technical measures regarding the Odor Emissions that may occur within the project are presented under the “III.3.7”.

- *Construction phase:*

There is no situation that will cause odor emission during the construction phase of the project.

- *Operation phase:*

In the facility, design and manufacturing will be made in such a way that the entire truck dump area, where sludge is accepted, stored, and the facility loading bunkers are 100% closed in order to ensure odor isolation. There will be two feeding bunkers. The bunker capacity is planned as 2x500 tons, that is, its volume is 1000 m^3. The total bunker area is foreseen as 1000 m^2. All areas related to sludge will be isolated from the outside air environment. Sulfate resistant (SRC) C35 concrete will be used in concrete structures with 100% impermeability to be used in this area.

The bunker to be built will be manufactured in accordance with the loading of sludge to the facility by trucks from outside the facility. In the meantime, trucks will be taken into the closed area and sludge will be discharged in order to prevent the odor that will disturb the environment. The odor inside will be removed by the air suction units.

A biofilter is designed as an odor treatment system for silos where wet sludge will be stored.

The sludge pumped from the underground silo will be stored in 2 parallel working 118 tons (118 m3) above ground silos. There will be a hydraulic sliding frame at the bottom of the sludge silos, and each silo will be fed by 2 main screw pumps located under it. Via these pumps, the sludge will be sent into the incinerator with injectors equidistant from each other around the Fluidized Bed Incinerator. Polluted air from sludge tanks and silos will be collected and deodorized with biofilter.

The gases accumulated in the silos will be transferred to the fluidized bed incinerator and a system will be set up to be burned there. In cases where the facility is not operating, an absorption system will be installed for odor control. This system will be installed as a backup for dangerous and explosive gases.

CH4, H2S and CO detectors have been added to the underground sludge bunker and aboveground silos for odor control purposes. These silos are covered however, when mud is poured into the underground silo with a truck, the hydraulic cover on the top of the tank will be opened and the mud can be poured. According to the signal coming from the detectors, the dangerous gas levels in the tank can be monitored.

Vitiated air will be drawn from the silos by fans operated with frequency inverters and will be pumped into the incinerator or biofilter unit.

Considering the distances to the settlements and the fact that the project area is located within the Hurma Wastewater Treatment Plant, no adverse effects are expected around the activity area with the odor removal units to be established.

The provisions of the "Regulation on the Control of Odor-Creating Emissions", published in the Official Gazette dated 19.07.2013 and numbered 28712, will be complied with at every stage of the activity.

Greenhouse gas emissions;

In order to determine the amount of greenhouse gas emissions, the greenhouse gas emission values during the construction and operation phases were calculated separately and evaluated in detail under the heading “6.2. Fuel Types to be Used in Land Preparation, Construction and Operation Phases, Consumption Amounts, Emissions” were evaluated in detail.

When the calculated hourly mass flow (kg/hour) value is compared with the mass flow (kg/hour) (places other than the chimney) values given for the normal operating conditions and weekly working days given in “IAPCR” Table 2.1, the emission mass flow rates are determined. It has been observed that the limit values given in the regulation are below. For this reason, air quality contribution values are not calculated.

Within the scope of the project, the provisions of the regulation on the follow-up of greenhouse gas emissions published in the Official Gazette dated 17.04.2014 and numbered 29003 will be complied with.

Detailed carbon footprints calculations has been attached as Annex.

General Directorate of ASAT attaches importance to energy efficiency and recovery processes

in its current facilities. Energy recovery processes continue by operating many complex facilities such as sludge drying, digestion and cogeneration facilities within the scope of climate change and reducing the existing carbon footprint.

With the construction of Hurma Incineration and Energy Recovery Plant, it is planned to reduce the carbon footprint and implement a project focused on energy recovery within the scope of climate change.

Noise;

Noise will be generated from the construction machinery to be used during the construction phase of the project. Details on the calculations and measures to be taken regarding the noise in question are listed in “6.6.”.

The closest settlement to the project area is the residence located at a distance of approximately 230 m from the project area. Noise level distribution calculations were interpreted considering the nearest settlement.

The area within the scope of the project is located approximately 230 m away from the nearest residence. The value calculated for the nearest house at a distance of 230 m is approximately 61.30 dBA. The 70 dBA limit value given in Article 23 of the Regulation on the Evaluation and Management of Environmental Noise is provided.

Environmental noise will not occur, as equipment that creates noise during operation, such as gas engines and generators, will be in a closed environment and sound insulation of the said area will be made. Since the mud trucks to be used during the operation period will arrive at the facility in different time periods, they will not be in the field at the same time. For this reason, noise emission has not been calculated for the operational period.

For the noise that may occur at every stage of the activity, the provisions of "Regulation on the Evaluation and Management of Environmental Noise", which was effectuated after being published in the Official Gazette dated 04.06.2010 and numbered 27601, and the "Regulation on the Amendment of the Regulation on the Evaluation and Management of Environmental Noise", which was published in the Official Gazette dated 27.04.2011 and numbered 27917 will be complied with.

Liquid Wastes-Wastewater;

Domestic wastewater will be generated from the use of personnel as liquid waste during the construction phase of the facility, and domestic and process-based wastewater will be generated from the use of personnel as liquid waste during the operation phase. Within the scope of the project, detailed explanations and calculations related to wastewater are discussed under the "III.7 Title".

The wastewater generated in the incineration plant will be collected in the wastewater manhole used for the contaminated rain water or the polluted water resulting from the fire extinguishing activities in Hurma WWTP. Before the said wastewater is treated at Hurma Wastewater Treatment Plant, the storage capacity in question will be stored in manholes with sufficient capacity, and then it will be discharged to be treated at Hurma WWTP.

Solid Wastes;

The possible solid wastes that may occur during the construction and operation phases of the project, their amounts and disposal methods are discussed in detail under the heading III.8.

During the construction phase, domestic solid waste, packaging waste, excavation-construction and demolition wastes will be generated.

During the operation phase, domestic solid waste, packaging waste, hazardous wastes, ash and slag wastes, waste oils, waste batteries and accumulators, waste electrical and electronic equipment, end-of-life tires, vegetable waste oils and medical wastes will be generated.

All possible wastes will be collected separately according to their types and the provisions of the relevant legislation, and their recycling/disposal will be ensured.

Impacts on Habitat, Flora and Fauna and precautions to be taken;

The planned project is within the boundaries of the treatment facility area belonging to the General Directorate of ASAT, which is currently in operation. For this reason, since the region where the project area is located is surrounded by the treatment plant units that are already being operated, the flora-fauna diversity cannot be mentioned. The flora and fauna characteristics of the project area and its surroundings and the precautions to be taken are discussed in detail under the headings II.3 and III.12.

If any protected species is found in the project area and its immediate surroundings during the construction and operation phase of the project, necessary measures will be taken in line with Environmental Law No. 2872, Land Hunting Law No. 4915, European Convention for the Protection of Wildlife and Natural Habitats (Bern Convention), Convention on International Trade in Endangered Species of Wild Plants and Animals (CITES) and CHC Decisions.

6.27. THE FLORA AND FAUNA CHARACTERISTICS OF THE PROJECT AREA AND ITS SURROUNDINGS AND THE PRECAUTIONS TO BE TAKEN ARE DISCUSSED IN DETAIL UNDER THE HEADINGS II.3 AND III.12.

During the closure of the facility, it is not expected to have a direct impact on water, air and soil, except in cases such as accidental spillage and leakage.

Considering the purpose of the incineration plant, it may be possible to close the sludge disposal plant if the existing wastewater treatment plants are closed.

Hurma Treatment Sludge Incineration Plant will be built as a steel construction structure on a concrete site, the floor will be completely covered with epoxy material, and the machines will be mounted on a concrete floor.

In case the facility is closed, the machines fixed on the concrete floor will be dismantled and then the steel construction will be removed. Construction-wreckage waste and excavation material that will arise during the removal of concrete material will be evaluated and disposed of within the scope of current legislation. After the concrete removal processes at the facility, the arrangement of the topography of the deteriorated region, works on vegetation and wildlife will be carried out.

In case the machines in the facility complete their economic life, the system will be operated by

making the necessary revisions on the existing system rather than removing the facility completely. For this reason, it is not expected to have any impact on existing underground and surface water resources.

The commitments specified in the EIA report and the General Health Law No. 1593 and the by-laws and regulations issued pursuant to these laws will be complied with in the installation, operation and operations of the facilities specified within the scope of the project, and in the operations after the operation is closed.

6.28. MONITORING AND CONTROL PROGRAM FOR THE PRE-CONSTRUCTION, CONSTRUCTION AND OPERATION PERIODS OF THE PROJECT

In the 5th paragraph of the 18th article of the Environmental Impact Assessment Regulation, which was published in the Official Gazette dated 25.11.2014 and numbered 29186, and the Regulation on the Amendment of the EIA Regulation dated 08.07.2019 and numbered 30825, "The Project Progress Report, which includes the developments in the investment in the periods determined by the project owner, the commission of the projects for which the EIA Positive Decision has been given, institutions/organizations that are qualified by the Ministry and that do not take part in the preparation of the EIA Report of the project in question are obliged to have them prepared, uploaded to the electronic system and submitted to the Ministry audits. The method for fulfilling the obligation is determined by the Ministry.

Accordingly, after the Project Owner has taken the "EIA Positive" Decision, the Project Progress Report, which includes the developments in the investment in the periods determined by the EIA Investigation and Evaluation commission, was published in the Official Gazette dated 29.11.2019 and numbered 30963, as per the Communiqué on the Certificate of Competency, which entered into force. The institution/organizations that are not involved in the preparation of the EIA Report of the project in question have it prepared, uploaded to the electronic system and submitted during the Ministry audits.

In this context, a company holding a Certificate of Competence from the Ministry of Environment and Urbanization will be assigned by the project owner to prepare the Project Progress Report during the construction phase of the project in question. The Project Progress Report, which is prepared by the company holding the Competency Certificate assigned, at the intervals determined by the Ministry of Environment and Urbanization, will be submitted to the Ministry of Environment and Urbanization.

6.29. PRECAUTIONS FOR HEALTH AND SECURITY TO BE TAKEN

In Hurma Treatment Sludge Incineration and Energy Recycling Plant for the provision of operation process of the activity, security of human health and natural environment, the following precautions will be taken.

Related with the equipments planned to be used in the plant, equipment information cards will be prepared, the protective inspection of machinery will be regularly carried out and such inspections will be reported in detail. This way any kind of accident arising from machinery and

equipment shall be prevented.

Procurement of equipment to be performed within scope of the project covers equipment to be required within existing units and equipment required for addition of units to the plant. The mechanic equipments in project have been selected in spare system, in a case of malfunction the working conditions will be saved and the spare equipments will be used.

All electro magnetic parts operated in Hurma Treatment Sludge Incineration and Energy Recycling Plant will be used at their own capacity. By using the electro magnetic equipments in control and in cycles the provision of economical life and protection will be achieved.

Economic utilization durations of materials to be used in units and equipment to be within scope of project are determined and equipment shall be of nature that is able to meet economic lives.

In case of breakdown of machines and equipment used in Hurma Treatment Sludge Incineration and Energy Recycling Plant, malfunction shall be eliminated within 24 hours at the latest. If problems can not be removed in such period, at least an equivalent machine or equipment of defected machine or equipment shall be provided.

Cleaning and periodical maintenance shall be regularly performed in order to provide safety of Hurma Treatment Sludge Incineration and Energy Recycling Plant. All personnel on duty in the plant shall be responsible for cleanliness and order of working field. Maximum care shall be taken in order to prevent existence of stone, wire, mess and tool on working fields. Cleaning work of the plant shall be performed on time. Environment shall be kept clean during repair and maintenance work of equipment in plant and no tool or part shall be left around. Area shall be cleaned thoroughly after completion of repair and maintenance work. All work within the plant shall be carried out properly and with the help of relevant device and assisting personnel.

Nobody other than electric personnel on duty shall deal with electric work of the plant according to electrical safety issues. Electrical connection shall be cut before any repair and maintenance work on any device. Warning signs shall be used in order to prevent any other person to give electricity in area in which electricity is disconnected and concerned personnel within the plant shall be informed.

Personnel working within field of Hurma Treatment Sludge Incineration and Energy Recycling Plant shall put on work clothes according to sanitary safety issues. Personal protective equipment such as safety helmet, mask, gloves, goggles etc in accordance with legislation in effect shall be used in parallel with directions of plant manager particularly in repair and maintenance work of the plant. Medical inspections and immunization of personnel to be employed within Hurma Treatment Sludge Incineration and Energy Recycling Plant shall be performed regularly.

In Hurma Treatment Sludge Incineration and Energy Recycling Plant, in case of electricity interruption, generator units will be installed in order to provide the continuity and meet the need of electricity.

Necessary precautions will be taken against the danger of a fire in Hurma Treatment Sludge Incineration and Energy Recycling Plant and equipments for extinguishing the fire and related devices will be placed in appropriate locations.

Treatment plant shall be designed in accordance with ATEX (ATmosphere Explosive)

Directives of which implementation within European Union has been made compulsory and which defines, explains and classifies explosive environments, equipment that may be used in explosive environments and their features and required precautions to be taken. ATEX directives are divided into two parts:

1- ATEX equipment directive 94/9/EC (Directive on Equipment and Protective Systems Used in Possible/Potential Explosive Environments)

2- ATEX workplace directive 99/92/EC (Directive on Minimum Requirements for enhancing health and safety of Personnel Working under Risk of Explosive Environments)

Provisions regarding equipment designed to be used in potential explosive environments and regarding protective systems are specified in Atex directives. All products that are within scope of such directive shall meet basic health and safety requirements that are necessary for safety operation of devices and that are specified in such directive.

Accordingly, Biogas storage tanks and installations in which explosive materials shall be stored shall be designed and manufactured in such a way that they shall not be a source of any arc or spark that are induced by electricity, electrostatic or pulse and that have the potential to flaring up explosive material.

Flameproof cables shall be used in the plant as a precaution against spark generation occurring when cables are cut or broken. Besides, cables to be used shall be of Explosion-proof nature and their outer sheaths shall be armored. By this way required precautions against cuts, breaks, crushing and burning shall have been taken.

Explosive environment in the plant shall be divided into zones under Atex directives and be classified. EX-danger sign in triangular shape shall be placed in entrance of dangerous areas. Electrical and magnetic devices used in areas with explosive nature shall have Ex-Proof (Explosion-proof) certificate.

All protective systems e.g. flame arrestors, which shall be installed in order to prevent explosions and spreads within the plant, shall comply with ATEX.

In Hurma Treatment Sludge Incineration and Energy Recycling Plant, there shall be “Danger Analysis Report” containing dangerous areas“ being divided into zones, Protection Analysis Against Explosion containing ex-proof prevention documents and certificate of conformity of tools and equipment used with Atex 94/9/EC directive.

It should be ensured that products in accordance with zone category shall be used in zones determined for explosive media under ATEX 94/4/EC directives. It should be compulsory for products to be used in determined areas as explosive media in the facility to have CE certificate. Products with CE certification represent conformity to basic quality and safety standards according to EU regulations. Products with CE certification are of nature that does not give harm to safety of human life and property, to plant and animal existence and to the environment when used in intended use. Through using products with CE certification, it shall be ensured that products of which safety is certified shall have been used. Equipment to be used in order to provide safety of explosive media in the facility shall be chosen among those that comply with Atex standards.

The following issues shall be observed in the facility according to Atex directives.

- Equipment used in explosive media shall have mounting instructions.
- Equipment used in explosive media shall have safety instructions.
- Equipment used in explosive media shall have maintenance and emergency repair information.
- Materials and equipment shall have operating instructions prepared by manufacturing firm or its authorized representative and all materials should be used in accordance with operating instructions.
- Operating instructions shall contain drawings and diagrams required for taking product under service, controlling and correcting it and for repairing it when necessary in terms of safety. Everyone shall be able to understand operating instructions easily.
- Hazardous areas shall be divided into zones according to their degrees and this situation shall be displayed in a manner that everybody shall easily see.
- Warning signs shall be placed in hazardous areas within the facility.
- There shall be training instructions regarding personnel working in the facility.
- Electrical and pressure information, maximum surface temperature and other limit values of equipment shall be specified.
- Special information regarding usage of materials and information regarding misusage shall be specified.
- Materials and protective systems to be used in storage tanks shall be designed allowing safe usage without causing any explosion.
- Parts in compliance with safety of the system shall be chosen when any attachment or spare part is required in the facility.
- Closed divisions that prevent product explosion shall only be opened by special tools. Usage of such tools shall be performed by solely competent people.
- Materials to be used within the facility shall not be of nature inducing explosion. Materials to be used in explosive media shall be of ex-proof and flame-proof nature materials.
- Fire and explosion protection installation and alarm systems shall be installed in the facility. Storerooms to be established within the facility shall be equipped with necessary heat, insulation, protection from lightning, ventilation, alarm, fire extinguishing systems considering harms may be caused by stored materials.
- Flame and gas perception systems shall be installed in places that have explosion risk.

Fire warning system with alarm shall be installed in wastewater treatment facility. There shall be alarm control panels in fire system. Control panels shall be suitable for integration with audible evacuation system and fire fighter telephone systems. Audible evacuation system shall

directly feed audible alarming devices such as loudspeakers in the field.

There shall be detectors, buttons, modules and sirens in field devices to be connected to fire alarm system. There shall be electronic perception devices that can be connected to fire alarm system such as ionization smoke detector, optical smoke detector, combined optical smoke and temperature detector, air sampling smoke detector, ray type smoke detector, temperature detector, linear type temperature detector, flame detector etc.

It should be possible to use fire alarm siren in fire alarm system that can be connected to circuit line directly without need of any control module, that can provide required feeding from circuit line without need of any separate feeding connection and that can be addresses by dip switch on it.

Besides, there shall be made enough number and appropriate quality (with foam, dry powder etc) fire extinguishers ready overall the facility. Fire extinguishers shall be checked semiannually, and their regular maintenance shall be provided.

For the prevention of any possible electric shocks, leaking current relays determined in the Regulation on Inner Electrical Wiring will be used. The highest building inside the work site will be installed with a lightning rod for the prevention of any shocks from lightning. In sections with electrical wiring and motors, nonflammable materials will be used.

Precautions must be taken against insects inside the wastewater treatment plant. In Hurma Treatment Sludge Incineration and Energy Recycling Plant insecticide operation will be carried out at least once a week. Applying pesticide on Wastewater Treatment Plant is under responsibility of Antalya Metropolitan Municipality. Disinfection operation is carried out by specialized persons with special protection dresses through taking required safety and health precautions. Disinfection is performed through spraying liquid medicine called BTI (Bacillus thuringensis israelensis) through special equipment. Bti is a larvacide that derives from natural bacteria and contains crystal proteins. Bti does not contain any chemical substance. Pesticide to be used in the plant only affects mosquito larvae. Drug does not have harmful affect to human and to the environment as a matter of its content. By regular disinfection larvae formation and reproduction of flies is prevented. Storing pesticide within project field is not a matter of discussion.

With the project to be realized there will not be any negative effects over the present roads and traffic. The present use of roads inside the Wastewater treatment plant is wide whereas in order to prevent any accidents the sewage trucks will be accepted one by one for the discharge of wastewater from the plant.

In case of any accidents inside the plant if any first aid is considered to be necessary before taking the person to a hospital the necessary equipment needed for such aid will be provided inside the treatment plant.

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT STRUCTURE AND RESPONSIBLITIES

7.1. PURPOSE AND SCOPE

The purpose of the Environment and Social Impact Plan is to determine the Environmental, Social, Health and Safety provisions to be followed within the scope of the construction and operation phases of the establishment of the HurmaTreatment Sludge Incineration and Energy Recovery Facility, which is planned to be realized within the West Antalya (Hurma) Wastewater Treatment Plant.

Environment and Social Impact Plan (ESIP) describes reduction and precautions for adverse, significant environmental effects, and monitoring conditions and institutional responsibilities required for implementation of ESIP. Environmentand Social Impact Plan covers reduction of and monitoring effect on environment, social and institutional matters, depending of circumstances of the country of project.

Environment and Social Impact Plan shall be used in order to prevent or (where it cannot be prevented) to minimize adverse effects on environment and people in place of execution of project operations within scope of project, and to provide existence and implementation of occupational health and safety precautions as required during construction.

The “Improvement Plan” and “Monitoring and Measurement Plan” needed to be applied in order to provide the conformity of the activities which will be carried out in the construction and operation stages of the Project to the national and Turkish environmental legislations, principles and procedures are given here below.

7.2. ENVIRONMENTAL AND SOCIAL MANAGEMENT STRUCTURE

Within the scope of the Hurma Waste Sludge Incineration and Energy Recovery Project, the realization of the possible impacts on the region where the construction activities take place and the nearby settlements will be supervised by the Supervisition Organization. During the activities, the Contractor should comply with the existing environmental laws and regulations and other legislation in this respect.

The Contractor shall undertake all relevant planning, including risk analysis linked to the construction works and areas related to construction work and specific environmental and social management reports special to construction site, (according to the Occupational Health and Safety Regulation).

Pre-construction inspection results of the works area will be controlled by the Supervision Team and before the Construction activities, the Contractor is obliged to make preparations and to take precautions regarding to the monitoring parameters specified in the ESMP whis was prepared by the Client. During the construction activities, the Contractor shall execute the construction activities in accordance with this situation. If the environmental and social risks change due to the changes that may occur during the execution of the contract, the Contractor is obliged to change the monitoring plans according to these changes and to continue to fulfill the obligations

by reducing and / or eliminating the risks to a minimum.

The ESMP will also include environmental and social impact mitigation methods and safe working applications that must be implemented, during the main construction activities and especiallyrealization of risky activities. Taking of all necessary permission and licenses for the Contractor's construction works; safety of construction area, workers and citizen; transportation of excavation waste; transportation waste, emission, and removal of other wastes etc…will be controlled.

The Contractor's Quality Control or Environmental Health and Safety (EHS) Expert will be responsible for the health, safety and environmental management at construction area and will continue their activities taking into consideration environmetal protection, the socio-economic characteristics of of settlements located near the construction area and the socio-economic value of public asset and daily routines of citizens. The Quality Control or EHS Specialist will be responsible for the monitoring, supervision and planning of the construction activities in terms of environment and health and safety and will report the EHS practices on the site quarterly. The Contractor's Quality Control or EHS Specialist will also monitor and coordinate the application and process of obtaining licenses and permits related to the local environment, health and safety laws and regulations. These applications and processes carried out by the Contractor shall be controlled by the Supervision Organization.

The flow chart related to enviromental and social managment system which shows authorities and reponsibilites of Supervision Organization, Contractor and ASAT is presented in Figure 59.

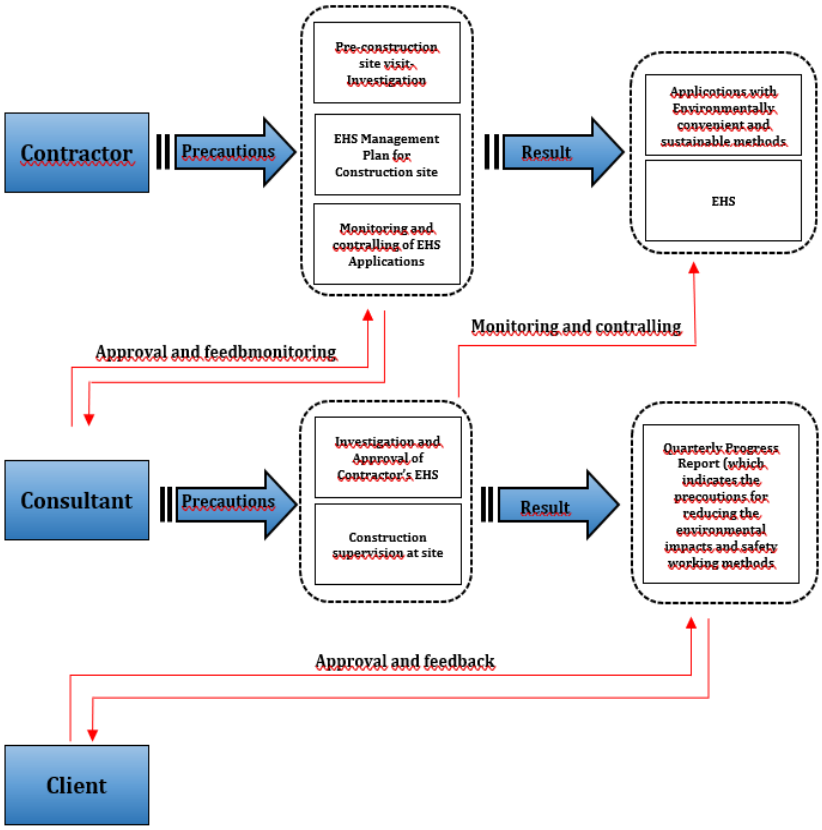


Figure 59: Environmental and Social Management System to be Implemented

The construction site will be regularly inspected by the Supervision Organization to ensure maintaining of cleanliness, order and convenience of environmental regulations and not to be adversely affected by negative environmental impacts of nearby settlemtents and habitats.

Providing of environmental health and safety training by the Contractor in accordance with the relevant occupational health and safety regulations will also be monitored by the Supervision Organization.

7.3. TRAINING

Within the scope of Hurma Wate Sludge Incineration and Recovery Project, Occupational Health and Safety Training should be provided to all contractor's staff to include the subjects specified in the "Regulation on the Procedures and Principles of Occupational Health and Safety Training of Employees" plans related to staff training will be included in the quarterly ESMP.

In addition, the Contractor will provide training on the environmental and social impacts of the ESMP document. It is the responsibility of the contractor to inform the contractor that the contractor has taken all necessary measures to minimize the environmental and social impacts during field manufacturing.

The contractor will ensure that employees are trained primarily in matters involving risks associated with work and workplace risks and safeguards before the employee actually starts to work.

Training will also be given on the risks that will arise due to changes in the workplace or job, the change of work equipment, or the implementation of a new technology.

The trainings will be repeated at regular intervals, taking into account the changing and emerging risks identified in the Regulation on the Procedures and Principles of the Occupational Health and Safety Training of Employees. Informing and training will be done not only for employees but also for measures to be taken for community health and safety. Persons who have been away from work for six months or more for any reason should be given training in information renewal before starting work again. Careful attention should be given to the selection of the topics that the trainers need to be effective in order to be effective. Training should be organized theoretically and practically so that employees can easily understand.

It is necessary that the knowledge, skills, attitudes and attitudes of the contractor personnel should be presented separately and in a measurable manner in occupational health and safety, environment and social issues.

Measurement and evaluation should be done at the end of the training. According to the evaluation results which shows the training is affective or not, the education program or the trainers should be changed or the training should be repeated if it is necccesary.

7.4. INSTUTIONAL ARRANGEMENTS

Table 99: Relevant Institution - Duties and Authorities

Related Institution	Duties and Authorities
ASAT General Directorate	General Directorate of ASAT has 19 seperate departments. One of these departments is "Wastewater Treatment Plants Department" Hurma Waste Sludge Incineration and Energy Recovery Project" within the scope of the ESMP report will be executed under work description and responsibility of the Wastewater Treatment Plants Department.
ALDAŞ Infrastructure Management and Consultancy Inc.	ALDAS Infrastructure Management Consultancy Industry and Trade Inc. that will serve as the supervisionorganization during the implementation of the Antalya Sustainable Water and Wastewater Project was established on 13 December 1995 in order to serve as responsible for the administrative and financial management of the water supply and sewage services on behalf of the General Directorate of ASAT. ALDAS manages investments, supervises the private operator and provides consultancy services for corporate restructuring, new investments and new policies as a ASAT's sole and authorized representative. ALDAŞ Inc. will serve as project management unit within the scope of the project and will control both the technical and administrative progress of the contract packages and the applications of the issues stated in the ESMP. In addition, ALDAS will examine the quarterly environment and social monitoring reports of the contractors as well as the field inspections and will submit these reports to AFD regularly.
Contractor Company	The construction contracts and the operation of the contract packages within the scope of the Environmental and Social Management Plan will be carried out by the contracting firms. Contractor Firms are obliged to comply with the responsibilities specified in the Environmental Management Plan. The issues related to the implementation of the ESMP will be examined by the contractor during the preparation of the tender offer and will be given taking into consideration the Environmental and Social Management Plan. Measures to be taken within the Environmental and Social Management plan to reduce the most possible adverse impacts of the project on the construction and operation phase and monitoring plans designed to control the implementation conditions of the

	measures. These plans also include the institutions and organizations (project stakeholders) responsible for the afformentioned items. During the construction phase, the contractor firm will provide training to the personnel who will take part in the project, including environmental, occupational, health and safety, citizen safety, measures within the scope of ESMP, in order to create social awareness. The implementation of the measures for the construction phase of the ESMP will be coordinated by experts in environmental, social and occupational health and safety. The subject experts are responsible for taking necessary measures and implementing monitoring plans to eliminate/minimize environmental and social impacts in the direction of the ESMP.
AFD	During the construction and operation stages, the AFD Authorities and General Directorate of ASAT will supervise the performance of the contractors in compliance with the ESMP. Regarding these issues, contractors will be required to quartely reports periodically and if necessary, on-site inspections will be done. ALDAŞ will inform the Instituition of France Development with its environmental and social monitoring reports biannually. In addition to this information, the Instituition of France Development will also check its activities periodically.

8. STAKEHOLDER ENGAGEMENT PLAN

A stakeholder is defined as any individual, organization or group who is potentially affected by the Project or who has an interest in the Project and its impacts. The purpose of stakeholder identification is to identify and prioritize Project stakeholders for consultation who may be affected (either directly or indirectly in positive or negative way) by the Project or who have an interest in the Project but are not necessarily directly impacted by the Project.

In order to achieve equal and fair stakeholder engagement, it is necessary to identify stakeholders at the first stage of the project. With this determination, it will ensure that all stakeholders of the project, including groups that are directly or indirectly affected, related to the project, and groups are analyzed correctly. Stakeholders will continue to be identified during different stages of the Project.

Stakeholders expected to be directly or indirectly affected by the project are listed below:

- Citizens
- National and local government institutions and organizations (Ministry of Forestry and Water Affairs, Ministry of Environment and Urbanization, Ministry of Culture and Tourism, Antalya Governorship, Konyaaltı Municipality, Konyaaltı District Governorate, etc.),
- Non-governmental organizations

- People directly or indirectly affected (People living in the Project impact area, landowners, common land users, seasonal workers, etc.)
- Universities, local businesses, etc. interest groups
- Contractors and suppliers, Project employees

8.1. CITIZENS

Citizens are the most important stakeholders for this project. It is planned to solve the treatment problem of citizens living in the basin that feeds the eastern collector line of Antalya, in areas that do not have a sewer system and where wastewater is drawn by vacuum trucks. Here, it is planned to eliminate the wastewater problem of all citizens, regardless of women, men, children and vulnerable groups.

8.2. NATIONAL AND LOCAL GOVERNMENT INSTITUTIONS AND ORGANIZATIONS

These organizations include authorities with statutory responsibilities relevant to the Project or to environmental or social issues, and other bodies responsible for providing infrastructure relevant to the Project. A list of governmental agencies relevant to the Project has been prepared as given below:

Level	Organization	Relation to the Project
National	Ministry of Forestry and Water Affairs	Regulatory functions such as environmental impact assessment permits and environmental permitting.
	Ministry of Environment and Urbanization	
	General Directorate of Environmental Management	
	General Directorate of EIA, Permits and Audits	
	Ministry of Culture and Tourism	
	General Directorate of Spatial Planning	
	General Directorate of Infrastructural Investments	Regulatory functions such as issuing relevant permits for infrastructural investments.
	Social Security Institution	MoLSS may have specific views on labor and working conditions, and occupational health and safety.
	Ministry of Labor and Social Security (MoLSS)	
	General Directorate of Labor	
	General Directorate of Occupational Health and Safety	
Provincal	Antalya Governorship	The governorship is the highest authority in the province representing national government.
	Antalya Metropolitan Municipality (AMM)	The municipality and its relevant departments have

		responsibilities for the Project.
	AMM Department of Fire Brigade	In case of fire, fire brigade is the responsible body to respond.
	Antalya Provincial Directorate of Environment and Urbanization	Regulatory functions relating to the Project such as environmental impact assessment permits and environmental permitting. May have views on future construction activities.
	Antalya Provincial Directorate of Disaster and Emergency Management	This organization has a function to manage and respond to emergency cases.
	Antalya Provincial Directorate of Security (Police)	In case of crime related issues, police performs necessary actions.
	Antalya Provincial Directorate of 112 Emergency Medical Services	In case of adverse health issues, 112 Emergency Medical Services is informed.
	Antalya Provincial Directorate of Culture and Tourism	This organization may provide specific view related to archaeological potential of future construction areas.
District / Local	Local governorships	Local municipalities and governorships and their relevant associated bodies may be important in case of emergency cases. In addition, these authorities together with the headmen of the neighborhoods in the vicinity of furture construction areas may have specific views about the activities.
	Konyaaltı Municipality	
	Headmen of neighborhoods in the vicinity of future construction areas	

8.3. NON-GOVERNMENTAL ORGANIZATIONS

A list of non-governmental agencies relevant to the Project has been prepared as given below:

Level	Organization	Relation to the Project
Provincal	The Union of Chambers of Turkish Engineers and Architects (Antalya Representative Office)	These chambers may provide provincial-specific and/or site-specific views related to future construction activities, particularly on route selection
	Chamber of Urban Planners (Antalya Office)	
	Chamber of Architects (Antalya Office)	
	Chamber of Civil Engineers (Antalya Office)	
	Chamber of Environmental Engineers (Antalya Office)	

8.4. PEOPLE DIRECTLY OR INDIRECTLY AFFECTED

All constructions to be made within the scope of the project will be carried out within the existing land boundaries of Lara Wastewater Treatment Plant.

In this context, it is foreseen that the stakeholders will not be affected regarding the land acquisition. However, they will be exposed to noise, dust, etc. during the construction and operation phases.

The effects of dust, noise, odor, traffic jam etc. that occur during the construction are detailed in the Environmental Impact Assessment Reports, and it is thought that they will not have significant impacts on the people during the construction phase.

Although, it is thought that it will not be exposed to significant impacts, citizens living/working around the wastewater treatment plant are important stakeholders of the project.

8.5. UNIVERSITIES, LOCAL BUSINESSES, ETC. INTEREST GROUPS

The effects of dust, noise, odor, traffic jam etc. that occur during the construction are detailed in the Environmental Impact Assessment Reports, and it is thought that they will not have significant impacts on the people during the construction phase.

Although, it is thought that it will not be exposed to significant impacts, universities, local businesses etc around the wastewater treatment plant are important stakeholders of the project.

8.6. CONTRACTORS AND SUPPLIERS, PROJECT EMPLOYEES

Sub-contractors and suppliers of the Company constitute important stakeholders for Project related activities and include cleaning and security service contractors; suppliers of equipment, vehicles, spare parts and associated services; maintenance service suppliers; and other suppliers of services such as informatics, electricity etc. In addition, construction contractors for any potential future construction activities are also among the important stakeholders of the project.

However, the **Environmental and Social Management Report will be prepared under the contract. All sub-contractors and contractors will work in accordance with this directive and rules.**

8.7. STAKEHOLDER ENGAGEMENT APPROACH

The issue of how and which information will be shared with the stakeholders who will be in contact during the project is important, and these details regarding the information process are summarized below.

Stakeholders Groups	Information to Share	Communication Method
Citizens	• Grievance mechanism procedure • Current affairs about the project • Non-technical summary of the project	• Websites to disclose Project Information • Public participation meeting • Advertisements in the local press • Regular information meetings(meeting will be organized with the public of Hurma Village once a year and information will be given about the project.Also before construction stage pre-bid meeting will organized and information about baundry of facility, project descriptin will be given. • • Announcements and posters to be hung in

		public areas (coffee house, headman's office, village mansion, etc.) • Materials such as promotional brochures and booklets to be distributed
National and local governmental institutions and organizations	• Non-technical summary of the project and Stakeholder Engagement Plan • Current developments about the project	• Websites to disclose Project Information • Consultation meetings • Hard copies of the non-technical summary of the project and the stakeholder engagement plan at the municipal buildings
Non-governmental organizations	• Non-technical summary of the project and Stakeholder Engagement Plan • Grievance mechanism procedure • Current affairs about the project	• Websites to disclose Project Information • Public participation meeting • Consultation meetings • Advertisements in the local press • Materials such as project brochures and booklets to be distributed
People directly or indirectly affected	• Grievance mechanism procedure • Current affairs about the project • Non-technical summary of the project	• Websites to disclose Project Information • Public participation meeting • Advertisements in the local press • Regular information meetings (meeting will be organized with the public

		of Hurma Village once a year and information will be given about the project. Also before construction stage pre-bid meeting will organized and information about baundry of facility, project descriptin will be given. • Announcements and posters to be hung in public areas (coffee house, headman's office, village mansion, etc.) • Materials such as promotional brochures and booklets to be distributed
Universities, local businesses, etc. interest groups	• Non-technical summary of the project • Grievance mechanism procedure • Current affairs about the project	• Websites to disclose Project Information • Public participation meeting • Consultation meetings • Materials such as project brochures and booklets to be distributed
Contractors and suppliers, Project employees	• Grievance procedure for employees • Current affairs about the project	• Regular meetings • Announcements and posters on the boards in the work areas

8.8. PUBLIC PARTICIPATION

8.8.1. Identification of the relevant public likely to be affected by the project

By Antalya Metropolitan Municipality, General Directorate of Antalya Water and Wastewater Administration (Asat), In Antalya Province, Konyaaltı District, Hurma Neighborhood, On parcel no. 7 of block 12131, within the boundaries of the current Hurma WWTP, The Hurma Treatment Sludge Incineration and Energy Recovery Plant Project is planned. For this reason, the Public

Participation Meeting was held at the "Lemon Park House" located in Sarısu Mevkii of Liman Neighborhood, which is close to the project site, since the people who are likely to be affected by the project are Hurma Neighborhood where the project site is located, Sarısu Neighborhood and Liman Neighborhood nearby the project site.

8.8.2. Methods Used for Public Participation in the EIA Process, Methods Proposed/Used to Reflect The Views of The Public In The Environmental Impact Assessment Study,

Before the public participation meeting, the announcement of the text of the announcement, which was written to the Konyaaltı District Governorship with the letter dated 30.10.2020 and numbered 79222, by the Antalya Provincial Directorate of Environment and Urbanization, by appropriate means (announcement, hung announcement, internet, etc.) and the announcement was made. They were asked to send the minutes to them. The published announcement text is presented in Image-9.

The Public Participation Meeting was announced on the 10th page of the People's Newspaper Birgün National Newspaper dated 27.10.2020 and the 7th page of the Akdenizde Yeni Yüzyıl newspaper dated 27.10.2020. (Image-10)

A brochure was printed to introduce the project to be distributed before and during the meeting (Image-11).

A Powerpoint presentation including the introduction of the project was prepared for the Public Participation Meeting. In the presentations, the definition of the project, its importance and environmental effects were supported with figures and photographs. The impacts related to the construction and operation periods of the project are presented as two separate phases. (Picture 13)

In accordance with Article 9 of the "Environmental Impact Assessment Regulation", The people of the region who are likely to be affected by the planned project to ensure public participation in the EIA process, to inform about the project, "People's Participation Meeting" was held on 10.11.2020 at 13.30 at Liman Neighborhood Sarısu District 99 Sk 3/3-1 Konyaaltı/Antalya address to get their opinions and suggestions. (Picture 14)

DUYURU

ÇED Sürecine
Halkın Katılımı Toplantısı

ANTALYA BÜYÜKŞEHİR BELEDİYESİ ANTALYA SU VE ATIKSU İDARESİ GENEL MÜDÜRLÜĞÜ (ASAT) tarafından; Antalya İli, Konyaaltı İlçesi, Hurma Mahallesi, 12131 Ada, 7 Nolu Parsel üzerinde "HURMA ARITMA ÇAMURU YAKMA VE ENERJİ GERİ KAZANIM TESİSİ" projesinin yapılması planlanmaktadır. Söz konusu proje için Çevresel Etki Değerlendirmesi (ÇED) Yönetmeliğinin 9. Maddesi gereğince aşağıda belirtilen tarih ve saatte faaliyetle ilgili halkı bilgilendirmek, görüş ve önerilerini almak için "Halkın Katılımı Toplantısı" yapılacaktır.

Halkımıza saygı ile duyurulur.

Toplantı Yeri	:Lemon Park House
Toplantı Yerinin Adresi	:Liman Mahallesi, Sarısu Mevkii, 99 Sk. 3/3-1 Konyaaltı/ANTALYA
Toplantı Tarihi	: 10.11.2020
Toplantı Saati	: 13:30
Proje Sahibi	: ANTALYA BÜYÜKŞEHİR BELEDİYESİ ANTALYA SU VE ATIKSU İDARESİ GENEL MÜDÜRLÜĞÜ (ASAT)
Tel	: 0 242 310 12 00
Faks	: 0 242 310 12 01
ÇED Raporunu Hazırlayan Kuruluş	: Arüv Çevre Müh. Müş. Hiz. İnş. San. ve Tic. A.Ş.
Tel	: (0242) 323 33 93
Faks	: (0242) 323 33 16

Image 9: Announcement Text



YeniYüzyıl — BÖLGE-SEKTÖR — 27 EKİM 2020 SALI — 7

"Devlet yeni strateji izlemeli"

AKARYAKIT SATIN ALINACAKTIR

TARIM VE ORMAN İL MÜDÜRLÜĞÜ

150000 Litre Motorin(Diğer) ve 10000 Litre 95 Oktan Kurşunsuz Benzin Mal alımı 4734 sayılı Kamu İhale Kanununun 19 uncu maddesine göre açık ihale usulü ile ihale edilecektir. İhaleye ilişkin ayrıntılı bilgiler aşağıda yer almaktadır:

Çiftçinin son yıllarda meydana gelen doğal afetlerle mücadele etmeye gücünün yetmediğini belirten KUTSO Başkanı Murat H. Günay, iklim değişikliği sonucu oluşan bu yeni durum karşısında devletin yeni bir strateji izlemesi gerektiğini belirtti.

Rus turistler elma hasadı turuna katıldı

Isparta'nın Eğirdir ilçesine düzenlenen iki günlük 'Elma Hasadı ve Kültür Turu'na Antalya'nın Alanya ilçesine ikamet eden Ruslar oldukça ilgi gösterdi.

DUYURU
ÇED Sürecine Halkın Katılımı Toplantısı

ANTALYA BÜYÜKŞEHİR BELEDİYESİ ANTALYA SU VE ATIKSU İDARESİ GENEL MÜDÜRLÜĞÜ (ASAT) tarafından; Antalya İli, Konyaaltı İlçesi, Hurma Mahallesi, 12131 Ada, 7 Nolu Parsel üzerinde "HURMA ARITMA ÇAMURU YAKMA VE ENERJİ GERİ KAZANIM TESİSİ" projesinin yapılması planlanmaktadır. Söz konusu proje için Çevresel Etki Değerlendirmesi (ÇED) Yönetmeliğinin 9. Maddesi gereğince aşağıda belirtilen tarih ve saatte faaliyetle ilgili halkı bilgilendirmek, görüş ve önerilerini almak için "Halkın Katılımı Toplantısı" yapılacaktır.

Halkımıza saygı ile duyurulur.

Toplantı Yeri	: Lemon Park House
Toplantı Yerinin Adresi	: Liman Mahallesi, Sarısu Mevkii, 99 Sk. 3/3-1 Konyaaltı/ANTALYA
Toplantı Tarihi	: 10.11.2020
Toplantı Saati	: 13:30
Proje Sahibi	: ANTALYA BÜYÜKŞEHİR BELEDİYESİ ANTALYA SU VE ATIKSU İDARESİ GENEL MÜDÜRLÜĞÜ (ASAT)
Tel	: 0 242 310 12 00
Faks	: 0 242 310 12 01
ÇED Raporunu Hazırlayan Kuruluş	: Artıv Çevre Müh. Müş. Hiz. İnş. San. ve Tic. A.Ş.
Tel	: (0242) 323 33 93
Faks	: (0242) 323 33 16



SAYFA 10 SIYAH MAVİ KIRMIZI SARI

10 EMEK — BirGün — www.birgun.net — 27 EKİM 2020 SALI

Madencilerin yolunu açın!

Ankara'ya yürümek isteyen Ermenekli maden işçilerinin önü jandarma barikatıyla kesildi. İşçiler "Jandarmayı hak yiyenlerin karşısına koyun" dedi. Yurttaşlardan madencilere yoğun destek geldi

İşyeri hekimleri ile pratisyenlerin izin süresi artsın

Sendikalı olmak işten atılmak demek

Sağlık çalışanlarını koruyun artık!

ATO, ADO ve SES Ankara Şubesi'nin düzenlediği ortak basın açıklamasında sadece kentte en az bin 72 sağlık çalışanına Covid-19 tanısı konulduğu belirtildi. Açıklamada, Ankara'da günde 10 bin civarında yurttaşa filyasyon yapıldığı da vurgulandı

SEKİZ TALEP ACİLEN YERİNE GETİRİLMELİ

'Hukuksuzluğu her yerde dile getireceğiz'

DUYURU
ÇED Sürecine Halkın Katılımı Toplantısı

ANTALYA BÜYÜKŞEHİR BELEDİYESİ ANTALYA SU VE ATIKSU İDARESİ GENEL MÜDÜRLÜĞÜ (ASAT) tarafından; Antalya İli, Konyaaltı İlçesi, Hurma Mahallesi, 12131 Ada, 7 Nolu Parsel üzerinde "HURMA ARITMA ÇAMURU YAKMA VE ENERJİ GERİ KAZANIM TESİSİ" projesinin yapılması planlanmaktadır. Söz konusu proje için Çevresel Etki Değerlendirmesi (ÇED) Yönetmeliğinin 9. Maddesi gereğince aşağıda belirtilen tarih ve saatte faaliyetle ilgili halkı bilgilendirmek, görüş ve önerilerini almak için "Halkın Katılımı Toplantısı" yapılacaktır.

Halkımıza saygı ile duyurulur.

Toplantı Yeri	: Lemon Park House
Toplantı Yerinin Adresi	: Liman Mahallesi, Sarısu Mevkii, 99 Sk. 3/3-1 Konyaaltı/ANTALYA
Toplantı Tarihi	: 10.11.2020
Toplantı Saati	: 13:30
Proje Sahibi	: ANTALYA BÜYÜKŞEHİR BELEDİYESİ ANTALYA SU VE ATIKSU İDARESİ GENEL MÜDÜRLÜĞÜ (ASAT)
Tel	: 0242 310 12 01
Faks	: 0242 310 12 01
ÇED Raporunu Hazırlayan Kuruluş	: Artıv Çevre Müh. Müş. Hiz. İn San. ve Tic. A.Ş
Tel	: (0242) 323 33 93

DUYURU
ÇED Sürecine Halkın Katılımı Toplantısı

MEVLÜT ANAR tarafından, İzmir İli, Bergama İlçesi, Okçular Mahallesi sınırları içerisinde yer alan S:201800608 (ER: 3355173) numaralı işletme ruhsatlı sahada "S:201800608 (ER:3355173) Granit Ocağı" projesinin yapılması planlanmaktadır. Söz konusu proje için Çevresel Etki Değerlendirmesi (ÇED) Yönetmeliğinin 9. Maddesi gereğince aşağıda belirtilen tarih ve saatte faaliyetle ilgili halkı bilgilendirmek, görüş ve önerilerini almak için "Halkın Katılımı Toplantısı" yapılacaktır.

Halkımıza saygı ile duyurulur.

Toplantı Yeri	: Okçular Köy Kahvesi (Eski Köy Kahvesi)
Toplantı Yerinin Adresi	: Okçular Mahallesi, Okçular Mahallesi İç Yolu, Eski Köy Kahvesi, Bergama/İzmir
Toplantı Tarihi	: 12.11.2020
Toplantı Saati	: 14:00
Proje Sahibi	: MEVLÜT ANAR
Tel	: 0 266 412 59 00
Faks	: 0 266 412 68 30
ÇED Raporunu Hazırlayan Kuruluş	: ELEMENT ÇEVRE DAN. VE MÜH. A.Ş.
Tel	: 0(232) 503 06 45
Faks	: 0(232) 502 55 18

Image 10: Newspaper Clippings



❖ **PROJE KONUSU YATIRIMIN TANIMI, ÖZELLİKLERİ**

Hurma Arıtma Çamuru Yakma ve Enerji Geri Kazanım Tesisi dahilinde; Antalya ili, Konyaaltı ilçesi, Hurma Mahallesi, 12131 ada ve 7 nolu parselde, ASAT Genel Müdürlüğü'ne ait Atıksu Arıtma Tesisleri'nden çıkacak çamuru kurutmak, yakmak ve yakma sonucu çıkacak buharı ısı enerjisi geri kazanımına çevirmek için akışkan yataklı yakma ve enerji geri kazanım sistemleri tesisi inşa edilecektir.

Tesisin kurulacağı 12131 ada ve 7 nolu parselin toplam alanı 174.658,00 m^2 olup; 163.524,70 m^2'lik alanında hâlihazırda işletilmekte olan Hurma Atıksu Arıtma Tesisi bulunmaktadır. Arıtma çamurlarının yakılması ve söz konusu yakma işleminden ısı enerjisi elde edilmesi kapsamında, 12131 ada 7 nolu parselin 11.133,31 m^2'lik kısmında yakma tesisinin yapılması planlanmaktadır.

Yapılacak tesisin enerji verimliliği, ısı balansı, çevresel standartları, izinleri elverişli olacak ve her türlü meteorolojik şartlar altında çalışabilecek bir tesis olması planlanmaktadır.

Şekil 1: 12131 Ada 7 Parsel Uydu Görüntüsü

Şekil 2: Hurma Arıtma Çamuru Yakma ve Enerji Geri Kazanım Tesisi Yeri Uydu Görüntüsü

❖ **PROJENİN İŞ-AKIM ŞEMASI**

Hurma Arıtma Çamuru Yakma ve Enerji Geri Kazanım Tesisi'nde 30 adet atıksu arıtma tesisinden gelen arıtma çamurunun kabulü, öncelikle kantar ünitesinde tartım işlemi gerçekleştirilecek olup, sonrasında çamurların çamur besleme bunkerine kabulü yapılacaktır.

Hurma Arıtma Çamuru Yakma Tesisi'ne kabul edilen çamurlar, öncelikle 1000 ton kapasiteli 1000 m^3 büyüklüğündeki yeraltı çamur bunkerine boşaltılacaktır. Sonrasında Yer altı çamur bunkerinden yer üstü çamur pompaları ile yer üstü çamur silolarına (2x118 m^3) çamur transferi gerçekleşecektir. İki adet 118 ton kapasiteli yer üstü çamur silolarının, proje kapsamında yapılacak olan ön kurutma tesisi ile bağlantısı olacaktır.

Hurma Atık Çamur Yakma Tesisi Projesi kapsamında yapılacak olan ön kurutma tesisi 500 ton/gün kapasite ile çalışacaktır. Ön kurutma işleminden sonra %40-45 kuru madde içeriğine sahip çamur keki elde edilmiş olacaktır. %40-45 kuru madde içeriğine sahip çamur kekinin Akışkan Yataklı Yakma Fırınına kabulü gerçekleşecektir.

Akışkan yataklı kazanda, ilk aşamada 850°C'de yakılan ve gaz fazına geçen tüm atıklar ve tüm inorganik partiküller ikinci yanma odasına aktarılarak burada 850°C'de tekrar yakılacaktır. İkinci yanma odasında gerçekleşen yanma sonucu ortaya çıkan kül için ikinci yanma odasının altında toplama haznesi olacaktır.

Şekil 3: Fluidized Akışkan Yataklı Tüketim Kazanı Tip Çizimi

Kazanlarda üretilen buhar, buhar türbininde elektrik üretimi için kullanılacaktır. Yakma reaktöründen çıkan gazlar, atmosfere verilmeden önce arıtılacaktır.

Baca Gazı Arıtım Üniteleri (Emisyon Kontrol Sistemi)

Baca gazı emisyonlarını kontrol etmek için a) multi siklon filtre b) Aktif karbon ve kireç dozlama ünitesi c)Karıştırıcı Ünitesi d)NaOH Dozlama Ünitesi e)Filtre Ünitesi/seramik filtre ünitesi f) by pass ı Dolgu Yataklı Yıkama Ünitesi g) Torba filtre h) Baca gazı emiş fanı i) Baca j)SEÖS (Sürekli Emisyon Ölçüm Sistemi) ve k)Baca Gazı Yıkama Suyu Arıtma Sistemi gibi emisyon kontrol üniteleri kurulacaktır.

❖ **PROJENİN SOSYAL ETKİLERİ**

Hurma Arıtma Çamuru Yakma ve Enerji Geri Kazanım Tesisi Projesi'nin inşaatı aşamasında 55 personelin, işletme aşamasında ise ilave 10 personelin istihdamı etmesi planlanmıştır. Personel istihdamının bölgeden yapılmasına önem gösterilecektir.

Tesisin bölgede yaratttığı istihdamı imkânları göz önüne alındığında bölgenin sosyo-ekonomik yapısına olumlu yönde etkisinin olacağı düşünülmektedir.

Yatırıma ilişkin Proje Bedeli 208.070.425 TL (iki yüz milyon yetmiş bin dört yüz yirmi beş TL) olarak hesaplanmış ve tesisin ekonomik ömrü 30 yıl olarak öngörülmüştür.

❖ **PROJENİN ÇEVRESEL ETKİLERİ**

Koku Emisyonu

Yaş çamurun depolanacağı silolar için koku arıtma sistemi olarak biyofiltre tasarlanmıştır.

Yer altı silosundan pompalanan çamurlar, 2 adet paralel çalışan 118 ton'luk yer üstü silolarında depolanacaktır. Çamur deposu ve silolarından kaynaklanan kirli hava toplanacak ve biofiltre ile koku giderimine tabi tutulacaktır.

Yer altı çamur bunkerine ve yer üstü silolarına koku kontrol amaçlı olarak birer adet CH_4, H_2S ve CO dedektörleri eklenmiştir. Bu siloların üstü kapalıdır ancak yeraltı silosuna kamyon ile çamur dökümü yapılacağı zaman, tankın üstünde bulunan hidrolik kapak açılarak çamur dökümü yapılabilecektir. Dedektörlerden gelecek sinyale göre depo içerisindeki tehlikeli gaz seviyeleri takip edilebilecektir.

Silolardan kötü hava frekans invertör ile çalıştırılan fanlar ile çekilerek yakma fırınına ya da biyofiltre ünitesine basılacaktır.

Faaliyetin her aşamasında 19.07.2013 tarih ve 28712 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren "Koku Oluşturan Emisyonların Kontrolü Hakkında Yönetmelik" hükümlerine uyulacaktır.

Atıklar:

- **Kül Cüruf Atıkları:** Proje kapsamında oluşan atık akışkan yatak kumu ve kül geçici depolama alanında depolanacak, "Atık Yönetimi Yönetmeliği" hükümlerine uygun olarak bertarafı sağlanacaktır.
- **Evsel Atıklar:** İnşaat ve işletme döneminde personel kaynaklı oluşacak evsel nitelikli katı atıklar hâlihazırda da olduğu gibi ağzı kapalı konteynırlarda koku oluşturmayacak şekilde muhafaza edilecektir.
- **Ambalaj Atıkları:** Tesis bünyesinde ambalaj atıkları (kağıt, cam, plastik ve metal kutular), "Ambalaj Atıklarının Kontrolü Yönetmeliği" ne uygun olarak evsel nitelikli katı atıklardan ayrı biriktirilecek ve geri dönüşümünün sağlanması için Lisanslı Firmalara verilecektir.
- **Tehlikeli Atıklar:** Tesiste oluşan tehlikeli atıklar "Atık Yönetimi Yönetmeliği" hükümleri uyarınca lisanslı geri kazanım/bertaraf tesislerine gönderilmektedir.
- **Atıksu:** Projede, inşaat ve işletme aşamasında oluşacak personel ve proses kaynaklı atıksular, tesis bünyesinde yer alan Hurma Atıksu Arıtma Tesisi'nde arıtılacaktır.
- **Gürültü Kontrolü:** Projenin inşaat döneminde kullanılacak makine-ekipman kaynaklı oluşması muhtemel gürültü düzeyleri hesaplanmış olup, çevre yerleşim alanlarında gürültü kirliliğine yol açmayacağı görülmüştür.
- **Hava Emisyonları:**

İşletme aşamasında Yakma tesisi bacasına SEÖS (Sürekli Atıksu Ölçüm Sistemi) kurulacaktır.

Yakma tesisi, baca gazı emisyonlarına ait olarak Atıkların Yakılmasına İlişkin Yönetmelikte belirtilen hava emisyonu limit değerleri aşılmayacak şekilde tasarlanacak, donatılacak, inşa edilecek ve işletilecektir.

asat
GENEL MÜDÜRLÜĞÜ

ANTALYA SU VE ATIKSU İDARESİ GENEL MÜDÜRLÜĞÜ

HURMA ARITMA ÇAMURU YAKMA VE ENERJİ GERİ KAZANIM TESİSİ

HALKIN KATILIMI TOPLANTISI
Liman Mahallesi, Sarısu Mevkii, 99 Sk. 3/3-1
Konyaaltı/ANTALYA
Lemon Park House
10.11.2020 (Salı)
Saat 13.30

ARÜV ÇEVRE

Image 11: Brochure





Image 12: Powerpoint Presentation



Image 13: Public Participation Meeting Photos

8.8.3. Public concern about the project, opinions/suggestions and evaluations on the subject

Local people and officials from various organizations were invited to the Public Participation Meeting. The minutes of the public participation meeting in the EIA process are presented in Annex-24.

In the presentation made at the Public Participation meeting, the definition of the project and its environmental and social impacts were discussed. After the presentation of the Public Participation Meeting, the Provincial Directorate of Environment and Urbanization gave the participants the right to speak about their opinions, suggestions and questions. The public stated that they support the project in general, and they are of the opinion that it will be important to prevent the odor problem, which may occur due to the treatment sludge in the current situation, with the planned project.

8.8.4. Project related parties and their opinions/suggestions and evaluations on the subject.

The special format of the EIA report has been prepared by the Ministry of Environment and Urbanization by taking the opinions and suggestions of the member institutions of the Investigation and Evaluation Commission established within the scope of the project, regarding the project and the project area.

9. GRIEVANCE MECHANISM

Potential citizen complaints to be received during the execution of the project will be informed to the supervisory organization. Grievance such as research on complaints, arrangements, if an remediation of the complaint will be carried out with the joint work of ASAT / ALDAŞ.

In order to inform the public about the establishment of the grievance mechanism, reevant brochures will be prepared and distributed in public places, notice boards and construction signs will be posted in and around the construction site regarding the grievance mechanism, information on the subject via telecommunication tools and the website will be published both during consultation of this plan and the project implementation period.

Records of the complaints received by ALDAŞ and General Directorate of ASAT through the following communication ways will be kept, and information will be given and recorded in quarterly reports.

- Complaint petitions to be left to ASAT General Directorate,
- CİMER (Presidency Communications Center)
- Alo 185 Complaint Line
- Whatsapp Complaint Line (IT will be established by the ASAT General Directorate for the projects within the scope of the SCP. The GSM number to be used as the complaint line will be indicated in the information notes to be left to the neighborhood Headmans residence entrances and workplaces when the contracts begin.)

A Grievance Redress Mechanism (GRM) will be developed by ASAT for potential use by both external and internal stakeholders (workers etc.). The aim of the GRM will be to timely resolve any project related grievance that may result in the complainant being worse off due to project activities.

- ASAT/ALDAŞ will form a grievance system and assign designated staff for its management. Once the system is established it will be made public and introduced to all stakeholders providing equal and easy access to all.
- Every grievance received through various means (forms, phone, through staff etc.) employed by the municipality will be recorded to a grievance allowing for timely response and action to be taken by the responsible party assigned for resolution of the grievance. For easy use, two grievance forms; namely Grievance Register Form and Grievance Close Out Form have been provided as annex to this SEF.
- Generally, ASAT adopts a service called “Alo ASAT 185” which aims to collect

complaints and requests from the local residents. Any grievance related to a sub-project will be first logged at the ASAT/ALDAŞ level and will be addressed by designated staff within a pre-defined period. There will also be other means of logging grievances such as a toll-free number, online forms, social media channels of the municipalities that have been made available for citizens to submit grievances. Below table provides a three level GRM system that the Project will adopt.

Project GRM

Level	Authority	Method	Procedures	Response Time
1.	Municipality (hotline, White Table, e-mail, online forms etc.)	In person, by phone, by writing, electronically - in all cases grievances will be recorded in a grievance logbook.	Municipality will assign a Community Liaison Officer to lodge and manage grievance and feedback mechanism of the sub-project. Grievance will be assessed. If needed will be examined on-site Response / redress of grievance will be communicated to petitioner. If cannot be resolved, Level 2 or Court of First Instance depending on grievance.	2 weeks

9.1. MONITORING AND REPORTING

- Monitoring and evaluation of the stakeholder engagement process is of utmost importance to ensure timely and effective decision making for Project implementation.
- Each project specific SEP will include a timeline for engagement activities as well as defining responsible parties for the implementation and monitoring of engagement activities. Monitoring of engagement activities can be realized through identifying key performance indicators that reflect the objectives of the SEP, and the specific tasks and actions. A series of sample key performance indicators by Project Phase are presented in below table.

Sample Key Performance Indicators by Project Phase

Project Phase	Indicator	Verification Method
Design and Planning	Preparation of sub project specific SEPs	# of SEPs prepared
	Public consultation meetings carried out to provide Project information and introduce project documents such as ESIA/ESMPs and/or RF/RPs	# of meetings conducted # and type of participants attended
	Designated staff appointed to carry out SEP	Names of staff appointed
	Establishment of Project GRM	Operational GRM
Construction	Raising awareness on Project activities	# of meetings held Decrease in the # of grievances received due to construction

Operation	# of grievances received due to operation	Decrease in the # of grievances received due to operation

Grievance boxes accessible to all employees at the construction site will be placed in appropriate areas and will be followed up regularly. Also, a special grievance unit will be established for female employees at the construction site to receive complaints about sensitive issues (such as sexual abuse/sexual harassment). At the request of the grievance, attempts will be made regarding restorative justice between the complainant and the person complained of, expert support will be provided to investigators and relevant administrative units in sexual harassment issues, and cooperation will be made with the competent authorities to take urgent measures regarding severe harassment cases.

Sample Grievance List

Type of Application (Grievance / Wish / Request Etc.	Relevant Project Name	Complaint Date	Complainant	Name	Sex	Tel.	Subject of Complaint	Details of Complaint	Answers or Actions	Status of Complaints (Closed/Open)

9.2. RESOURCES AND RESPONSIBILITIES

Antalya Metropolitan Municipality - General Directorate of ASAT

Address: Fabrikalar Neighborhood. Dumlupınar Boulevard No:5 ANTALYA/TURKEY

E-mail: info@asat.gov.tr

Telephone: ALO 185

Fax: 0-242-310-1201

Website: www.asat.gov.tr

Inspection Authority – ALDAŞ A.Ş.

Address: Liman Neighborhood Atatürk Boulevard No:265 07130 Konyaaltı/ANTALYA/TURKEY

E-mail: infor@aldas.com.tr

Telephone: 0-242-259-3216

Fax: 0-242-259-3220

Website: www.aldas.com.tr

9.3. REPORTING

- Monthly Progress Meetings and Meeting Minutes
- Quarterly Environmental Impacts Monitoring Report
- Reporting the complaints received daily and presenting them in quarterly periods
- Environmental and social monitoring reports biannually

SAMPLE GRIEVANCE AND GRIEVANCE CLOSE OUT FORM

Grievance Form

Reference No	
Name – Surname *The complainant shall hold the right to remain anonymous* *(Although giving name and address is not compulsory, it should be kept in mind that during the feedback process regarding the grievance some problems may occur due to lack of information)*	
Please mark how you wish to be contacted	Please provide details for your preferred communication
E-mail	
Telephone	
Mail	
Other	
Province/Town/Settlement	
Date	

Category of the Grievance	
1. On assets/properties impacted by the project	
2. On infrastructure damages (roads, sewage system or water resources etc)	
3. On decrease or complete loss of sources of income	
4. On environmental issues (ex. pollution)	
5. On employment process	
6. On traffic, transportation and other risks	
7. Other (Please specify):	

Description of the Grievance What did happen? When did it happen? Where did it happen? What is the result of the problem?
What would you like to see happen to resolve the problem?

-
- **Signature:** **Date:**

- **Grievance Close Out Form**

Grievance closeout number:	
Define immediate action required:	
Define long term action required (if necessary):	
Compensation Required?	[ ] YES [ ] NO
CONTROL OF THE REMEDIAL ACTION AND THE DECISION	

Stages of the Remediate Action	Deadline and Responsible Institutions
1.	
2.	
3.	
4.	
5.	
6.	
7.	

-
- COMPENSATION AND FINAL STAGES
- This part will be filled and signed by the complainant after s/he receives the compensation fees and his/her complaint has been remediated.
-
- Notes:
-

Name-Surname and Signature of the Complainant

Title-Name-Surname and Signature of the Representative of the Responsible Institution/Company

-
- Date…./…../…..

10. MONITORING AND MEASUREMENT PLAN

10.1. CONSTRUCTION STAGE MONITORING AND MEASUREMENT PLAN

Parameter	Phase	Type of Effect	Significance of Effects	Where the parameters shall be monitored?	How shall the parameters be monitored?	When shall the paramers be monitored?	Instutional Responsibility
Excavation Waste	Construction	Negative/ Direct/avoidable/temprary	Low	At the excavation area and by following truck which are used for materials transportation. and Storage areas	• visual observation • Quantity of excavated materials refilled, stored and disposed.	By daily records during the construction period.	Contractor, ALDAŞ, ASAT
Solid Pollution	Construction	Negative Direct/avoidable/temprary	Low	contruction site	• Sampling/Analysis	Before the start of the land preparation and construction phase	Contractor, Site ALDAŞ, ASAT
Wastes	Construction	Negative Direct/avoidable/temprary	Low	Construction site, storage areas, and site office	• visual observation • waste records • Field inspection	By daily records during the contruction period.	Contractor, ALDAŞ, ASAT
Wastewater	Construction	Negative Direct/avoidable/temprary	Low	In the construction site and site office in general	• recording of wastewater receipts if the site office is connected to the existing wastewater network (or recording of wastewater vacuum truck transportation receipt)	On the daily basis records during the contruction period.	Contractor, ALDAŞ, ASAT
Air Quality	Construction	Negative Direct/avoidable/temprary	Low	The closest sensitive area and settlements	• sampling and analyses of PM 10 and settling dust	During the construction phase, quarterly	Contractor, ALDAŞ, ASAT

Noise	Construction	Negative	Medium	In construction site where work machines work extensively	• By measuring the noise levels with portable devices, especially in areas where machines work extensively.	Monthly during the construction phase.	Contractor, ALDAŞ, ASAT
Healty and Security	Construction	Negative Direct/avoidable/permenant	Low	Construction site and office.	• By the controlling of security sign boards and safety barriers during the site works. • By checking whether the speed limits of work machines and trucks are complied with, • By checking whether workers health and safety equipment (earplugs, eyeglasses, safety boots, etc.) are used, • By checking work conditions in the construction site, • By following the trainings given to the personnel by the of contractor, • It will be checked wheter or not the contractor inform the residents about the work site, targeted start and end date, contact person in case of emergency	daily during the constructionphase.	Contractor, ALDAŞ, ASAT

					• Within Covid-19 Epidemic Measures, which is declared as a pandemic by the World Health Organization; o Having a maximum of 3 people including the driver in passenger vehicles, and necessity to wear a mask in vehicles with more than one person o Entering and exiting the construction site with the individual HES codes obtained through the "Hayat Eve Sığar (HES) application implemented by the Ministry of Health, o Measuring fever with a thermometer at entrances to the construction site, o It is mandatory to wear a personal protective mask in the construction site, o Taking all relevant measures and measures announced by the		

					Ministry of Health regarding the Covid-19 Epidemic, o Informing all personnel and ensuring compliance with the measures by authorized persons, o Regular follow-up of these measures, o Creating the relevant documentation to convey information related to the follow-up o Adequate ventilation in public areas such as dormitories, dining halls and social facilities, o Paying attention to the protection of social distance in public areas such as dormitories, dining halls, social facilities, shuttle transportation and transportation, if the volumes are insufficient, switch to shift meals without interrupting the business plan in order		

					to maintain social distance in dining halls o The prohibition of entrances to the back of the kitchen (cooking) and food distribution stand, except for the personnel who take necessary hygiene measures, o To move on to the next shift after cleaning all places where there is human contact, such as tables, chairs, etc. o Prohibiting the use of common materials in dormitories, dining halls, social facilities and ensuring the use of personal materials (paper towels, disposable cups, liquid soap dispensers, packaged salt / sugar / spices, packaged bread, etc.), o Providing daily disinfection of public areas,		
Traffic	Construction	Negative Direct/av	Low	On roads near the construction works	• With the monitoring of the road closing and route	Daily during the construction stage	Contractor, ALDAŞ, ASAT

		oidable/temprary			permission and route chart drawing, • Safety precautions for road closure and routing, with the relevance of traffic signs and signs. • The operations, which will be carried out for the purpose of traffic routing, will be controlled on site, • In the construction site, pedestrian crossings along with pedestrian areas will be checked to ensure that they are safe and adequate.		
Grievance	Construction	Negative / Positive/ Direct/avoidable/temprary	Medium	Site Office	• Grievance Records	Upon complaint from the beginning of the project	Contractor, ALDAŞ, ASAT
Social Relations	Construction	Negative Direct/avoidable/permenant	Medium	Site Office	• Complaint records • Disputes with security personnel and Project staff	Upon complaint from the beginning of the project construction phase	Contractor, ALDAŞ, ASAT
stakeholder engagement	Construction	Positive Direct/avoidable/permenant	Medium	Site Office	• attendance records	After each participation from the beginning of the project	Contractor, ALDAŞ, ASAT
Labor	Construction	Negative / Positive Direct/av	Medium	Site Office	• Employment records • Grievance records	Quarterly	Contractor, ALDAŞ, ASAT

		oidable/permenant					

10.2. OPERATION STAGE MONITORING AND MEASUREMENT PLAN

Parameter	Phase	Type of Effect	Significance of Effects	Where the parameters shall be monitored?	How shall the parameters be monitored?	When shall the parametersbe monitored?	Instutional Responsibility
Emission from Flue Gase	Operation	Negative Direct/avoidable/permenant	High	Inciniration plant Continuous Emission Monitoring System (CEMS) will be installed to the chimney.	• Gas analyzes for hydrocarbon content in the air, CO, CO2, NO, SO2, CH4, HCl, HF parameters and flow rate measurement.	Daily	ASAT
Ash Control	Operation	Negative Direct/avoidable/permenant	Medium	Incineration Plant temprary storage areas	• TOC analyses • Site inspection for temprary storage areas. • Aggrement with Manufacturing Plant and trasportation of ash • Aggrement with Licased firm and trasportation of ash	Daily	ASAT
Solid Pollution	Operation	Negative Direct/avoidable/temporary	Low	WWTP	• Sampling/Analysis	Annual	ASAT
Wastes	Operation	Negative Direct/avoidable/ temporary	Medium	WWTP, storage areas and administrative office	• visual observation • waste records • Field inspection	Daily	ASAT
Wastewater	Operation	Positive Direct/ temporary	High	In the construction site and site office in general	• recording of wastewater receipts if the site office is connected to the existing wastewater network (or recording of wastewater vacuum truck transportation receipt)	On the daily basis records during the contruction period.	Contractor, ALDAŞ, ASAT
Odour	Operation	Negative Direct/avoi	Medium	The closest sensitive area ve settlements	• Complaint records • sampling/analysis/measurement	When Grievance is taken	ASAT

		dable/ temporary					
Noise	Operation	Negative Direct/avoidable/ temporary	Low	Sensitive areas near the Incineration Plant	• By measuring the noise levels with portable devices,	Annual When Grievance is taken	, ASAT
Healty and Security	Operation	Negative Direct/avoidable/ perminant	Medium	Incineration Plant	• Visual Observations • Field inspection • event logs • Education records • work permits	monthly	ASAT
Traffic	Operation	Negative Direct/avoidable/ temporary	Low	Incineration Plant Entrance of WWTP Bunker Location	• Intervals of the number of vehicles per day records • control of bunker capacities • accident records • licensed Transport vehicles report • weighbridge records	Daily	ASAT
Grievance	Operation	Negative / Positive Direct/avoidable/ temporary	Medium	Site Office	• Grievance Records	Quarterly	ASAT
Disagreements	Operation	Negative Direct/avoidable/ temporary	Medium	Administrative Office	• Grievance records	Quarterly	ASAT
Labor	Operation	Negative / Positive Direct/avoidable/ permenant	Medium	Administrative Office	• Employment records • Grievance records	Quarterly	ASAT

10.3. MANAGEMENT PLAN FOR CONSTRUCTION STAGE

Theme	E&S Risk identified	Expected Action	Legal obligation / Good Practices	Resources & Responsibilities	Funding sources	Calendar: Conception & Implementation	Indicators of achievement
1. Assessment and Management of Environmental and Social Risks and Impacts							
1.1 Management of Enterprises & Contractors	Meeting of ESMP requirement properly during the construction	ESMP report will be executed within the scope of description of technical and administrative specification of Contract and responsibility of the Wastewater Treatment Plant Department of ASAT General Directorate. ALDAS Infrastructure Management Consultancy Industry and Trade Inc. will serve as the supervision organization during the implementation of the project. ALDAŞ Inc. will serve as project management unit within the scope of the project and will control both the technical and administrative progress of the contract packages and the applications of the issues stated in the ESMP.	ESS1: Assessment and Management of Environmental and Social Risks and Impacts Regulations mentioned on the Environmental Impact Assessment Report.	ASAT Wastewater Treatment Plant Department ALDAŞ Project Implementation Unit Contractor's Quality Control or EHS Specialist	Within the contract price	Before Construction phase: ESMP report and Environment Impact Assessment report should be ready. Grievance Records: Grievances will be received daily, and they will be reported quarterly. Quarterly Environmental and Social Impacts Monitoring Reports	Result of Public Participation Meeting which was held within the frame of ESIA report studies Quarterly Environmental and Social Impacts Monitoring Reports and their results Number of Grievance Records

1.2 Project Monitoring and Disclosure of Information	Irregularity of project monitoring	During the construction phase, The Contractor's Quality Control or EHS Specialist will also monitor and coordinate the application and process of obtaining licenses and permits related to the local environment, health and safety laws and regulations. These applications and processes carried out by the Contractor shall be controlled by the ALDAŞ Supervision Organization. AFD Authorities and General Directorate of ASAT will also monitor and control the performance of the contractors in compliance with ESMP. Regarding these issues, contractors will be required to give quarterly reports periodically and, on-site inspections will be included in. ALDAŞ will inform the Institution of French Development with its environmental and social monitoring reports biannually. In addition to this information, the Institution of French Development will also check its activities periodically.	ESS1: Assessment and Management of Environmental and Social Risks and Impacts Regulations mentioned on the Environmental Impact Assessment report.	ASAT Wastewater Treatment Plant Department ALDAŞ Project Implementation Unit Contractor's Quality Control or EHS Specialist	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports Monthly Progress Reports	Quarterly Environmental and Social Impacts Monitoring Reports and their results. Grievance Records Minutes of meeting results from regular meetings with stakeholders.
1.3 Definition of budget for E&S mitigation measures implementation	All mitigation measures will be taken by the Contractor and controlled by ALDAŞ. During the construction phase, the budget for E&S implementation will be under the Contractor's responsibility. It is estimated that budget related to contractor's implementation of E&S could be 6.000 € per year. Till loan agreement; Consultancy services for the implementation for preparation and management of ESMP and procedures for all environmental and social requirement will be executed by ALDAŞ INC. It will be financed by ASAT's on resources under the special agreement between ASAT/ALDAŞ (ASAT/ALDAŞ agreement is valid since 1995). Implementation of this stage approximately .20.000 €.						

2. Labour and Working Conditions							
2.1 Terms and Conditions of Employment	Working Conditions Protection of the Workforce Occupational health and safety	Contractor clearly and comprehensibly documented to workers their rights under national labour law; will provide information regarding collective bargaining agreements, working hours rights, wages, overtime, compensation, and benefits at the beginning of the employment relationship and when any material changes occur. The Contractor shall not exert any pressure on workers to elect workers' representatives, make or join workers' organizations, or bargain collectively, and shall not discriminate or retaliate against workers participating in or attempting to participate in such organizations and collective bargaining. Wages, working hours and other benefits will be made in accordance with the Turkish Labor Law. ALDAŞ will provide a grievance mechanism to address workplace concerns of workers. ALDAŞ will inform the workers about the grievance mechanism during their recruitment and ensure that they can be accessed easily.	Turkish Labour Law (Law No.4857) ESS2: Labour and Working Conditions	ASAT Wastewater Treatment Department, OHS Unit ALDAŞ Project Implementation Team, OHS Unit Contractor OHS Unit ASAT, ALDAŞ, Contractor	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports Monthly Facility Progress Reports	Employee Complaint Records Presence of an Organization or Workers representative Monitoring Report Findings Contractor's monthly work hours reports

2.2 Non-Discrimination and Equal Opportunity	Physical and psychological violence	Contractor will show special sensitivity on the principles of non-discrimination and equal opportunity.	Turkish Labour Law (Law No.4857) ESS2: Labour and Working Conditions	ASAT Wastewater Treatment Department, OHS Unit ALDAŞ Project Implementation Team, OHS Unit Contractor OHS Unit ASAT, ALDAŞ, Contractor	Within the contract price	Monthly Facility Progress Reports	Event Records Number of non-conformities Education Records Work Permits Monitoring Report Findings
2.3 Worker's Organizations	Worker's Rights	The Contractor shall not exert any pressure on workers to elect workers representatives or join workers organizations, or bargain collectively, and shall not discriminate or retaliate against workers participating in or attempting to participate in such organizations and collective bargaining.	Turkish Labour Law (Law No.4857) ESS2: Labour and Working Conditions		Within the contract price	Monthly Facility Progress Reports	Presence of an Organization or Workers representative Monitoring Report Findings
2.4 Labour protection: child labour and forced labour	Working Conditions Protection of the Workforce Occupational health and safety	Necessary measures will be taken against child labour and forced labour to: • Prevent child labour • Improve worker safety • Ensure workplace safety of employees	Turkish Labour Law (Law No.4857) ESS2: Labour and Working Conditions	ASAT Wastewater Treatment Department, OHS Unit ALDAŞ Project Implementation Team, OHS Unit Contractor OHS Unit ASAT, ALDAŞ, Contractor	Within the contract price	Monthly Facility Progress Reports	Employment Records follow-up to prevent child Labour in the field

2.5 Grievance Mechanism	Negative impacts on workers and citizens	Grievance boxes accessible to all employees at the construction site will be placed in appropriate areas and will be followed regularly. Complaint petitions left to ASAT General Directorate, CİMER (Presidency Communications Centre)- Alo185 Complaint Line- WhatsApp Complaint Line will be followed.	ESS2: Labour and Working Conditions ESS10: Stakeholder Engagement and Information Disclosure	ASAT Wastewater Treatment Department, OHS Unit ALDAŞ Project Implementation Team, OHS Unit Contractor OHS Unit ASAT, ALDAŞ, Contractor	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports. Grievances will be received daily, and they will be reported quarterly.	Grievance Records Employee Complaint Records

2.6 Occupational Health and Safety	Health and safety of all the workers	All Project personnel will comply with environmental, health and safety policies. Safe working environments will be created at work sites and physical hazards and risks will be created in order to minimize risks and hazards that may arise related to human health and safety (e.g.natural disasters, accidents, equipment failures, etc.). will be avoided. Relevant Turkish legislation, ASAT's OHS measures and practices, plans and procedures will be complied with. Employees will be informed about the dangerous situations that may arise from their jobs and thus a safer working environment will be created. Employees will be trained in accordance with the Regulation on the Procedures and Principles of OHS. In this context, training programs will be prepared, and evaluation studies will be carried out after the trainings. All employees will be provided with personal protective equipment and necessary training will be provided for their use. There will be warning signs (eg."Danger", "No Entry" etc.) in the work areas according to the quality of the work to be done and the potential risks.	Turkish Law on OHS (Law no.6331) "Occupational Health and Safety Regulation" which was effectuated after being published in the Official Gazette dated 09.12.2003 and numbered 25311 "Occupational Health and Safety Law" Published in the Official Gazette dated 30.06.2012 and numbered 28339 ESS2: Labour and Working Conditions	ASAT Wastewater Treatment Department, OHS Unit ALDAŞ Project Implementation Team, OHS Unit Contractor OHS Unit ASAT, ALDAŞ, Contractor	Within the contract price	Monthly OHS Monitoring Report Check List issued by OHS Specialist of the Contractor	Event Records Number of nonconformities Training Records Work Permits Monitoring Report Findings

2.7 Contracted workers	Working Conditions Protection of the Workforce Occupational health and safety	Working conditions and management of worker relationships (such as development and implementation of labour management procedures applicable to the project) including terms and conditions of employment, non-discrimination and equal opportunity, and worker's organizations	ESS2: Labour and Working Conditions Turkish Law on OHS (Law no.6331)	ASAT Wastewater Treatment Department, OHS Unit ALDAŞ Project Implementation Team, OHS Unit Contractor OHS Unit ASAT, ALDAŞ, Contractor	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Monitoring Report Findings
2.8 Workers in Community Labour	Working Conditions Protection of the Workforce Occupational health and safety	The Contractor shall not exert any pressure on workers to elect workers representatives or join workers organizations, or bargain collectively, and shall not discriminate or retaliate against workers participating in or attempting to participate in such organizations and collective bargaining.	ESS2: Labour and Working Conditions Turkish Law on OHS (Law no.6331)		Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Presence of an Organization or Workers representative Monitoring Report Findings

2.9. Potentially explosive atmospheres	Taking measures for explosive atmosphere	Equipment used in explosive media shall have mounting instructions. • Equipment used in explosive media shall have safety instructions. • Equipment used in explosive media shall have maintenance and emergency repair information. Materials to be used within the facility shall not be of nature inducing explosion. Materials to be used in explosive media shall be of ex-proof and flame-proof nature materials • Fire and explosion protection installation and alarm systems shall be installed in the facility.. • Flame and gas perception systems shall be installed in places that have explosion risk.	Occupational Health and Safety Regulation ATEX directive 94/9/EC	ASAT Wastewater Treatment Department and OHS Team	Within the contract price	Monthly OHS Monitoring Report and Check List Equipment List for	Event Records Number of nonconformities Education Records Work Permits Monitoring Report Findings

3. Resource Efficiency and Pollution Prevention and Management							
3.1 Energy Use	Energy Loss Excessive Energy Consumption Risk of Energy Shortage	Improving Energy Performance and Efficiency, Compliance to Energy Savings Procedures. New and well-maintained vehicles will be used during construction stage for energy saving.	ESS3: Resource Efficiency and Pollution Prevention and Management	ASAT Wastewater Treatment Department Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Contractor Key Personnel	Within the contract price	Daily Records	Electricity consumption receipts of construction site Fuel consumption records of vehicles at the construction site.
3.2 Water Use	Water requirement and Wastewater production	During the dust suppression activities, surface runoff due to irrigation will be prevented. The limited amount of domestic wastewater produced in the project area will be collected in the container of the toilet cabins built in the area during the construction phase of the project and in the leak-proof septic tanks and will be disposed of in accordance with ASAT regulations. Units of the project that are in contact with water, wastewater and chemicals will be constructed using concrete with appropriate cement ratio and durability so that the foundation is not permeable. Thus, there will be no leakage to the soil and surface water during the operational phase of the project	ESS3: Resource Efficiency and Pollution Prevention and Management	ASAT Wastewater Treatment Department Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Contractor Key Personnel	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Visual Observations Water and Wastewater Receipts Septic-Tank Proof Septic-tank pumping records Wastewater Disposal Regulations Monitoring Report Findings

3.3 Raw Material Use	Dust Formation	During the preparation of the land at the facility site and the construction of the units, irrigation will be carried out with a sprinkler for dusting that will occur on the roads. There is no dust formation due to the transportation of raw materials	ESS3: Resource Efficiency and Pollution Prevention and Management	ASAT Wastewater Treatment Department Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team Contractor Key Personnel	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Monitoring Report Findings
3.4 Air Pollution	Dust and exhaust emission	Carrying out emission measurements in areas where vegetation is cleared. Implementation of dust suppression methods (irrigation, sweeping etc.) with sufficient frequency. Covering interior roads with materials to prevent dust and keeping roads clean. Implementing speed limit in the project area. Keeping trees with wind barriers and planting new ones. Vehicle's loading/unloading without spillage. Covering the stored excavation materials. Checking the exhausts of vehicles regularly.	"Regulation on Control of Industrial Air Pollution" (IAPCR) which was effectuated after being published in the Official Gazette dated 03.07.2009 and numbered 27277 (Amended O.G.: 30.03.2010-27537, 10.10.2011-28080, 13.04.2012-28263, 16.06.2012-28325, 10.11.2012-28463, 20.12.2014-29211) ESS3: Resource Efficiency and Pollution Prevention and Management	ASAT Wastewater Treatment Department Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Contractor Key Personnel	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Visual Observations Exhaust emission monitoring Monitoring Report Findings

3.5 Management of Hazardous and Non-hazardous Wastes	Waste Generation (liquid waste-solid waste types-excavation waste-demolition waste-construction waste)	Waste to be generated within the scope of the project will be managed according to the waste management hierarchy. Wastes will be stored on site only for a temporary period and final disposal will take place outside the facility. There will be absolutely no question of any kind of incineration or burial at the site, and of throwing the wastes into the surrounding roads or water sources. During all activities related to the collection, temporary storage, transportation, and disposal of wastes throughout the project, any application that will put personnel or public health at risk will be avoided. Wastes to be temporarily stored at the site will be delivered to licensed transport vehicles suitable for the type of waste to be removed from the site. Information regarding the transactions within this scope will be kept under record and the records will be kept in the administrative building. Limited amount of hazardous and special waste likely to be generated within the scope of the project (eg, waste electronic devices/parts, cables, filters)	ESS3: Resource Efficiency and Pollution Prevention and Management	Ministry of Environment and Urbanization, Waste Management Department ASAT Wastewater Treatment Department. Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Contractor Key Personnel Environmental and Social Expert	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Appropriate waste management plan Proper waste separation Suitable temporary waste storage on site Waste disposal agreements and records Waste Complaint Records Wastewater Treatment Regulations Visual Observation Waste Records Field Inspection

3.6 Management of Chemicals and Hazardous Materials	Hazardous Materials Generation	Limited amount of hazardous and special waste likely to be generated within the scope of the project (e.g., waste electronic devices/parts, cables, filters, packages contaminated with chemicals or oils such as paint and solvent/solvent, rags, protective clothing, etc.), Temporary Storage It will be stored separately from non-hazardous wastes in containers in special sections separated from the site. This area will have an impermeable base, will be sheltered from runoff waters and rain, and will be properly drained.	ESS3: Resource Efficiency and Pollution Prevention and Management	Ministry of Environment and Urbanization, Waste Management Department ASAT Wastewater Treatment Department. Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Contractor Key Personnel Environmental and Social Expert	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Appropriate waste management plan Proper waste separation Suitable temporary waste storage on site Waste disposal agreements and records Waste complaint records Monitoring Report Findings

3.7 Solid Quality	Topsoil Loss	In order to minimize the effects on the soil environment; The amount of soil that may be subject to compaction and contamination will be minimized by using the designated work sites and routes for construction machinery and equipment and field personnel. During the construction phase, the fuel needs of the construction machines and vehicles to be used in the area will be supplied from the nearest station; If deemed necessary, the fuels stored in the area will be stored in areas where necessary sealing measures are taken. The provisions of the "Regulation on Control of Excavated Soil, Construction and Demolition Wastes" will be followed during the land preparation and construction phase of the project The scope of the project should comply with the provisions of the "Regulation on Control of Soil Pollution and Point Source Contaminated Sites". Waste and wastewater generated during the land preparation and construction phases of the Project will be stored and disposed of in a controlled manner in line with the appropriate regulations and management practices specified in this report.	ESS3: Resource Efficiency and Pollution Prevention and Management	ASAT Wastewater Treatment Department Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Contractor Key Personnel Environmental and Social Expert	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Environmental Spill/Leak event records//reports Excavation Quantity The quantity of reused excavation Total quantity of excavation sent to disposal Monitoring Report Findings

3.8 Noise	Increase in Environmental Noise Level and Vibration	Machinery and equipment used during land preparation and construction activities will not be operated at the same point/location but will be distributed homogeneously within the area. Machinery and equipment should not be operated simultaneously in the WWTP area close to the surrounding buildings. Use of construction noise barriers around the nearest receptors of the WWTP area. Machinery and equipment will be maintained regularly, and speed limits will be defined, and these limits will be followed by construction vehicles. A grievance procedure will be implemented to manage complaints about noise.	"Regulation on Evaluation and Management of Environmental Noise", which was effectuated after being published in the Official Gazette dated 04.06.2010 and numbered 27601 (Amended O.G.: 27.04.2011-27917, 08.11.2015-29536). Ministry of Environment and Urbanization, "Regulation on the Evaluation and Management of Environmental Noise", which was published in the Official Gazette dated 04.06.2010 and numbered 27601.	ASAT Wastewater Treatment Department Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Contractor Key Personnel Environmental and Social Expert	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Noise Level Measurement Results Construction Machinery and Equipment Maintenance Record Noise Complaint Records Monitoring Report Findings

3.9 Negative Impact on Social Life	Complaints, Disputes and Negative Social Relations	Training of the contractor's field personnel on environmental and social issues Execution and controlling the activities carried out during the construction works in such a way as not to restrict / prevent the social and economic life of the public of the region Protection of public health and social welfare		ASAT Wastewater Treatment Department Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Environmental and Social Expert Contractor Key Personnel Environmental and Social Expert	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Training of Contractor's site staff and training records Grievance Records
4. Community Health and Safety							
4.1 Infrastructure and Equipment Design and Safety	Safety of Equipment and Workers	Protective inspection of machinery will be regularly carried out and such inspections will be reported in detail. By this way any kind of accident arising from machinery and equipment shall be prevented. Cleaning and periodical maintenance of equipment shall be regularly performed. Employees will be provided with Personal Protective Equipment according to the nature of the job. Necessary training will be provided for their use. The plant area will be surrounded by fences. Access of local people and animals to the area will be kept under control. Access to the facility for personnel and third parties will be carried out in a controlled manner.	ESS4: Community Health and Safety "Occupational Health and Safety Regulation" which was effectuated after being published in the Official Gazette dated 09.12.2003 and numbered 25311 "Occupational Health and Safety Law" Published in the Official Gazette dated 30.06.2012 and numbered 28339	ASAT Wastewater Treatment Department Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Environmental and Social Expert Contractor Key Personnel Environmental and Social Expert	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Education Records Facility Entry Permits Monitoring Report Findings

4.2 Safety of Services	Work Conditions Protection of the Workforce Occupational health and safety	Private security guards will be employed to ensure the safety of the work area. Private security practices within the scope of the project will be in accordance with the provisions of the Private Security Services Law and the Law on the Execution of Private Security Services	ESS4: Community Health and Safety "Occupational Health and Safety Regulation" which was effectuated after being published in the Official Gazette dated 09.12.2003 and numbered 25311 "Occupational Health and Safety Law" Published in the Official Gazette dated 30.06.2012 and numbered 28339	ASAT Wastewater Treatment Department Site staff of Hurma WWTP ALDAŞ Project Site Supervision Team, Environmental and Social Expert Contractor Key Personnel Environmental and Social Expert	Within the contract price for Construction Site For whole treatment plant security is 41.455 €/year	Daily Records. Construction Site will be monitored 24/7.	Facility entry and exit records Monitoring Report Findings
4.3 Traffic and Road Safety	Increase of traffic near Hurma WWTP Safety on roads near to construction works	In case the sludge to be brought from the treatment plants with low sludge amount cannot be brought daily according to the filling capacity of the licensed transport vehicles, the sludge amount entering the incineration plant can be brought to 500 tons/day by bringing the sludge from the treatment plants with more sludge production capacity. Transport vehicles will be licensed. In order not to create traffic at the entrance and inside the Hurma WWTP, weighbridge measurements will be taken and discharged to the sludge bunkers. The	ESS4: Community Health and Safety Highway Traffic Law numbered 2918 and "Regulation on Facilities to be Constructed and Opened on the Side of the Highway", which was effectuated after being published in the Official Gazette dated 15.05.1997 and numbered 22990.	ASAT Wastewater Treatment Department Site staff of Hurma WWTP. ALDAŞ Project Site Supervision Team, Environmental and Social Expert Contractor Key Personnel	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Intervals of the number of vehicles per day at the plant, Control of bunker capacities Accident records Licensed Transport vehicles report Weighbridge records

4.3 Traffic and Road Safety		routes of the construction machinery and trucks to be used within the project will be determined from the roads with less traffic and the route directions will be arranged with the necessary traffic information signs. Speed limits and transport tonnage limits determined by the relevant Municipality for construction machinery and trucks will be complied with and transportation will be provided in a safe and healthy way. With the monitoring of the road closing and route permission and route chart drawing. Safety precautions for road closure and routing, with the relevance of traffic signs. The operations, which will be carried out for the purpose of traffic routing, will be controlled on site, In the construction site, pedestrian crossings along with pedestrian areas will be checked to ensure that they are safe and adequate. Ensuring the delivery of construction raw materials to the facility at regular intervals. Necessary health and safety signs and traffic signs will be placed at the project site. Employees will be informed and warned about these signs.		Environmental and Social Expert	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports	Control of entrances and exits of construction trucks and vehicles

4.4Community Exposure to Health Issues	Security of Human Health.	ASAT will advise individuals with asthma, diabetes, or immune system disorders not to work in treatment facilities due to the risk of infection. Necessary precautions will be taken against the danger of a fire and equipment for extinguishing fire and related devices will be placed in appropriate locations. All electromagnetic parts operated will be used at their own capacity. By using the electro-magnetic equipment in a controlled way, provision of economic life and protection will be achieved. Within Covid-19 Epidemic Measures, which is declared as a pandemic by the World Health Organization. Having a maximum of 3 people including the driver in passenger vehicles, and necessity to wear a mask in vehicles with more than one person, Entering and exiting the construction site with the individual HES codes obtained through the "Hayat Eve Sığar (HES) application implemented by the Ministry of Health, Measuring fever with thermometer at entrances to the construction site It is mandatory to wear a personal protective mask in the construction site, Taking all relevant measures for the measures announced by the Ministry of Health regarding the Covid-19 Epidemic, Informing all personnel and ensuring compliance with the measures by authorized persons,	ESS4: Community Health and Safety General Health Law No. 1593	ASAT Wastewater Treatment Department Site Doctor of Hurma WWTP ALDAŞ Project Site Supervision Team, Environmental and Social Expert Contractor Key Personnel Environmental and Social Expert and site Doctor	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Controlling of construction site and accommodation parts Monitoring Report Findings Examination records of Site Doctor at the construction site

		Regular follow-up of these measures, Creating relevant documents and documentation to convey information related to follow-up, Regular and frequent ventilation of public areas such as dining halls and social facilities,					
4.5 Management and Safety of Hazardous Materials	Waste Generation	Limited amount of hazardous and special waste likely to be generated within the scope of the project (e.g., waste electronic devices/parts, cables, filters, packages contaminated with chemicals or oils such as paint and solvent/solvent, rags, protective clothing, etc.), Temporary Storage It will be stored separately from non-hazardous wastes in containers in special sections separated in the Site. This area will have an impermeable base, will be sheltered from runoff waters and rain, and will be properly drained. Hazardous areas shall be divided into zones according to their degrees and this situation shall be displayed in a manner that everybody shall easily see. Warning signs shall be placed in hazardous areas within the plant. Personnel working shall put on work clothes according to sanitary safety issues. Personal protective equipment will be used such as safety helmet, mask, gloves, goggles etc. in accordance with legislation.	ESS4: Community Health and Safety	ASAT Wastewater Treatment Department Site Doctor of Hurma WWTP ALDAŞ Project Site Supervision Team, Environmental and Social Expert Contractor Key Personnel Environmental and Social Expert and site Doctor	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Appropriate waste management plan Proper waste separation Suitable temporary waste storage on site Waste disposal agreements and records Waste Complaint Records

4.6 Emergency Preparedness and Response	Work Conditions Protection of the Workforce Occupational health and safety	1.An Emergency Preparedness and Response Plan will be prepared by the Contractor during construction period. 2. ASAT will ensure that the Emergency Preparedness and Response Plan covers escape plans in case of disinfection emission/spill.	ESS4: Community Health and Safety	ASAT Wastewater Treatment Department. Site Doctor of Hurma WWTP ALDAŞ Project Site Supervision Team, Environmental and Social Expert Contractor Key Personnel Environmental and Social Expert and site Doctor	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Event Records Number of nonconformities Education Records Work Permits Monitoring Report Findings
4.7 Security Personnel	Security of Workers and Project Site	The entrance of operating personnel, maintenance personnel and third parties to the plant will be provided in a controlled manner through the doors where the security personnel are present.	ESS4: Community Health and Safety	ASAT Wastewater Treatment Department. Site Doctor of Hurma WWTP ALDAŞ Project Site Supervision Team, Environmental and Social Expert Contractor Key Personnel Environmental and Social Expert and site Doctor	Within the contract price	Daily Records. Construction Site will be monitored 24/7.	

5. Land Acquisition, Restrictions on Land Use and Involuntary Resettlement							
5.1 Project Design (resettlement minimization)	No risk Land ownership of the project site belongs to Antalya Metropolitan Municipalit.	To avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives; (ii) avoid forced eviction; (iii) mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by: (a) providing timely compensation for loss of assets at replacement costs and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher; (iv) improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure; (v) conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant; and (vi) ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation, and the informed participation of those affected.	ESS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement	ASAT, ALDAŞ, Contractor	Within the contract price		Title Deed

6. Biodiversity Conservation and Sustainable Management of Living Natural Resources							
6.1 Assessment of Risks and Impacts on habitats and biodiversity	Protection of different living species.	If any protected species is found in the project area and its immediate surroundings during the construction and operational phase of the project, necessary measures will be taken in line with Environmental Law No. 2872, Land Hunting Law No. 4915	Environmental Law No. 2872, Land Hunting Law No. 4915 ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	ASAT, ALDAŞ, Contractor	Within the contract price	Within the scope of the project, it is planned to implement the following sub-project regarding biodiversity. Creating a biological barrier with andiz and cedar trees around the Hurma Wastewater Treatment Plant The barrier to be formed from trees has more advantages. Plants, with their constantly changing aesthetic structures, make a significant positive impact on the physiological and psychological needs	number of trees planted inventory seedling number greenhouse number Statistics of lifetimes within the facility irrigation and maintenance charts landscape control
6.2 Biodiversity Conservation: attenuation, habitats, compensation	Protection of habitats	(i) protect and conserve biodiversity and habitats; (ii) apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity; (iii) promote the sustainable management of living natural resources; and (iv) support livelihoods of local communities including Indigenous Peoples, through the adoption of practices that integrate conservation needs and development priorities	ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	ASAT, ALDAŞ, Contractor	Within the contract price		

6.3 Legally Protected and Internationally Recognized Areas of Biodiversity Value	Protection of habitats	Since orange is one of the most popular symbols of Antalya Province, orange afforestation and landscaping works will be carried out. Also, landscape designs will be made with various garden ornamental plants.	ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	ASAT, ALDAŞ, Contractor	Within the contract price	of the surrounding people with their cultural effects, improving the climate, preventing the spread of odour to the environment shading, dust filtration, providing resting opportunities, and it is thought that they will be more aesthetic. In addition, it is planned to grow citrus seedlings, which is the characteristic plant of Antalya, by creating small glass greenhouses within the facility. It is planned to grow the seedlings later in the plant landscape. It is planned to create a natural, beautiful ambient air in addition to the facility's own odour control unit, by ensuring that the citrus scent is confined within the closed facility with a natural tree barrier.	

8. Cultural Heritage							
8.1 Identification of cultural heritage	Adverse Impacts on Cultural Heritage due to the project activities.	There are no areas under protection for special purposes such as forest areas, afforestation areas, wildlife and vegetation protection within the project area and there is no cultural or natural heritage in the project area. Protection and preservation of legal Cultural Heritage areas. Consultation with stakeholders regarding Cultural Heritage and promote equitable sharing of benefits due to use of Cultural Heritage.	ESS8: Cultural Heritage	ASAT, ALDAŞ, Contractor	Within the contract price		
10. Stakeholder Engagement and Information Disclosure							
10.1 Stakeholder Identification and Analysis	Negative impact on open and transparent relations with stakeholders	Effective Stakeholder engagement improves the environmental and social sustainability of the project.	ESS10: Stakeholder Engagement and Information Disclosure	ASAT, ALDAŞ, Contractor	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports. Grievances Report Regular meeting (Prebid meeting before construction period and midterm of contract period) with stakeholders	Minutes of Meeting with Stakeholders Result of Grievances
10.2 Stakeholders engagement plan		Open and transparent engagement with project stakeholders. Non-technical summary of the project and Stakeholder Engagement Plan. Current developments about the project. Current affairs about the project	ESS10: Stakeholder Engagement and Information Disclosure	ASAT, ALDAŞ, Contractor	Within the contract price		
10.3 Information disclosure		To ensure appropriate project information on environmental and social risks is disclosed to stakeholders in a timely, understandable accessible and appropriate manner and format.	ESS10: Stakeholder Engagement and Information Disclosure	ASAT, ALDAŞ, Contractor	Within the contract price		

10.4 Meaningful consultation		To assess level of stakeholder interest and support for the project. To enable stakeholder's views to be taken into account in project design.	ESS10: Stakeholder Engagement and Information Disclosure	ASAT, ALDAŞ, Contractor	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports. Grievances Report Regular meeting (Prebid meeting before construction period and midterm of contract period) with stakeholders	Minutes of Meeting with Stakeholders Result of Grievances
10.5 Engagement during Project Implementation and External Reporting		To build and maintain a constructive relationship with stakeholders in project-affected parties. Monitoring and evaluation of the stakeholder engagement process is of utmost importance to ensure timely and effective decision making for Project implementation.	ESS10: Stakeholder Engagement and Information Disclosure	ASAT, ALDAŞ, Contractor	Within the contract price		
10.6 Negative Impact on Social Lives		Training of the contractor's field personnel on environmental and social issues, Execution and controlling the activities carried out during the construction works in such a way as not to restrict / prevent the social and economic life of the people of the region.	ESS10: Stakeholder Engagement and Information Disclosure	ASAT, ALDAŞ, Contractor	Within the contract price		Training and training records Grievances

10.7 Grievance Mechanism	Potential Citizen Complaints	Grievance Redress Mechanism (GRM) will be developed by ASAT for potential use by both external and internal stakeholders (workers etc.). The aim of the GRM will be to timely resolve any project related grievance that may result in the complainant being worse off due to project activities. ASAT/ALDAŞ will form a grievance system and assign designated staff for its management. Once the system is established it will be made public and introduced to all stakeholders providing equal and easy access to all. Every grievance received through various means (forms, phone, through staff etc.) employed by the municipality will be recorded to a grievance allowing for timely response and action to be taken by the responsible party assigned for resolution of the grievance. For easy use, two grievance forms; namely Grievance Register Form and Grievance Close Out Form have been provided as annex to this SEF. Generally, ASAT adopts a service called "Alo ASAT 185" which aims to collect complaints and requests from the residents. Any grievance related to a sub-project will be first logged at the ASAT/ALDAŞ level and will be addressed by designated staff within a pre-defined period. There will also be other means of logging grievances such as a toll-free number, online forms, social media channels of the municipalities that have been made available for citizens to submit grievances.	ESS2: Labour and Working Conditions ESS10: Stakeholder Engagement and Information Disclosure	ASAT Wastewater Treatment Department. Site Doctor of Hurma WWTP ALDAŞ Project Site Supervision Team, Environmental and Social Expert Contractor Key Personnel Environmental and Social Expert and site Doctor	Within the contract price	Quarterly Environmental and Social Impacts Monitoring Reports.	Grievance Records Decrease in the number of grievances received

11. Gender							
11.1 Gender	Non-Discrimination and Negative Effect on Equal Opportunity	In order to achieve the goal of increasing women's employment, supporting female labor force is one of the most important priorities. General Directorate of ASAT aims to increase number of working women and support gender equality within the scope of this project. Equal job opportunities for women will be provided. It aims at least 10% of the ASAT ALDAŞ personnel who will take part in the project to be female.	Civil Law of the Republic of Turkey No. 4271	ASAT, ALDAŞ, Contractor	Within the contract price	Monthly Progress Metting	Social security records personnel records

10.4. MANAGMENT PLAN FOR OPERATION STAGE

Theme	E&S Risk identified	Expected Action	Legal obligation / Good Practices	Resources & Responsibilities	Funding sources	Calendar: Conception & Implementation	Indicators of achievement
1. Labor and Working Conditions							
1.1 Terms and Conditions of Employment	Working Conditions Protection of the Workforce Occupational health and safety	Please see precautions in Operational Phase: • The plant area will be surrounded by fences. Access of local people and animals to the area will be kept under control. Access to the facility for personnel and third parties will be carried out in a controlled manner. • Private security guards will be employed to ensure the safety of the work area. Private security practices within the scope of the project will be in accordance with the provisions of the Private Security Services Law and the Law on the Execution of Private Security Services • Employees will be trained in accordance with the Regulations on the Procedures and Principles of Employees' Occupational Health and Safety Training.' • Employees will be provided with Personal Protective Equipment according to the nature of the job. Necessary training will be provided for their use. • Smoking will be prohibited in places where the risk of fire is high. All workers will be informed about the action plan on fire.	Turkish Labour Law (Law No.4857)	ASAT Wastewater Treatment Department	Treatment Plant OHS cost: 65.455 €/year	Monthly Monitoring Report	Employee Complaint Records Monitoring Report Findings Result of the Staff Training Risk Analyses and OHS Report
1.2 Non-Discrimination and Equal Opportunity	Physical and psychological violence						
1.3 Worker's Organizations	Worker's Rights				OHS cost:		

1.4 Labour protection: child labour and forced labour	Working Conditions Protection of the Workforce Occupational health and safety	• All equipment will be operated in proper working order. • The procedures approved by ASAT and the requirements of the technical specifications of the supplier companies will be followed for maintenance and repair activities. • Necessary health and safety signs and traffic signs will be placed at the project site. Employees will be informed and warned about the signs. • Within the scope of the Regulation on the Procedures and Principles of Occupational Health and Safety Training, trainings will be given to the operational and maintenance personnel, and measurement and evaluation will be made after the trainings. • The entrance of the operating personnel, maintenance personnel and third parties to the facility will be provided in a controlled manner through the doors where the security personnel are present. • Equipment meeting international standards in terms of electrical performance and safety will be used in the facility. • Before the plant is put into operation, necessary electrical tests will be carried out to check that the electrical connections and other related equipment are working properly. • An Emergency Preparedness and Response Plan will be prepared before the facility starts operating.			65.455 €/year		Employment Records follow-up to prevent child labour in the field

		• In order to prevent the cleaning workers from entering the channels, grates with automatic cleaning system should be used instead of manual. • Appropriate ventilation systems should be installed in places where methane accumulation is expected. • Railings will be made to hold onto all tanks and pits. • ASAT will prepare a Confined Space Entry Procedure in accordance with its own standards, national requirements, and internationally accepted standards. • ASAT will ensure that the Emergency Preparedness and Response Plan covers escape plans in case of disinfection emission/spill. • ASAT will provide enough number of gas measuring instruments to its employees. • ASAT will advise individuals with asthma, diabetes, or immune system disorders not to work in treatment facilities due to the risk of infection. ASAT will ensure that all activities in the incineration and energy recovery plant comply with national standards and international standards.					

1.5 Occupational Health and Safety	Health and safety of all the workers	All Project personnel will comply with environmental, health and safety policies. Safe working environments will be created at work sites and physical hazards and risks will be created in order to minimize risks and hazards that may arise related to human health and safety (e.g., Natural disasters, accidents, equipment failures, etc.). will be avoided. Relevant Turkish legislation, ASAT's OHS measures and practices, plans and procedures will be complied with. Employees will be informed about the dangerous situations that may arise from their jobs and thus a safer working environment will be created. Employees will be trained in accordance with the Regulation on the Procedures and Principles of OHS. In this context, training programs will be prepared, and evaluation studies will be carried out after the trainings. All employees will be provided with personal protective equipment and necessary training will be provided for their use. There will be warning signs (e.g. “Danger", "No Entry" etc.) in the work areas according to the quality of the work to be done and the potential risks.	Turkish Law on OHS (Law no.6331) “Occupational Health and Safety Regulation” which was effectuated after being published in the Official Gazette dated 09.12.2003 and numbered 25311 "Occupational Health and Safety Law" Published in the Official Gazette dated 30.06.2012 and numbered 28339	ASAT Wastewater Treatment Department	65.455 €/year	Monthly OHS Monitoring Report Check List	Event Records Number of nonconformities Training Records Work Permits Monitoring Report Findings
1.6 Workers in Community Labour	Working Conditions Protection of the Workforce Occupational health and safety	The Contractor shall not exert any pressure on workers to elect workers representatives or join workers organizations, or bargain collectively, and shall not discriminate or retaliate against workers participating in or attempting to participate in such organizations and collective bargaining.				Monitoring Report	Presence of an Organization or Workers representative Monitoring Report Findings

1.7 Grievance Mechanism	Disagreement with both employees and citizens	Grievance boxes accessible to all employees at the construction site will be placed in appropriate areas and will be followed regularly. Complaint petitions to be left to ASAT General Directorate, CİMER (Presidency Communications Centre) Alo185 Complaint Line-WhatsApp Complaint Line	Turkish Law Right to Information Act (Law no.4982)	ASAT General Directorate	26.000 €/ month	Grievances will be received daily, and Grievance's report will be responded within the time duration according to legal regulations. Quarterly Environmental and Social Impacts Monitoring Reports	Grievance Records Employee Complaint Records OHS Risk Analysis Report
1.8. Potentially explosive atmospheres	Taking measures for explosive atmosphere	Equipment used in explosive media shall have mounting instructions. • Equipment used in explosive media shall have safety instructions. • Equipment used in explosive media shall have maintenance and emergency repair information. Materials to be used within the facility shall not be of nature inducing explosion. Materials to be used in explosive media shall be of ex-proof and flame-proof nature materials . • Fire and explosion protection installation and alarm systems shall be installed in the facility.. • Flame and gas perception systems shall be installed in places that have explosion risk.	Occupational Health and Safety Regulation ATEX directive 94/9/EC	ASAT Wastewater Treatment Department and OHS Team	1000 €/year	Monthly OHS Monitoring Report and Check List Equipment List for	OHS Risk Analysis Report Monitoring Report

2. Resource Efficiency and Pollution Prevention and Management							
2.1 Energy Use	Energy Loss Excessive Energy Consumption Risk of Energy Shortage	Improving Energy Performance and Efficiency Energy Conservation	According to the natural gas market tariffs regulation published in the Official paper dated 13.10.2016 and numbered 29856, natural gas unit prices are determined by the Energy Market Regulatory Authority (EMRA). 14.03.2013 Market and Electricity Payment Licenses No. 6446 transactions and Electricity Power Plants License transactions and License Fee Payments are made according to the electricity market license regulation based on the License Fee.	ASAT Wastewater Treatment Department	130.601,55 €/month	Daily Site Operating Report	Electricity consumption receipts of construction site. Fuel consumption records of vehicles at the construction site.

2.2 Water Use	Water requirement and wastewater production	During the dust suppression activities, surface runoff due to irrigation will be prevented. The limited amount of domestic wastewater produced in the project area will be collected in the container of the toilet cabins built in the area during the construction phase of the project and in the leak-proof septic tanks and will be disposed of in accordance with ASAT regulations. Units of the project that are in contact with water, wastewater and chemicals will be organized using concrete with appropriate cement ratio and durability so that the foundation is not permeable. Thus, there will be no leakage to the soil and surface water during the operational phase of the project.	General Directorate of ASAT's tariffs Water Consumption Regulations	ASAT Wastewater Treatment Department	181,85 €/month	Monthly Facility Operation Progress Reports	Visual Observations Receipt for Water Consumption
2.3 Raw Material Use	Chemicals, fuel (natural gas), electricity etc.	Determining the raw materials needed by each unit in the treatment plant. Establishment of safe raw material storage areas for these raw materials in accordance with the regulations Inventory of raw material usage, stock, and planned materials Optimization processes in the enterprise related to the use of raw materials	Environmental Permit and License Regulation Water pollution control regulation (WPCR) Urban Wastewater Treatment Regulation	ASAT Wastewater Treatment Department	43.185 €/month	Monthly Facility Operation Progress Reports	Monitoring Report Findings (Consumption amounts, purchase frequency, treatment efficiency)

2.4 Odour Control	Increasing of Odour Pollution from Wastewater	• There is an odour removal unit to eliminate the odour in the treatment plant. • To ensure that the sludge bunkers are fully insulated and closed. • Ensuring closed system operation of sludge bunkers • Providing continuous control and maintenance of the biofilter odour control system in bunkers, drying plants • Covering the vehicles safely against spills during the collection, transportation, and transmission of the sludge from the plants to the incineration plant, ensuring its transfer and discharge to the vehicles with closed conveyor systems.	Regulation On Control of Odour Generating Emissions	ASAT Wastewater Treatment Department	2.273 €/month	Daily Records	Grievance Reports Odour Control Operation Monitoring Report Operational Site Inspection
2.5 Emission from Flue Gas	Air Pollution	• Controlling machines and tools in terms of exhaust systems and emission levels. • Protecting the environment from pollution. • For continuous emission control, a Continuous Emission Monitoring System (CEMS) will be installed to the chimney. • Sensors will be used for gas parameters and flow measurement in the chimney and CEMS system.	Industrial Air Pollution Control Regulation (IAPCR)	ASAT Wastewater Treatment Department	3.200 €/month	Monitoring Air Parameters Daily Measurement Records	Gas analyses for hydrocarbon content in the air, CO, CO2, NO, SO2, CH4, HCl, HF parameters and flow rate measurement

2.6 Ash Control	Air Pollution	Making agreement with industrial and manufacturing for using of ash as raw material in cement plants for obtaining arable soil, waste/sludge stabilization, base material in road construction, filling material in the recovery of open mines. The Incineration Plant will be operated in a such a way that the Total Organic Carbon (TOC) content of the slag and bottom ash will be less than 3% or the combustion loss will be less than 5% of the dry weight of the material.	Industrial Air Pollution Control Regulation (IAPCR)	ASAT Wastewater Treatment Department		Air Quality Monitoring Daily Measurement Records	TOC Analyses Site inspection for temporary storage areas. Agreement with Manufacturing Plant and transportation of ash. Agreement with Licensed firm and transportation of ash.

2.7 Management of Hazardous and Non-hazardous Wastes	Waste Generation Solid Pollution	Waste to be generated within the scope of the project will be managed according to the waste management hierarchy. Wastes will be stored on site only for a temporary period and final disposal will take place outside the facility. There will be absolutely no question of any kind of incineration or burial at the site, and of throwing the wastes into the surrounding roads or water sources. During all activities related to the collection, temporary storage, transportation, and disposal of wastes throughout the project, any application that will put personnel or public health at risk will be avoided. Wastes to be temporarily stored at the site will be delivered to licensed transport vehicles suitable for the type of waste to be removed from the site. Information regarding the transactions within this scope will be kept under record and the records will be kept in the administrative building. Limited amount of hazardous and special waste likely to be generated within the scope of the project (eg, waste electronic devices/parts, cables, filters, packages contaminated with chemicals or oils such as paint and solvent/solvent, rags, protective clothing, etc.), Temporary Storage It will be stored separately from non-hazardous wastes in containers in special sections separated in the Site. This area will have an impermeable base, will be sheltered from runoff waters and rain, and will be properly drained.		ASAT Wastewater Treatment Department	5.455€/year	Annual Waste Management Plan Sampling Analysis Field Inspections	Waste Management Plan Proper Waste Separation Appropriate temporary waste storage on site Waste Disposal agreements and records Sludge disposal regulations and records Waste Complaint Records Monitoring Report Findings

2.8 Wastewater	Wastewater Pollution	Increasing treatment efficiency. Continuous monitoring of input and output wastewater value. Operating equipment and raw materials in accordance with the operation.	Permit and License Regulation Water Pollution Control Regulation (WPCR) Urban Wastewater Treatment Regulation	ASAT Wastewater Treatment Department	Treatment Plant Operating Cost: 303.914 €/month	Daily Site Operation Report	Inlet and outlet Load (BOD; COD, SS, TN, TP etc. according to the regulations)
2.9 Noise	Increase in Noise Level	During the purchasing of equipment and machinery, the noise levels specified in the technical specifications/data sheet will be taken into account. During the operational phase, limit values will be met as per the Turkish environmental legislation. Noise levels will be measured with portable devices. Necessary measures will be taken to control noise levels during any complaints or physical controls.	"Regulation on Evaluation and Management of Environmental Noise", which was effectuated after being published in the Official Gazette dated 04.06.2010 and numbered 27601 (Amended O.G.: 27.04.2011-27917, 08.11.2015-29536). Ministry of Environment and Urbanization, "Regulation on the Evaluation and Management of Environmental Noise", which was published in the Official Gazette dated 04.06.2010 and numbered 27601.	ASAT Wastewater Treatment Department	Minor	Noise Monitoring Daily Site Operation Report Upon receipt of a grievance	Noise Level Measurement Results Machinery and Equipment Maintenance Record Noise Grievance Records

3. Community Health and Safety							
3.1 Infrastructure and Equipment Design and Safety	Safety of Equipment and Workers	Protective inspection of machinery will be regularly carried out and such inspections will be reported in detail. By this way any kind of accident arising from machinery and equipment shall be prevented. Cleaning and periodical maintenance of equipment shall be regularly performed. ASAT will be provided with Personal Protective Equipment according to the nature of the job. Necessary training will be provided for their use. The plant area will be surrounded by fences. Access of local people and animals to the area will be kept under control. Access to the facility for personnel and third parties will be carried out in a controlled manner.	Local Regulation on Occupational Health and Safety	ASAT Wastewater Treatment Department	10.909 €/year	Daily Site Operating Report	Event Records Number of nonconformities Education Records Work Permits Monitoring Report Findings
3.2 Safety of Services	Work Conditions Protection of the Workforce Occupational health and safety	Private security guards will be employed to ensure the safety of the work area. Private security practices within the scope of the project will be in accordance with the provisions of the Private Security Services Law and the Law on the Execution of Private Security Services	Local Regulation on Occupational Health and Safety	ASAT Wastewater Treatment Department	41.455 €/year	Daily. Construction Site will be monitored 24/7.	Facility entry and exit records Monitoring Report Findings

3.3 Traffic and Road Safety	Increase of traffic and safety risks on the roads	Control of bunker capacities To ensure safe and effective management of traffic	Highway Traffic Law numbered 2918 and "Regulation on Facilities to be Constructed and Opened on the Side of the Highway", which was effectuated after being published in the Official Gazette dated 15.05.1997 and numbered 22990.	ASAT Wastewater Treatment Department	Minor	Daily Site Operation Report	Intervals of the number of vehicles per day records Accident Records Licensed transport vehicles report Weighbridge Records

3.4Community Exposure to Health Issues	Security of Human Health.	ASAT will advise individuals with asthma, diabetes, or immune system disorders not to work in treatment facilities due to the risk of infection. Necessary precautions will be taken against the danger of a fire and the equipment for extinguishing fire and related devices will be placed in appropriate locations. All electromagnetic parts operated will be used at their own capacity. By using the electro-magnetic equipment in a controlled way, provision of economic life and protection will be achieved. Within Covid-19 Epidemic Measures, which is declared as a pandemic by the World Health Organization. Having a maximum of 3 people including the driver in passenger vehicles, and necessity to wear a mask in vehicles with more than one person, Entering and exiting the construction site with the individual HES codes obtained through the "Hayat Eve Sığar (HES) application implemented by the Ministry of Health, Measuring fever with thermometer at entrances to the construction site It is mandatory to wear a personal protective mask in the construction site, Taking all relevant measures for the measures announced by the Ministry of Health regarding the Covid-19 Epidemic, Informing all personnel and ensuring compliance with the measures by authorized persons, Regular follow-up of these measures, Creating relevant documents and documentation to convey information related to follow-up, Regular and frequent ventilation of public areas such as dining halls and social facilities	General Health Law No. 1593	ASAT Wastewater Treatment Department	16.364 €/year	Monthly OHS Monitoring Report and Check List	Results of the regular Doctor Examinations

3.5 Emergency Preparedness and Response	Work Conditions Protection of the Workforce Occupational health and safety	An Emergency Preparedness and Response Plan will be prepared before the facility starts operating. ASAT will ensure that the Emergency Preparedness and Response Plan covers escape plans in case of disinfection emission/spill.	Occupational Health and Safety Regulation	ASAT Wastewater Treatment Department and OHS Team	24.545 €/year	Monthly OHS Monitoring Report and Check List	Event Records Number of nonconformities Education Records Work Permits Monitoring Report Findings
4. Biodiversity Conservation and Sustainable Management of Living Natural Resources							
4.1 Assessment of Risks and Impacts on habitats and biodiversity	Protection of different living species.	If any protected species is found in the project area and its immediate surroundings during the operational phase of the project, necessary measures will be taken in line with Environmental Law No. 2872, Land Hunting Law No. 4915	Environmental Law No. 2872, Land Hunting Law No. 4915 ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	ASAT Wastewater Treatment Department	Cost for Landscape: 130.909 €/year	Ensuring the sustainability of the project in the construction phase. protecting of biological	number of trees planted inventory seedling numbers greenhouse numbers Statistics of

4.2Biodiversity Conservation: attenuation, habitats, compensation		(i) protect and conserve biodiversity and habitats; (ii) apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity; (iii) promote the sustainable management of living natural resources; and (iv) support livelihoods of local communities including Indigenous Peoples, through the adoption of practices that integrate conservation needs and development priorities	ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	ASAT Wastewater Treatment Department		barrier with andiz and cedar trees around the Hurma Wastewater Treatment Plant Continuing the cultivation of citrus tree seedlings, maintaining the glass greenhouses grow citrus seedlings,	lifetimes within the facility irrigation and maintenance charts landscape control
4.3Legally Protected and Internationally Recognized Areas of Biodiversity Value		Since orange is one of the most popular symbols of Antalya Province, orange afforestation and landscaping works will be carried out. Also, landscape designs will be made with various garden ornamental plants.	ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	ASAT Wastewater Treatment Department			
5. Stakeholder Engagement and Information Disclosure forming re							
5.1 Stakeholder Identification and Analysis	Comments and informing of stakeholder groups	Stakeholders will continue to be identified during different phases of the project	ESS10: Stakeholder Engagement and Information Disclosure	ALO ASAT and Press and Public Communication Department, Site staff of Hurma WWTP	Minor	. When a grievance or informing request is taken	Informing Brochure Minutes of Meeting

5.2 Stakeholders engagement plan	Failure to inform stakeholders	The communication tools (websites, promotional posters, and local press/social media etc.) will be used regularly.	ESS10: Stakeholder Engagement and Information Disclosure	ASAT Wastewater Treatment Department, Site staff of Hurma WWTP			
6. Gender							
6.1. Gender	Non-Discrimination and Negative Effect on Equal Opportunity	In order to achieve the goal of increasing women's employment, supporting female labour force is one of the most important priorities. General Directorate of ASAT aims to increase number of working women and support gender equality within the scope of this project. Equal job opportunities for women will be provided. It aims at least 10% of the ASAT personnel who will take part in the project to be female.	Civil Code of the Republic of Turkey No. 4271	ASAT Wastewater Treatment Department, Site staff of Hurma WWTP	6.260 €/month	Monthly Progress Meeting	Social security records personnel records

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ANNEXES

Information, documents, plans and maps specified in the relevant sections and their legends

Annex-1 Coordinates of The Location Selected For The Project

Annex-2 LEB (Local Environment Bord) Decision Letters

Annex-3 The Site Location Map

Annex-4 1/25,000 Scale Topographic Map

Annex-5 1/500 Scale General Layout Plan

Annex-6 Work Flow Chart

Annex-7 Sludge Analysis Reports

Annex-8 Title Deed

Annex-9 Settlements and Facilities Near the Project Area

Annex-10 1/25,000 Scaled Map of Sensitive Regions

Annex-11 Letter of the General Directorate of Civil Aviation dated 28.09.2020 and numbered E.15084

Annex-12 1/25,000 Scale Master Zoning Plan and Legend

Annex-13 1/1000 Scaled Implementation Zoning Plan, Plan Sheets Of 1/5000 Scaled Master Zoning Plan, Legend Sheets and Plan Provisions

Annex-14 1/25,000 Scaled Geological Map

Annex-15 1/100,000 Scale Geological Map and Geological Section

Annex-16 Soil Investigation and Analysis Report

Annex-17 Earthquake Hazard Map

Annex-18 Meteorological Data

Annex-19 Opinion Letter of Antalya Governorship Provincial Directorate Of Agriculture And Forestry Dated 05.11.2020 And Number E-88977526-3104850

Annex-20 Air Emission Measurement Report

Annex-21 Environmental Impact Asessment and Environmental Permission Certificate

Annex-22 Excavated Soil / Construction / Demolition Wastes Permission Letter of Republic Of Turkey Antalya Metropolitan Municipality Environmental Protection And Control Department Dated 10.12.2020 And Numbered 94707

Annex-23 Calculation for Carbon Footprint

Annex-24 Minutes of Public Consultation

Annex-25 Templates for E&S Reporting and Sample Grievance Form

Annex-26 – Work Schedule for Hurma Treatment Sludge Incineration and Energy Recovery Facility Project