
ANKARA ETLİK INTEGRATED HEALTH CAMPUS PROJECT



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) REPORT



OCTOBER 2014
ANKARA



ANKARA ETLİK INTEGRATED HEALTH CAMPUS PROJECT

ESIA REPORT

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ABBREVIATIONS

µg	Microgram
2U1K	2U1K Engineering and Consultancy Inc.
AoI	Area of Influence
ASKI	Ankara Water and Sewage Administration
ASTI	Inter-city Bus Terminal of Ankara
BAT	Best Available Techniques
BIHCP	Bilkent Integrated Health Campus Project
BREF	BAT Reference Documents
CCTV	Closed Circuit Television
CIA	Cumulative Impact Assessment
CEPMEIP	Coordinated European Particulate Matter Emission Inventory Program
Citi	Citigroup Global Markets Limited
dBA	A-weighted sound level
DIE	Directive on Industrial Emissions
DSI	State Hydraulic Works
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EHS	Environment, Health and Safety
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EIHC	Etlik Integrated Health Campus
EMEP	European Monitoring and Evaluation Programme
EN	European Norm
EPA	Environmental Protection Agency
EPC	Engineering, procurement and construction
EPSU	European Federation of Public Service Union
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
GATA	Gulhane Military Medical Academy
GDP	Gross Domestic Produce
GLC	Ground Level Concentration
H	Hour
Ha	Hectar
HOSPEEM	European Hospital and Healthcare Employers

HSE	Health, Safety and Environment
HSS	Health System Strengthening
HTP	Health Transformation Program
IAEA	International Atomic Energy Agency
IFC	International Finance Corporation
IHCP	Integrated Health Campus Project
ILO	International Labour Organization
ISO	International Organization for Standardization
IUCN	International Union for the Conservation of Nature and Natural Resources
JV	Joint Venture
kW	kilo Watt
L	Liter
L_{eq}	Equivalent noise level
L_{noon}	Noontime noise level
MoEU	Ministry of Environment and Urbanization
MoH	Ministry of Health
MoJ	Ministry of Justice
MPN	Most Probable Number
MR	Measurement Results
NATO	North Atlantic Treaty Organization
NMHAP	National Mental Health Action Plan
NTS	Non Technical Summary
°C	Degrees Celcius
OECD	Organization for Economic Co-operation and Development
OG	Official Gazette
OHS	Occupational Health and Safety
OHSAS	Occupational Health and Safety Advisory Services
OSCE	Organization for Security and Co-operation in Europe
PAP	Project Affected People
PIF	Project Introduction File
PIP	Pollution Indicator Parameter
PM₁₀	Particulate matter with diameter less than or equal to 10 micron
PPE	Personal Protective Equipment
PPP	Public Private Partnership
PR	Performance Requirement
PS	Performance Standard
RAMEN	Regulation on Assessment and Management of Environmental Noise
RCAPOIE	Regulation on Control of Air Pollution Originating from Industry

RCIAP	Regulation on Control of Industrial Air Pollution
RCSPSPPS	Regulation on Control of Soil Pollution and Sites Polluted by Point Sources
RV	Reference Value
SEP	Stakeholder Engagement Plan
SGK	Social Security Agency
SIA	Social Impact Assessment
SPV	Special Purpose Vehicle
STL	Short-Term Limit
TMP	Traffic Management Plan
TPH	Total Petroleum Hydrocarbons
TS	Turkish Standard
UCB	UniCredit Bank AG
USD	United States Dollar
UTM	Universal Transverse Mercator
WHO	World Health Organization
WPCR	Water Pollution Control Regulation
YKY	Yapı Kredi Yatırım A.Ş.

1 INTRODUCTION

1.1 Introduction

This document is the final Environmental and Social Impact Assessment (ESIA) report for the ‘*Etlik Integrated Health Campus Project*’ (hereinafter ‘the Project’). It has been prepared by 2U1K on behalf of the Ankara Etlik Hastane Sağlık Hizmetleri İşletme Yatırım Anonim Şirketi (the Project Company). The Project Company is committed to full compliance with all Turkish EIA Regulations and international lending requirements of the European Bank for Reconstruction and Development (EBRD) Performance Requirements and the International Finance Corporation (IFC) Performance Standards (details of the operational framework for the Project are provided in *Chapter 3*). Full details of the proposed development and project alternatives are provided in *Chapter 2*.

1.2 Objectives of the ESIA

The ESIA is a study into the effects of construction and operation of the Project on the physical, biological and social environment. The ESIA Report describes the Project, and the impacts it is predicted to have on environmental and social baseline conditions and the impacts on these conditions, and explains how the Project has been designed and how it will be implemented in order to minimize its adverse impacts and maximize its benefits.

1.3 ESIA Report Structure

The remainder of this report is structured as follows:

- *Chapter 2: Project Description.* Describes the Project, including the background to its development and alternatives considered, and gives details of its design, construction and operation;
- *Chapter 3: Regulatory Framework.* Outlines the policy, legal and administrative context for the ESIA. This includes the legal requirements for the Project, international treaties and conventions, corporate standards and program requirements (specifically those of the EBRD and IFC).
- *Chapter 4: Impact Assessment.* Describes the methodology used for the assessment of impacts associated with the Project, as well as the process followed to identify mitigation and enhancement measures and then assign residual impact significance. The existing physical, biological and social baseline characteristics in the Project’s Area of Influence are described, together with the stakeholder engagement undertaken for the Project.
- The results of the impact assessment are then presented under the following impact headings:

- Air Quality;
 - Noise;
 - Water, Soil and Groundwater;
 - Geohazards;
 - Waste;
 - Traffic;
 - Ecology;
 - Resettlement;
 - Influx;
 - Local economy and local livelihoods;
 - Community Health, Safety and Security;
 - Access to Services and Infrastructure;
 - Occupational Health, Labour and Working Conditions; and
 - Cultural Heritage.
- *Chapter 5: Environmental and Social Management Plan.* Introduces the Environmental and Social Management System for the Project.

The Report is followed by the following Appendices:

- *Appendix-A: Dual Management;*
- *Appendix B: Construction Schedule of the Project;*
- *Appendix C: General Layout of the Health Campus;*
- *Appendix D: Environmental and Social Management and Monitoring Plan;*
- *Appendix E: Soil Analysis Report;*
- *Appendix F: Air Quality Measurement Report;*
- *Appendix G: Noise Measurement Report;*
- *Appendix H: Groundwater Analysis Report;*
- *Appendix I: Questionnaires*
- *Appendix J: Stakeholder Engagement Plan;*
- *Appendix K: Traffic Management Plan;*
- *Appendix L: Health Campuses in Ankara; and*
- *Appendix M: Waste Management Plan.*

2 PROJECT DESCRIPTION

2.1 Introduction

This Section describes the Project in terms of facilities and equipment required for the Health Campus, as well as associated activities during all Project phases. The background to the development is provided and a description of the alternatives considered.

2.2 Project Overview

The Project will be a large urban development on 1,071,885 m² (107 ha) of land in the Kecioren and Yenimahalle districts of the Ankara province. It will include a health complex, a medical hotel, two heliports, a university, a trigeneration power plant (a combined cooling, heat, and power system) and a commercial zone. The hospital itself will have 3,566 beds. Construction of the Project is expected to take 42 months and the campus will be transferred to the Ministry of Health (MoH) after 25 years of operation.

2.2.1 The Project Company

The Project Company “Ankara Etlik Hastane Sağlık Hizmetleri İşletme Yatırım Anonim Şirketi” (also called a Special-Purpose Vehicle, SPV) for the Etlik Integrated Health Campus (IHC) Project has been formed as the result of a consortium between Astaldi Concessioni s.r.l., Astaldi SpA, Türker Gayrimenkul Geliştirme ve Yatırım İnşaat Anonim Şirketi, Türkerler Holding Anonim Şirketi and Türkerler İnşaat Turizm Madencilik Enerji Üretim Ticaret ve Sanayi A.Ş. The Project Company has been selected by the MoH to design, construct and operate the Ankara Etlik Integrated Health Campus (IHC) Project (the Project).

Under the terms of the contract the Project Company will construct the Project (over a period of approximately 42 months) and take on dual management of the campus during its 25 year operation. Specifically, The MoH will assign doctors, nurses and other clinical staff to the campus; the Ministry of Justice (MoJ) will provide security services to parts of the new forensic hospital; and the Project Company will be responsible for the provision of support services including imaging, laboratory services, housekeeping, security, catering, cleaning, maintenance, information management systems, car parking and waste management services. The organizational structure for this Project is presented in Figure 2-1.

The MoH will pay annual rents to the Project Company for the 25 year operational term. In addition to this, the MoH will pay for the non-volume services¹. The MoH provides a 70%

¹ Non-volume services are those services that are not dependent upon the occupancy rate of the hospital, consumption and/or level of utilization. Non-Volume Services include maintenance-related services such as building and land services, extraordinary maintenance and repair services, housekeeping, security, car parking services etc.

occupancy guarantee for these services. In other words, the MoH will pay at least 70% of the total fee of the non-volume services for a year. At the end of the operation period, the campus will be transferred to the MoH. The organizational structure for this Project is presented in Figure 2-1. Description of the dual management of the health campus by the MoH and the Project Company is described in Appendix-A.

The finance for the Project will likely be sourced from a number of lenders, including multilaterals, export credit agencies and commercial lenders (collectively the Lenders). The Project Company is currently negotiating with EBRD and IFC as the major lenders. Citigroup Global Markets Limited (Citi), UniCredit Bank AG (UCB) and Yapı Kredi Yatırım A.Ş. (YKY) are acting as the financial advisors to the Project Company.

The ESIA has been developed based on the hospital design developed by Studio Altieri S.p.A. of Italy and NKY Architects Co. of Turkey. Should the final campus design and methods of construction differ from the outline used for this assessment, the Project Company will consider whether the environmental and social impacts will be significantly different from those identified by the ESIA and if this is the case, will implement additional mitigation to ensure that the actual impacts are not materially worse than those reported in this ESIA report.

2.2.2 Project Rationale

Turkey requires substantial investment and improvement in its healthcare infrastructure. Many existing facilities have limited capacity, outdated technology and do not fully meet the current standards of the MoH. Existing hospitals have struggled to meet the increasing efficiency requirements of health care facilities by MoH in line with the reform program in health care services, to provide an efficient service to patients, to provide safe working conditions for employees and to meet the costs of maintenance and repair. This has resulted in financial deficits.

In order to address these issues, Turkey has been implementing the World Bank's Health System Strengthening (HSS) Program since 2003, supported by the World Bank through a lending program and policy dialogue. Turkey has achieved considerable success in expanding health insurance coverage for its population (especially poor people), improving access to health services (especially in rural areas) and building institutional capacity to sustain the HSS reforms.

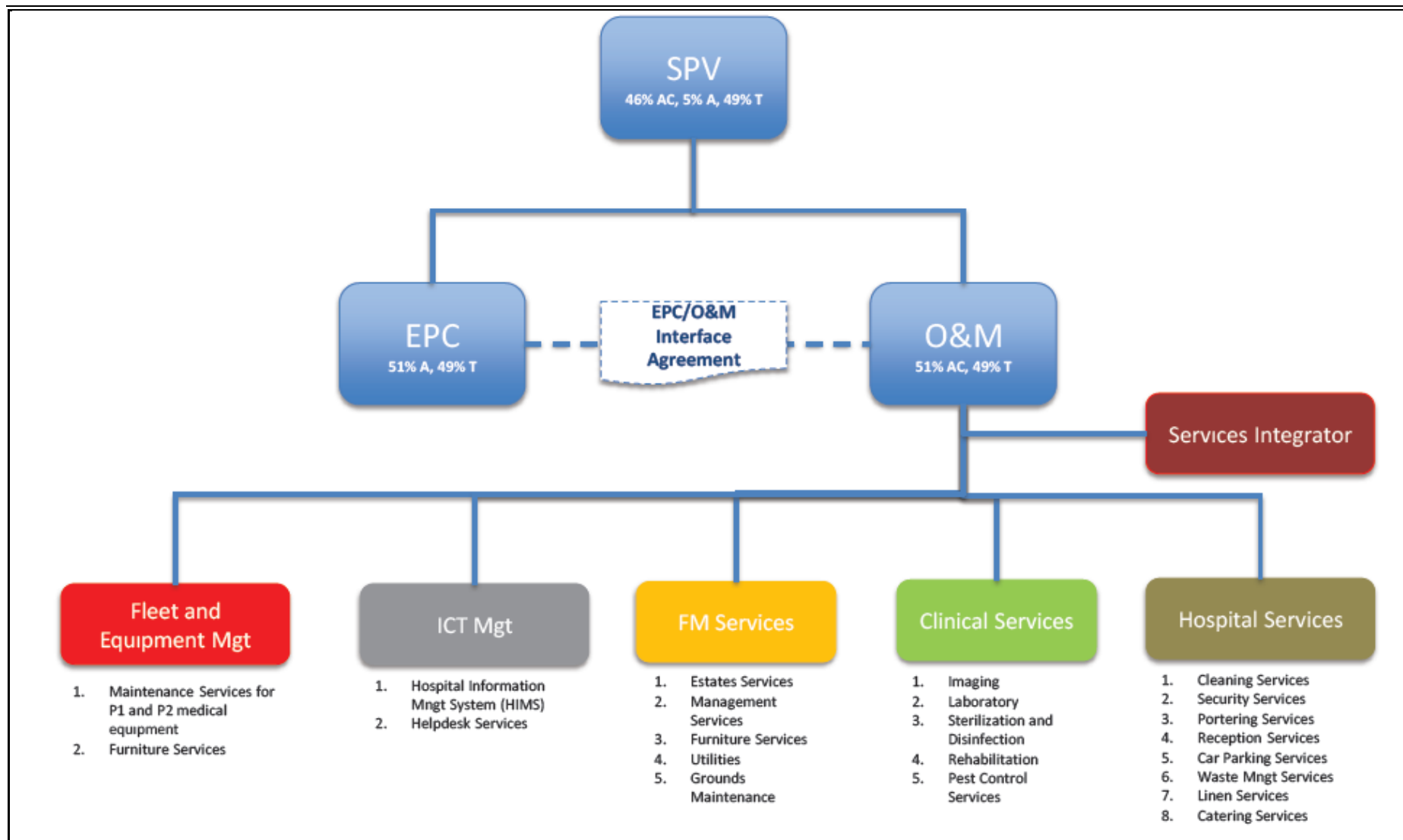


Figure 2-1. Organisational Structure

As part of the HSS Program, the MoH initiated a process of reconstruction in 2003. Prior to this program, there were multiple social insurance schemes covering public sector and private sector workers, self-employed people and a social assistance program covering health insurance for poor and vulnerable people (the Green Card Program). The reconstruction program of MoH performed the following:

- combined all the different health insurance schemes under one MoH umbrella (in 2006);
- hospitals of social insurance agencies were transferred to the MoH;
- Green Card health insurance was expanded to include pharmaceuticals and outpatient benefits and the coverage was widened for low-income groups;
- 112 Emergency healthcare services were increased to also cover villages, in addition to the cities;
- the number of emergency stations (locations where an ambulance and a health crew are situated) was increased and all ambulances were equipped with state-of-the-art technology;
- primary care services, particularly preventive health care and mother-child health care services, were strengthened; and Family Medicine implementation was introduced across the country; and
- A Public Private Partnership (PPP) unit was established to manage investments in the health sector.

The Etlik IHC Project is being developed as part of the HSS Program and the wider Public-Private Partnership (PPP) program in Turkey. The PPP program involves the development of approximately 30 new healthcare facilities with a total capacity of over 26,000 beds and a total investment cost in excess of USD 10 billion. The private sector finances the design, construction and supplementary facilities of the project and the MoH is responsible for providing clinical staff. There are currently at least 12 projects in the MOH's pipeline. Five projects are in their contractual phase, four are in the pre-construction phase and another four are in the final bid phase. One of the projects planned is also to be built in Ankara; Bilkent, which is to the west of the city centre and in the same stage of development as Etlik (i.e., detailed design and ESIA works).

The health campuses provide a range of specialized health care services in one location with the aim of consolidating health care delivery. The MoH has classified the 81 provinces of Turkey into 29 health zones on the basis of transportation facilities, labour force capacity, and conditions of health facilities. The objective of the zoning is to provide more efficient health care in each zone.

Ankara has two Health Regions, namely Etlik and Bilkent regions. Hospitals in Ankara Etlik Region were found to have limited capacity and outdated technology. In addition, operating rooms, intensive care, emergency services, laboratory and imaging center facilities and outpatient services of the state hospitals were not compliant with current standards. The

exceptions were Keçiören Training and Research Hospital (established in 2005) and Yenimahalle State hospital (established in 2009).

MoH of Turkey has divided the country into health regions and numbered them starting from the eastern part of Turkey using a numbering basis. The numbering does not reflect any kind of ranking with regards to health conditions. It is just an identification number. Etlik is the No. 10 Health Region of Turkey. The Etlik Region serves 3,615,188 people in Ankara, covering the districts of Çubuk, Elmadağ, Kalecik, Akyurt, Pursaklar, Altındağ, Yenimahalle and Keçiören. A few provinces neighboring Ankara are also within the Etlik region, namely Çorum (population of 535,405), Kırıkkale (population of 276,647), Kırşehir (population of 221,876) and Yozgat (population of 476,096). The Etlik region currently has 32 hospitals with a total bed capacity of 10,855 (see Table 2-1)

Table 2-1. Current Capacity of Etlik Region including pertinent districts of Ankara and nearby provinces.

Source of Hospital	Number of Hospitals	Capacity of Bed	Proportion (%)
State	22	8,171	75.27
Private	6	397	3.66
University	4	2,287	21.07
Total	32	10.855	100

Source: Ministry of Health Inpatient Health Facility Planning Guide, 2011.

2.3 Needs for Health Campuses

The MoH regards integrated health campuses as an essential part of the Turkish healthcare system for the following reasons:

- To increase access to healthcare services for the whole country;
- To contribute to the regional development of healthcare;
- To improve the efficiency and quality of healthcare services;
- To ensure cost-effective healthcare service delivery;
- To ensure an adequate quantity and higher quality of patient beds;
- To utilize the latest technology for healthcare provision;
- To adopt and establish new concepts in curative services such as day-surgery etc.; and
- To ensure a well-qualified workforce and quality healthcare service delivery.

Table 2-2 below shows current bed capacities of hospitals in Etlik Region. The total number of beds is much lower than the total in Table 2-1. It should be noted that Table 2-1 shows total number of beds including Ankara and nearby provinces within Etlik region whereas Table 2-2 shows bed capacity only within Etlik region.

Table 2-2. Current Bed Capacities of Etlik Region (incl. relevant districts of Ankara and excl. nearby provinces)

Hospital Name	Bed Capacity
Dr. Zekai Tahir Burak Maternity H.	540
Ankara Training And Research H.	550
Atatürk Chest Diseases And Chest Surgery Training And Research H.	519
Turkey Yüksek İhtisas H.	500
Dr. Sami Ulus Maternity And Child H.	418
Ankara Ch,Ld Hematooncology H.	322
Keçiören Training And Researh H.	308
Ankara Physical Therapy and Rehabilitation H.	270
Yenimahalle State H.	200
Gazi Mustafa Kemal State H.	160
Occupational Diseases H.	104
Ulucanlar Eye H.	101
Ulus State H.	100
Total	4092

Source: Ministry of Health Inpatient Health Facility Planning Guide, 2011.

The General Directorate of Treatment Services of the MoH is designing integrated health campuses to be the central facility, supporting other central and satellite hospitals. Figure 2-1 shows the General directorate of Treatment Services' healthcare design for Ankara and Figure 2-2 shows the planned capacity in the Etlik Region.

Furthermore, as mentioned in Section 3.2.3, erection of high-security mental health institutions is required pursuant to the relevant Turkish legislation.

2.3.1 Legislation Pertaining to Forensic Hospitals

European Union (EU) accession negotiations, brings further requirements that all prospective members must enact legislation to level their laws into line with the body of European law built up over the history of the Union. The candidate countries of EU have to adapt their legislation according to Copenhagen criteria. In the scope of EU harmonization process including forensic hospitals, some law amendments have done so far.

National basis foundation of the Forensic Hospital is Turkish Criminal Law (5237) and Turkish Law on The Execution of Penalties and Security (5275) which enacted to add forensic hospitals in 2004.

According to Criminal Law Article 57;

ARTICLE 57-(1) *Decision for imposition of security precautions is given by the court about a person suffering from mental illness at the time of commission of the offense. The insane people subject to security precautions under the court's decision are sheltered and taken under protection for treatment purposes in the fully organized health institutions.*

(2) *An insane person against whom security precautions are imposed, may be discharged from the health institution where he receives treatment under the court's or judge's decision if the report prepared by the health commission of the institution contains a statement that there is no risk to the community, or the risk is considerably diminished.*

(3) *In the report of the health commission, information is provided according to the degree of mental illness and the quality of the offense whether the person is to be kept under the medical control or not and if so, how long this should be continued and at what intervals.*

(4) *The medical control and observation is provided for a period and at intervals indicated in the report through transfer of these people by the Public Prosecutor's Office to the health organizations equipped with necessary technical instruments and specialist.*

(5) *Where the risk created by the mental deficiency of the person is determined to be increased during the medical control and observation, the court may re-adjudicate imposition of security precautions for protection and treatment purposes on the basis of the report.*

(6) *On the basis of the commission's report issued by the fully organized health institution where the insane person is sheltered pursuant to the provisions of first and second subsections, the punishment of imprisonment may be applied, partially or entirely, as security precaution specific to persons suffering from mental illness subject to decision of the court: However, the convictions period remains the same.*

(7) *The court may adjudicate transfer of the persons who commits an offense or addicted to drugs or alcohol to the health institutions rendering therapy in this field. The therapy continues until these persons are saved from using alcohol or drugs. Upon completion of therapy, they are discharged from the health institution on the basis of the report to be prepared by the health commission under the court's or judge's decision.*

According to the Law on the Execution of Penalties and Security Measures;

ARTICLE 16.- (1) *The prison sentence of a convict who is mentally ill shall be postponed and the convict shall be placed under protection and treatment in the health institution specified in Article 57 of the Turkish Criminal Code until he is rehabilitated. The period of time spent in the health institution shall be deemed to have been spent in prison.*

(2) *In any other case of illness, the execution of the prison sentence shall be continued in those parts of official health institutions which are allocated for convicts. However, if the execution*

of the prison sentence even in this way presents an absolute danger for the life of the convict, its execution shall be postponed until he is cured.

(3) The decision of postponement as provided for in the paragraphs above shall be made by the Office of Chief Public Prosecutor in the place of execution, upon a report issued by the Forensic Medicine Institution or issued by the health committee of a fully equipped hospital designated by the Ministry of Justice and approved by the Forensic Medicine Institution. The decision of postponement shall be notified to the convict himself and to his legal representative, stating the obligations to which he shall be subject. The place where the convict will be during the period of postponement shall be notified by the convict himself or his legal representative to the relevant Office of Chief Public Prosecutor. The Office of Chief Public Prosecutor that has made the decision of postponement or, upon request by the convict, the Office of Chief Public Prosecutor in the place where he is located or treated shall have the convict's health condition examined in accordance with the procedure described in this paragraph at the intervals of time specified in the health report or, if no such intervals are specified therein, at quarterly intervals. According to the results of such examination, the Office of Chief Public Prosecutor that has made the decision of postponement shall decide whether or not the postponement should continue. Upon request by the Office of Chief Public Prosecutor that has made the decision of postponement, measures for the monitoring of the convict shall be carried out by the law enforcement authorities and officers located in the place where notification has been made. In the event of acting in breach of the obligations mentioned in this paragraph, the decision of postponement shall be cancelled by the Office of Chief Public Prosecutor that has made the decision. An appeal may be filed with the office of execution judge against the decision to cancel.

2.3.2 Forensic Hospital

Currently there is no forensic hospital in Turkey. However, psychiatric hospitals give service to criminal people who have mental health problem. MoH has conducted a research in 2010 with WHO (World Health Organization) to determine need analyse of psychiatric hospitals in Turkey. National and international specialists attended to this research.

The National Mental Health Action Plan (NMHAP) was declared by the Ministry of Health in 2011 and this plan was prepared in line with the principles and international standards of WHO.

According to NMHAP there are a total of 7,543 psychiatric beds in all hospitals of the Turkey and 52.2 % of the beds are located in Psychiatric Hospitals. In Psychiatric Hospitals, a total of 668 beds belong to forensic psychiatric, 184 beds belong to alcohol and substance abuse

and 564 beds belong to chronic patients. Totally, 2,516 beds are used for services of general psychiatry.

The figures of NMHAP show that there has been a serious shortage in forensic psychiatric treatment. As a result of this research, the MoH has decided to establish forensic hospitals in 29-health region with the total capacity of 2,400 beds.

2.4 Project Location

The Project site is located in Yenimahalle and Keçiören Districts of Ankara Province of Turkey. Figure 2-3 provides a location map of the Project site and a satellite image is provided in Figure 2-4. Surrounding the Project Site to the north are the Antares mall, the Metro retail market, two universities, (Turgut Özal University and Yıldırım Beyazıt University), a small sport facility and housing. To the east there is a park, a high school, a military medical academy and hospital (GATA). To the south are the: governor's house, facility of State Hydraulic Works (DSI) and facility of State Highways. To the west is the technical works facility of the Metropolitan Municipality of Ankara.

The Project Site currently houses Zübeyde Hanım Maternity and Child Hospital, Diskapi Polyclinic, six buildings for living quarters, archive and storage buildings for the Social Security Agency, two cafes, garage and social recreation facilities. Hence, the site is formerly occupied, i.e. a "brown field" site.

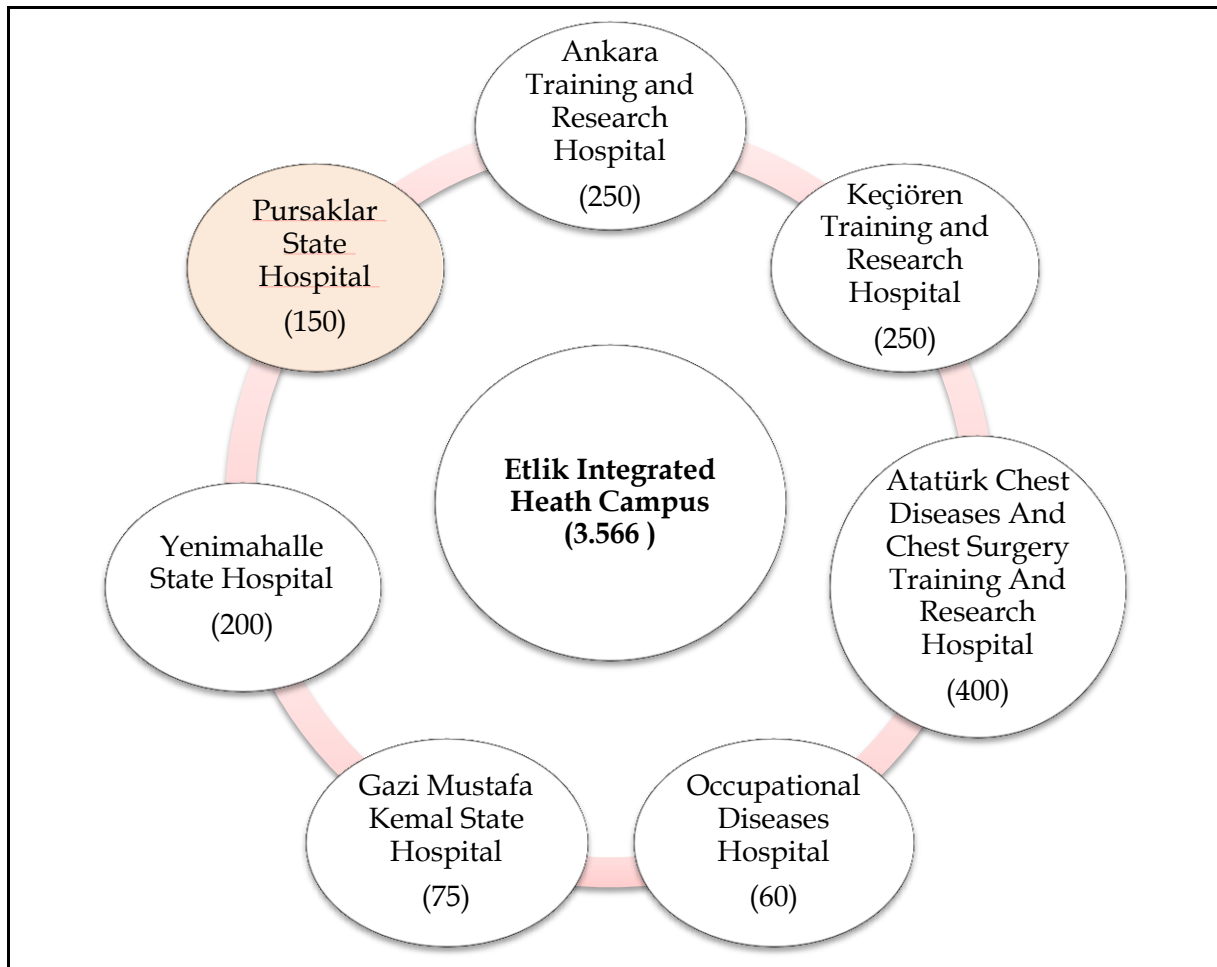


Figure 2-2. Design of Central and Satellite Hospitals

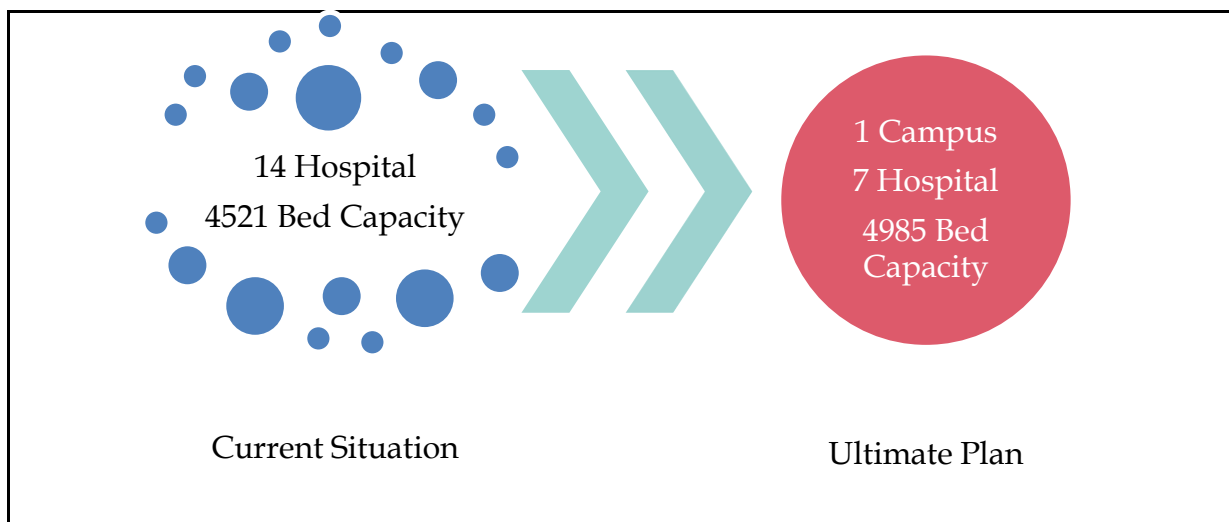


Figure 2-3. Ultimate Capacity of Health Services



Source: Official website of TR General Directorate of Highways

Figure 2-4. Location of the Project in Ankara and Turkey



Source: GoogleEarth.

Figure 2-5. A Satellite Image of the Project Site

2.5 Project Schedule

Construction of the Project is expected to take 42 months and the preliminary schedule is presented in Appendix-B. The Project Company has not finalized the schedule for operations but the operating period will be 25 years. After this period the Project will be transferred to the MoH. A hand-back procedure has been prepared, and is currently with the MoH for sign off. It defines the obligations of both parties as well as the process that will be followed, including establishment of a hand-back committee, and the inspections and monitoring that will be undertaken during this period.

2.6 Project Facilities

The Etlik IHC is a large urban development on 1,071,885 m² (107ha) of land. It will include a health complex, a medical hotel, two heliports, a university, a trigeneration power plant (a combined cooling, heat, and power system) and a commercial zone. A simplified layout of the Project Complex is given in Figure 2-6.



Source: Etlik IHCP Preliminary Feasibility Report, 2009.

Figure 2-6. Simplified General Layout

The Project Company estimates that up to 50,000 people could use this site on a daily basis. The following sections describe the main components and facilities proposed for the Project.

2.6.1 The Main Hospital

The main hospital will make up approximately 50% of the complex and comprise six hospital towers and a central core (providing support services) connecting them. The towers are numbered T-1 through to T-6. Information regarding the number of floors in each tower and which hospital they will house is given in *Table 2-3*.

Table 2-3. Information about Towers at the Core

Tower	Number of Floors	Hospital Housed	Number of Beds
T-1	17	General	694
T-2	11	Orthopedics & Neurology	478
T-3	11	Cardiovascular	362
T-4	15	Pediatric	508
T-5	14	Womens	540
T-6	14	Oncology	550

In addition, to support services, the central core will also house a 24-bed burn unit and a 10-bed iodine therapy unit, a 300-bed rehabilitation hospital with five floors. In addition there will be a 100-bed forensic hospital with two floors and a 100-bed clinic hotel with six floors. There will also then be a seven-storey administrative building. The hospital will also have underground parking with a capacity of 8,923 cars. There will also be space for 360 cars above ground. A model of the hospital is illustrated in *Figures 2-7 and 2-8*.

**Figure 2-7.** General View of the Core and the Towers



Figure 2-8. View of the Core and the Towers (T3 in front)

2.6.2 Forensic Hospital

Based on the needs mentioned in Section 2.3 and 3.2.3, the health complex incorporates a high security 100-bed Forensic Hospital which will be separated from the main hospital by a boulevard. It will be located in the south-west corner of the Project site (see the General Layout in Appendix-C).

As can be seen from Figure 2-9 below, the Forensic Hospital has a honeycomb shape which has been designed with security in mind providing better sight of patients. The facility also has a larger floor area per bed than other parts of the hospital complex with the 100 beds covering a total area of 24,016 m².

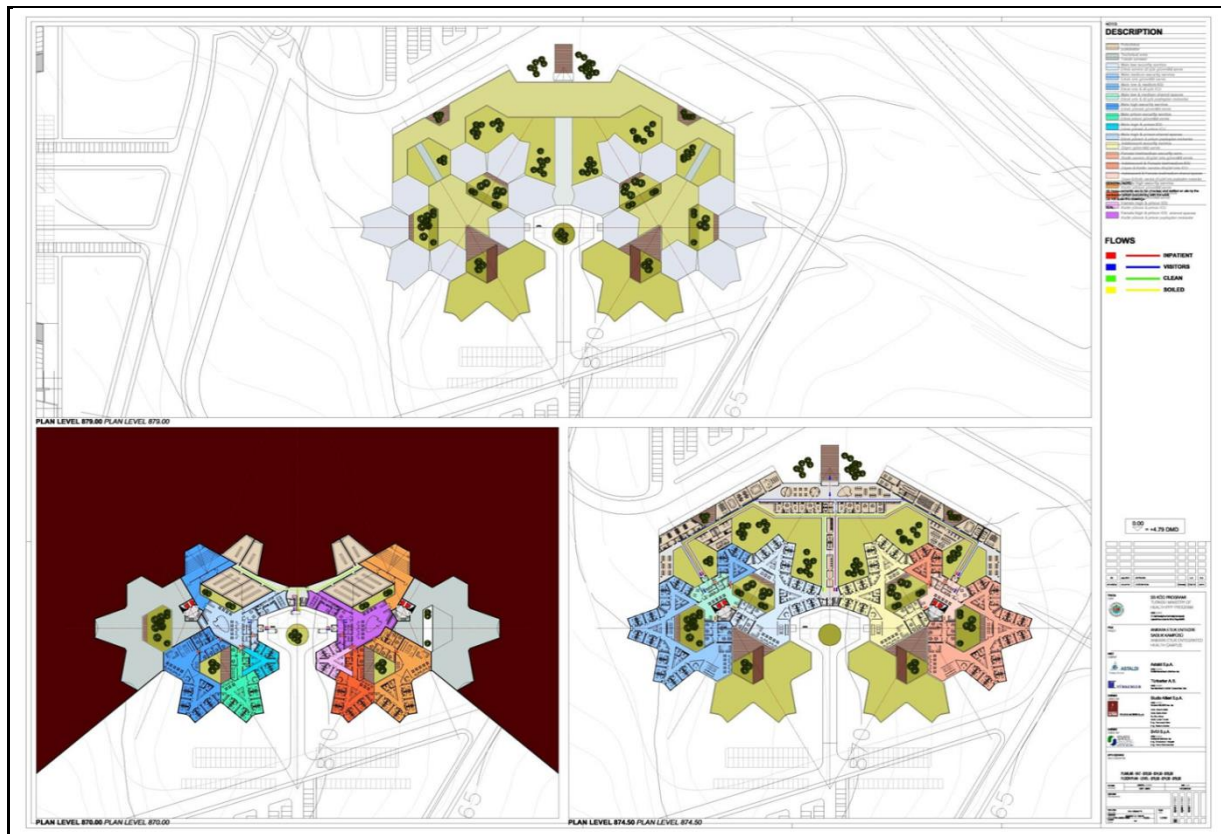


Figure 2-9. Forensic Hospital

The following patients will be treated in the high-security Forensic Hospital:

- Criminals who are found guilty by a court of law who have mental health issues and are therefore not given a prison sentence. These patients will remain in a high security section of the Forensic Hospital for the duration of their sentence.
- Criminals under arrest who will undergo a diagnosis to ascertain their mental health status before trial. These patients will also be kept under high security, but in a separate section of the Forensic hospital.

In the scope of the National Mental Health Action Plan (2011-2023) (see Section 2.3), the MoJ and MoH will cooperate for the high-security forensic hospitals. Pursuant to the cooperation protocol that will be signed by the MoJ and MoH, security of the hospital will be undertaken by the MoJ while medical services are the responsibility of the MoH.

Staff Attack Alert will be used for the personnel. Personnel will use hand-held radio or infrared transmitters' intrusion alarm in appropriate conditions. The basis of the control room monitor will be capable of determining the location of the alarm. The gardens and courtyards will be in coverage area of the alert system. Closure of the system will be consistent with the security and alarm systems. CCTV (Closed Circuit Television) will be used in public circulation. The digital storage and monitoring will be located in the personnel zone. The rooms in the part of the Forensic Hospital where criminals with mental

health issues stay will be equipped with locked windows, reinforced glass and double locking systems. Hence, the Forensic Hospital will be physically isolated from other hospitals in the campus.

Patient unit will be separate from the visitors to areas for safety but this unit will not be completely disconnected from the clinic. Intensive care areas will be under the supervision of nurses. Footprint of the patient will be followed in the day room, bedroom and in the doctor room. Forensic hospital will have separate rooms by gender and age. In addition to security services in the Forensic Hospital, military police will transport criminals between the prisons and Forensic Hospital.

The section containing criminals under arrest will be managed by the MoJ. Clinical staff for both sections will be provided by the MoH.

When the doctor determines that the patient is not dangerous for himself/herself or his/her environment anymore the patient can be able to leave the hospital but permanent controls are required for the patient. If the controls are judged that s/he may be dangerous, the patient will have to return the treatment.

2.6.3 Rehabilitation Hospital

A 300-bed Rehabilitation Hospital will be situated at the east side of the complex just north of the Forensic Hospital. It will be five-storeys. The rehabilitation hospital will treat patients with neurological, musculo-skeletal, orthopaedic and other medical conditions.

2.6.4 Medical Hotel and Commercial Zone

The Project will house a Medical Hotel and Commercial Zone in the north-east corner of the Project complex. The hotel will have six floors and 100 beds. The hotel will be used by patient's families and patients waiting to be allocated a bed in the Main Hospital. In addition, it is planned to accommodate tourists and visitors from outside Ankara and neighbouring countries, including international dignitaries. The hotel will be operated by the MoH.

The Commercial Zone and hospital hotel are under planning and the details on the Commercial Zone were not confirmed at the time of writing. However, it is known that it will include a shopping mall. Both the Commercial Zone and medical hotel are not subject to the international financial institution's consideration for financing and is not part of the Project.

2.6.5 Two Heliports

In the scope of the Project, there will be two heliports serving to the campus. One will be located on top of the main hospital while the other will be located on the ground. Heliport locations can be seen in the General Layout provided in Appendix-C.

Heliports will be operated by a specialized firm and health care employees of the heliports will be provided by MoH. Heliports will be surrounded by a security zone that unauthorized people will not be allowed to enter.

2.6.6 Administrative Building

The Administrative Building, which will house the Provincial Directorate of Health, will be located in the northwest corner of the Project Complex. A worship area will also be incorporated into this building, primarily for use by administrative staff.

2.6.7 Technical Buildings

Two main technical buildings will be constructed, one positioned to the north of the Main Hospital and the other to the south of the Main Hospital. A tri-generation system, which produces electricity, heating and cooling at the same time, will be installed. The tri-generation system will be comprised of six gas engines, each with an electrical installed capacity of 2.7 MW. The total installed electrical capacity will be 16.2 MW_e. Three units of the trigeneration plant will be located in the southern technical building while the other three will be in the northern technical building. The emissions from the trigeneration plant will comply with the Turkish and EU requirements.

In addition to the trigeneration plant, there will be also eight boilers, three of which will be for back up, in order to satisfy heat and hot water demand of the Project. Each of the boilers has a thermal installed capacity of 10 MW_t and total installed thermal capacity for boilers will be 80 MW_t. During normal operation period for cold weather conditions in Ankara (in between November and April according to the long-term temperature averages), three boilers will be in operation to secure heat and hot water demand together with the tri-generation plant. On the other hand, during severe winter conditions, which are proposed to occur in a maximum of 30 days between December and February according to long-term monthly average temperatures in Ankara, in addition to three boilers, two additional boilers will be in operation. In other words, during severe winter conditions, a total of five boilers and tri-generation plant will be in operation to secure heat, hot water and electricity supply. During hot periods (in between May and October) when there is no need for heat supply, only one boiler will be in operation for satisfying hot water demand together with the tri-generation plant. Three boilers to be installed for back-up purpose will only be operated in case other boilers are out of order due to break-down.

Fan coil units will also be provided. The size and number of units is not yet confirmed, as it depends on the final architectural design and size of each room. As an example, a 2.5 kW unit will be provided in each patient room.

The central heating system is likely to use natural gas supplied by the city network. In case of shortage, the central heating system will be fed by diesel tanks that will be located on site. Fuel tanks will be located next to both technical buildings. The total amount of stored diesel will be 330 m³ (or 330,000 L), which corresponds to a three day supply. The exact location and arrangement of the diesel storage tanks is still to be confirmed, however, a preliminary estimate suggests that there will be a total of 16 tanks, 10m high and 2.5m in diameter.

2.6.8 Health Sciences University

The Project Complex is expected to house a Health Sciences University comprising a research and development centre, an education building and an administrative building. This is proposed for the south eastern corner of the Complex. As the plans for the centre have not been finalised by the MoH, this facility is not covered within the scope of this ESIA report.

2.7 Construction Activities and Methodologies

The construction schedule is provided in Annex-A.

2.7.1 Construction Workforce

It is estimated that a maximum of around 4,000 workers will be required for the construction phase of the project. A maximum of 3,000 of these will be housed on site. There is an existing sewage network that services the site and its toilet facilities will be connected to this system upon consultation with the Water and Sewerage Administration of the Metropolitan Municipality. It is likely that if workers largely originate from Ankara, they may prefer to stay in their own homes than use the workers accommodation. The origin of the workforce will depend on the sub-contractors to be selected.

In line with the IFC/EBRD's Guidance on Worker's Accommodation, services and utilities available in the workers accommodation will include but are not limited to the following:

- Daily room, bathroom and toilet cleaning to provide hygienic conditions for the construction staff;
- Necessary air conditioning and hot water will be supplied to dormitories. Room temperatures will be at least 20 °C in cold weather;
- Providing at least 150 L/cap-day of water. Drinking water will be supplied from the market in big bottles filled with spring water;

- Wastewater collected from the workers accommodation will be conveyed to the municipal sewerage network;
- Every worker will be provided with a separate bed and linen, pillow and cover, which will be washed regularly;
- Rooms in the worker dormitory will be shared by at most eight people;
- Staff will be provided with necessary furniture in the rooms (e.g. chairs, desks and private lockers);
- There will be toilets and bathrooms in the dormitories which will be shared by at most 15 people;
- In line with the recommendations of the WHO on safe food, cooks will prepare food in the kitchen, where necessary sanitary conditions will be established;
- People in the kitchen will handle food with clean hands and necessary hygienic materials such as bonnet;
- Raw foods will be stored in separate containers and fridges to ensure freshness;
- An adequate number of first aid kits will be placed in dormitories and other areas in the workers accommodation;
- Accommodation will be free of charge to workers;
- The right amount of calories will be provided for food and it will be nutritious;
- Leisure and communications facilities will be provided to the workers;
- Security staff will control access to the workers accommodation;

The labor workers accommodation will be constructed by a specialized firm. The accommodation will be managed by the Project Company, which has been formed by leading construction contractors with experience in managing large worker accommodation facilities.

Workers accommodation facilities will be temporary. Site reinstatement will be made after camp facilities are removed at the end of the construction phase. Dismantled facilities will be transported for use at other construction locations.

The existing social housing on site will be used to house up to 250 skilled / technical workers employed directly by the Project Company during the construction phase. The existing social housing will be demolished towards the end of the construction period.

The remainder of the workforce not housed in the camps or social housing are expected to reside in Ankara.

The expected flow of construction workers is illustrated in Figure 2-10.

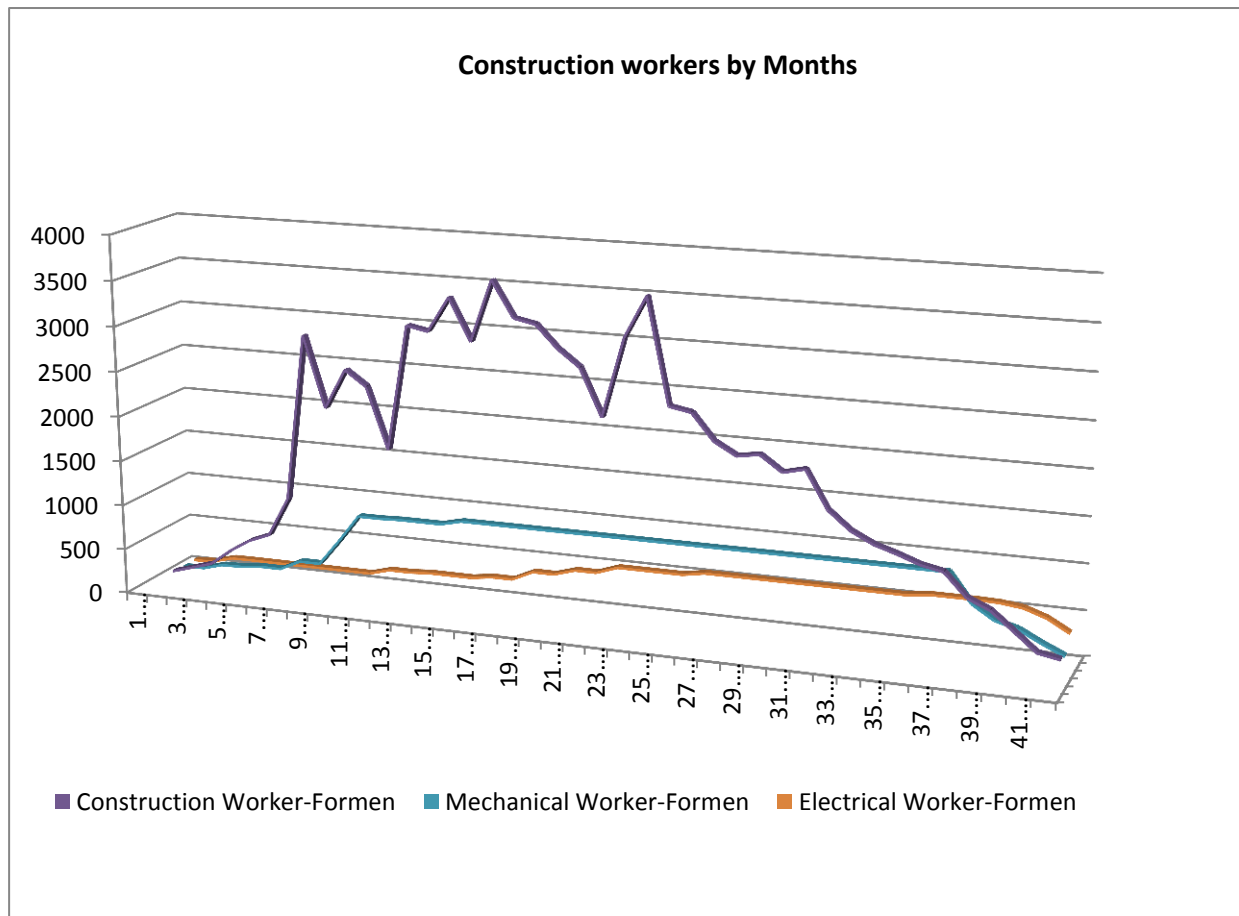


Figure 2-10. Construction Workers by Months

2.7.2 Clearance and Excavation works

Total surface area covered by the existing buildings, i.e. Specialist Hospital, SGK housing and SGK Archive and Storage, in the Project Site is 59 ha. Considering the entire Project Site covers 107 ha of land, the remaining 101 ha of land will be cleared.

The majority of the area is covered with grasses with the occasional tree (which will be felled). Conventional bulldozers, excavators and dump trucks will be used for land clearance. 15 excavators, 136 trucks, two loaders and a bulldozer and a concrete pump will be used.

Waste material from the clearance operations will be comprised primarily of soil with some building material from existing structures. Demolition waste will be segregated at the site by a specialized team and equipment of the Metropolitan Municipality of Ankara. In this way, soil, steel and other useful materials will be separated, and taken to the landfill or recovery plants. Methods for clearing waste will be discussed further in Section 4.5.5.1.1.

2.7.3 Building Infrastructure

The civil works in the context of buildings construction includes concrete and reinforcing steel works; water proofing; installation of seismic isolators, precast structure, formwork and steel structure. This will be followed by the construction of internal walls, floors, joints, wall finishing, ceiling, door and windows, stairs, wall protection, roof and facade. After construction the main building structure, landscaping, plumbing, air conditioning and electricity installations will be made.

2.7.4 Road Infrastructure

Road works will start with earthworks. This will be followed by infrastructure works (i.e. laying suitable types of materials). Finally, asphalt-finishing and lanes drawn with the necessary warning signs in place. Loader, excavator, trucks, finisher and roller compactors will be used.

2.8 Operation

2.8.1 Workforce

The Hospital Complex is expected to employ over 10,000 workers. The MoH will recruit some of these contracted workers while others will be provided by contractors and managed by the Project Company. Contracted staff of the MoH is considered to be hired in the Health complex to minimize retrenchment.

There will be a dual management system between the MoH and the Project Company in the campus. Under this system, The MoH will assign doctors, nurses and other clinical staff to the campus; the MoJ will provide security services to parts of the new forensic hospital; and the Project Company, i.e. SPV, will be responsible for the provision of support services including imaging, laboratory services, housekeeping, security, catering, cleaning, maintenance, information management systems, car parking and waste management services. An organizational chart of the SPV for the operational phase is given in Figure 2-11 and the organizational chart for the management under MoH's responsibility is given in Figure 2-12. Further details are provided in Appendix-A.

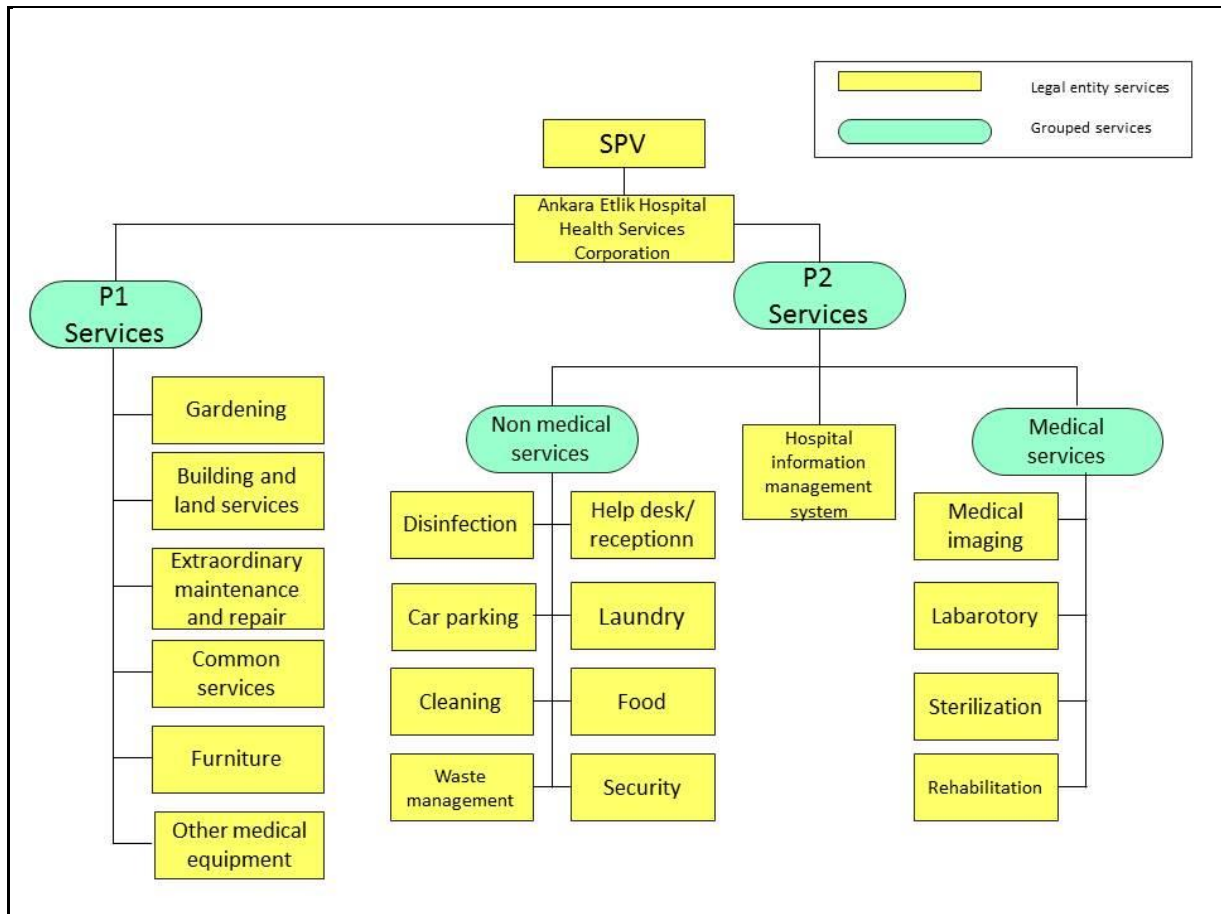


Figure 2-11. Organizational Chart of the SPV

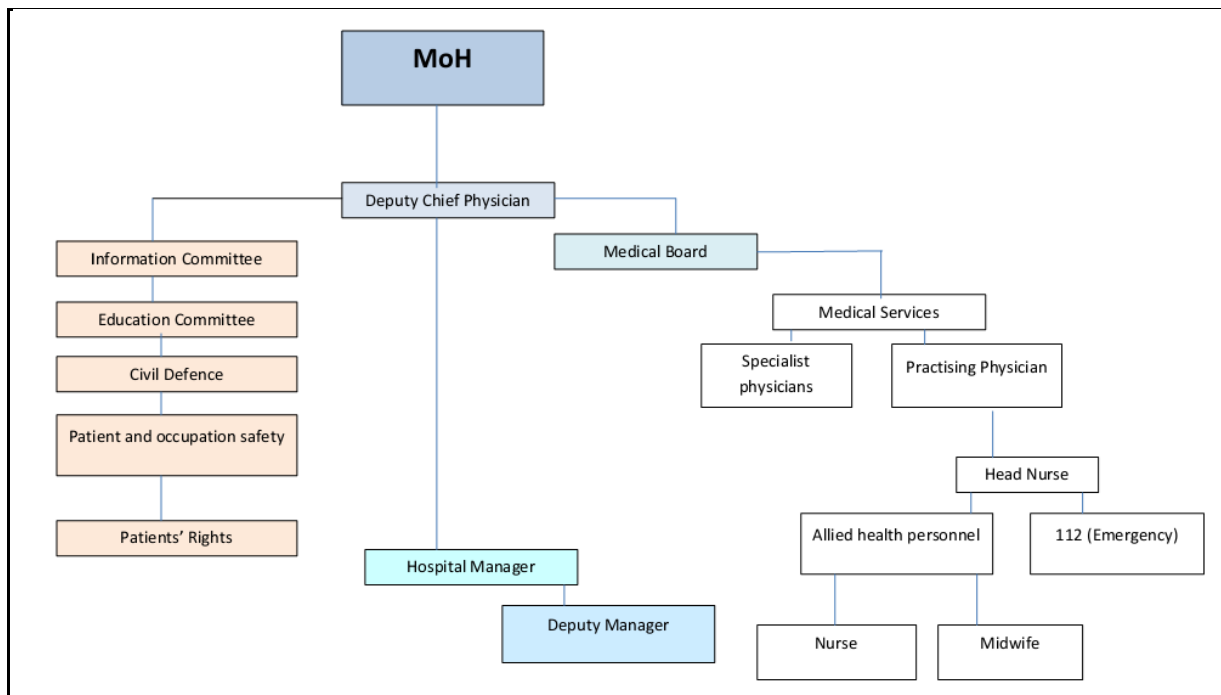


Figure 2-12. Organizational Chart for the part of the management under MoH's responsibility

The health campus will operate in two shifts.

During the daytime shift there will be 5,274 employees including doctors and nurses while total number of employees in both day and night shifts within a 24-hour period will be 10,339. On weekdays, there are estimated to be 3,500 patients assuming 98% occupancy and an estimated 20,000 outpatients, 800 emergency patients and 13,067 visitors.

The expected workforce is detailed in Table 2-4.

Table 2-4. Workforce Details for Health Campus Operation

Services	Estimated number of employees at daytime shift	Estimated total number of employees within a 24-hour period
Administration	57	85
Estate Services (Including Planned Preventative Maintenance and Asset Property Management)	58	87
Extraordinary Maintenance (Life Cycle Replacement)	55	82
Utilities Service	17	26
Furniture	11	16
Grounds and Garden Maintenance Services	24	36
All Other Non Clinical Services	27	40
Pest Control	17	26
Car Parking	30	45
Cleaning	824	1236
Data process (including HW& SW)	67	100
Security	206	309
Patient guiding/secretariat/Portering/Reception/Help Desk	267	400
Linen	17	25
Catering	182	273
Laboratories	118	177
Imaging	215	323
Sterilisation and Disinfection	230	345
Rehabilitation	182	273
Waste Management	10	15
Doctors (to be provided by MoH)	1100	1500
Nurses (to be provided by MoH)	1500	4200
MoH personnel	60	60
Personel for commercail areas	350	500
Medical Hotel	100	160

It is known that 12 hospitals will close as a result of this Project and all medical staff (doctors and nurses) from these hospitals will be reassigned to Etlik and Bilkent health campuses. It is expected that the majority staff will come from Ankara.

2.8.2 Traffic Arrangements

A road network will be designed to reduce possible congestion between in-campus and off-campus traffic networks. The detailed design of the in-campus traffic network is still to be confirmed. In particular, the distribution system and drop off areas for taxis and buses has not yet been defined and will be completed the following design phases. The road network for the Project is provided in Figure 2-13.



Figure 2-13. Project Traffic Network

As is marked by the arrow in Figure 2-13 an extension of General Dr. Tevfik Saglam Street (to the east of the site) will provide eastern access to the health campus and in particular to the Main Hospital.

Two avenues will provide access to the campus from the north and the south and will be expected to distribute traffic to the main hospital, towers and other buildings. The roundabouts located close to each other in both avenues will be designed to handle increased traffic and thus minimize traffic congestion.

A secondary internal road network will include direct access to parking, the drop-off ring, and connecting roads. To separate the drop-off traffic from the visitors and the ambulances, a dedicated drop-off ring has been designed. These two roads give access to drop-off areas at both sides of the main hospital, and both roads have a south-north one way direction. Further detailed design is still required for this road network.

Main gates to the health campus for ambulances are located at the northern roundabout. They will drop off on the north side of the main hospital. There will be designated lanes for ambulances. Parking areas below the towers of the main hospital can be accessed from the two main north-south avenues. The complex has been designed so that most traffic to the hospital flows from the south side.

A traffic assessment study has been carried out by the design team. In this study, a traffic survey was undertaken to describe existing conditions. The results indicated that the total number of vehicles in the existing network during morning peak traffic is approximately 10,650 vehicles per hour. The extra load to be generated when the health campus becomes operational is estimated to be about 3,800 vehicles per hour. The traffic assessment study identifies that traffic density is already high. However, the study also suggests that traffic density can be decreased if there are changes to the traffic light sequence.

2.8.3 Hospital Closures

Once the Project is operational, twelve existing state hospitals will be closed and the employees of these hospitals will be assigned to Etlik and Bilkent health campuses. One of the hospitals which used to be operate on the Project site has already closed in the scope of the Project in June, 2012. The other hospitals, including Sami Ulus Maternity and Child, Zekai Tahir Burak Training and Research, Altındağ Physical Medicine and Rahabilitation, Numune Training and Research, Türkiye Yüksek İhtisas Training and Research, Atatürk Training and Research, Ulus State Hospital, Dışkapı Training and Research Hospital, Etlik Zübeyde Hanım Maternity, Gazi Mustafa Kemal State, Abdurramnan Yurtasan Oncology, Ulucanlar Eye Training and Research hospitals. Time frame of the closures is not provided by MoH but closures are expected to occur once the Project is operating.

All the hospitals, which are planned for closure, are governmental hospitals.

4,807 employees of the existing twelve hospitals are hired by private contractors and 8,283 employees (doctors & nurses) are hired by MoH.

4,807 contracted workers, who work in twelve hospitals, are expect to be redundant. This number is provided from General Directorate of Treatment. For the Etlik IHP, the number of the redundant people will be approximately 2500 people. This is one of the the cumulative impacts of the two health campus Projects. However, health campus will have 10,000

employees. Etlik complex will hire totally 3,919 contracted workers. Contracted staff of the MoH is considered to be hired in the Health complex to minimize retrenchment. MoH is planning to hire redundant contracted workers with service procurement of the health complex.

2.9 Decommissioning

The entire lifespan of the Project has not been defined. The current contract of the Project Company is for 25 years of operation, with all facilities then being handed back to the MoH. It is planned that the health campus will continue to operate indefinitely provided that necessary maintenance is undertaken. At this stage, it is not possible to provide a detailed plan for renewal of equipment e.g. trigeneration plant.

2.10 Health, Safety and Security

All Project employees, including contractors, will be required to adhere to rules and guidelines stipulated in the HSSE requirements developed by the Project Company, which include requirements for health and safety, access control during construction and security measures.

The Project Company will require all employees and sub-contractors to adhere to the Project Company health and safety Policy for the Project Complex as well as Turkish health and safety legislation. This will include the use of suitable personal protective equipment (PPE), and implementation of and adherence to a management system for activities associated with health and safety risks. Among other issues, these would include working at heights, underground and working in confined spaces.

During the construction phase, the site will be fenced to prevent unauthorized people from entering the site and to ensure the security of construction workers. There will be security points at all entrances to the site. Closed circuit television system will also be installed for continuous surveillance of the construction site.

During the operational period of the Project, to prevent the spread of infectious diseases, adequate waste management and hazardous material management plans will be developed, implemented and monitored. Occupational health and safety management systems will also be established for all staff with adequate training on exposure to vector-borne diseases. In particular, in accordance with IFC guidelines, the Project will ensure the following during construction and operation:

- the separation of clean / sterilized and dirty / contaminated materials and people flows;

- development and inclusion of adequate disinfection / sterilization procedures and facilities;
- adequate space for the storage of recyclable materials for pick-up;
- adequate supplies of potable water to reduce risk of exposure to water borne diseases;
- selection of heating, ventilation and air conditioning systems that provide isolation and protection from airborne infections;
- provision of hazardous material and waste storage and handling areas;
- treatment and exhaust systems for hazardous and infectious agents; and
- selection of easily cleaned building materials that do not support microbiological growth, are slip resistant, non-toxic and non-allergenic.

2.10.1 Design Considerations for Emergency Situations

Fire safety throughout the campus follows Turkey's regulation on Fire Protection, issued on the official Journal No. 26375 of 19.12.2007 based on the Decree Law No. 2007/12937 of 27.11.2007 of the Council of Ministers and the "Regulation Amendment to the Regulations about Fire Protection of Buildings" issued on the Official Journal No. 27344 of 09.09.2009 based on the Decree Law No. 2009/15316 of 10.08.2009 of the Council of Ministers.

For situations that are not covered under Turkey's regulation on Fire Protection, international regulations will apply. In particular, National Fire Protection Agency standards have been applied to the design.

The health campus has been designed to provide fast access by fire engines to all the buildings. According to local regulations and to international best practice, the building is divided into fire compartments. As per standard practice, this design helps to reduce the spread of fumes and smoke, allows partial evacuation of the building and reduces overall damage by fire. Dedicated fire compartments will be created for storage areas. Storage areas will also have sprinkler system protection.

Safe and quick exit of occupants from the building has been carefully considered in the design. According to Turkish regulation, clear pathways for fire exits are required and a smoke exhaust system is fitted in exit corridors. These systems are designed for a 10 volume/hour (vol/h) air exchange in case of emergency, while providing a 2 vol/h air intake. Intake grills will be installed in the ward corridors. In the high rise buildings two emergency elevators will be installed. These lifts are normal elevators which will be overrun in the case of fire and operated by fire fighters.

The building design will consider a fire protection lobby in front of each emergency exit stairwell. Emergency lifts will share these fire protection lobbies.

Every building is surrounded by a fire hose system, to allow firefighting from outside. Water reels will also be installed inside, near exit stairwells and in the main corridors.

All buildings will be protected by sprinkler systems, except in specific areas, such as the hospital theatres and intensive care unit.

There will be fuel storage tanks on site and these will be installed in compliance with Appendix 12/C of the Turkish Fire Regulation.

2.10.2 Design Considerations to Prevent Epidemics

At a design level, there are limits to what can be included to prevent the spread of epidemics, with control needed through operational management systems. However, it has still been considered within the layout of the Health campus and these measures are described below.

2.10.2.1 Mechanical, Electrical and Plumbing Systems

The main hospital and each tower have air conditioning systems. Hot and cold water are distributed centrally with substations for each tower and a portion of the Core. The air intake of the air handling units will avoid short-circuit with the air emitted out. In this way there is no risk that contaminated air extracted from an infected room, will be recirculated within the hospital. The air intake and air extraction positions will be chosen according to the dominant wind direction, i.e. northeast. Regarding the air handling units installed in the basement of the tower, the minimum height of the air intake will be 5 m above the ground to avoid the aspiration of pollutants and contaminants from the ground level. Regarding the water for the air conditioning system, it will be a closed-circuit and the detailed design will ensure that there is no risk of contamination due to water circulation.

Hot and cold water for sanitary use will be taken from the city network. The hospital is connected to the aqueduct with a backflow valve that will prevent water from the hospital returning to the city network. Water coming from the aqueduct is filtered with a 50 micron filter and then divided into two circuits: one cold and one hot. To avoid risk of legionella an ultrafiltration system will be used to trap the bacteria and organic elements contained in the water (pseudomonas, coli bacteria, etc.) with no use of chemical substances thus maintaining potable water quality.

2.10.2.2 Design Considerations for Emergency Actions

The health campus design incorporates the segregation of people flow to help manage infection control. The principal circulation and entrances within the campus are listed below:

- Internal staff and in-patient circulation;
- Visitors / outpatient circulation;
- Lift connection from the emergency department to the upper operating theatres;
- Staff entrances;
- Good and deliveries circulation / entrances;

Therefore, the design incorporates the segregation of flows, an access control system and a general compartmentalization of space, both throughout the hospital as well as within specific departments.

Such inherent design characteristics will therefore be used by the hospital management in their preparation of an Emergency Response Plan.

2.11 Area of Influence and Associated Facilities

The ESIA assesses Project impacts within the Area of Influence (AoI). According to the definition given in EBRD PR1, the AoI includes:

- i. The assets and facilities directly owned or managed by the client that relate to the project activities to be financed (such as production plant, power transmission corridors, pipelines, canals, ports, access roads and construction camps);
- ii. Supporting/enabling activities, assets and facilities owned or under the control of parties contracted for the operation of the clients business or for the completion of the project (such as contractors);
- iii. Associated facilities or businesses that are not funded by the lenders as part of the project and may be separate legal entities yet whose viability and existence depend exclusively on the project and whose goods and services are essential for the successful operation of the project;
- iv. Facilities, operations, and services owned or managed by the client which are part of the security package committed to the lenders as collateral;
- v. Areas and communities potentially impacted by: cumulative impacts from further planned development of the project or other sources of similar impacts in the geographical area, any existing project or condition, and other project-related developments that can realistically be expected at the time due diligence is undertaken;
- vi. Areas and communities potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The area of influence does not include potential impacts that would occur without the project or independently of the project.

In this regard, the commercial area are primarily included in the AoI. In addition, surrounding communities, facilities and amenities that are described in Section 2.4 are included in the AoI. The AoI also includes the excavated material dump site, the landfill, the domestic wastewater treatment plant and the planned incineration plant of Ankara Metropolitan Municipality are the associated facilities.

The social area of influence is described in more detail under the social baseline in Section 4.4.4.2.

Information regarding municipal infrastructure (i.e. the associated facilities) is given as follows:

Wastewater Treatment Infrastructure

The Metropolitan wastewater treatment plant is Tatlar Wastewater Treatment Plant, located around 25 km to the west of the Project Site. Conceptual design and tender documents of the wastewater treatment plant were prepared between October 1988 and January 1990. Final design was completed in October 1992, and construction of the first stage started in the same year. The wastewater treatment plant was designed as three-stages:

- Stage 1: to serve a population of 3,920,000 in the year 2002;
- Stage 2: Extension to serve a population of 4,833,000 (planned);
- Stage 3: Extension to serve a total population of 6,228,300 and additional units added for removal of nitrogen and phosphorus (planned).

The treatment plant was put into operation in 1997. Currently, 900,000 m³/day of wastewater is treated. Activated sludge process is implemented in the treatment plant. The main treatment units are as follows:

- Coarse and fine screens;
- Aerated grit chamber;
- Drum screens for removal of sand, oil and foam;
- Primary sedimentation tanks;
- Aeration tanks;
- Secondary sedimentation tanks.

Wastewater is discharge to Ankara Creek, which eventually joins Sakarya River. Sarıyar Dam is located downstream of the plant on Sakarya River. Sarıyar Dam has a hydroelectric power plant and is also used for irrigation and recreation. For this reason, hyper-nutritification/eutrophication control (i.e. removal of nutrients) is necessary in order for the plant to meet the Turkish Water Pollution Control Regulation and the Water Framework Directive of EU (2000/60/EC). The wastewater treatment plant is designed to perform tertiary treatment for removal of nitrogen and phosphorus. Aeration tanks in Stage 3 include

anoxic zones to carry out denitrification. Phosphorus removal is planned to be carried out by chemical coagulation with the addition of iron chloride (FeCl_3).

Discharge characteristics of the plant are presented along with relevant national and EU standards in Table 2-5.

As can be seen from the Table 2-5, the wastewater treatment plant has been designed to meet stringent discharge criteria regarding tertiary treatment of nutrients, i.e. nitrogen and phosphorus.

Table 2-5. Discharge Characteristics of the Wastewater Treatment Plant and Relevant National and EU Discharge Standards

Parameter	Discharge Characteristics of the Tatlar Wastewater Treatment Plant	Water Pollution Control Regulation (for equivalent population over 100,000)*	Urban Wastewater Treatment Regulation	EU Urban Wastewater Treatment Directive (91/271/EEC)
pH	6.5-8.5	6-9	-	-
Chemical Oxygen Demand	3-8 mg/L	90 mg/L	125 mg/L (75% treatment efficiency)	-
Biochemical Oxygen Demand	-	35 mg/L	25 mg/L (70-90% treatment efficiency)	-
Dissolved Oxygen	5.0-7.5 mg/L	-	35 mg/L (90% treatment efficiency)	-
Suspended Solids	5-15 mg/L	45 mg/L	-	-
Total Coliform	1000 MPN/100 mL	-	-	-
Total Nitrogen	0.1-1.0 mg/L	-	10 mg/L (70-80% treatment efficiency)	-
Total Phosphorus	0.005-0.1 mg/L	-	1 mg/L (80% treatment efficiency)	-

* 24-hour composite sample.

After being processed into thickener, sludge is transferred to anaerobic sludge stabilization units where biogas is generated. Biogas is converted to electricity. According to information obtained from the plant director, 70% of the electricity demand of the plant is supplied from the electricity generated from biogas.

Although the plant operates at full capacity for Stage 1, construction of Stage 2 has not started yet. Instead of realizing Stage 2 of this plant, the metropolitan municipality is planning to construct and operate another wastewater treatment plant in the city center, around 4 km to the southwest of the Project Site. Construction of this new treatment plant will start in 2013, and is intended to be complete in less than two years. This is intended to sufficiently serve the Project. The new wastewater treatment plant will discharge to Ankara Creek as well and will operate to the same national and international standards.

Domestic wastewater and storm water will be collected separately, and discharged to the municipal sewerage network.

Solid Waste, Hazardous Waste and Medical Waste Management Infrastructure

A solid waste management company, ITC, will construct and operate a medical waste incineration plant at one of the two landfills of Ankara, Çadırtepe Landfill, located to the northwest of the city, and around 40 km from the Project Site. According to information from an authorized person at ITC, the daily medical waste generation in Ankara is 30 ton and it is currently landfilled in a separate lot in the landfill. An incineration plant is planned to be erected in nine months. This plant is designed as two-stages. On completion of the first stage, capacity will be 50,000 ton/year. At the second stage, the capacity will be doubled, and total capacity will be 100,000 ton/year. The second stage is planned to be constructed three years after stage one. An EIA Report had been prepared for the proposed incinerator and approved by the Ministry of Environment and Urbanisation (MoEU). A detailed air quality modeling study had been presented in the EIA Report. Air pollutant emission levels of the incinerator are planned and committed to be in line with the limit values of Turkish Regulation on Incineration of Wastes which are fully in line with Directive 2000/76/EC on the incineration of wastes but this Directive is now replaced by the Directive 2010/75/EU on Industrial Emissions. Emission design values will be checked in terms of full compliance of the pertinent Directive.

Besides medical waste, solid wastes and hazardous wastes will also be taken to the same area as ITC is also planning to erect a hazardous waste landfill at Çadırtepe.

2.12 Project Alternatives

2.12.1 Site Alternatives

The Project Site is owned by the Treasury. The Ministry of Health completed correspondences with the General Directorate of National Properties to obtain their consent to use the site for a term of 49 years to establish health facilities pursuant to the Regulation on the Construction of Health Facilities on a Lease-and-Build basis and the Restoration of the Services and Areas in Facilities other than Medical Service Areas, which was introduced by means of the following Supplementary Article to the Healthcare Services Basic Law no 3359.

Also, according to the "2023 Master Plan of Ankara the Capital", prepared by Ankara Metropolitan Municipality, two health complexes are planned to be constructed in northern and south western Ankara. In the master plan, it is described that the area with blue hatching (see Figure 2-14) is the health campus area, i.e. the Project Site.

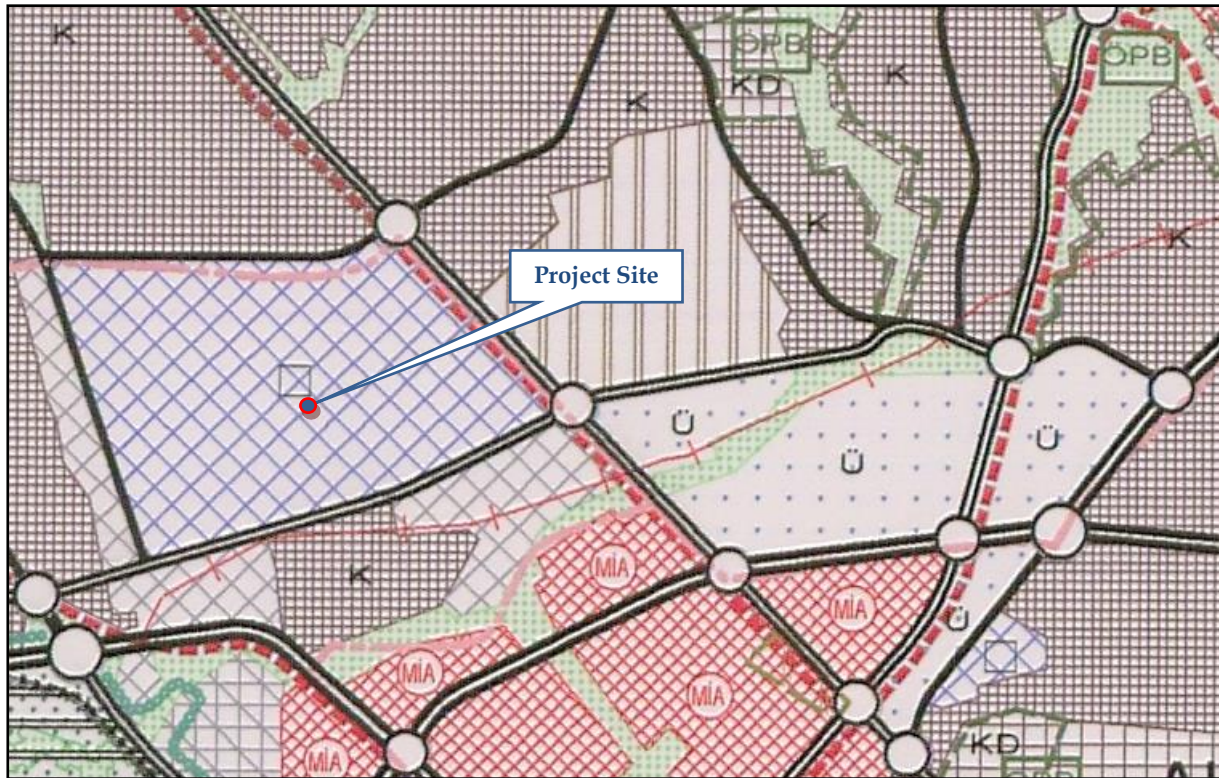


Figure 2-14. Map Showing the Project Site in "2023 Master Plan of Ankara the Capital"

For such a large-scale hospital development with easy access, there is a need for a large land plot at or close to city center, and no viable site alternatives within the city are available for Ankara. The Project Site is advantageous in that respect - a property of the Treasury which houses another hospital (Etlik Specialized Hospital) and a very large plot for such a major development. The land plot of a total of 107 ha is a unique plot in the middle of urban settlement. Although there have been some resettlements, the resettlement of the public housing residents was already carried out in accordance with Turkish law and there was no material evidence of disputes and grievance. In addition to the governmental support and adherence to the city master planning, the Project Site is in close proximity to the inter-city bus terminal (i.e., ASTI) and subway line under construction (i.e., to be completed in 2014) and surrounded by main streets in every direction, which makes transportation easy. Hence, it is concluded that there are no alternative sites to be considered for this health campus.

2.12.2 Technology Alternatives

2.12.2.1 Medical Technologies

The health campus will utilize highly advanced and sophisticated medical devices increasing patient throughput. In other words, more patients will be served in a facility with almost the same bed capacity as the total of those to be closed. Examples of such high-tech devices are as follows:

- Robotic pharmaceutical preparation system;
- Da Vinci Robot (urology, women's health);
- MR device and accessories (intraoperative) 1.5 and 3 Tesla;
- Magnetic Navigated Coronary Angiography System;
- Baby food preparation robot.

2.12.2.2 Proton Technologies

Proton therapy will also be used in the health campus. Proton therapy is an advanced treatment for cancer. It is more effective as compared to conventional x-ray therapy methods. In proton therapy, higher doses can safely be used for cancer cells and less damage is given to healthy tissues and vital organs. The Project Company intends to build a health campus, which is superior to previous health facilities in terms of energy efficiency.

2.12.2.3 Energy Efficiency

Many energy-efficient systems will be employed in the health campus including a trigeneration plant. In this system, electricity, heat and cooling are produced simultaneously using natural gas as fuel. Traditional gas engines typically operate at an efficiency of 35-45% whereas trigeneration systems operate up to 85% by converting 45% of the source energy to electricity, 40% to heating and cooling. Heat and line losses typically take up the remaining 13% and 2% respectively.

Other energy-efficient systems are presented below:

- **Ground source heat pumps** will be installed at the medical hotel to reduce heating demand;
- **Grey water treatment systems** will be used for wastewater in the hotel that comes from shower and sinks. Treated water will be used in irrigation;
- **Hot water productions** have been planned using solar thermal panels to be placed on the roofs of the towers;
- **Economizer and heat recovery systems** had been foreseen, in order to gain some profit from waste heat coming from boilers and air-conditioning plants;
- **Building automation system** will be established for efficient operation of electrical and mechanical systems;
- **Light-Emitting Diodes** and armatures using solar power energy will be used in outdoor lighting.

3 REGULATORY FRAMEWORK

This chapter describes the national and international legislation, standards and guidelines that are relevant to the Etlik IHC Project and this ESIA.

3.1 International Legislation

The Etlik ICH Project has adopted the relevant directives and regulations of the European Union (EU). In particular, the EU EIA Directives on the Assessment of the Effect of Certain Public and Private Projects on the Environment (85/337/EEC) (CEC, 1985), as amended by Directive 97/11 EC (CEC, 1997); Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programs relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC.

Other EU directives that will be taken into consideration throughout the Project life-cycle are:

- **Directive on Industrial Emissions (DIE) (2010/751/EU)** - regarding minimizing pollution from various industrial sources throughout the European Union. The DIE Directive that repeals the IPPC Directive is based on several principles, namely (i) an integrated approach, (ii) best available techniques (BAT), (iii) flexibility and (iv) public participation.
 - i. In the **integrated approach**, the whole environmental performance of the Project, covering, for example, emissions to air, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, and restoration of the site upon closure, must be taken into account.
 - ii. The **BAT Reference Documents** (the so-called **BREFs**) are prepared for several establishments. Besides the BAT for respective facilities, these documents also introduce the achievable emission values. BREFs do not set legal limits but they are meant to be guidelines for governments. Therefore, they should be taken into consideration in order to eliminate any future liability due to new legislation that comes into force.
 - iii. The **Flexibility** principle allows licensing authorities to take a number of different aspects, such as technical characteristics of the installation, geographical location and local environmental conditions, into account when they determine permit conditions.
 - iv. **Public participation** is required to ensure that the public has a right to participate in the decision-making process. Information is generally provided about the permitting process, permits and the results of monitoring.
- **Directive on Waste (2006/12/EC)** sets the general principles of waste management that should be followed for handling waste types listed in Annex-I of the Directive.

- Directive on Ambient Air Quality and Cleaner air for Europe (2008/50/EC) sets the general principles and standards to combat emissions of pollutants at source and to identify and implement the most effective emission reduction measures at local, national and community level to protect human health and the environment.
- Water Framework Directive (2000/60/EC) sets the main principles for sound management of Europe's water resources. It aims to reach good status throughout Europe by adopting river basin management plans.
- Directive on Assessment and Management of Environmental Noise (2002/49/EC) provides a basis for handling noise problems. The directive mainly includes strategies for (i) monitoring noise (i.e. preparation of strategic noise maps), (ii) informing and consulting the public about noise exposure, (iii) addressing local noise issues for preparation of action plans for noise reduction, and (iv) development of a long-term EU strategy [URL-1].
- Directives governing health sector developments include the following:
 - EU Council Directive 2010/32/EU of 10 May 2010
implementing the Framework Agreement on prevention from sharp injuries in the hospital and healthcare sector concluded by European Hospital and Healthcare Employers' Association (HOSPEEM) and European Federation of Public Service Union (EPSU) so as to prevent workers' injuries caused by all medical sharps (including needle sticks); to protect workers at risk; and to set up an integrated approach establishing policies in risk assessment, risk prevention, training, information, awareness raising and monitoring;
 - Directive 2002/98/EC of the European Parliament and of the Council of 27 January 2003
setting standards of quality and safety for the collection, testing, processing, storage and distribution of human blood and blood components and amending Directive 2001/83/EC;
 - Directive 2004/23/EC of the European Parliament and of the Council of 31 March 2004
setting standards of quality and safety for the donation, procurement, testing, processing, preservation, storage and distribution of human tissues and cells as well as two technical directives 2006/17/EC and 2006/86/EC providing the detailed requirements of the EUTCD;
 - EU directives on pharmaceuticals including Directive 65/65/EEC¹, Directive 75/318/EEC, Directive 75/319/EEC, Directive 93/41/EEC, Directive 93/42/EEC, Directive 2001/20/EC, Directive 2001/83/EC, and Directive 2005/28/EC; and

- Directive 2011/24/EU of the European Parliament and of the Council of 9 March 2011

on the application of patients' rights in cross-border healthcare. The directive applies to individual patients who decide to seek healthcare in a Member State other than the Member State of affiliation. It does not apply to the following: services in the field of long-term care; allocation of and access to organs for the purpose of organ transplants; public vaccination programs against infectious diseases.

3.2 Turkish Legislation

This section provides an overview of the relevant national legislation, principally the Environment Law of August 1983 (amended with the Law dated April 26, 2006 and numbered 5491).

The purpose of the Environmental Law is to protect the environment, which is the common asset of all living beings, in line with the principles of sustainable environment and sustainable development. Article 10 of this Environment Law requires an EIA to be undertaken in order to obtain a permit or license to construct and operate a new development. Projects which may cause environmental issues as a result of their proposed activities are required to prepare a Project Introduction File (PIF) and if required, an EIA report.

The Ministry of Environment and Forestry do not require an EIA to be undertaken for Etlik Hospital Project in accordance with the Official Gazette Date/ Number 17.07.2008/26939, although they also require a PIF for the concrete batching plant and the trigeneration plant. For the purpose of this proposed project, a PIF is required and will be submitted to the Provincial Directorate of the Environment and Urbanization for both these two plants. Then, a decision will be made as to whether EIA studies under national legislation will be required for the batching plant and the trigeneration plant.

The content of the PIFs include:

- I. Project Description
 - a. Project flow chart, capacity, area, technologies, personnel,
 - b. Use of resources (e.g., land use, water use, energy consumption etc.),
 - c. Amount of wastes (liquid, solid, gas) and physical, chemical and biological properties of these wastes,
 - d. Accident risk due to selection of technologies,
 - e. Potential impacts on environment and proposed mitigation measures

- II. Project Site
 - a. Land use and its quality (agriculture, forest, planned area, surface water etc.),
 - b. Assessment of sensitive areas within the Project Site or its vicinity according to the list of such areas in Annex V of the EIA Regulation,
- III. Project Alternatives (Technologies and Site Alternatives),
- IV. Conclusion,
- V. References.

Health, safety and environmental regulations that will also apply to the Etlik IHC Project are:

- Environmental Law No. 6831 and relevant regulations;
- Law on Conservation of Cultural and Natural Assets No. 2863 (as amended with the Law numbered 5226) and relevant regulations;
- Labor Law No. 4857 and relevant regulations;
- Regulation on General Principles of Waste Management (OG dated 05.07.2008 and numbered 26927);
- Medical Waste Control Regulation (OG dated 03.12.2011 and numbered 28131)
- Water Pollution Control Regulation (OG dated 31.12.2004 and numbered 25687) (amended by the regulation issued in the OG dated 30.03.2010 and numbered 27537);
- Hazardous Waste Control Regulation (OG dated 14.03.2005 and numbered 25755) (amended by the regulation issued in the OG dated 30.10.2010 and numbered 27744);
- Waste Oil Control Regulation (OG dated 30.07.2008 and numbered 26952) (amended by the regulation issued in the OG dated 30.03.2010 and numbered 27537);
- Solid Waste Control Regulation (OG dated 14.03.1991 and numbered 20814) (amended by the regulation issued in the OG dated 05.04.2005 and numbered 25777);
- Landfill Regulation (OG dated 26.03.2010 and numbered 27533);
- Regulation on Assessment and Management of Air Quality (OG dated 06.06.2008 and numbered 26898);
- Regulation on Assessment and Management of Environmental Noise (OG dated 07.03.2008 and numbered 26809);
- Regulation on Soil Pollution Control and Point Source Polluted Areas (OG dated 08.06.2010 and numbered 27605);
- Regulation on the Control of Excavation Soil, Construction and Debris Wastes (OG dated 18.03.2004 and numbered 25406); and

- Regulation on Occupational Health and Safety (OG dated 09.12.2003 and numbered 25311).

3.2.1 Turkish Land Acquisition

There are two fundamental laws, with respect to expropriation and compensation of property/land-take in Turkey, which are important to understand for this Project considering that facilities are being closed and homes/jobs transferred away from the Project site:

- Turkish Expropriation Law No. 2942 (amended in 2001 by Law No. 4650); and
- Resettlement Law (No. 5543),

It is understood that the resettlement law is primarily intended for large projects requiring village-scale land take, and for which a formal Resettlement Plan must be announced, developed and implemented by the responsible ministry. The Resettlement Law does not seem to apply to this type of Project.

The Expropriation Law applies in cases of land take, regardless of the scale of the project. According to Article 46 of the Turkish Constitution, where public interest requires it, State and public corporations are entitled to expropriate or impose administrative servitude on all or part of the property on privately owned lands, provided that compensation is paid in advance.

Such expropriation is regulated by the Expropriation Law (Law No. 2942, amended in 2001 by Law No. 4650). Acts of expropriation can only be exercised on immovable assets. State appropriation of movable assets constitutes a separate chapter in Turkish law. Therefore, the Expropriation Law (in connection with the Turkish Civil Code) limits the scope of expropriation to:

- land, including all sorts of structures and vegetation (considered integral components of the land); natural vegetation is included into the expropriation value if connected to economic value (e.g. berry shrubs),
- sections owned separately in a building (i.e. apartments),
- usufruct of groundwater sources,
- real estate easement established permanently or for a period of at least 30 years.

The Expropriation Law provides for compensation only to the legal owner (individual or entity of local governance) for loss of land and assets. Actual occupants may be eligible in cases when the title deed for the land is not registered and there are no persons claiming rights on the immovable asset. Compared to the compensation for registered land,

compensation for actual occupants is lower. Customary land users are not fully considered by the Expropriation Law.

In the case of transfers between public institutions, properties, sources or right of easement that belong to a public institution or public legal entity cannot be expropriated by another public institution or public legal entity. The authority that requires the property determines the expropriation value as defined in the “purchasing procedure” according to Article 8 of the Expropriation Law. It then applies to the owning authority with a written petition stating the amount to be paid that is based on the designated expropriation value according to Article 30 of Law. If the owning authority does not give consent to the transfer or does not respond to the application within 60 days, the dispute will be resolved within two months by the relevant administrative chamber of the Council of State upon the application of the expropriating authority.

A Decision of Public Interest is necessary for expropriation of any property and this must be approved by the relevant Ministry, unless the development is carried out in accordance with an approved Development Plan or Special Plan or Project approved by relevant Ministries. In these cases, a simple Declaration will be made indicating that the expropriation process will be initiated by the authorized executive body. A Declaration of Public/Beneficial Interest has not been made for the Project, however the Project is very clearly in “public interest”, if so the Expropriation Law could be enforced.

The land required for the Project was transferred to the Treasury in 2006 from the Municipality of Yenimahalle and the Social Security Institution (SGK). This was done in accordance with Article 30 of the expropriation law. Then, the Treasury granted land use rights to the MoH for the purpose of providing healthcare services (see *the box below*). The land is owned and will remain owned by the Treasury for the life of the Project.

New Provision to the Basic Act on Health Services Act (No 5396)

Article 1, Additional Provision 7 (2005) of the Basic Act on Health Services

Act (No 5936) states that:

“Health facilities considered necessary to be built by the Supreme Planning Council, may be built on the lands owned by the tenant or by the Treasury, through renting it out for a period which shall not exceed forty-nine years and for a certain price; it shall be rented out to natural or private judicial entities that will be selected through a tender pursuant to the pre-project to be delivered by the Ministry of Health and basic standards to be set.

To this end, Ministry of Finance may transfer the immovable properties of the Treasury to natural or private judicial entities, free of charge. The title deed will have a note specifying that the transferred land cannot be used for purposes other than that of the contract and that it cannot be transferred without the permission of the Ministry of Finance and Health.”

3.3 Health Campus and Public Private Partnership (PPP) Legislation

According to the Ministry of Health's legislative requirements for the 'Establishment of Service Buildings and Health Care Facilities', paragraph 48 of this decree dictates:

(1) The MoH and affiliated institutions will establish all health facilities which include but are not limited to hospitals, health education facilities, health campuses and social equipment, as well as being responsible for the expenses associated with these facilities. The funding will come from:

- a) Financial contributions from the budget of the Ministry and its institutions,
- b) The income of the working capital,
- c) The immovable state owned property of these institutions, as well as the immovable property of the Treasury of the Ministry of Finance.

(2) The Ministry has the authority to distribute the immovable property of public institutions for its own purpose.

(3) The MoH also holds the right to decommission buildings used for the purposes of providing health services if deemed necessary by a ministry appointed commission.

On the 12th December 2012 a draft law was submitted to the Turkish Parliament to support the decree above, which included the following points:

- Health facilities deemed necessary by the MoH are able to source funding from the private sector,
- Upgrades and renewals of existing facilities can also be funded and implemented by the private sector,
- Health facilities can be developed by the private sector according to the "Built-Rent-Transfer" model,
- The private sector is able to take responsibility for the construction component of any commercial facility and the provision of supporting services. This includes securing financing for the construction works. At the end of the agreed operation period, the private sector will transfer the facility to the MoH in a working and usable condition, and from here on the MoH will take responsibility for all operational activities.,
- The Ministry will control the activities of the construction company at all stages,
- Investments made by the private sector will be exempt from all taxes and expenses on construction work carried out..

3.4 Lender Guidelines

The SPV has committed to adopting EBRD's Environmental and Social Performance Requirements (PRs) and standards as the main international standards for compliance

during the execution of Project activities. EBRD has a set of 10 PRs that projects are expected to meet in order to obtain financial support from the EBRD. These PRs are listed below:

- PR1: Environmental and Social Appraisal and Management;
- PR2: Labor and Working Conditions;
- PR3: Pollution Prevention and Abatement;
- PR4: Community Health, Safety and Security;
- PR5: Land Acquisition, Involuntary Resettlement and Economic Displacement;
- PR6: Biodiversity Conservation and Sustainable Natural Resource Management;
- PR7: Indigenous Peoples;
- PR8: Cultural Heritage;
- PR9: Financial Intermediaries; and
- PR10: Information Disclosure and Stakeholder Engagement.

Information gathered during the scoping study has identified that PR7 and PR9 are not applicable to the proposed project. Indigenous people are not found within the Project site or Ankara and financial intermediaries are not applicable to this project.

In addition to EBRD's PRs, IFC's Performance Standards (PSs) were also referred to in the scope of ESIA. The IFC's PSs are listed as follows:

- PS1: Social and Environmental Assessment and Management Systems;
- PS2: Labor and Working Conditions;
- PS3: Pollution Prevention and Abatement;
- PS4: Community, Health Safety and Security;
- PS5: Land Acquisition and Involuntary Resettlement;
- PS6: Biodiversity Conservation and Sustainable Natural Resource Management;
- PS7: Indigenous Peoples; and
- PS8: Cultural Heritage.

The relevant sub-sectoral guideline of EBRD for "Health Services and Clinic Waste Disposal" dated October 2009 has also been taken into account in the context of the ESIA study. In addition to these the following IFC guidelines were considered in the study:

- IFC General EHS Guidelines, dated April 30, 2007;
- IFC EHS Guidelines for Health Care Facilities, dated April 30, 2007.

- IFC EHS Guidelines for Thermal Power Plants, dated December 19, 2008.

Specific objectives of EBRD and IFC regulations are given Table 3-1 below.

Table 3-1. Specific Objectives of IFC PS1 and PR 1 and PR 10 of EBRD

Objectives of IFC (PS 1)	Environmental and Social Appraisal and Management of EBRD (PR 1)
• To identify and assess social and environmental impacts, both adverse and beneficial, in the project area of influence; • To avoid, or where avoidance is not possible, minimize, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment; • To ensure that affected communities are appropriately engaged on issues that could potentially affect them; • To promote improved social and environmental performance for companies through the effective use of management systems.	• To identify and assess environmental and social impacts and issues, both adverse and beneficial, associated with the project. • To adopt measures to avoid, or where avoidance is not possible, minimize, mitigate, or offset/compensate for adverse impacts on workers, affected communities, and the environment. • To identify and, where feasible, adopt opportunities to improve environmental and social performance. • To promote improved environmental and social performance through a dynamic process of performance monitoring and evaluation.

3.5 Gaps between Turkish Legislation and International Guidelines

As part of Turkey's accession process to the EU, efforts are being made to revise Turkish Environmental Legislation to achieve compliance with EU Environmental Directives. For the purposes of the proposed project, where possible the more stringent requirements of the standards of international lender will be adopted.

The most evident difference between Turkish legislation and international guidelines is the omission of a social impact assessment in Turkish law. In order to achieve international alignment, socio-economic surveys have been undertaken and stakeholder engagement carried out. A grievance mechanism has also been established for the Project.

A key difference between Turkish requirements and those of EBRD are concerning land acquisition, involuntary resettlement and economic displacement (PR5). These gaps are:

- In the event of adverse economic, social, or environmental impacts from project activities other than land acquisition (e.g. loss of access to assets or resources or restrictions on land use), Turkish Law does not make provisions for such impacts must be avoided, minimized, mitigated or compensated for through an ESIA process.
- Turkish Law does not require the avoidance or minimisation of expropriation or a consideration of alternatives.

- Turkish Law does not require a socio-economic baseline survey to be undertaken (although plans defining the expropriation boundaries and requirements must be prepared).
- There are no requirements for prior consultation and participation in decision processes or any on-going consultation.
- Under the Turkish Expropriation Law, only people who own land or property will receive compensation. Tenants or people without legal rights to the land will not be compensated.
- Turkish Expropriation Law does not recognise resettlement rights of peoples who do not own the property or land being expropriated.
- The Turkish Expropriation Law does not provide for relocation assistance. Neither are there measures in place to make sure that an adequate standard of living can be restored.
- Turkish Expropriation Law does not cover economic displacement or assistance with resettlement.
- Turkish Law does not provide for compensation for loss of income or livelihood and does not provide compensation for those who lose their employment or livelihood as a result of expropriation.
- Turkish Law notes that measures such as improvement and providing additional incomes to reach to the defined standard of living are prerequisites of the resettlement plans and projects. However, there are no detailed provisions for the plans and projects for improving the standard of living.
- There does not appear to be a requirement that “improved living conditions” should be offered.
- In Turkish Law, there appears to be no provision to mitigate the negative impacts of displacement, identify development opportunities or establish the entitlements of all categories of affected peoples (including host communities) with particular attention paid to the needs of the poor and vulnerable.
- There is no requirement to provide opportunities to displaced persons and communities to derive appropriate development benefits from the project.
- There are no provisions under Turkish requirements for monitoring outcomes, resettlement monitoring, or a final check to determine if the resettlement is complete.
- Turkish Law does not recognise Indigenous Peoples and their subsequent customary rights to land ownership and/or use.

3.6 Sponsor's Environmental and Social Risk Assessment Capacities

The Project Company is the Sponsor of this PPP project. It is a joint venture of companies which have already been certified for management systems, environmental management and occupational health and safety, i.e. ISO 9001 and, 14001 and OHSAS 18001, respectively. The Project Company will set up the same management systems to ensure that sound management, environmental and OHS systems are employed during all phases of the Project.

4 IMPACT ASSESSMENT

4.1 Environmental and Social Impact Assessment

ESIA is a systematic process to identify, predict and evaluate the environmental effects of proposed projects. It is established in European law by the Directive on the Assessment of the Effect of Certain Public and Private Projects on the Environment (85/337/EEC) (CEC, 1985), as amended by Directive 97/11 EC (CEC, 1997). These Directives require that projects of a certain scale, or in particular locations, certain environmental aspects must be covered by an ESIA.

EIA best practice promotes environmentally sound and sustainable development through the identification of appropriate enhancement and mitigation measures. The primary aims and objectives of the EIA process are to:

- Modify and improve environmental design;
- Ensure efficient and appropriate resource use;
- Identify key impacts and appropriate mitigation measures;
- Avoid irreversible environmental damage;
- Enhance social aspects of development; and
- Protect human health and safety.

An ESIA aims to ensure that all potential impacts associated with the site's design, construction, operation and decommissioning, during normal and abnormal conditions, are identified and assessed. Appropriate mitigation measures are then put forward and any potential residual impacts identified.

The ESIA process is iterative and contains many feedback loops for continual refinement of a development proposal.

4.1.1 Purpose of the ESIA

The purpose of this ESIA is to report the findings and conclusions of the EIA process that has been undertaken for the Project. The ESIA provides a systematic analysis of the Project in relation to the existing environmental and social baseline. This ESIA provides information to those from whom consents and authorizations (the Competent Authorities or Lenders) are sought to enable them to assess the impact (s) of the Project. This ESIA is a public document that provides information to local stakeholders to help them understand the development and its potential effects.

The EU directive requires a discussion of the potential for direct, indirect, secondary, cumulative, short, medium and long-term, permanent, temporary, positive and negative effects to be addressed. All of these aspects have been included, although the level of detail in which they are considered differs depending on their likelihood and significance. Measures to mitigate potentially adverse impacts are discussed and any residual impacts identified.

A non-technical summary (NTS) has also been provided, which presents a brief description of the Project and identifies and describes its potential environmental impacts. Copies of the NTS are available free of charge from upon written request or can be viewed on its website; www.aeh.com.tr.

4.2 Methodology

This section of the report presents the methodology used to conduct the impact assessment. The overall approach is illustrated in Figure 4-1. It consists of a multi-stage iterative approach in order to predict and evaluate the potential effects the Project could have on the physical, biological and social environment. Measures are then identified that the Project will take to avoid, minimize, mitigate or compensate for any adverse impacts; and to enhance positive impacts where possible are then identified.

Results continue to be revisited and modified as the assessment progresses and as Project effects are monitored.

4.2.1 Screening

The screening stage of the impact assessment process looks at the type of project and the applicable framework of legislation and standards to determine what type of IA requirements apply to the project.

Screening for this Project was undertaken through a review of applicable national legislation and international financing requirements. The outcome of screening established the requirement for an ESIA that meets Turkish EIA requirements and international financing standards of the EBRD and IFC.

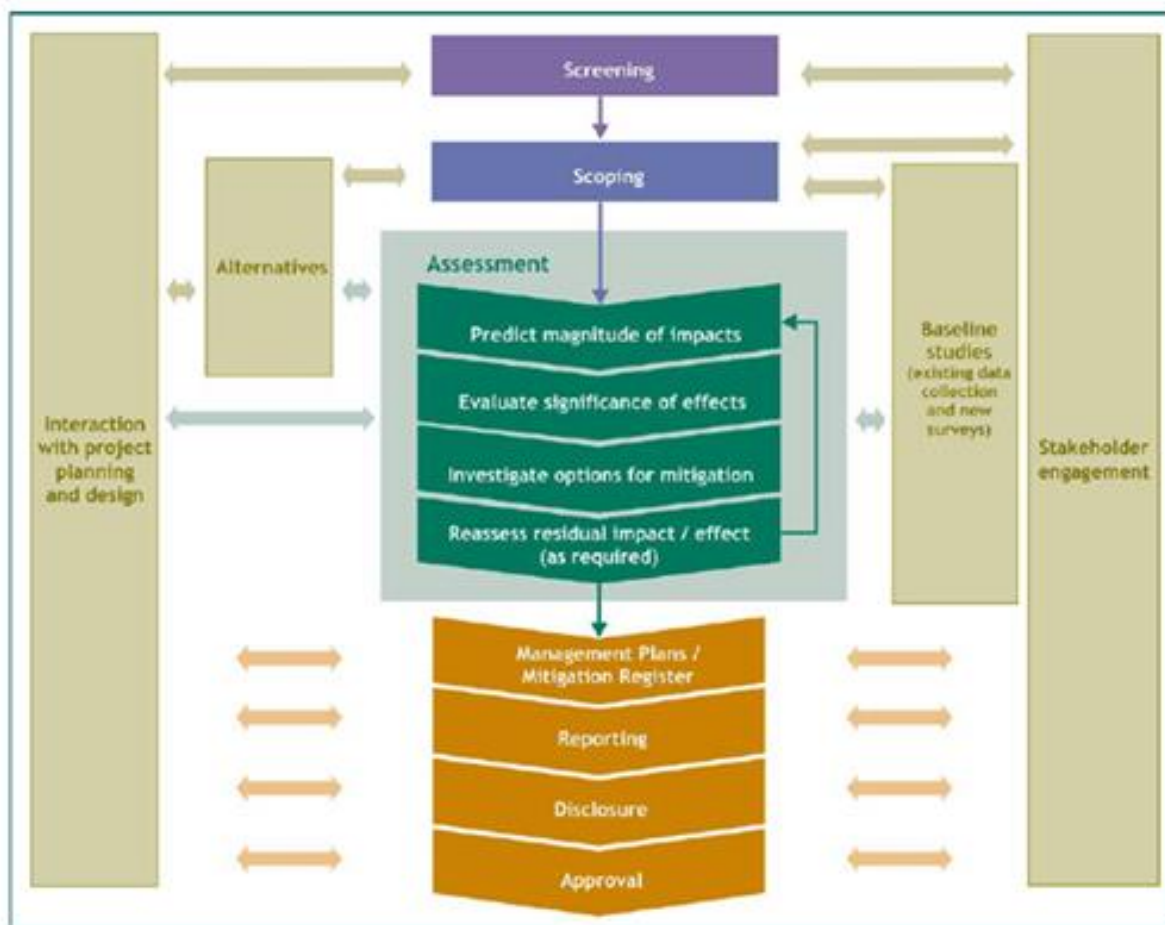


Figure 4-1. ESIA Methodology

4.2.2 Scoping

Scoping is a vital early step in the preparation of the ESIA. The scoping assessment identifies issues that are likely to be important during the process and eliminates those that are not. Effective scoping will ensure that the ESIA focuses resources on those areas where significant effects are likely. It also ensures that cumulative impacts are identified at an early stage and addressed so far as is practicable in the early stages of Project development. Good design practice dictates that alternatives are considered and the advantages and disadvantages of all options investigated.

The approach to the scoping is based on EBRD's Environmental and Social Performance Requirements and IFC Performance Standards on Social and Environmental Sustainability, key process elements of the ESIA process generally consist of:

- i. project definition;
- ii. (initial) screening of the project and the scoping of the ESIA process;

- iii. stakeholder identification and gathering of social and environmental baseline data, where relevant;
- iv. impact identification and analysis; and;
- v. generation of mitigation or management measures and actions.

In Turkey, Scoping is officially a part of the EIA procedure according to the Turkish EIA Regulation. As per the Regulation, “Scoping and Format Determination Meeting” with the participation of Examination and Evaluation Committee members who will review the EIA Report is held at the Turkish Ministry of Environment and Urbanization in Ankara. The objective of this meeting is to set the scope of EIA works to be conducted for a specific project following the completion of Public Participation Meeting in a province where the proposed project will be realized. Since the Project is exempted from the legal EIA procedure, the official Scoping process required by the Turkish EIA Regulation has not been carried out for the Project. In this respect, the guidelines of European Commission (EC) (2001), EBRD Environmental and Social Policy (2008) and Performance Standards 2012 of the International Finance Corporation (IFC) which were integrated into the Equator Principles (2003) on scoping were utilized for the identification of internationally acceptable ESIA scope.

Given the tight project timetable, the initial scoping was based on the professional experience and expertise of the ESIA Team formed for the Project, discussions with the wider project team, reviews of the existing project documents including initial project design, and assessment of the current environmental and social conditions of the project site and potential impacts of the Project. Scoping was undertaken for the Project to identify the AoI for the Project, to identify interactions between the Project and resources/receptors and impacts that could result from these interactions. A number of decisions regarding the location, scale, layout and design of the development were made during the proposal identification process. Characteristics of the Project as a large-scale urban land development and operation of large-scale hospital facilities are taken into account to identify key environmental and social issues to be assessed. The initial scoping has been accompanied with stakeholder consultation about the project’s benefits and impact. Preliminary consultation meeting was done on 17th of January with the most affected people. Information about scoping phase has been shared and concerns and expectations of the PAPs have been answered by SPV and ESIA team. Attendees were; owners of pharmacies, Mukhtars of Ayvalı and Varlık mahalles, owner of café, amusement park and sport complex (same person).

The ESIA Team’s professional expertise, discussion with the wider Project/Design Team of the Project Company, initial discussions with key stakeholders, the reviews of the existing project documents and relevant media coverage and analyses of the characteristic of the project as a large-scale urban land development and operation of the large-scale hospital

operation have made initial identification and prioritization of key environmental and social issues of the Project. .

The key focus areas identified during the scoping process are summarized below:

- improvements to healthcare provision for the residents of Ankara;
- traffic impacts associated with the construction and operation of the hospital complex;
- additional people flow that will be brought about to the existing utilities and amenities surrounding the Project site such as malls, transportation system etc.;
- stakeholder engagement to inform and consult benefits and impact of the Project and environmental;
- health and safety management during the construction and operation (e.g. infectious disease management);
- security issues regarding the forensic hospital;
- possible temporary effects on healthcare provision during the transitional phases;
- economic displacement, job creation, noise and other nuisance during construction.

Further analyses on the key and other environmental and social issues were taken care during the ESIA studies.

4.2.3 Baseline Studies

This stage comprises the collection of baseline data representative of the Study Area in order to provide a baseline against which the impacts of the Project can be assessed. The baseline takes into account current conditions, as well as those changing conditions (i.e. trends) apparent in the baseline. It takes into consideration other developments in the area which are underway or certain to be initiated in the near future.

The baseline description has the following main objectives:

- to focus on receptors that were identified during scoping as having the potential to be significantly affected by the Project;
- to describe and where possible quantify their characteristics (nature, condition, quality, extent, etc.);
- to provide data to aid the prediction and evaluation of possible impacts; and
- to inform judgments about the sensitivity, vulnerability and/or importance of resources/receptors.

See *Section 4.2* for a description of the methodologies, limitations and results of the data collection, as well as a summary of the baseline conditions.

4.2.4 Stakeholder Engagement

Stakeholder engagement is a critical requirement underpinning the impact assessment process, which requires engagement with relevant stakeholders throughout key stages of the Project. This assists in informing stakeholders about the Project as well as understanding stakeholder views on the Project, which should be taken into account in the prediction and evaluation of impacts. Stakeholder engagement activities are planned and recorded in a stakeholder engagement plan (SEP). A description of stakeholder engagement activities are presented in *Section 4.4* and the SEP can be found in Appendix J.

4.2.5 Assessment of Impacts

4.2.5.1 Introduction

Impact identification and assessment commences with scoping and continues through the remainder of the impact assessment process. This is a largely objective exercise to determine what could potentially happen to the environment as a consequence of the Project and associated activities. As during scoping, potential interactions between the Project and baseline environment are identified. The potential impacts resulting from any potential interactions are then explained. As the range of potential impacts is diverse, a wide range of prediction methods are used including quantitative and qualitative methods.

The principal steps include:

- Impact prediction: to determine what could potentially happen to resources / receptors as a consequence of the Project and its associated activities.
- Impact evaluation: to evaluate the significance of predicted impacts by considering their magnitude and the sensitivity or importance to the affected resource / receptor.
- Mitigation and enhancement: to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.
- Impact evaluation: to evaluate the significance of residual impacts assuming effective implementation of mitigation and enhancement measures.

4.2.5.1.1 Determining Magnitude

Once the impact characteristics are understood (as described in Table 4-1), they are used to assign each impact a magnitude.

Table 4-1. Impact Characteristic Terminology

Characteristic	Definition	Description
Type	A description indicating the relationship of the impact to the Project in terms of cause and effect	• Direct (impacts that result from a direct interaction between the Project and a resource/receptor) • Indirect (impacts that follow on from direct interactions between the Project and its environment) • Induced (impacts that result from other activities (which are not part of the Project) but that happen as a consequence of the Project)
Duration	The time period over which a resource / receptor is affected	• Temporary • Short-term • Long-term • Permanent
Extent	The geographic reach of the Project	• Local • Regional • International
Scale	The size of the impact in terms of size of area affected or percentage of resource lost or affected	[no fixed designations; intended to be a numerical value]
Frequency	The measure of the constancy or periodicity of the impact	[no fixed designations; intended to be a numerical value]

Magnitude describes the intensity of the change that is predicted to occur in the resource or receptor as a result of the impact and is a function of the following impact characteristics:

- Extent;
- Duration;
- Scale;
- Frequency;
- Likelihood (for unplanned events only).

Likelihood pertains only to unplanned events (e.g. explosion, community riot, etc.). The likelihood of an unplanned event occurring is designated using a qualitative (or semi-quantitative, where appropriate data are available) scale.

The magnitude designations are:

- Positive;
- Negligible;
- Small;
- Medium; and
- Large.

Whilst the designations of magnitude are universal, the definitions of these designations vary on a resource / receptor basis. The overall significance of positive impacts is not rated.

4.2.5.1.2 *Determining Sensitivity/Vulnerability*

Defining sensitivity or vulnerability is the other principal impact evaluation step taking into account a range of factors which may be physical, biological or socio-cultural. Other factors may include legal protection, environment policy, stakeholder views and economic value. As with magnitude, designations of sensitivity are universal but the definitions of these designations vary on a resource / receptor basis. Sensitivity designations include:

- Low;
- Medium;
- High.

4.2.5.1.3 *Impact Significance*

Once magnitude and sensitivity has been characterized, impact significance can be assigned according to the matrix in Figure 4-2.

		Sensitivity/Vulnerability/Importance of Resource / Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Not Significant	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

Figure 4-2. Impact Assessment Matrix

4.2.5.2 Mitigation and Enhancement Measures

Once the significance of a given impact has been characterised, appropriate mitigation or enhancement measures are identified. In the case of mitigation, the priority is to first apply mitigation measures to the source of the impact (i.e., to avoid, or reduce the magnitude of, the impact from the associated Project activity), and then to address the resultant effect to the receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

4.2.5.3 Assessing Residual Impacts

Once mitigation and enhancement measures are identified, the significance of residual impacts after mitigation has been applied, is predicted. Residual impacts are assessed as Negligible, Minor, Moderate or Major. Positive impacts are not assigned a degree of significance, but simply stated as being positive.

4.2.6 Dealing with Uncertainty

Even with a firm Project design and a stable environment, predictions are by definition uncertain. Potential impacts have been characterized through quantitative or qualitative assessment and expert judgment. Where assumptions have been made, the nature of any resulting uncertainties is presented. Uncertainty can also arise as a result of the stage of project planning at the time of report preparation. Where this results in uncertainty material to the findings of the ESIA, it is clearly stated. The general approach has been to take a conservative view of likely residual impacts, to identify standards of performance that the project will meet, and to propose suitable monitoring and additional contingency measures.

4.2.7 Management and Monitoring

The final stage of the impact assessment process is to define the required management and monitoring measures to ensure that impacts or associated Project components remain in conformance with applicable standards and that mitigation measures are effectively addressing impacts. An Environmental and Social Management and Monitoring Plan (ESMMP) has been prepared for this purpose and presented in Appendix-D.

4.2.8 Study Limitations

Every effort has been made to obtain data concerning the existing environment and to accurately predict the effect of the Project.

The Project-specific aspects of this ESIA have drawn upon existing literature, project-specific documentation, personal communication with local experts and site-specific surveys and studies. References are provided to enable additional reading on specific aspects of interest.

This ESIA has been based on the best available information at the time of publication. However, the ESIA of the project will continue throughout detailed design phase and will take account of forthcoming research results as and when they become available.

Limitations to the baseline data: Baseline data discussions are divided into two main groups;

- i. environmental baseline; and
- ii. social baseline data gathering.

No significant limitations regarding the environmental baseline data gathering through literature search and field surveys (measurements and analysis) are noted. Regarding the social baseline data gathering limitations were mainly due to the existing State Council decision for suspension of the ongoing project activities based on evaluation of lawsuit request of Turkish Medical Association. Due to this fact, SPV and the MoH postponed to conduct social baseline data gathering and public consultations needed for the compilation of the ESIA Report until the legal settlement which took place in March 2013.

Regarding the project description data availability, limitations were related to the slow developments in the project design activities and inquiring rational behind decisions which were made or would be given by the MoH in relation to the power generation, traffic management, security services in Forensic Hospital, commitments related to the management of the operational staff in particular medical services.

In order to overcome the above limitations, some assumptions have been made based on professional judgment of consultants experienced gained on similar and comparable projects. It should be also noted that some of the gaps were highlighted in the ESMMP and will be separately listed in the Environmental and Social Action Plan (ESAP) to be prepared based on the ESIA documentation.

Assumptions adopted in the evaluation of impacts are reported in the relevant sections. However, these assumptions are often implicit, relying on expert judgment. Where technical deficiencies are known, or it has been necessary to make assumptions, these are documented.

The ESIA has been undertaken during the initial design phase of the project and therefore some of the technical aspects of the construction have yet to be determined. Where an alternative option could incur additional impacts, these are discussed in pertinent sections.

4.3 Baseline Conditions

The Project Site is situated in the city, i.e. surrounded by houses, shopping center and other public buildings such as hospital and school. The site is also surrounded by main streets at each side (see satellite image showing the site in Figure 4-3). Moreover, as can be seen from the satellite image given in Figure 4-3 below, the site is currently occupied to a certain extent. The area covers Etlik Maternity Hospital, Polyclinic of the Diskapi Training & Research Hospital, Etlik Specialist Hospital with a capacity of 400 beds, 3 buildings for living quarters, archive and storage buildings for the Social Security Agency, two cafes, garage and social recreation facilities. A subway line is currently under construction, and is passing from the south of the Project Site. A camp site for subway construction is located adjacent to the Project Site. Also, there is a kiosk neighboring the Project Site at northwest. Photos from the Project Site are given in Figures 4-4 and 4-5.



Source: GoogleEarth.

Figure 4-3. Satellite Image Showing Buildings Existing in the Project Site

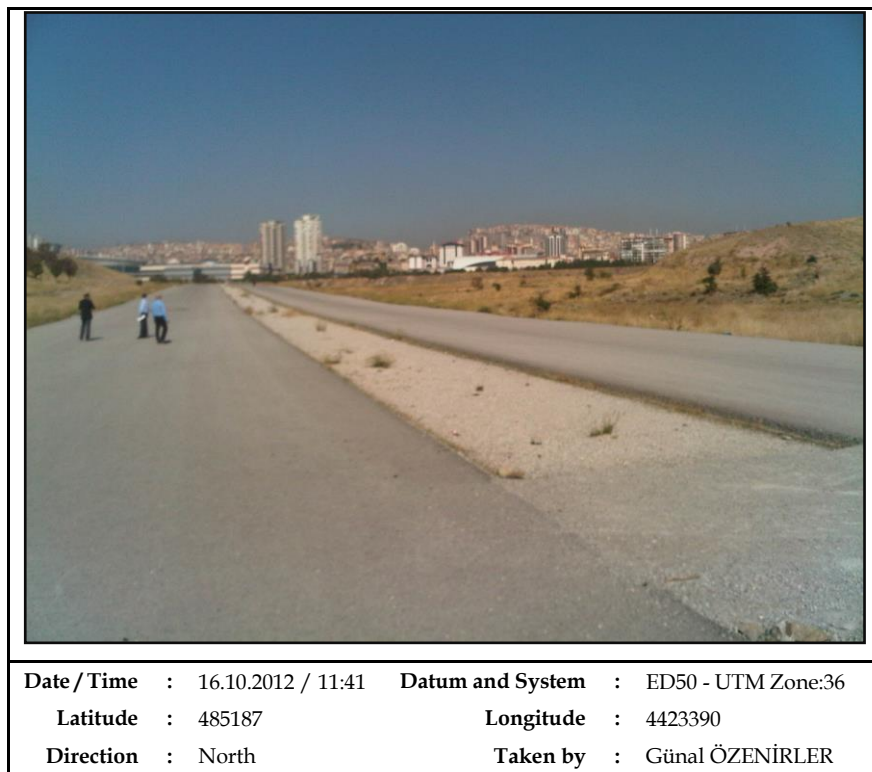


Figure 4-4. A View from the Project Site-1



Figure 4-5. A View from the Project Site-2

Specialist Hospital and living quarters have been evacuated for demolishing. There is also a wide asphalted road within the site connecting southern and northern streets.

Baseline characteristics of the important environmental elements are provided under respective sections below.

4.3.1 Physical

4.3.1.1 Air

The Ministry of Environment and Urbanization is operating National Air Quality Monitoring Network in which air quality data, i.e. PM₁₀, PM_{2.5}, SO₂, NO₂, NO_x, O₃, temperature, wind direction, wind speed, relative humidity and pressure are gathered from the stations spread in Turkey since 2009. In Ankara, there are eight stations, and as can be seen from the figure below, five of them are surrounding the Project Site. As seen in the figure, two stations are closest to the Project Site, i.e. Keçiören and Demetevler.



Figure 4-6. Air Quality Monitoring Stations near the Project Site

Air quality data measured at the Air Quality Measurement Station of the MoEU at Keçiören, and Demetevler in 2012 are presented in hourly and daily basis below.

Table 4-2. Air Quality Data of Keçiören and Demetevler, Ankara

Parameter	Average Daily (µg/m³)		Maximum (µg/m³) (Hourly/Daily)				Limit Value in Turkish Legislation*	Limit Value in EU**
	Keçiören	Demetevler	Keçiören		Demetevler			
PM ₁₀	75	72	1374	566	2439	458	78*	50
SO ₂	18	13	232	103	183	109	150*	125
NO	38	36	813	177	838	267	-	-
NO ₂	55	46	246	125	223	160	68*	200***
NO _x	97	88	849	310	995	350	-	-
O ₃	34	-	317	178	-	-	-	120****

* Limit values on daily basis given for the year 2012 in Table 2.2 in Annex-2 to the Regulation on Control of Industrial Air Pollution.

** Limit values on daily basis given in Directive 2008/50/EC on ambient air quality and cleaner air for Europe.

*** Hourly limit value.

**** Maximum daily 8 hour mean

Comparing these values to the limit values of ambient air quality given in the above table, air quality values in Keçiören are under legal limits for PM₁₀, SO₂ and NO₂. There are no limit values for ambient NO and O₃ in the Regulation on Control of Industrial Air Pollution (RCIAP).

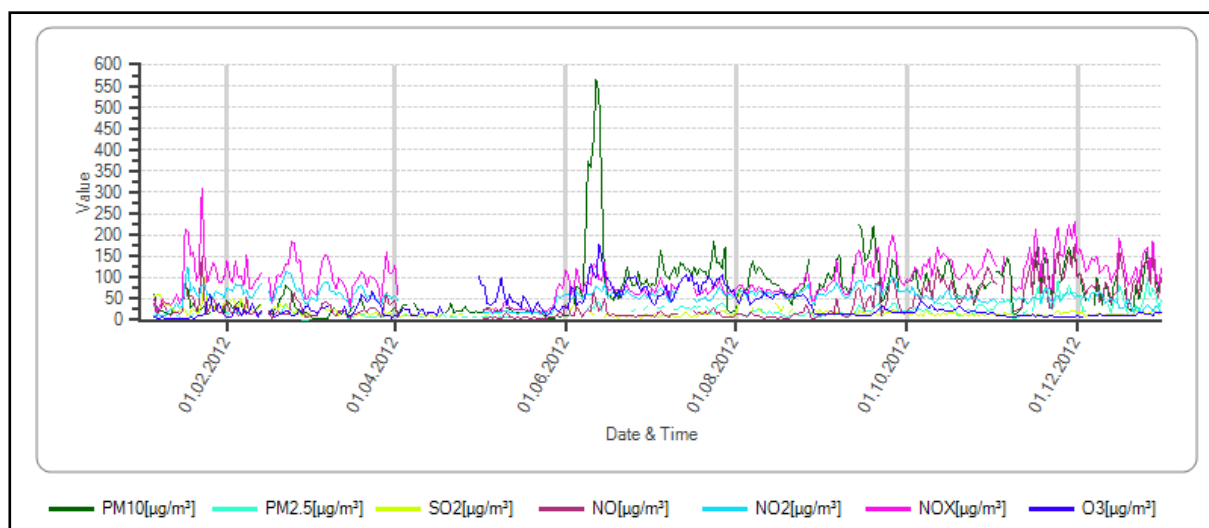


Figure 4-7. Graphical Representation of Daily Air Quality Data of Keçiören

As can be seen from Figure 4-7, peak values were observed within a very short time interval. Hence, average values are fairly below it. Also, due to dry weather conditions in Ankara, PM₁₀ concentration is high during summer.

An area-specific air quality data were produced through baseline measurements which were conducted in the closest sensitive receptors. Baseline air quality measurement locations are given in Figure 4-14.

4.3.1.2 Water

During site survey conducted at the Project Site, no natural surface watercourse was observed, nor are any noted on mapping for the locality.

4.3.1.3 Climate

Terrestrial climate prevails in the central Anatolia with cold winters with precipitation and hot and dry summers. Since central Anatolia is surrounded by mountain ranges in each direction, marine effect cannot be observed in the region, hence, climate is not humid, except for northern part of the province which is a transitional area between terrestrial and Black Sea climate. According to long-term meteorological data recorded at Ankara Meteorological Station between 1970 and 2011, average temperature is 12 °C while average maximum and minimum temperatures are 30.3 °C in July and -3.0 °C in January, respectively. Average insolation time in the city is 6.6 days. Average number of days with precipitation is 8.7 whereas annual average of monthly total precipitation is 33.4 kg/m². Long-term meteorological data are presented in monthly basis in Table 4-3.

Table 4-3. Meteorological Data for Ankara

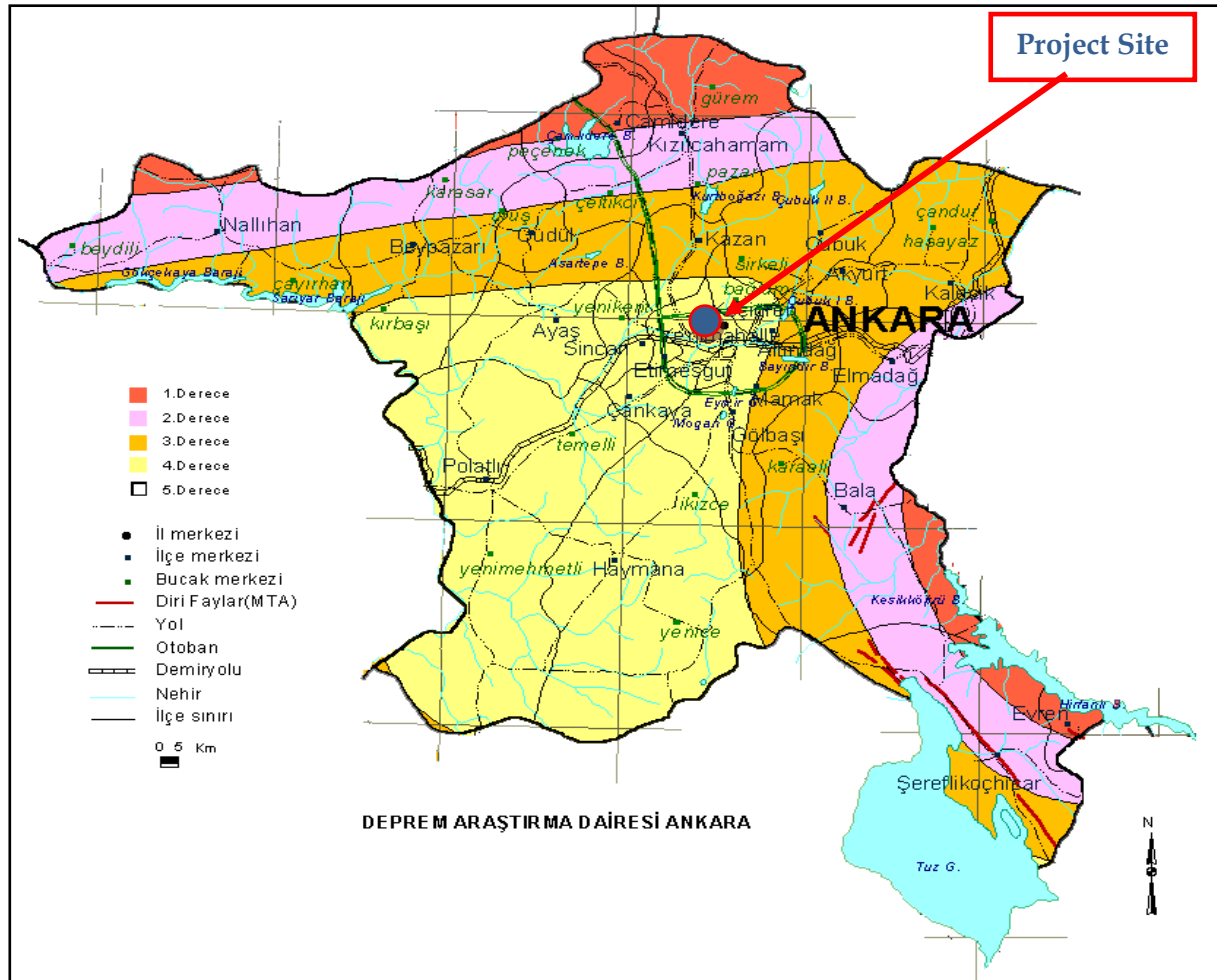
Meteorological Parameters	January	February	March	April	May	June	July	August	September	October	November	December
Average temperature (°C)	0.3	2.1	6.2	11.3	16.1	20.2	23.6	23.3	18.7	13.0	6.7	2.3
Average max. temperature (°C)	4.3	6.7	11.9	17.1	22.2	26.6	30.3	30.2	26.0	19.7	12.4	6.2
Average min. temperature (°C)	-3.0	-2.0	1.1	5.7	9.7	13.1	16.1	16.1	12.0	7.4	2.2	-1.0
Average insolation time (hour)	2.4	3.5	5.3	6.3	8.4	10.3	11.3	10.5	9.2	6.4	4.2	2.2
Average number of days with precipitation	11.1	10.4	10.6	12.3	12.5	8.9	3.9	3.0	3.8	7.5	8.8	11.0
Monthly total amount of precipitation (kg/m ²)	39.2	33.4	36.7	50.0	50.3	35.3	15.5	12.0	17.5	33.2	35.4	42.5

[URL-2]: Official website of the General Directorate of State Meteorological Works.

4.3.1.4 Seismicity and Geohazards

Ankara is a zone crisscrossed by plains and lowlands formed by the branches of Kizilirmak and Sakarya rivers passing through to the northwest of the Central Anatolia. It is possible to see forest areas lying next to steppes and moorlands. Mountains that are a branch of range of North Anatolia Mountains mark the northern border of the province and pass through lowlands which are actually the continuation of the Central Anatolian plains.

The Project Site is fairly flat with limited variation in topography with mild inclination towards the south. As can be seen from the earthquake map of Ankara (see Figure 4-8), prepared by Earthquake Research Department of the General Directorate of Disaster Affairs, Ankara lies in a fourth-degree (degree one being the most risky whereas degree five being with least danger) earthquake zone (see fair yellow zone including Keçioren in the map in Figure 4-8). In the map, degree one (red zone) indicates the most risky areas while degree five (white) shows the areas with least danger (there are no fifth-degree zones in Ankara).



Source: Earthquake Research Department of the General Directorate of Disaster Affairs

Figure 4-8. Earthquake Map of Ankara Province

4.3.1.5 Traffic

A detailed traffic assessment has been carried out to identify the existing condition of traffic during rush hours in the surrounding nodes and arteries. In the context of the study, 15-minute traffic counts were made using cameras. This study focused on 10 intersections named A1 through A10 as shown in Figure 4-9.

Outcomes of the baseline traffic study are given as follows:

- The traffic is heavily congested during the weekday morning and evening peak hours. Saturday observations on the given time periods did not show congestion level as critical as the weekday ones;
- In the campus area, north-east boundary, Etlik Caddesi, is one of the main arterials connecting northern part of Keçiören region to the city center, and has major traffic flows on it;

- The morning peak started earlier on the north-east edge of the campus area, Etlik Caddesi, (A1, A2 and especially A3), with has significant traffic flows;

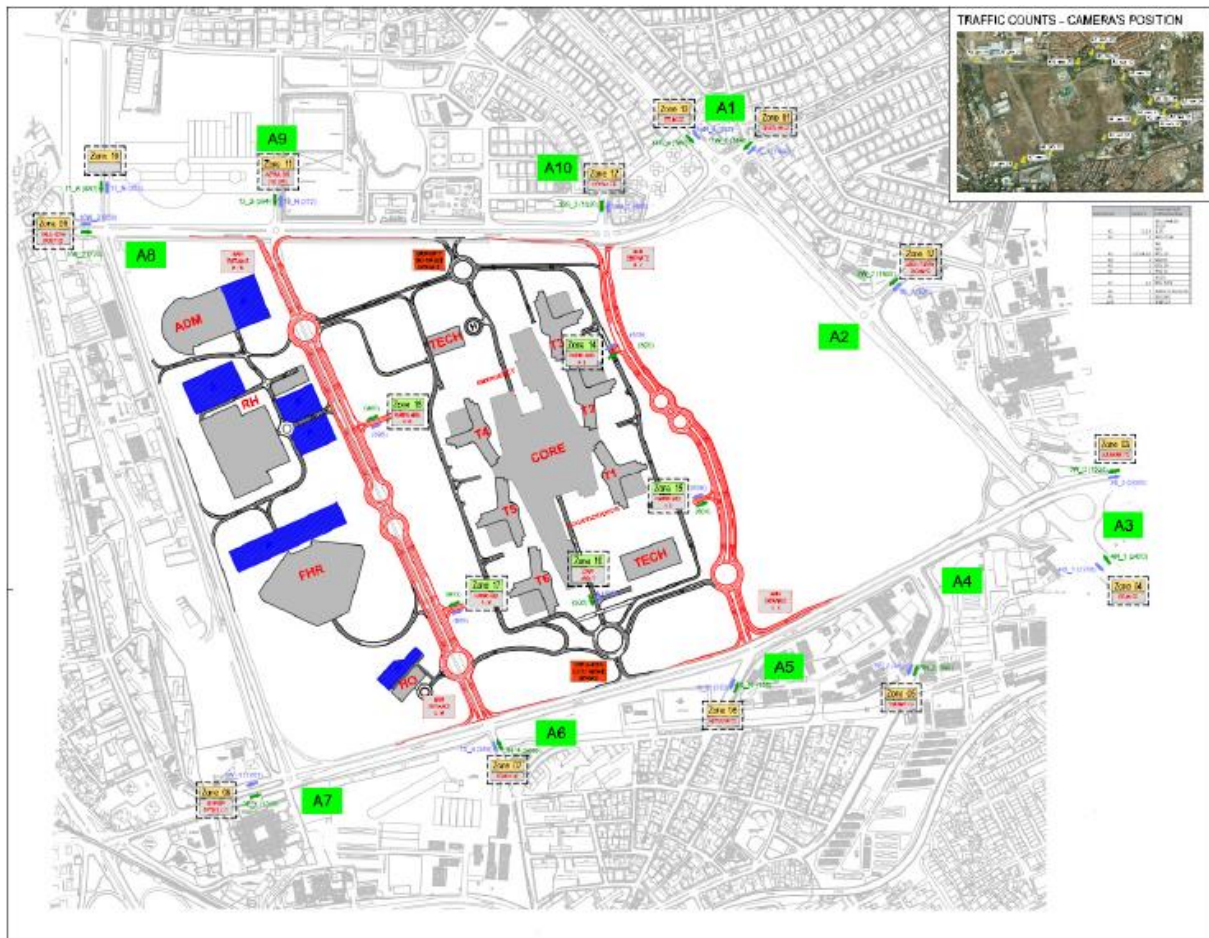


Figure 4-9. Intersections Determined for the Traffic Assessment Study

- A3 and A4 were the first intersections to be congested. While there are not any apparent traffic attraction points on the southern part of A4, driving through the study area (as shown in Figure 4-9) during the weekday morning selected periods showed the south exit of the A4 intersection is used as a by-pass road to reach main arteries avoiding a portion of the commute traffic congestion.
- Traffic caught up slowly in the northern edge (A8, A9 and A10). The evening peak again was observed more heavily and earlier on the same locations but lasted for about 2 hours.⁷

According to results of the traffic assessment study, it was found out that total calculated number of vehicles in the existing network during morning traffic peak is roughly 10,650 vehicles per hour.

Derived from observations of baseline traffic conditions (and current traffic management measures) traffic congestion on the main roads near the Project site could be decreased by

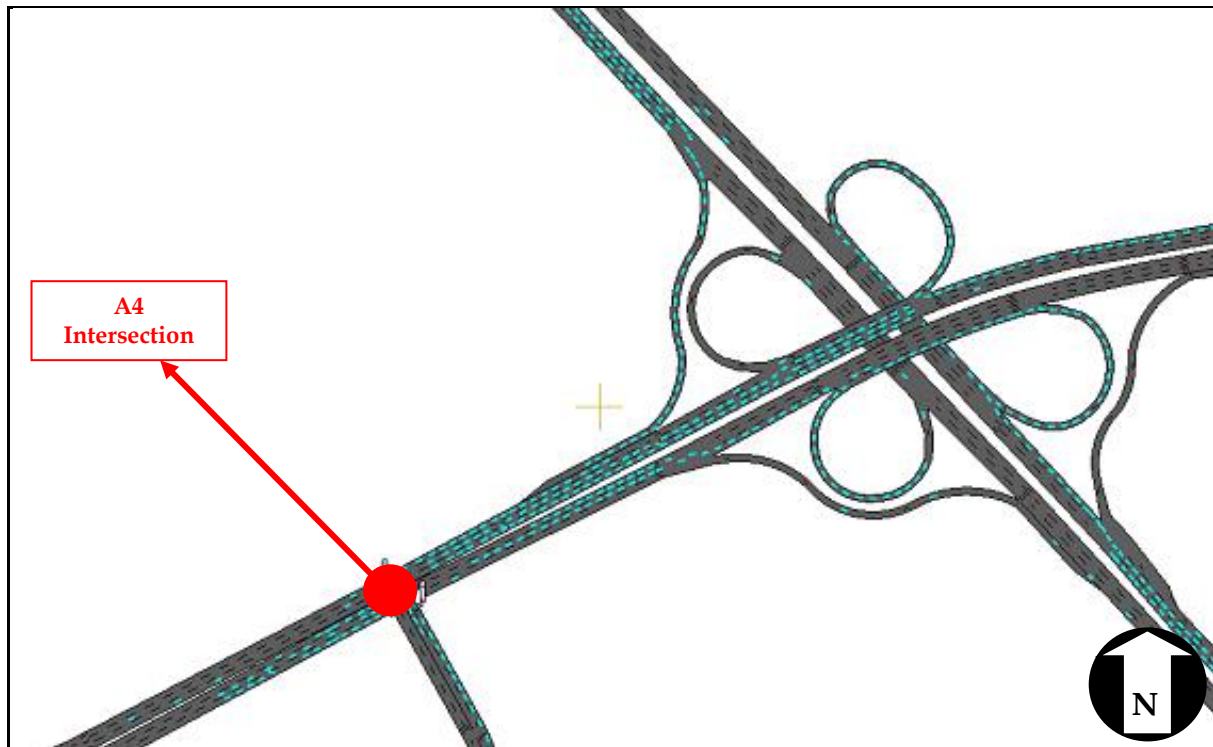
revising durations of red and yellow lights. The traffic congestion during morning and evening rush hours is the heaviest on Etlik Street to the east. Based on computer modeling, the study team concluded that this congestion is mainly due to the congestion in the eastern-most intersection to the south of the Project site (along Eşref Bitlis Street). This intersection has been labeled as A4 in the modeling study (see Figure 4-10).



Source: Google Earth

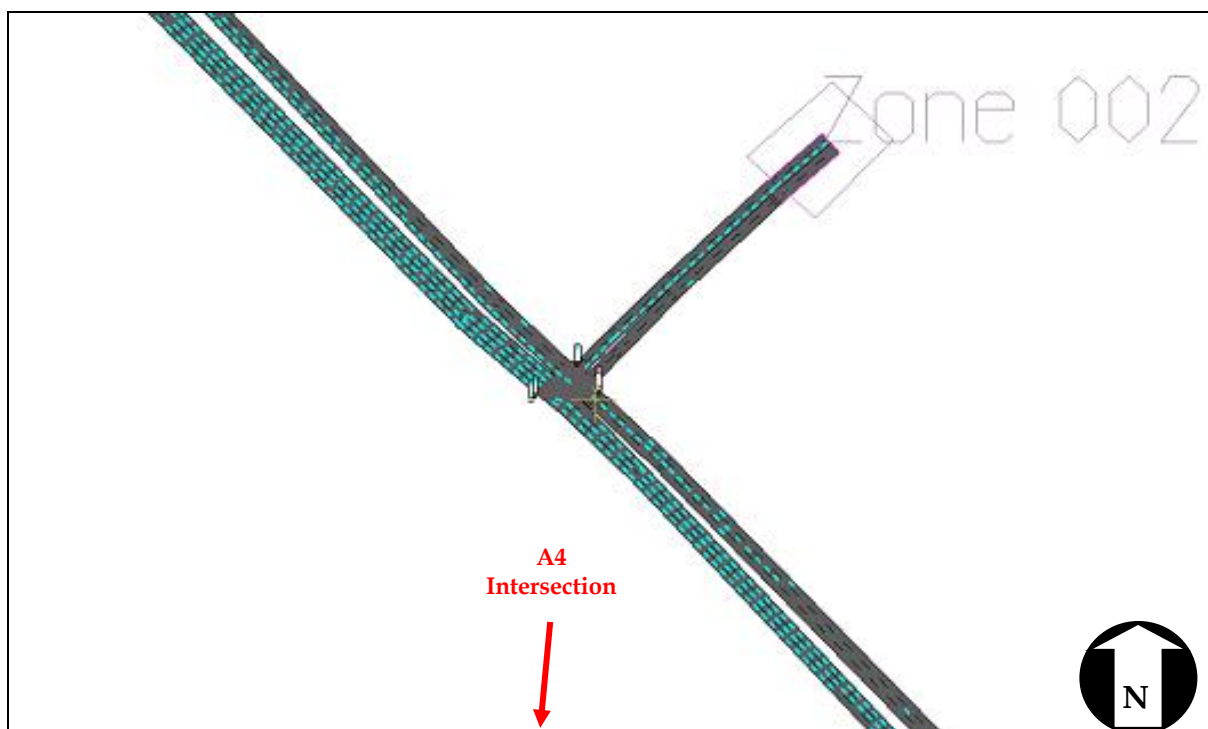
Figure 4-10. A4 Intersection

The current traffic situation during morning rush hours at this intersection is illustrated in Figure 4-11 below. Figure 4-12, shows the traffic condition to the north of this area shown in the Figure 4-12, i.e. to the east of the Project site.



Source: Ankara Etlik IHC Traffic Study, 2012.

Figure 4-11. Traffic Situation at A4 Intersection during Morning Rush Hours

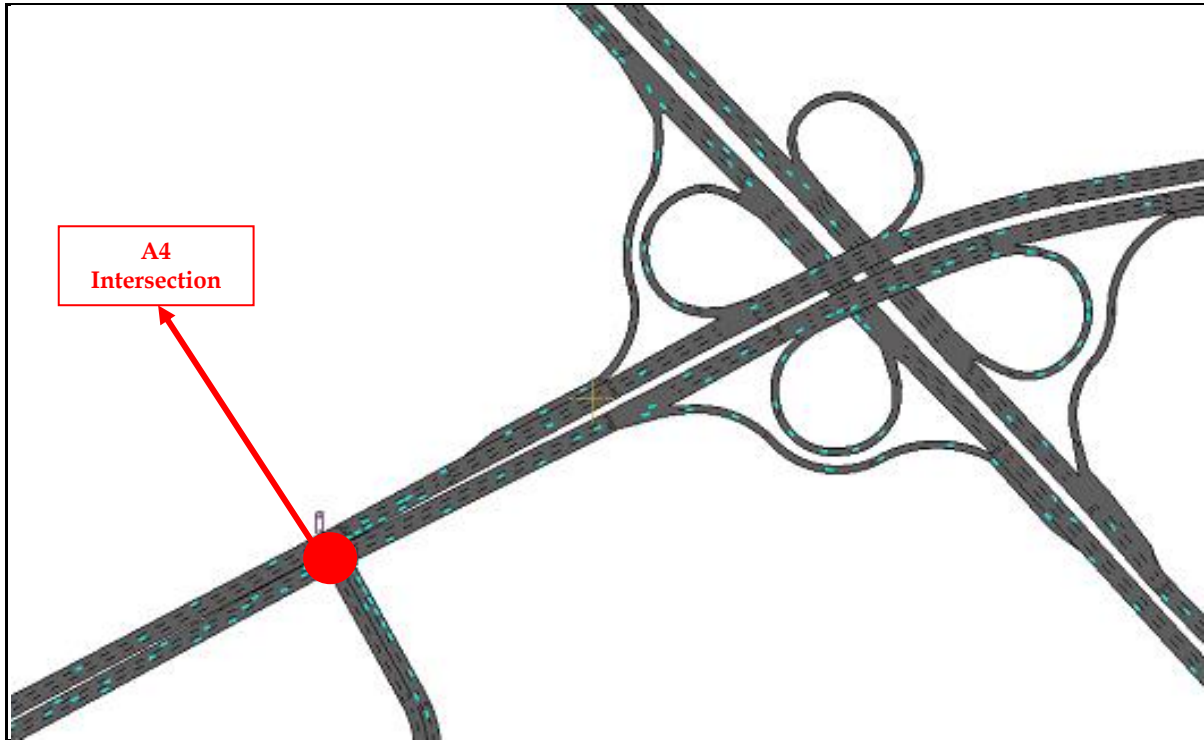


Source: Ankara Etlik IHC Traffic Study, 2012.

Figure 4-12. Traffic Situation to the east of the Project Site during Morning Rush Hours

It is seen that the short duration of the green light at the intersection A4 for drivers turning to the left, i.e. south, is not only insufficient to clear the crossroad, but also propagate the traffic congestion backward.

Based on modeling when the duration of the green light for drivers coming from the west and turning to the south at the intersection A4 is increased from 20 seconds to 65 seconds, and the red light has been set to 17 seconds, it is observed that traffic situation becomes better as can be seen from Figure 4-13.



Source: Ankara Etlik IHC Traffic Study, 2012.

Figure 4-13. Traffic Situation in rush hours in the case the duration of the green light for turning towards south at A4 has been increased

4.3.1.6 Baseline Measurements

In the context of this study, baseline condition of the project site was observed and recorded with mapping regarding locations of the envisaged project built elements.

In order to describe baseline soil pollution, soil samples were taken from 12 locations where there is suspicion for contamination. These locations were determined during field study, and samples were taken from points close to surface using hand auger.

In addition to determination of baseline air quality, samplings and analyzes were carried out at the closest sensitive receptors (four locations) in order to determine particulate matter (PM₁₀) concentration.

Noontime, evening and nighttime noise levels were the measures to determine background noise levels. For this purpose, background noise levels were measured at the closest sensitive receptors, which were determined as appropriate during the field study.

The map showing sampling and measurement locations are given in Figure 4-14.

4.3.1.6.1 Soil Pollution

For the purpose of determination of the potential for baseline soil pollution, information about the samples taken from 12 locations is presented in Table 4-4.

Table 4-4. Locations where soil samples were taken

No	Description	Coordination (UTM Datum ED 50)	
		East	North
1	Sampling Point-1 (Soil-01)	485866	4423897
2	Sampling Point -2 (Soil-02)	486102	4423708
3	Sampling Point -3 (Soil-03)	485561	4423414
4	Sampling Point -4 (Soil-04)	485622	4423645
5	Sampling Point -5 (Soil-05)	485214	4423712
6	Sampling Point -6 (Soil-06)	485143	4423362
7	Sampling Point -7 (Soil-07)	485016	4423593
8	Sampling Point -8 (Soil-08)	484777	4424069
9	Sampling Point -9 (Soil-09)	485140	4424229
10	Sampling Point -10 (Soil-10)	485357	4424046
11	Sampling Point -11 (Soil-11)	485420	4423793
12	Sampling Point -12 (Soil-12)	485692	4424103

Antimony, arsenic, copper, mercury, zinc, silver, cadmium, stannum, chromium, lead, selenium, TPH and asbestos parameters were analyzed in soil samples taken from the locations given in Table 4-4. Analysis results are given in Table 4-5 whereas analysis reports are given in Appendix-E.

Table 4-5. Analysis Results of Soil Samples

Parameter /Location	Sampling Location-1	Sampling Location-2	Sampling Location-3	Sampling Location-4	Sampling Location-5	Sampling Location-6	Sampling Location-7	Sampling Location-8	Sampling Location-9	Sampling Location-10	Sampling Location-11	Sampling Location-12
Antimony (mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic (mg/kg)	5.0	5.0	4.5	8.5	6.5	2.9	2.1	5.15	7.5	4.5	8.5	8.0
Copper (mg/kg)	18.5	24	13.5	18	14.5	14.5	15.5	11	52	17	24	23.5
Mercury (mg/kg)	9.5	2.75	1.2	2.2	1.5	0.8	1.0	0.85	1.65	0.75	1.0	0.65
Zinc (mg/kg)	87.5	49	46.5	67.5	59.5	60.5	50	51	129.5	55	73.5	111
Silver (mg/kg)	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Cadmium (mg/kg)	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75
Stannum (mg/kg)	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25
Chromium (mg/kg)	33	57	45.5	19.5	25.5	42.5	46	36	46	36	28.5	32
Lead (mg/kg)	92	95	65.5	68	66.5	86	108.5	100.5	173	102	159.5	124.5
Selenium (mg/kg)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
TPH (mg/kg)	0.022	-**	-	0.026	-	-	-	-	0.019	-	-	-
Asbestos	Asbestos	No	-	-	No	-	-	-	-	No	-	-
	Actinolite	n.d.*	-	-	n.d.	-	-	-	-	n.d.	-	-
	Amosite	n.d.	-	-	n.d.	-	-	-	-	n.d.	-	-
	Anthophyllite	n.d.	-	-	n.d.	-	-	-	-	n.d.	-	-
	Chrysolite	n.d.	-	-	n.d.	-	-	-	-	n.d.	-	-
	Crocidolite	n.d.	-	-	n.d.	-	-	-	-	n.d.	-	-
	Tremolite	n.d.	-	-	n.d.	-	-	-	-	n.d.	-	-

* not detectible

** analysis was not carried out.

Values given for antimony, arsenic, copper, mercury, zinc, silver, cadmium, stannum, chromium, lead, selenium and TPH in Table 4-5 are the Reference Values (RV) of the Etlik IHCP site pursuant to the Regulation on Control of Soil Pollution and Sites Polluted by Point Sources (RCSPSPPS). According to this regulation, RV is "pollution indicator parameter (PIP) or value of target pollutant measured for comparison with PIP of the site at Phase I assessment and target pollutant concentration values (TPCV) at Phase-II assessment in soil, surface water and groundwater samples taken from areas that are considered unpolluted due to a point source or human activity, in the vicinity of the suspicious site". Pursuant to the RCSPSPPS, "in case sufficient or exact results are not obtained or site is suspicious for pollution as a result of Phase-I assessment, soil/surface-groundwater/gas samples are taken from site assumed to have been polluted by a point source or human activity, and PIP given in Table 1 and 2 in Annex-2 are measured. These measurements are named as 'measurement results (MR)', and maximum value is named as MR_{max} . MR_{max} is compared with the RV".



Figure 4-14. Baseline Noise, Air, Soil, Groundwater Sampling Locations

In suspicious site, MV and RV are compared and deviation level from RV is calculated. Deviation level is used to determine whether the site has been affected by an activity at a point and thus, to figure out the method to follow.

$$\text{Deviation} = \frac{MV_{\max}}{RV}$$

This assessment is made according to the basic framework given in Table 4-6. In this regard, the site is designated as a "Site for which follow-up is required" if ratio of $MV_{\max}$ to RV is equal to or less than 1. If deviation level is between 1 and 25, the site is subject to Phase-II assessment and designated as "Site for which follow-up is required". If deviation level is larger than 25, it is considered that there is high pollution and danger, and hence, site is designated as "Polluted Site" which has to be remediated within time allowed by the Ministry. When more than one PIP is going to be measured at site, the deviation level, which indicates the worst case is taken into consideration.

Table 4-6. Site Pollution Assessment on RD Basis

Criteria (Deviation = $MV_{\max}/RV$)	Assessment
< 1	Site for which follow-up is required
> 1	Site which is subject to Phase-II assessment and follow-up is required for
> 25	Polluted Site which is required to be remediated within time allowed by the Ministry

Source: Table 1 in Annex-9 of the RCSPSPPS (Site Pollution Assessment on RD Basis)

Measured PIP values are compared with RV as stipulated in Annex-9 to the RCSPSPPS. As a result of this comparison, Provincial Directorate of Environment and Urbanization designates the site as

- Site for which follow-up is not required;
- Site subject to Phase-II assessment, site for which follow-up is required;
- Site for which remediation is required, polluted site.

These measurements are considered as reference values for the site. In other words, they represent the unpolluted condition of the site. These values are intended to be compared with the samples that might be necessary to be taken in case of a suspect for pollution in the future. The analyses of soil samples are forming a background soil quality prior to the realization of the proposed investment. Observations of soil pollution expert on the site reveal that the site is not polluted and results of the soil analyses confirm this statement since the values are not showing extreme values for the set of parameters analyzed.

4.3.1.6.2 Air Quality

Locations of air quality (PM) measurements carried out on November 6, 2012 at the project site and the closest receptors are given in Table 4-7 whereas analysis report is presented in Appendix-F.

Table 4-7. PM Measurement Locations

No	Name of Measurement Location	Coordinates (UTM Datum ED 50)	
		East	North
1	Ziya Gökalp Elementary School (PM-01)	485510	4423361
2	Kanuni Vocational High School (PM-02)	486209	4424385
3	Uhud Apartments (PM-03)	485446	4424538
4	Yahya Kemal Beyatlı High School (PM-04)	484630	4423826

PM measurements were carried out according to gravimetric method pursuant to TS EN 12341. Comparison of measurements carried out at the closest receptors with the Short-Term Limit Values (STLV) given in Annex-2 of the Regulation on Control of Air Pollution Originating from Industry (RCAPOIE) is presented in Table 4-8.

Table 4-8. Comparison of PM Measurement Results with Limit Values

No	Description	Measurement Result $\mu\text{g}/\text{m}^3$	Limit Value $\mu\text{g}/\text{m}^3$
1	Ziya Gökalp Elementary School	35	140
2	Kanuni Vocational High School	52	
3	Uhud Apartments	70	
4	Yahya Kemal Beyatlı High School	79	

As can be seen from Table 4-8, results of measurements carried out at all locations comply with the limit values stipulated in the RCAPOIE. Limit values stipulated in the RCAPOIE must be complied with at sensitive receptors during construction activities.

4.3.1.6.3 Noise Measurement

Locations of background noise measurements on November 6 and 7, 2012 at close sensitive receptors. The grid reference for these measurement locations is provided in table 4.9 below. The measured ambient noise level (L_{eq}) at these receptors during daytime, the evening and at night is detailed in table 4.10. The detailed baseline noise survey report and analysis is included in Appendix F.

Table 4-9. Noise Measurement Locations

No	Name of Measurement Location	Coordinates (UTM Datum ED 50)	
		East	North
1	Ziya Gökalp Elementary School (Noise-01)	485500	4423368
2	Özel Hasan Tanık Primary and Elementary School (Noise-02)	485918	4423505
3	Mosque of Ankara Special Provincial Administration (Noise-03)	486126	4423612
4	Gülhane Military Medical Academy (Noise-04)	486527	4424044
5	Kanuni Vocational High School (Noise-05)	486214	4424381
6	Location in the Opposite Side of Etlik Training and Research Hospital (Noise-06)	485446	4424538
7	Antares Housing (Noise-07)	484939	4424768
8	Mosque of Environmental Protection Department of Ankara Metropolitan Municipality (Noise-08)	484670	4424102
9	Between Yahya Kemal Beyatlı High School and Military Houses (Noise-09)	4484636	4423826
10	Planned Concrete Batching Site (Noise-10)	485259	4423755
11	Etlik Zübeyde Hanım Maternity Hospital (Noise-11)	486304	4423992
12	Polyclinic of Dışkapı Yıldırım Beyazıt Specialist Hospital (Noise-12)	486002	4423874

Table 4-10. Results of Background Noise Measurements

Measurement Location	Noontime (07:00-19:00) Measurement Results (dBA)			Evening Time (19:00-23:00) Measurement Result (dBA)		Nighttime (23:00-07:00) Measurement Result (dBA)	
	08:00	12:00	16:00	20:00	22:00	02:00	06:00
Noise-01	59.1	60.2	57.4	60.2	59.8	57.7	59.2
Noise-02	68.5	65.2	67.3	69.2	68.8	54.9	63.3
Noise-03	72.0	71.7	73.3	71.7	73.8	60.2	65.2
Noise-04	77.3	66.6	77.1	75.9	76.9	61.6	65.9
Noise-05	73.2	67.8	76.1	71.6	72.0	62.8	65.8
Noise-06	68.2	64.6	61.9	63.8	63.4	58.3	64.8
Noise-07	62.2	63.2	59.4	64.9	61.1	52.7	59.6
Noise-08	68.3	67.6	64.2	65.3	65.9	57.0	66.1
Noise-09	56.2	57.5	60.6	59.1	55.4	50.9	52.2
Noise-10	50.6	50.7	52.0	54.1	50.4	46.0	49.0
Noise-11	53.2	52.7	52.0	57.1	53.2	50.7	52.2
Noise-12	51.4	53.2	54.2	57.0	54.0	48.7	50.0

4.3.1.6.4 Groundwater Sampling and Analysis

Groundwater samples were taken on January 19, 2013 from three points shown in the Figure 4-14. Groundwater samples were analyzed for parameters chemical oxygen demand, antimon, arsenic, copper, mercury, zinc, silver, cadmium, stannum, chromium, lead, selenium and mineral oil. Analysis results are given in Table 4-11 whereas analysis reports are presented in Appendix-H. The highest of the corresponding class numbers for the

measured parameters reflects the overall quality of the water source that the sample has been taken from. The quality classes of all three samples comply with the corresponding limit values in Class I.

Antimon, silver and stannum were analyzed to check whether soil contaminant reached groundwater or not. According to measurement results, concentration of each of these three parameters is lower than the respective detection limits.

Table 4-11. Groundwater Analysis Results

Parameter	Groundwater Sample-1 (mg/L)	Groundwater Sample-2 (mg/L)	Groundwater Sample-3 (mg/L)	Quality Classes in Water Pollution Control Regulation			
				I	II	III	IV
Chemical Oxygen Demand	15	25	13	25	50	70	>70
Antimon	<0.002	<0.002	<0.002	-	-	-	-
Arsenic	0.0068	0.0094	0.0032	20	50	100	>100
Copper	<0.01	<0.01	<0.01	20	50	200	>200
Mercury	<0.001	<0.001	<0.001	0.1	0.5	2	>2
Zinc	0.019	0.012	0.027	200	500	2000	>2000
Silver	<0.02	<0.02	<0.02	-	-	-	-
Cadmium	<0.003	<0.003	<0.003	3	5	10	>10
Stannum	<0.5	<0.5	<0.5	-	-	-	-
Chromium	<0.02	<0.02	<0.02	20	50	200	>200
Lead	<0.01	<0.01	<0.01	10	20	50	>50
Selenium	<0.001	<0.001	<0.001	10	10	20	>20
Mineral Oil	<0.003	<0.003	<0.003	0.02	0.1	0.5	>0.5

4.3.2 Biological

Turkey hosts two of the world's 25 biological diversity hotspots within its national borders. These two ecoregions, namely the Caucasus and the Mediterranean Basin have both great global importance in terms of species richness and diversity of habitats (Myers et al 2000). Ankara, which is within Central Anatolian Plateau, however does not show the characteristics of these two ecoregions. Biodiversity of the Ankara region is typified by the Central Anatolian Steppe and the Northern Anatolian Forests and has its own remarkable biodiversity which mostly appears in the natural or semi-natural areas located near the city.

Although the project site located in the city center, in light of the aforementioned sensitivities, a comprehensive ecological research has been undertaken to evaluate the potential of the Project site in terms of biodiversity and the potential presence of flora and fauna. The context, methodology and the results of the work is given in the following sections of this report.

4.3.2.1 Terrestrial Ecology

Methodology and the Findings of Terrestrial Ecology Work

During the preparation of this ESIA report, a comprehensive ecology survey was performed fulfilling the IFC PS 6 criteria. Main objectives of this document had been summarized in three items:

- To protect and conserve biodiversity;
- To maintain the benefits from ecosystem services;
- To promote the sustainable management of living natural resources through the adoption of practices those integrate conservation needs and development priorities.

The 25 requirements detailed in IFC PS 6 criteria have informed the methodology adopted for this ESIA. In addition to this, Habitats Directive has been taken into account during the study

General Status

The vegetation structure of the Central Anatolian Plateau, considered as “Irano-Turanian” in terms of phytogeography. The vegetation structure of the Ankara also shows characteristics of the Europa-Siberia floristic region (see Figure 4-15).



Figure 4-15. Floristic Regions of Turkey (Kose et al., 2012 in Avci 1996)²

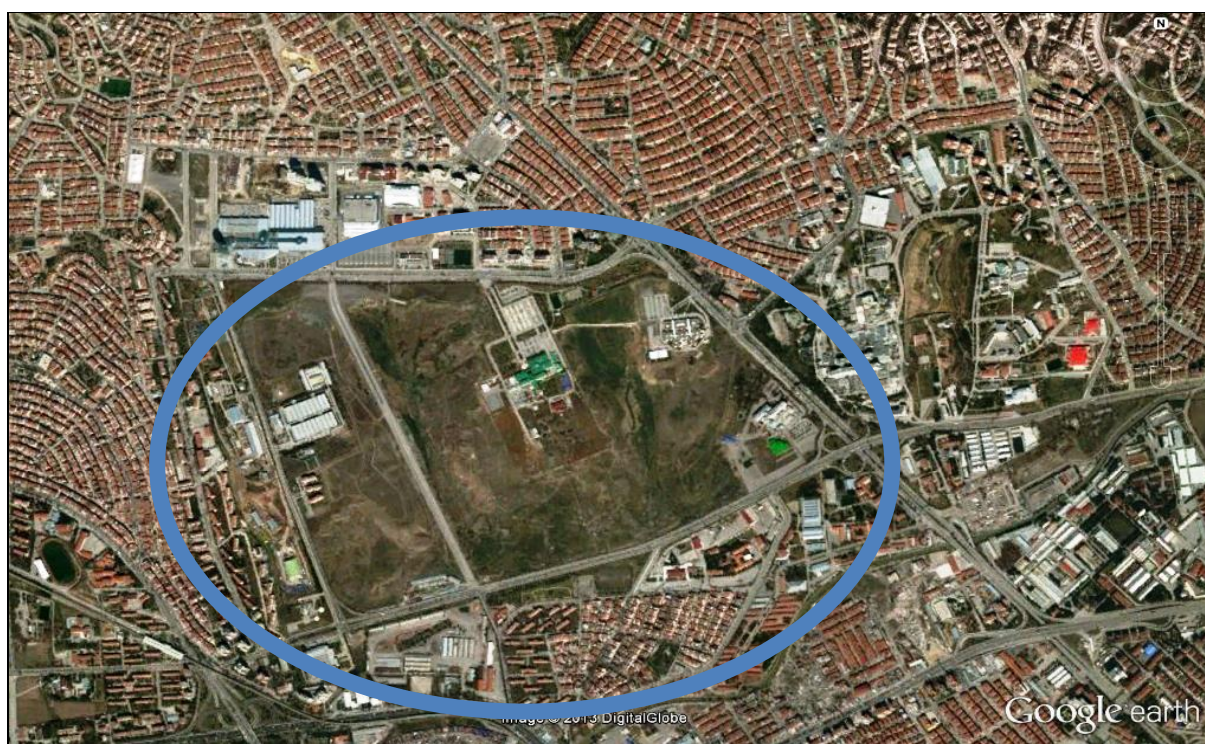
² Kose, N., Akkemik, U., Dalfes, H. N., Ozeren, M. S. And Tolunay, D., 2012; Tree-ring growth of *Pinus nigra* Arn. subsp. *pallasiana* under different climate conditions throughout western Anatolia. *Dendrochronologia*, 30(4): 295-301

However, referring also the definition of Natural Habitat given in IFC PS6, the native vegetation of the Project site has been significantly disturbed by human activities (see Figure 4-16). Consequently, almost all the natural vegetation is highly disturbed or degenerated. In this respect, almost all parts of the Project site are dominated with degenerated herbaceous plants, sparse vegetation or isolated ornamental trees with limited ecological function.

Natural fauna of the Project site is highly limited. Anthropogenic activities have resulted in habitat degradation and the remaining degraded habitats affect the ability to support fauna. The results of the flora and fauna literature research and findings from the fieldwork have been included in this report in detail in following sections. Also the results have been evaluated according to both international and Turkish standards.

Designations

Before and after the fieldwork, legally protected or internationally recognised areas have also been determined. The project site is at least 15km from the protected area network of Ankara.



Source: Google Earth

Figure 4-16. Satellite Image of the Project Site and Close Environs

During the study, flora and fauna species data has been collected. The collected raw data was examined to determine whether the target species which possibly rare, local endemic and attained as important in national or international lists as stated in the PS6.

To determine the potential natural flora of the project site Turkish Plants Data Service has been used³. This resource has been built on the extensive data which created by Turkish botanists over years. In this perspective, the potential flora of the project site has been listed according to the habitat preferences, altitude climate conditions and topography. Besides species which has been recorded during the site survey are noted.

The fauna survey, used non-capturee methods such as examination of the tracks and looking for other signs of activity.

In terms of ornithology direct counts and the line transect methods were employed at the project site to typify baseline conditions.

4.3.2.1.1 Terrestrial Ecology Survey

Habitats and Flora of the Project Area

The habitat types were coded by using the EUNIS habitat type hierarchical view coding system⁴. During this study habitat types which shape the landscape of the site has been aimed to classified as Natural, Modified and Critical habitats which designated in IFC PS6 (see Table 4-12).

Table 4-12. Habitat Types Observed During the Fieldwork

EUNIS Habitat Name	EUNIS Code	Current Situation
Residential Buildings of City and Town Centers	J1.1	Modified
Pasture woods (with a tree layer overlying pasture)	X09	Modified
Urban and suburban derelict spaces	J1.51	Modified
Small broadleaved deciduous anthropogenic woodlands	G5.2	Modified
Lines of trees	G5.1	Modified

Findings of the site surveys during the fieldwork indicate that the study area is typified by the habitats detailed in Table 4-12. As is seen in the table, the project area is composed of highly modified habitats surrounded by road networks, residential buildings and abandoned farmlands. There are also ornamental lines of trees around the abandoned buildings in the project site (see Figure 4-17).

³ Turkish Plants Data Service <http://turkherb.ibu.edu.tr/index.php>

⁴ http://eunis.eea.europa.eu/habitats-code-browser.jsp?expand=#level_A

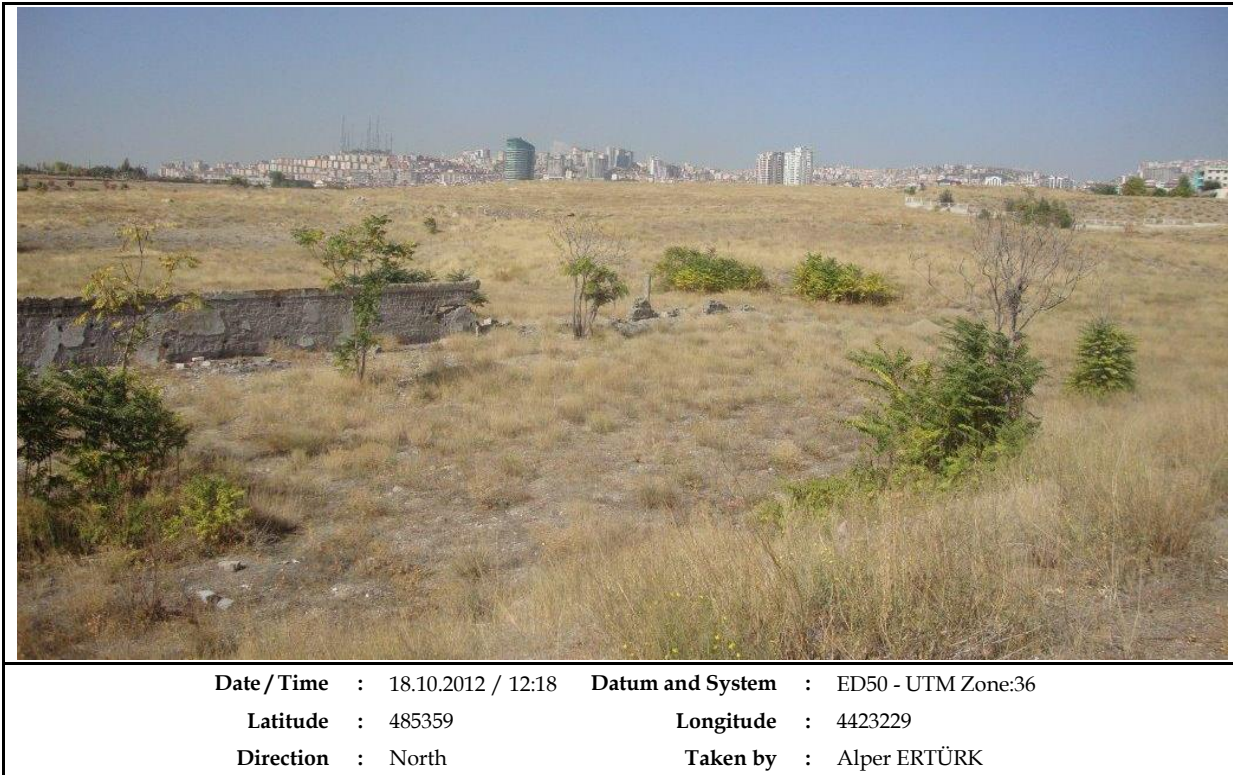


Figure 4-17. Flora Structure in the Project Site

The data obtained from the literature research revealed that there is no endemic taxa distributed in the area (Seçmen et al, 1992; Akman, 1995; Karaömerlioğlu, 1999; Güner et al., 2000; Güvenç, 2002; Altınözlü, 2004; Halıcı and Aksoy, 2009). The risk categories of the endemic taxa were determined by using the “Red Data Book of Turkish Plants” (Ekim et al., 2000) which is based on the IUCN (International Union for the Conservation of Nature and Natural Resources) Red List’s Classification System.

The categories in IUCN Red List Classification System (Red Data Book of Turkish Plants) are as follows:

- EX : Extinct;
- EW : Extinct in the wild;
- CR : Critically endangered;
- EN : Endangered;
- VU : Vulnerable;
- NT : Near Threatened;
- LC : Least Concern;
- DD : Data deficient;
- NE : Not evaluated.

The survey confirmed that the project site is covered by ruderal herbaceous plants and ornamental plants. In the Table 4-13 plant species have been listed according to the endemism, suitable habitat and threat categories.

The endemic taxa are assessed with regards to Turkish list of IUCN species and BERN (2002) Conventions. However there is no species which were listed in BERN convention in the area.

Table 4-13. Flora Species Observed During the Fieldwork and Literature Research

Species	Endemism	Phytogeographic Region	Suitable Habitat	IUCN	BERN	Source
AMARANTHACEAE						
<i>Amaranthus retroflexus</i> L.	-	-	Roadside	-	-	L
APIACEAE/UMBELLIFERAE						
<i>Eryngium campestre</i> L. var. <i>virens</i> LINK	-	-	Roadside	LC	-	L
ASTERACEAE/COMPOSITAE						
<i>Cichorium intybus</i> L.	-	-	Bare Areas	-	-	F
<i>Senecio vernalis</i> WALDST. ET KIT.	-	-	Bare Areas	-	-	L
BORAGINACEAE						
<i>Anchusa azurea</i> MILLER var. <i>azurea</i> MILLER	-	-	Bare Areas	-	-	F
CUPRESSACEAE						
<i>Juniperus chinensis</i>	-	-	Ornamental	-	-	F
FABACEAE/LEGUMINOSAE						
<i>Robinia pseudoacacia</i> L.	-	-	Road Side	-	-	F
<i>Melilotus officinalis</i> (L.) DESR.	-	-	Disturbed areas	-	-	L
<i>Trifolium</i> sp.	-	-		-	-	F
PINACEAE						
<i>Cedrus libani</i> A. RICH	-	Mediterranean	Bare Areas	-	-	F
POACEAE/GRAMINEAE						
<i>Aegilops triuncialis</i> L. subsp. <i>triuncialis</i> L.	-	-	Ruderal	-	-	L
<i>Cynodon dactylon</i> (L.) PERS. var. <i>dactylon</i> (L.) PERS.	-	-	Dry Areas	-	-	L
ROSACEAE						
<i>Rosa</i> spp.	-	-	Ornamental	-	-	F
SALICACEAE						
<i>Populus nigra</i> L. subsp. <i>nigra</i> L.	-	-	Roadside	-	-	F
SCROPHULARIACEAE						
<i>Verbascum</i> sp.	-	-	Bare Areas	-	-	F

Resource: F: Fieldwork L: Literature

The results of the study indicate that the project site does not support natural habitats and are typical of a degraded and highly disrupted environment.

As a result of the flora study no endemic taxa were detected in the project site. The results indicate that the flora and the vegetation of the project area do not significant in terms plant biodiversity of Turkey and the area cannot be considered as natural or critical habitat for any of the species.

Fauna

Fauna inventory was prepared based on conducted fieldwork and a literature research. In addition to the literature research and site visits, status of fauna of the region was evaluated according to the biological and ecological perspectives. Risk categories of fauna species was given according to the IUCN red list categories which were published in ver. 2011.2. In the given fauna list, species are written with their family names which they belong to. The scale of IUCN risk categories are given below.

- **EXTINCT (EX);**
- **EXTINCT IN THE WILD (EW);**
- **CRITICALLY ENDANGERED (CR);**
- **ENDANGERED (EN);**
- **VULNERABLE (VU);**
- **NEAR THREATENED (NT);**
- **LEAST CONCERN (LC);**
- **DATA DEFICIENT (DD);**
- **NOT EVALUATED (NE);**

In addition to aiming to meet the requirements under the Performance Standards, of IFC PS6 the project design is also compliant with the applicable national law. In this context BERN convention and “Central Hunting Commission Decisions” regulations should also be taken into account. Therefore during the preparation of the fauna lists, regulations which were stated below was also followed.

For the fauna species taken under protection by the Appendix II and III of the Bern Convention (especially the measures stated in the Article 6 and 7). The following issues will be considered for the species listed in the Appendix II in accordance with the 6th Article .

- a) all forms of deliberate capture and keeping and deliberate killing;
- b) the deliberate damage to or destruction of breeding or resting sites;

- c) the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation, insofar as disturbance would be significant in relation to the objectives of this Convention;
- d) the deliberate destruction or taking of eggs from the wild or keeping these eggs even if empty
- e) the possession of internal trade in these animals, alive or dead, including stuffed animals and any readily recognizable part or derivative thereof, where this would contribute to the effectiveness of the provisions of this article.

According to the article 7, each contracting party shall take appropriate and necessary legislative and administrative measures to ensure the protection of the wild fauna species specified in Appendix III. Any exploitation of wild fauna specified in Appendix III shall be regulated in order to keep the populations out of danger, taking into account the requirements of Article 2. For the species listed in the Appendix – III according to the Article 7, the following measures shall be arranged:

- a) closed seasons and/or other procedures regulating the exploitation;
- b) the temporary or local prohibition of exploitation, as appropriate, in order to restore satisfactory population levels;
- c) the regulation as appropriate of sale, keeping for sale, transport for sale or offering for sale of live and dead wild animals.

The species listed in the Appendix II of the Bern Convention are strictly, the species listed in the Appendix III are periodically under protection. The statues of the species with respect to the Bern Convention and CITES and statues of reptiles, fowls and mammals in respect to the “Central Hunting Commission Decisions” 2010 – 2011 were provided in the lists.

According to 2010/2011 Hunting Season Central Hunting Commission Rules which became effective upon publication in Official Gazette dated 18.05.2010 and numbered 27592 by Ministry of Environment and Forestry:

- Species in Appendix-I list are under protection by T.R Ministry of Environment and Forestry
- Species in Appendix II are under protection by Central Hunting Commission.
- In Appendix III list, there are hunting animals of which hunting is allowed in certain periods by Central Hunting Commission.

The fauna species allowed to be hunted in areas not under protection and as pursuant to certain rules, and the hunting seasons are determined by the T.R. Ministry of Forestry and Hydraulic Works, Central Hunting Commission of General Directorate of National Parks.

These are determined jointly with the public authorities responsible for natural protection and are rearranged every year. The list of fowls and mammals allowed to be hunted during the determined periods in accordance with the 2011 – 2012 Central Hunting Commission decrees is given in the table

In the lists, status of fauna species according to Bern Convention and for birds and mammals, status according to “Central Hunting Commission” rule were stated. In the column of Central Hunting Commission Rules (MAK) KK=Protected every time, BZ= Free hunting animals in certain periods (especially except the breeding period).

Both on a literature review of fauna to identify fauna which would typically be associated with the Project Area and neighborhood, species and sub species 17 species are noted as being expected. Fauna inventory was prepared in a large framework and it also includes many species not observed directly in Project Site. In order to do an impact assessment, information such as habitats of species (biotope) and risk status is also included. Endemic species are sensitive in terms of risk status. However, during the site visits it is found that the immediate area of the facility and the close environs do not used by target species which they are listed in national and international lists or known to be endemic, and the area does not serve as a good habitat for them.

The Project site does not have small ponds, water courses or rocky areas which suitable for reptiles and amphibians. This situation makes the area unsuitable habitat for both groups. However, *Bufo viridis* (Green Toad) and *Ophisops elegans* (Snake-eyed Lizard) has been included in the list due to their high tolerance to the habitat degradation and wide distribution in Turkey.

Table 4-14. Amphibians and Reptiles Listed During the Fieldwork and Literature Research

Species	Common Name	HABITAT	BERN	IUCN 2011.2	M.A.K	Source*
BUFONIDAE						
<i>Bufo viridis</i> (= <i>Pseudepidalea viridis</i>) LAURENTI, 1768	European Green Toad	Ponds, Orchards, near water courses	App-II	LC	-	L
<i>Ophisops elegans</i> MENESTRIES, 1832	Snake-eyed Lizard	Bare, rock areas	App-II	-	App-I	L

Resource: F: Fieldwork L: Literature

The ornithological field survey confirmed that the Project site is used by the species which are typically associated with modified anthropogenic areas. During the survey 11 bird species were observed; none of them listed as ‘threatened’ on either national and international lists (see Table 4-15).

Table 4-15. Birds Listed During the Fieldwork and Literature Research

Family and Species Name	Common Name	BERN	IUCN	M.A.K	Source (*)
FALCONIDAE					
<i>Falco tinnunculus</i> (Linne, 1758)	Common Kestrel	App-II	LC	App-I	L
COLUMBIDAE					
<i>Columba livia</i> (Gmelin, 1789)	Rock Dove	App-III	LC	App-III	F
<i>Streptopelia decaocto</i> (Frisvaldzsky, 1838)	Eurasian Collared Dove	App-III	LC	App-II	F
STRIGIDAE					
<i>Athene noctua</i> (Scopoli, 1769)	Little Owl	App-II	LC	App-I	L
HIRUNDINIDAE					
<i>Delichon urbicum</i> (L., 1758)	Common House Martin	App-II	LC	App-I	L
CORVIDAE					
<i>Pica pica</i> (L., 1758)	Common Magpie	-	LC	App-III	F
<i>Corvus monedula</i> (L., 1758)	Western Jackdaw	-	LC	App-III	L
<i>Corvus corone</i> (L., 1758)	Carrion Crow	-	LC	App-II	F
<i>Corvus corax</i> (L., 1758)	Raven	App-III	LC	App-II	L
STURNIDAE					
<i>Sturnus vulgaris</i> (L., 1758)	Starling	-	LC	App-II	L
PASSERIDAE					
<i>Passer domesticus</i> (L., 1758)	House Sparrow	-	LC	App-III	F

(*)Resource: F: Fieldwork L: Literature

The Project site is located near the town center and is unsuitable for the mammal species especially the large mammals. However, based on the literature review, the mammal species listed in Table 4-16 are known as occur in the anthropogenic areas.

Table 4-16. Mammals Listed During the Fieldwork and Literature Research

Species	Common Name	Habitat	BERN	IUCN	M.A.K	Source
MURIDAE						
<i>Rattus rattus</i> (Linnaeus, 1758)	Rat	Bushy areas, riversides, near water courses sewages in city centers	-	LC	-	L
<i>Mus domesticus</i> LINNAEUS, 1758	Home mice		-	LC	-	L
CANIDAE						
<i>Vulpes vulpes</i>	Red Fox					
LEPORIDAE						
<i>Lepus europaeus</i>	European Hare	Open Areas, Bushy areas		LC	App-I	L

(*)Resource: F: Fieldwork L: Literature

IFC PS6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable

development. Ecosystem services are defined as the benefits that people, including businesses, potential derive from ecosystems; services where the benefit is typically not monetized. Ecosystem services are organized into four types

- Provisioning services - products obtained from ecosystems;
- Regulating services,- benefits obtained from a regulating ecosystem function (for instance carbon sequestration provided by woodland);
- Cultural services – for instance spiritual or recreation use of natural resources; and
- Supporting services – which support the function of the world for instance nutrient cycling which in turn facilitates crop production.

As the project site is a highly modified environment, with only limited fragments of previous natural ecosystems, it is not thought to provide any ecosystem services to local residents or others. Additionally as the project site is such a modified environment it is not possible to successfully restore (for instance as an enhancement) natural features to provide useful ecosystem services. As such ecosystem services are not considered further within this ESIA.

4.3.3 Cultural

The site has been extensively disturbed by relatively modern development and as such sensitivity in this regard is considered to be limited. The exception to this is a tumulus (see Figure 4-18) which was identified during the archaeological site survey.

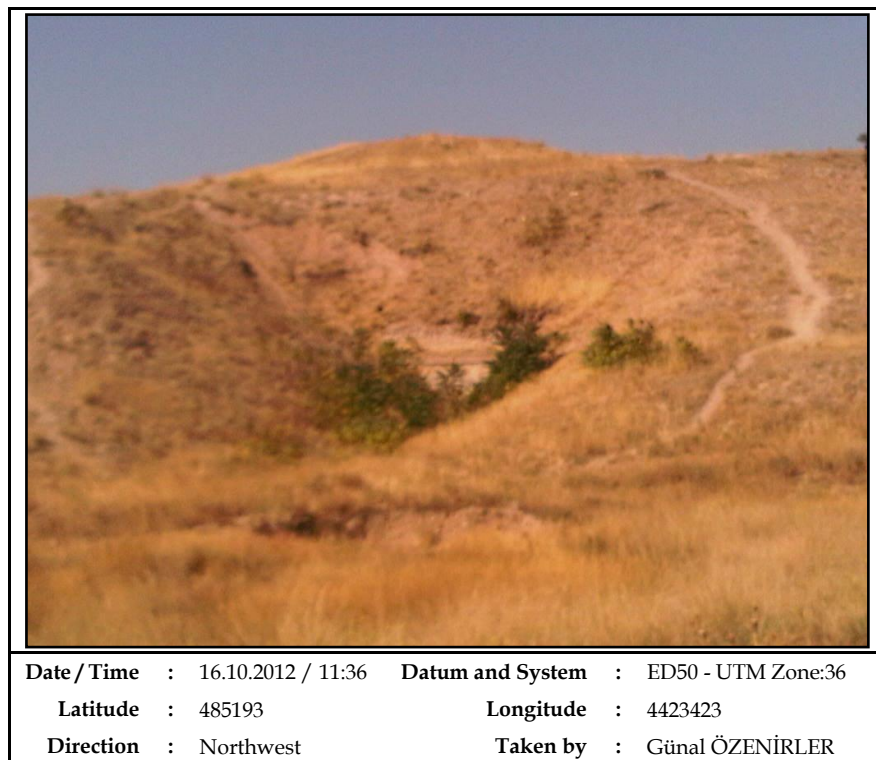


Figure 4-18. Tumulus in the Project Site

The survey was conducted on the December 7, 2012 by Prof. Dr. A. Coşkun ÖZGÜNEL. As discussed the survey only identified one feature of note within the project site; a Tumulus. It is estimated to have had an approximately 100 m of diameter, and was composed of two super positioned hills . There is a structure at the cut in the southern side of the tumulus, resembling a gate. This suggests that the tumulus was used as an underground shelter or archive and storage in the past. It was observed that the hill at the top was formed by stockpiling. This stockpile is considered to be probable tomb.

A subsequent investigation using Georadar was undertaken. The survey employed a Ramac CUII GPR system and a 250-MHz antenna was used, and a number of 21 GPR profile data were collected with 1.0-m interval across a 24 m by 20 m plain. According to results of georadar study, two assumed graves were detected, one of which is considered to be a pseudo grave to deceive thieves.

As a result of these two studies, the tumulus is consider to be a cultural asset that requires protection during the construction and operation of the Project. Considering the 75-m distance from the projection of central point of the tomb to skirt of the hill, a 150-m protection zone is proposed (see Figure 4-19).

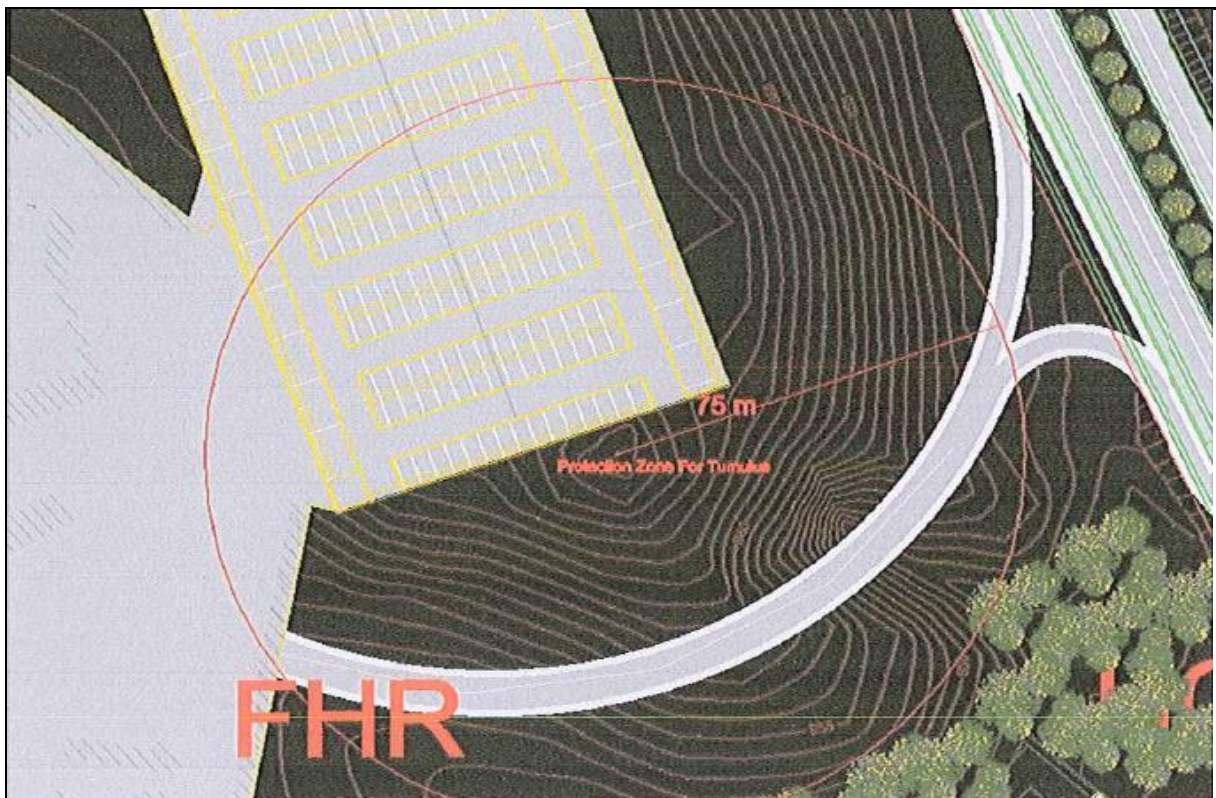


Figure 4-19. Protection Zone for Tumulus

Taking the outcomes of the archaeological survey into consideration, the Project Company revised the design accordingly, i.e. car park location and access road of the Forensic Hospital. The revised design is given in Figure 4-20.

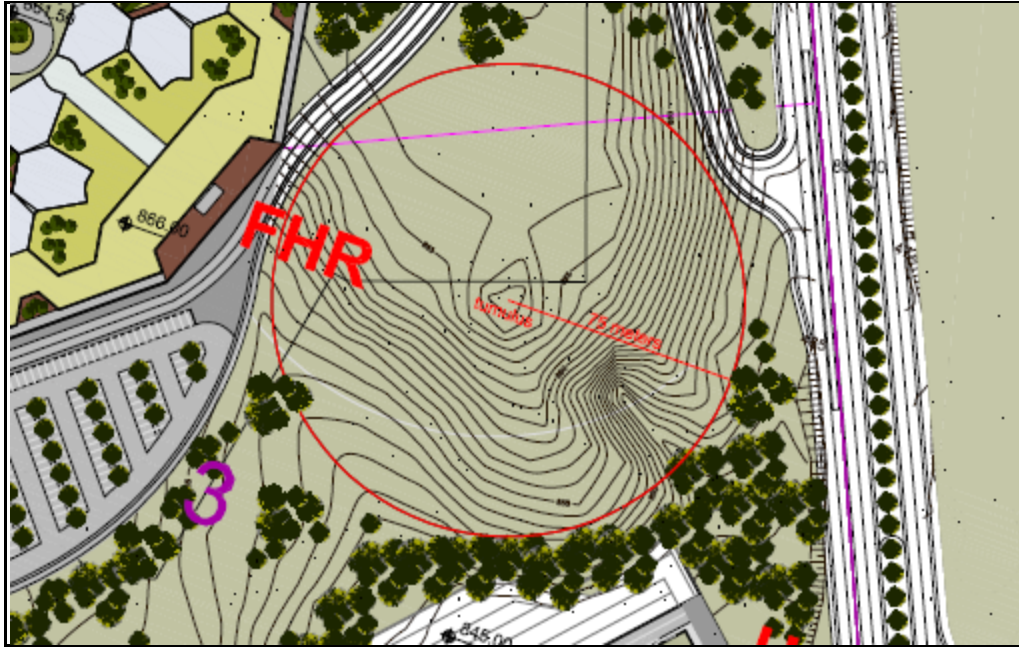


Figure 4-20. Design Revision According to Protection Zone for Tumulus

4.3.4 Social

4.3.4.1 Introduction

This section describes the social and economic characteristics of the Project area. The information presented was obtained through desk-top research and key informant interviews in March and April, 2013.

4.3.4.2 Project Area (Social Overview)

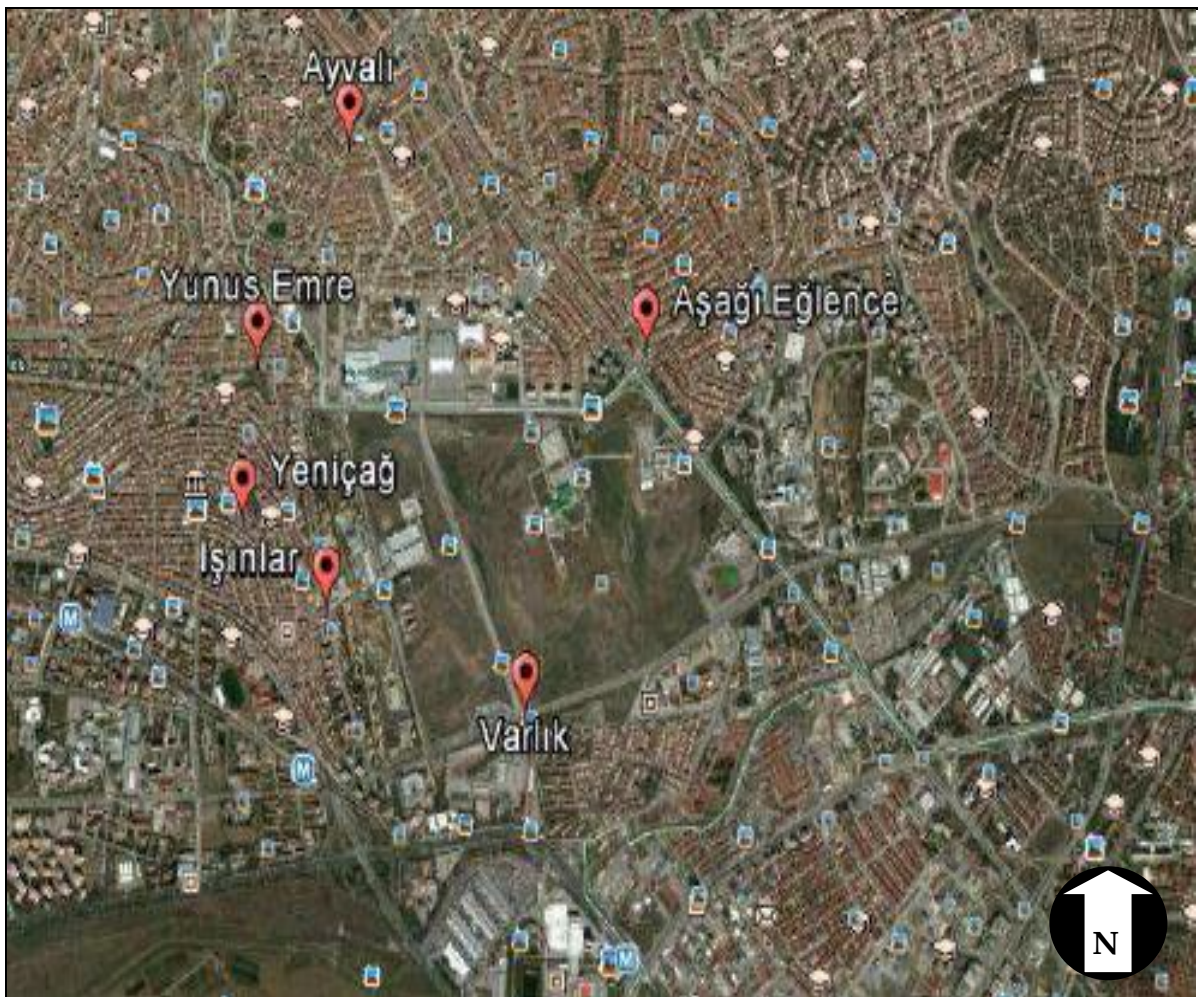
The Project site cuts across two Districts: Keçioren and Yenimahalle.. Districts are further sub-divided into “Mahalle”, i.e. neighborhoods, which are headed by Mukhtars. The Project site falls within Varlık Mahalle, which extends to the south of the Project site. The Project is also surrounded by five additional Mahalles:

- AsagieglenceMahalle (Kecioren) to the east and north-east;
- Ayvali Mahalle (Kecioren) to the north;
- Yunusemre Mahalle (Yenimahalle) to the north-west;
- Yenicag Mahalle (Yenimahalle) to the west; and
- Isinlar Mahalle (Yenimahalle) to the west.

These are illustrated in Figure 4-21. Residential houses within the Mahalles do not directly face the site except in a few small locations. Most residential housing is buffered from the Project by the public buildings and amenities that are adjacent and facing the Project site. The Mukhtars estimate that between 35,000 – 40,000 residents living within the Mahalles are within 500m of the Project site.

The Project site is also surrounded by major roads. These include: Akşemseddin Street to the west; Halil Sezai Erkut Street to the north; Etlik Street to the east; and Eşref Bitlis Street to the south. Etlik Street is an important commuter road for residents north-east and east of the Project site while an additional road further south of the site, İvedik Street, is an important commuter road for residents living west of the Project site.

The Project site is directly surrounded by a range of public buildings as well as popular public facilities and amenities, which are illustrated in Figure 2-5. These are also listed in Table 4-17. There are many commuters, shoppers and users of these public facilities that are considered as part of the AoI of the Project.



Source: Google Earth

Figure 4-21. Parishes ("Mahalles") near the Project site

Table 4-17. Public Facilities and Amenities near the Project Site

Name of the Surrounding Infrastructure, Building etc.	Location w.r.t Project Site	Remarks
Antares AVM and Residence	North	Shopping mall and private housings
Metro Grossmarket	North	Market for shopping
Yildirim Beyazit University	North	Campus area with a population of c.750
Turgut Ozal University	North	Campus area with a population of c.1000
Park, Cafe and Sport Facility	North	A small leisure center with an area of 2 ha
Diskapi Yildirim Beyazit Policlinics	Northeast	Details on the Policlinic are given in SEP
GATA	East	Military Medical Academy and Hospital
DSI (GD of State Hydraulic Works) Social Facilities	Southeast	Social facilities for the staff of DSI
Ankara Province Special Administration	South	Founded in line with Special Provincial Administration Law No. 5302 (dated 04.03.2005) to meet the needs of the people living in provinces outside the municipality jurisdiction areas.
KGM (GS of State Road Authority) Facilities	South	Workshops of the GD of KGM for parking and maintenance of their heavy machineries
Ankara Metropolitan Municipality (MM) Heliport	Southwest	Heliport
MM's Workshops (Parks, Gardening, Heavy Machinery Park)	West	Workshop of Ankara MM for machineries used in cleaning services in the city, plantation nursery for gardens and parks

4.3.4.3 Approach and Methodology

4.3.4.3.1 Overview of Methodology

Socio-economic data was collected using a combination of research methods. Data collection commenced with desk-top research using the Turkish Statistical Institute for the most recent socio-economic data. Other sources such as websites of the MoH and the relevant municipalities were also used.

Primary data was collected through key informant interviews using a combination of semi-structured interviews and formal questionnaires. Copies of these can be found in Appendix-I. Although the MoH did not permit detailed community baseline data collection, semi-structured interviews were held with Mukhtars of all six affected Mahalles to gain a general understanding of their communities and to verify data obtained through desk-top research. Semi-structured interviews and / or questionnaires were also conducted with the following institutions:

- MoH Deputy General Manager of Treatment Services;
- Turkish Medical Association;
- Yildirim Beyazit University;
- Public Relations Department of Antares Shopping Mall; and

- six local businesses adjacent to or within the Project site including a taxi stand, kiosks and canteens.

4.3.4.3.2 *Limitations and Assumptions*

Social baseline data collection relied on secondary sources until the 9th March 2013, when the Council of Ministers adopted a new law “Concerning the Construction of Facilities, Renovation of Existing Facilities and Purchasing Service by the Ministry of Health by Public Private Partnership Model” (No. 6428) effective as of 9 March 2013, with the aim of ensuring continuance of the pending health PPP projects by remedying the deficiencies determined in the Council of State’s July 2012 injunction relief decision mentioned above and amending certain other provisions of the existing legislation to provide further support and stronger legal ground for health PPP projects. Primary data collection commenced mid-March following this decision.

Whilst considerable efforts have been taken to obtain primary data since mid-March, there is still a reliance on secondary data sources and it is assumed that secondary demographic data is reflective of the Project social Area of Influence. It is also assumed that data from the Turkish Statistical Institute is up to date and reliable.

4.3.4.4 Demographics

4.3.4.4.1 *Overview of National Demographics*

Ankara is the capital of Turkey. It is centrally located in Anatolia region, covering 30,715 m² and it is the country's second largest city after Istanbul. The city has experienced considerable growth and is becoming a major commercial and industrial centre. Since the foundation of the Republic in 1923, the population of the city increased rapidly due to migration from the other regions of Turkey. Ankara has both public and private sector investments, where economic activities are largely based on trade and industry. According to Turkstat (2012) data, Ankara’s exports have increased by 3% in the last year.

As the nation’s capital, Ankara is the center of the Turkish Government and houses all foreign embassies. It is an important crossroads for trade given its strategic location at the center of Turkey's highway and railway networks, and it serves as the marketing center for the surrounding agricultural area. According to the Turkish Statistical Institute, as of 2012, the city of Ankara had a population of 4,842,136.

Ankara is divided into 25 Districts, which include the two Districts within the Project area: Kecioren and Yenimahalle. Although Ankara is predominantly an urban center, several Ankara districts also have small rural populations, whereby while they are officially within city boundaries, they are able to farm on land outside of the main urban center. Population figures for Ankara Districts are provided below in Table 4-18.

Table 4-18. Population Figures for Ankara Districts

Settlement	Urban			Rural			Total		
Ankara	Total	Male	Female	Total	Male	Female	Total	Male	Female
Akyurt	26,572	13,534	13,038	629	324	305	27,201	13,858	13,343
Altındağ	363,744	182,916	180,828	-	-	-	363,744	182,916	180,828
Ayaş	8,295	4,331	3,964	4,792	2,320	2,472	13,087	6,651	6,436
Bala	7,542	3,857	3,685	9,855	4,997	4,858	17,397	8,854	8,543
Beypazarı	37,097	18,351	18,746	9,641	4,707	4,934	46,738	23,058	23,680
Çamlıdere	2,764	1,412	1,352	3,975	1,936	2,039	6,739	3,348	3,391
Çankaya	832,075	406,801	425,274	-	-	-	832,075	406,801	425,274
Çubuk	77,958	39,160	38,798	4,656	2,318	2,338	82,614	41,478	41,136
Elmadag	42,674	21,809	20,865	1,182	576	606	43,856	22,385	21,471
Etimesgut	425,947	215,283	210,664	-	-	-	425,947	215,283	210,664
Evren	1,885	937	948	1,126	540	586	3,011	1,477	1,534
Gölbaşı	109,261	55,432	53,829	1,382	697	685	110,643	56,129	54,514
Güdül	2,591	1,276	1,315	6,065	2,932	3,133	8,656	4,208	4,448
Haymana	8,970	4,857	4,113	22,088	11,058	11,030	31,058	15,915	15,143
Kalecik	8,730	4,426	4,304	4,918	2,394	2,524	13,648	6,820	6,828
Kazan	41,442	21,340	20,102	1,866	945	921	43,308	22,285	21,023
Kecioren	840,809	415,085	425,724	-	-	-	840,809	415,085	425,724
Kızılcahamam	16,504	8,245	8,259	8,131	3,972	4,159	24,635	12,217	12,418
Mamak	559,597	282,464	277,133	-	-	-	559,597	282,464	277,133
Nallıhan	12,125	5,979	6,146	18,174	8,954	9,220	30,299	14,933	15,366
Polatlı	101,012	50,646	50,366	18,337	9,416	8,921	119,349	60,062	59,287
Pursaklar	119,593	60,210	59,383	-	-	-	119,593	60,210	59,383
Sincan	479,454	244,408	235,046	-	-	-	479,454	244,408	235,046
Şereflikoçhisar	28,453	14,480	13,973	6,589	3,207	3,382	35,042	17,687	17,355
Yenimahalle	687,042	335,924	351,118	-	-	-	687,042	335,924	351,118
Total	4,842,136	2,413,163	2,428,973	123,406	61,293	62,113	4,965,542	2,474,456	2,491,086

Source: www.turkstat.gov.tr

4.3.4.4.2 Demographics of Project Affected Districts and Mahalles

Of the six Mahalles surrounding the Project site, Ayvali and Aşağı Eğlence Mahalles are located in Kecioren District, while Varlık, Isınlar, Yenicag and Yunusemre are located in Yenimahalle District.

Mahalle populations are outlined in Table 4-19.

Table 4-19. Population Figures for Ankara Districts

Mahalle	District	Population
Ayvali Mahalle	Kecioren	42,841
Aşağıeğlence Mahalle		28,656
Varlık Mahalle	Yenimahalle	11,250
Yenicag Mahalle		4,689
Isinlar Mahalle		9,714
Yunusemre Mahalle		10,171
Total		107,321

Source: www.turkstat.gov.tr

It is estimated that between 35,000 to 40,000 of this population reside within 500m of the Project site with the majority of this population being within 1.5km of the Project site.

Tables 4-20 and 4-21 below provide some detail on gender breakdown and marital status of those living in Kecioren and Yenimahalle.

Table 4-20. Gender Breakdown for Kecioren and Yenimahalle

Settlement	Total	Male	Female
Ankara	4,842,136	2,413,163	2,428,973
Kecioren	840,809	415,085	425,724
Yenimahalle	687,042	335,924	351,118

Source: www.turkstat.gov.tr

Table 4-21. Breakdown of Marital Status for Kecioren and Yenimahalle

Category	Yenimahalle District		Kecioren District	
	Population	%	Population	%
Single	145.826	26.45	161,774	24,97
Married	355.673	64.52	429,021	66,23
Divorced	24.485	4.44	25,594	3,95
Widowed	25.260	4.58	31,427	4,85

Source: www.turkstat.gov.tr

Mahalle population data and age profiles are provided in Table 4-22 below. More specifically, baseline data shows that between 10 and 40% of the population are aged over 60 years (with Varlik Mahalle having the highest elderly population at 40%). Home ownership status is provided in Table 4-23.

Table 4-22. Population Data of Mahalles

	Keciören		Yenimahalle			
Number of Houses	Ayvali	Asagieglence	Yunusemre	Isinlar	Varlık	Yenicag
Total Number of Population	50,000	11,000	20,000	14,500	18,000	30,000
Total Number of Houses	10,000	3,000	5,000	2,500	5,000	10,000
Household size	5	3,7	4	5,8	3,6	3
Age Percentage (%)	Ayvali	Asagieglence	Yunusemre	Isinlar	Varlık	Yenicag
Under 5 years	20	5	15	5	5	10
5-18 years	30	5	30	20	20	30
19-59 years	40	50	35	60	50	40
60 years and over	10	40	20	15	25	20

Source: Etlik IHCP Socio- Economic Baseline Survey: Community Level Questionnaire, Apr.

Table 4-23. Ownership Status of Houses in Mahalles

Ayvali		Asagieglence	Yunusemre		Isinlar		Varlık		Yenicag	
Keciören			Yenimahalle							
Owner	Owner	Tenant	Owner	Tenant	Owner	Tenant	Owner	Tenant	Owner	Tenant
60	70	30	50	50	60	40	80	20	50	50

Source: Etlik IHCP Socio- Economic Baseline Survey: Community Level Questionnaire, Apr.2013 Migration, Ethnicity, Religion and Language

The Project area has experienced significant in-migration over the last 50 years. The Ayvali Mahalle population has significantly increased due to the establishment of new institutions such as hospitals, universities and the Antares shopping mall. The Mukhtar of Ayvali Mahalle estimates that 80% of the residents in Ayvali are immigrants from other Districts of Ankara as well as the cities of Çankırı, Çorum and Sivas. Yunusemre Mahalle has similar immigrant population characteristics as Ayvali Mahalle. In Yenicag, Isinlar and Asagieglence Mahalles, the Mukhtars estimate that 65%-70% of the residents are immigrants from Yozgat (220km from Ankara), Çorum (244km), Çankırı (135km), Sivas (444km) and Kırıkkale (82km) cities. In Varlık Mahalle, Bulgarian migrants of Turkish background constitute the majority of the neighborhood residents. It is estimated by the local Mukhtar that 70% of the residents are migrants who settled in this Mahalle with Government assistance due to the political issues in Bulgaria in the 1950's. During the 20th century Bulgaria practiced forced deportations and expulsions, which also targeted the Muslim Pomak population and immigration of Turkish people from Bulgaria to Turkey started in 19th century and the biggest emigration was occurred in 1950s and 1989, approximately 2 million Turkish left Bulgaria.

Except for Varlık and Asagieglence Mahalles, the local populations of the other Mahalles have increased due to the growth in job opportunities in the area.

There are known Kurdish populations residing in the Project Area although the exact numbers are not known. Sensitivities exist with respect to the Kurdish-Turkish relationship although this is more pronounced outside of Ankara and is not known to be a major problem within the urban Ankara environment in terms of conflict or discrimination.

4.3.4.4.4 Education Levels

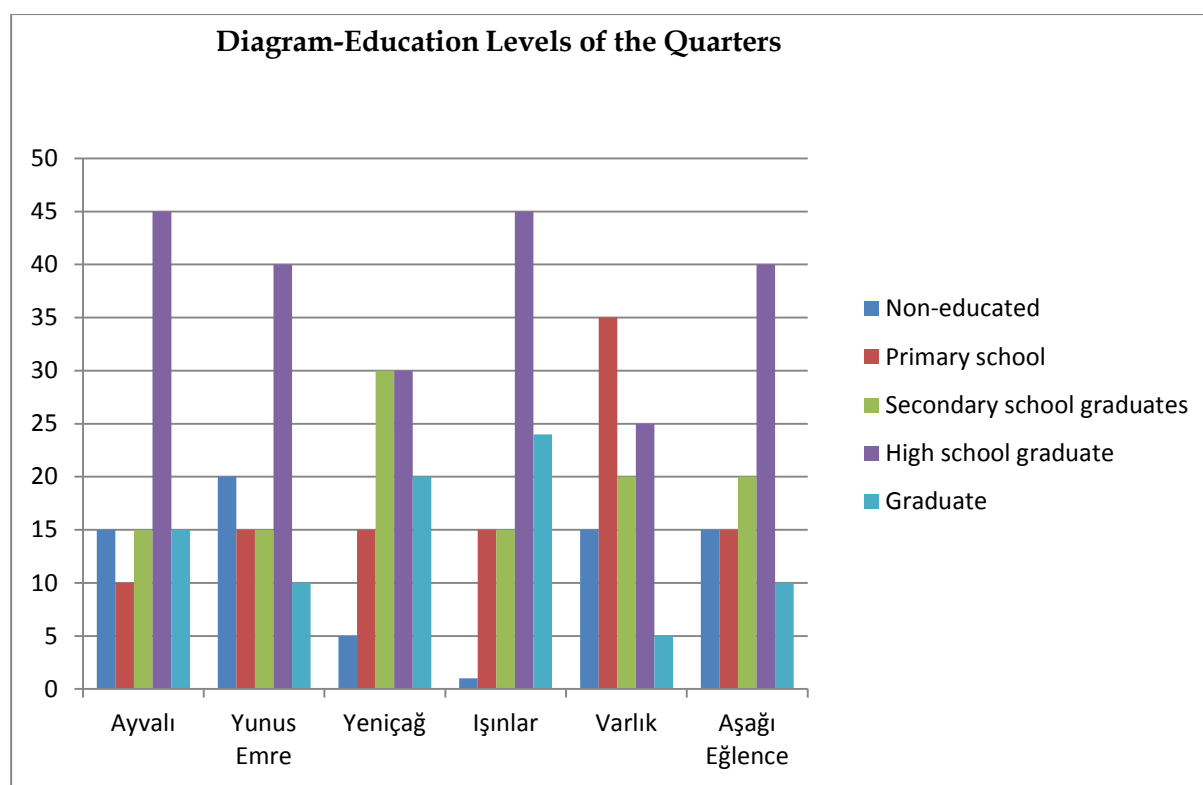
The breakdown of District education levels can be found in Table 4-24 below.

Table 4-24. Education Levels of Kecioren and Yenimahalle Districts

Category	Yenimahalle District		Kecioren District	
	Population	%	Population	%
Illiterate	11,711	1.86	18,710	2.45
Literate but not Primary School Graduate	82,608	13.09	122,603	16.06
Primary School Graduate	92,726	14.69	143,888	18.85
Graduates of Elementary Education	76,675	12.15	122,839	16.09
Elementary School Graduate	31,478	4.99	47,340	6.20
Graduates of High School or equivalent	160,784	25.48	188,229	24.65
Vocational School or Faculty Graduate	138,326	21.92	91,319	11.96
M. S. or M. B. A.	15,638	2.48	6,363	0.83
Ph. D.	4898	0.78	1452	0.19
Unknown	16,283	2.58	20,723	2.71

Source: www.turkstat.gov.tr

Semi-structured interviews with Mukhtars estimate that in Yunusemre Mahalle, 20% of the residents have never attended to school. In Varlık, 35% are primary graduates, in Yenicag 35 % are secondary graduates, and in Ayvali and Isinlar 45% are high school graduates and the number of university graduates is the highest (24%) in Isinlar. Figure 4-22 represents education levels of the Mahalles based on the information from Mukhtars.



Source: Etlik IHCP Socio- Economic Baseline Survey: Community Level Questionnaire, Apr.2013

Figure 4-22. Education Levels of the Mahalles near the Project site

4.3.4.4.5 Vulnerable Groups

The Mukhtars were asked to identify vulnerable groups in their Mahalle. Vulnerable groups in the context of Ankara are defined as those who: are living with the assistance of others; female headed households; people with physical disabilities; and the mentally disabled. The Mukhtars are responsible for ensuring vulnerable groups are supported by the government. In particular, the Mukhtars are responsible for presenting the case of vulnerable individuals and households to the Ministry of Family and Social Policies.

Semi-structured interviews with Mukhtars highlighted that most of the people living with the assistance of others reside in Ayvalı; the most female headed households are found in Varlık, who also tend to be the elderly households. Details of vulnerable groups of the Mahalles are described in Table 4-25.

Table 4-25. Estimated Numbers of Vulnerable Groups of the Mahalles

Vulnerable Groups	Ayvalı	Asagiegle nce	Yunusemre	Isinlar	Varlık	Yenicag
Districts	Keciören		Yenimahalle			
People who live with the assistance of others	500	100	200	2	30	13

Vulnerable Groups	Ayvali	Asagiegle nce	Yunusemre	Isinlar	Varlık	Yenicag
Districts	Keciören		Yenimahalle			
Female-headed households	unknown	40	15	10	100	150
Physically disabled people	unknown	50	5	35	20	9
Mentally disabled people	unknown	10	3	0	0	3

Source: Etlik IHCP Socio- Economic Baseline Survey: Community Level Questionnaire, Apr.2013

4.3.4.4.6 Gender

Ankara is a cosmopolitan location in which residents originate from different cities of Turkey with different socioeconomic status, age and education levels. It is expected that overall Turkish trends with respect to gender are prevalent in the Project locality, including gender differences in employment, education levels, sectorial recruitment and traditional customs.

According to Turkstat (2012) data, the percentage of the female population of Turkey is 49.8 % while the percentage of male population is 50.2 %. The average first marriage age of women was 23.3 years in 2011

In 2011, 120,117 couples obtained a divorce. Couples cited the main reasons for divorce as: irresponsible acts (%26.6); other reasons (23.4 %); domestic violence (20.8 %); and deceit (16.8%). An overwhelming majority (93.7%) of couples have both a formal and religious marriage ceremony, however 3% of couples only have a religious marriage ceremony, which leaves women within these marriages without the protection of the Code of Civil Law. Almost one quarter of all married couples are in a consanguineous marriage.

The literacy rate amongst women in Turkey is 92.2 %, while the literacy rate amongst men is 98.3%. In 2012 the employment rate of women was 29.5 %, considerably lower than the employment rate of men, which is 71%. This situation results from the patriarchal structure of Turkey, where women are considered to be responsible of looking after the family and are therefore expected to remain at home. Table 4-26 below illustrates the sectors where men and women are currently employed for the different Regions of Turkey for each sector. It highlights that women are more likely to be employed in agriculture than men, while men are more likely to be employed in industry and the service sector (with the exception of West Anatolia, where slightly more women work in the service industry than men).

Table 4-26. Sectoral Divisions by Gender

Regions	Agriculture		Service		Industry	
	M (%)	F (%)	M (%)	F (%)	M (%)	F (%)
East Marmara	11.1	26.7	46.3	44.6	42.7	28.8
West Anatolia	10.6	20.1	61.9	64.4	27.5	15.6
Mediterranean	21.0	50.3	52.9	41.0	26.0	8.8
Central Anatolia	21.7	55.8	52.2	36.8	26.1	7.5
West Black Sea	33.2	75.4	44.0	18.1	22.8	6.4
East Black Sea	32.4	78.6	48.4	16.4	19.1	5.0
Northeast Anatolia	46.3	86.0	44.0	11.9	9.9	2.0
Middle East Anatolia	24.6	69.5	56.6	25.3	18.8	4.9
Southeast Anatolia	24.7	66.9	48.1	25.1	27.2	7.9

Source: www.turkstat.gov.tr

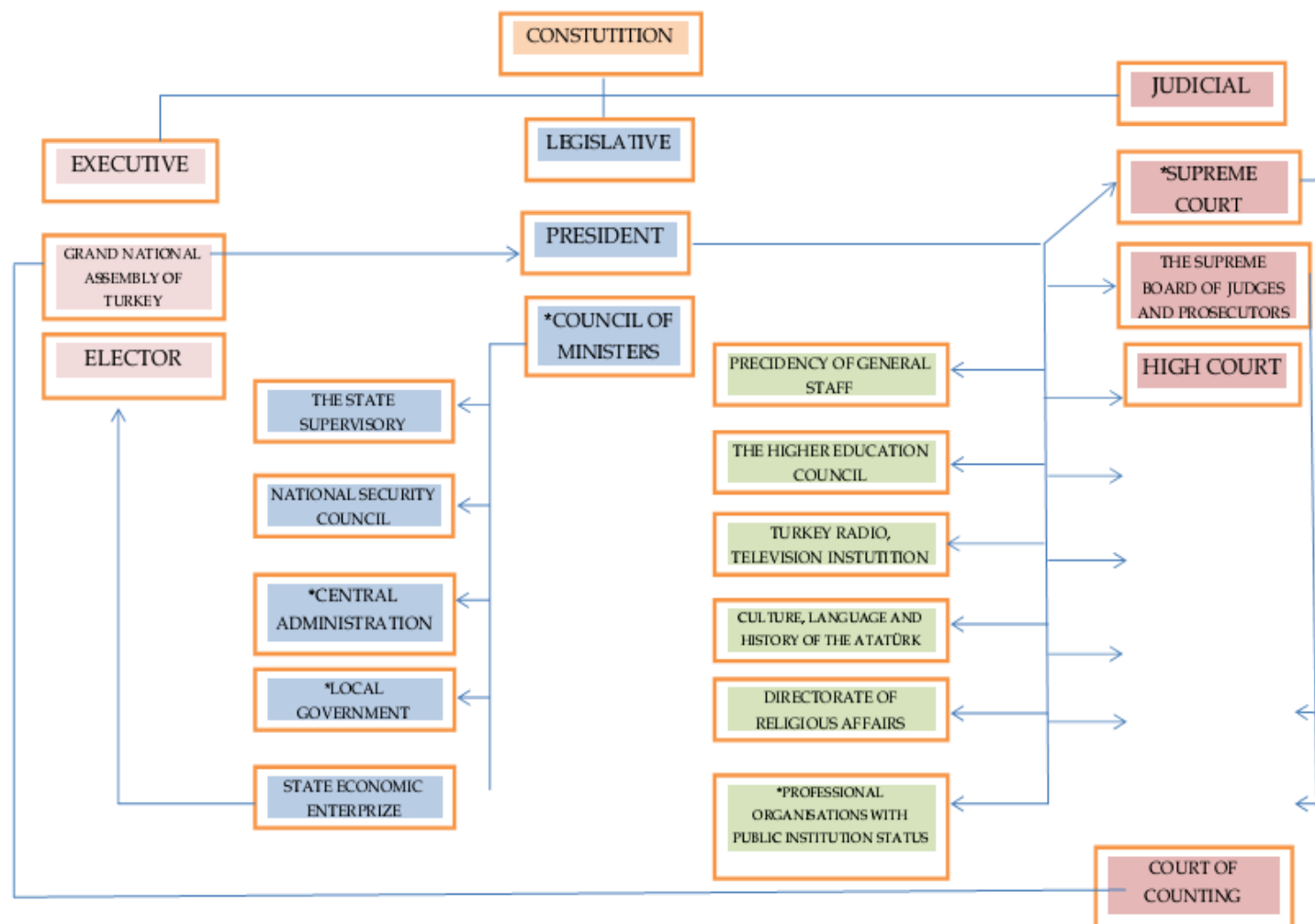
There are laws to protect women in Turkey from discrimination, but these laws are not systematically applied. Women face discrimination in the following areas:

- Inequality in achieving educational opportunities;
- Inequality in achieving job opportunities;
- Unequal salary payment;
- Sector based gender discrimination ;
- Unequal division of labour within the household;
- Unequal participation in politics; and
- Dominance of traditional customs, which limit the role of women and enforce the patriarchal structure.

It is assumed that the discrimination faced by women in Turkey is also likely to be present in the Project area and it should also be noted that women within the Project area have experienced verbal harassment from construction workers in the past. Women using local leisure facilities reported incidents of verbal harassment by construction workers working on the Antares shopping mall, which has increased their sensitivity towards the behaviour of construction workers associated with the Etlik IHCP.

4.3.4.5 Administrative Institutions

Figure 4-23 below represents the governance structure of the Turkish Republic. The Constitution of Turkey is the fundamental basis of all laws, rights and governance of Turkey. The governance of Turkey takes place within a framework of a strictly secular parliamentary representative democratic republic through a multi-party system, whereby the Prime Minister of Turkey is the head of government. The President of Turkey is the head of state and holds a largely ceremonial role but with substantial reserve powers.



Source: www.tbmm.gov.tr

Figure 4-23. Governance Structure of Turkey

Turkey has become increasingly integrated with the West through membership of organisations such as the Council of Europe, NATO, OECD, OSCE and the G-20 major economies. Turkey began full membership negotiations with the European Union in 2005, having been an associate member of the European Economic Community since 1963 and having joined the EU Customs Union in 1995.

Turkey is subdivided into 81 provinces for administrative purposes. The provinces are organized into 7 regions for census purposes; however, the provinces do not represent an administrative structure. Each province is divided into districts, with a total of 923 districts. Each district has its own Mahalles.

According to the provisions of the 1982 Constitution, the units of local government are: special provincial administrations; municipalities (Metropolitan and district municipalities); and rural villages and Mahalles.

Within the scope of the Etlik IHCP, the Council of Ministers, local municipal government, professional organisations with Public Institution Status and the state council play an active role.

4.3.4.5.1 State Council

The Council of State, which is the highest administrative court in the Republic of Turkey, issued a stay order for the tender process of each Health Campus Project. The Council of State pointed out that Article 7 of the Regulation and the tender specifications provides for the establishment of an easement right over the Treasury's property, where health services will be carried out by a private contractor.

4.3.4.5.2 Council of Ministers

The Council of Ministers, chaired by the Prime Minister, includes all the ministers of the Republic of Turkey, who make decisions together and the Board. Within the scope of the Project, the MoH is responsible for oversight, while the laws, policies and regulations governing the Project will be decided collectively by the Council of Ministers. The MoH has launched a number of tenders for the construction of integrated health campus projects under the PPP model in various cities in Turkey based on current Laws and Regulations.

4.3.4.5.3 Provincial and District Government

This represents Turkey's central administrative system. Each province is administered by a Governor (Vali) appointed by the Council of Ministers with the approval of the President. The governors function as the principal agents of the central government and report to the Ministry of Interior. Each province is divided into districts and each district is administered

by a head official of the district (Kaymakam). A governor represents Ankara while Yenimahalle and Kecioren Districts have two separate Kaymakam.

Municipal governments exist in each provincial and district capital, as well as in all communities with at least 2,000 inhabitants. Municipal governments are responsible for implementing national programs for health and social assistance, public works, education, and transportation. Each municipality (Belediye) is headed by a mayor (Belediye Reisi), who is elected by the citizens to a five-year term and is assisted by deputy directors of departments and offices. Municipalities are responsible for water supply, production and distribution of the network, sewage systems, urban roads, the distribution of natural gas, garbage collection, clean roads, fire services and police duties. Municipal governments also prepare a master plan and detailed development plans, authorise construction permits, control works and operate the territory of the municipality to provide freight and passenger vehicles.

4.3.4.5.4 *Mukhtars*

Mukhtars are elected as the heads of Mahalle during local elections for five-year terms. However, political parties are not permitted to stand candidates for these posts. The Mukhtars are responsible for compulsory tasks relating to the provision of public health, primary school education, security and notification of public announcements, etc. Within the scope of the Project, there are six Mahalles around the Project Site and Mukhtars represent the smallest units of the community. Mukhtars are the leaders of their communities who are the primary interface between the government and the citizens.

4.3.4.5.5 *Professional Organizations with Public Institution Status*

The Turkish Medical Association has an active role in the Project as a professional organization with public institution status. The Turkish Medical Association filed lawsuits with the Council of State against the Project due to doctors' objectives and concerns for patient rights. This issue is described in more detail under the Section 2.2.2: Project Rationale.

4.3.4.6 Economy and Employment

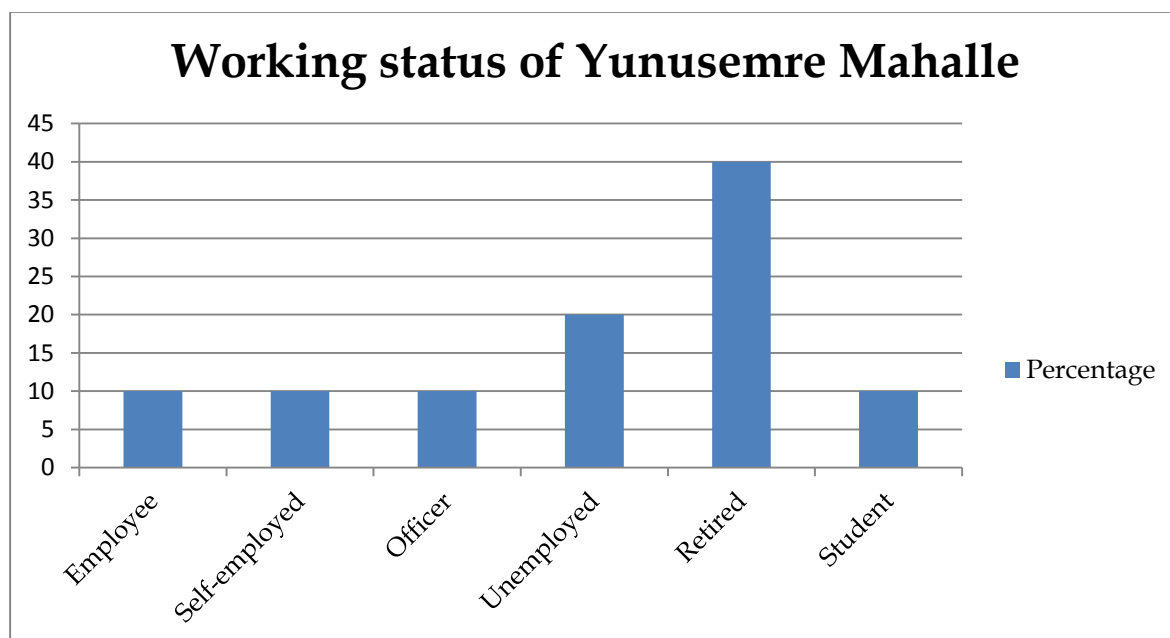
4.3.4.6.1 *Employment*

The Project area is considered to be a middle class area with a relatively high population of government workers and a thriving local economy with two universities and the large popular Antares shopping mall. The Project area is close to the city centre, which supports local businesses. However unemployment in the area is higher than average at 15%, compared with the average for Ankara (12.1%) and Turkey (10.6%).

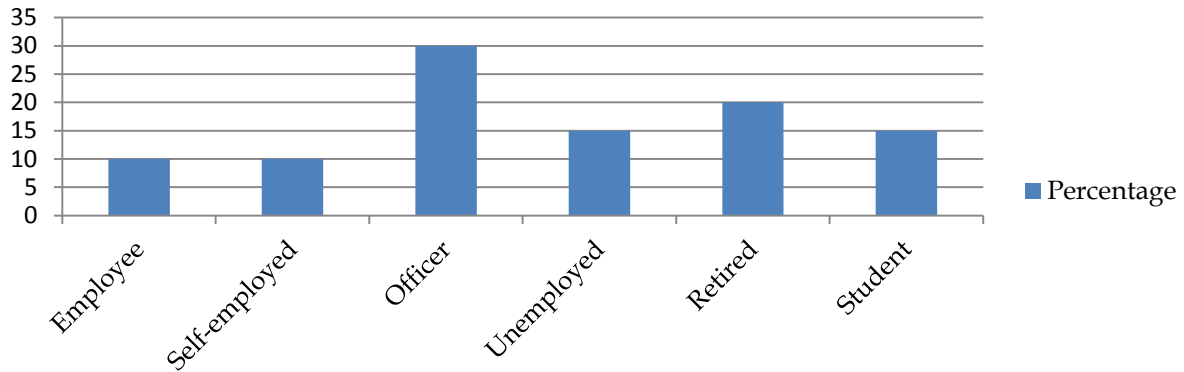
The Mahalles have a higher proportion of retired people than the average for Ankara. They also have a very high proportion of government workers, largely because of the presence of a wide range of government offices and institutions as described in Section 2.4. The main livelihoods in the area are:

- government workers;
- general employees (wage labour of varying types that could include the service sector or contracting or manual work);
- self-employed; and
- retired.

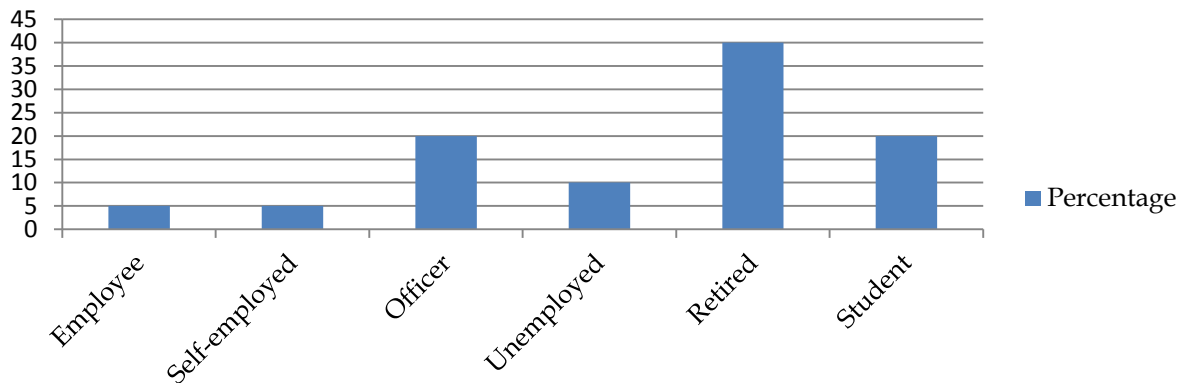
When questioned on the local economy, five out of six Mukhtars within the Project area believe that the economic development of the neighborhood is mid-range – or average compared with other Mahalles of Ankara. Ayvali has experienced important economic improvements in the last five years but the Mukhtar specified that although there are important economic investments in the neighborhood, the population of the community is getting older and this situation is preventing further economic development. An aging population is also a concern in Yunusemre, Varlik and Aşağıeglence Muhalles, where there are more retired people than any other group. The detailed working status of the Mahalles is given in diagrams in Figure 4-24.



Working status of the Yenice Mahalle



Working status of Aşağıgöğence Mahalle



Working status of the Varlık Mahalle



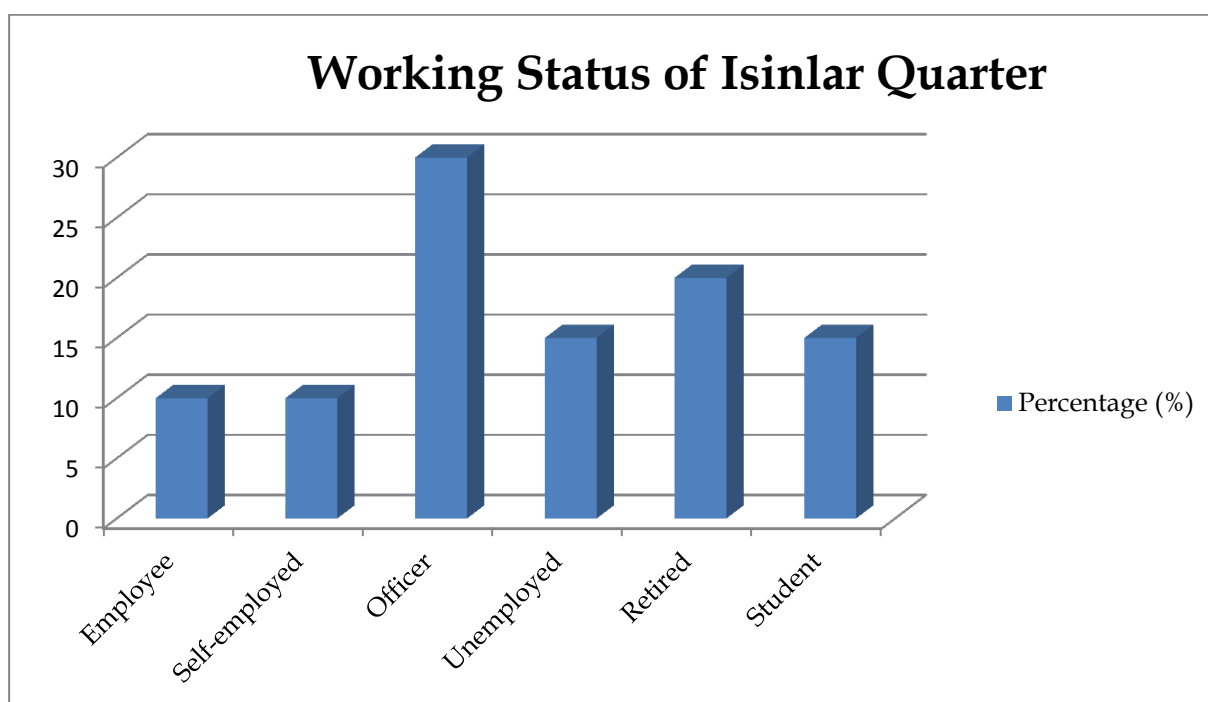
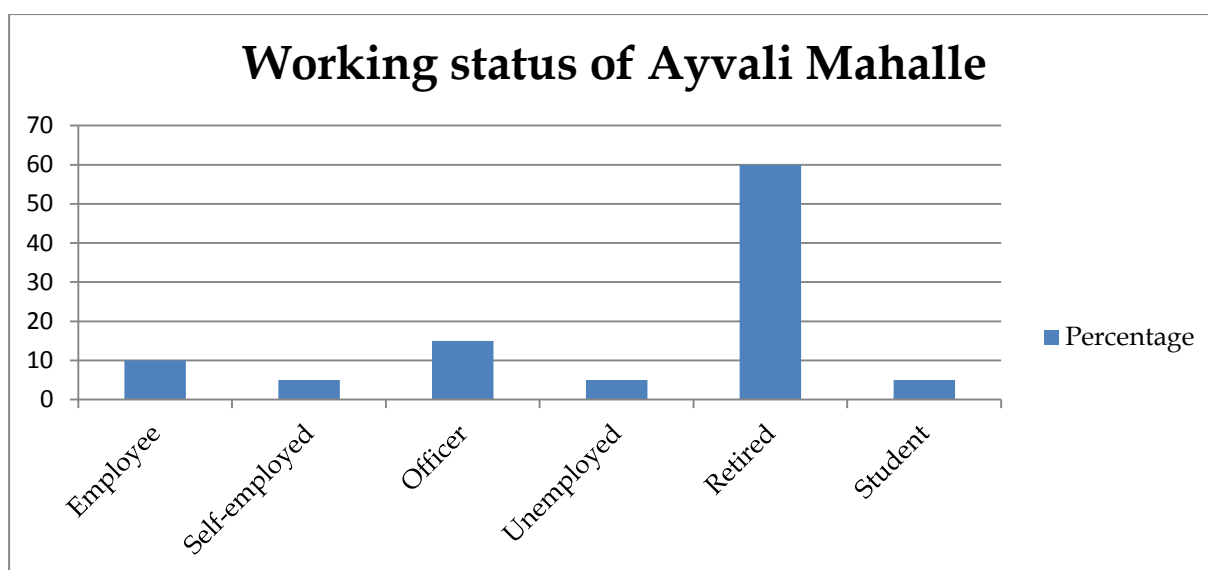
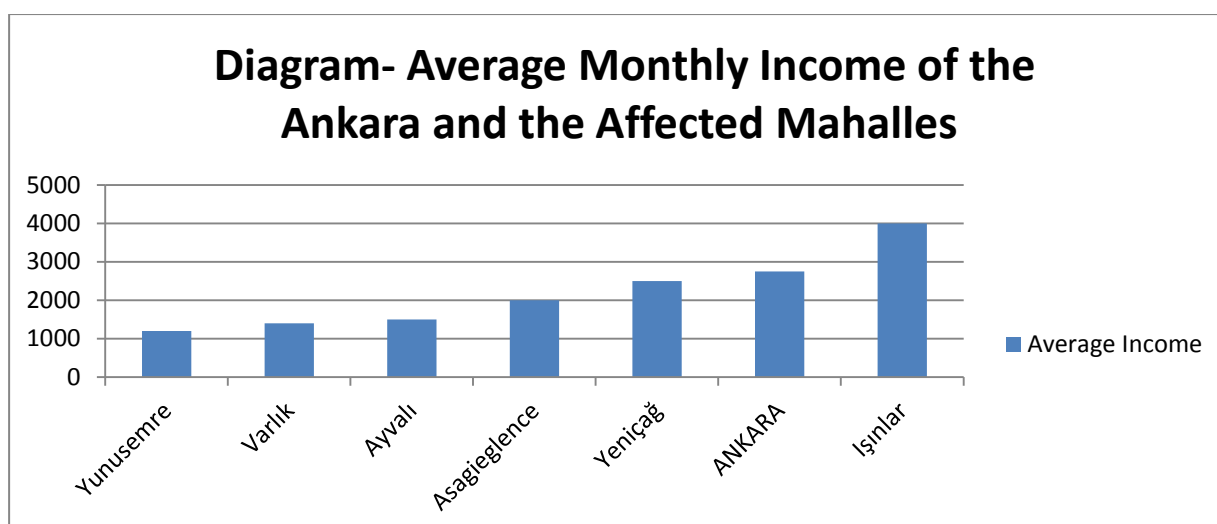


Figure 4-24. Working Status of Mahalles

4.3.4.6.2 *Income Levels*

The six Mahalles in the Project area of influence have an average monthly income of between 1,200 TL and 4,000 TL. Isinlar has the highest average monthly income (4,000 TL) as shown in Figure 4-25. This is considerably higher than the average monthly income of Ankara, which is 2,752 TL. Yenicag has the second highest average monthly income in the Project area (2,500 TL), which is just below the Ankara average. Average monthly incomes in the other four Mahalles are considerably lower than the Ankara average.



Source: Etlik IHCP Socio- Economic Baseline Survey: Community Level Questionnaire, Apr.2013

Figure 4-25. Average Monthly Income of the Ankara and the Affected Mahalles

4.3.4.7 Land-Use and Land Tenure

The Project site land is government land, which has been managed by the relevant Ministries and government Institutions, depending on which Ministry was utilizing the land. Prior to 2006, the land comprised of parcels owned by the Municipality of Yenimahalle and the Social SGK. After 2006 the land was owned by the Treasury. The Treasury granted land use rights to the MoH for the purpose of providing healthcare services. The land where the amusement park, sports centre, the running track and cafes are located is owned and managed by Yenimahalle and Kecioren District Municipalities. These facilities are located on the proposed Project site.

This is an urban development and the land surrounding the Project site a mixture of private and government owned land. This land is used for the following purposes:

- Private developments such as shopping malls and other services;
- Private housing;
- Public parks and amenities; and
- Government offices and government facilities.

The shopping malls, university land and housing developments surrounding the Project site are on private land. There are many different government institutions and buildings surrounding the Project site as described in Section 2.4 and these are on government land and management by the relevant government department.

4.3.4.8 Infrastructure

This section outlines the key infrastructure and services within the Project area.

4.3.4.8.1 Transport Infrastructure

The Metropolitan Municipality of Ankara is responsible for developing transport infrastructure. Currently, transportation to the Project area is available through public buses and mini buses. These buses provide service from the city centre and also from the national bus station to the Project area. The Metropolitan Municipality has a building site to the south of the Project area which will connect Tandoğan and İvedik subway lines. Distance between İvedik subway station and the Project site is approximately 1 km and it is the closest subway station to the Project area. The metropolitan municipality is planning to operate bus services which will provide transportation between health campus and the subway station.

4.3.4.8.2 Public and Private Utilities

The Metropolitan Municipality of Ankara is responsible for distributing natural gas and water. The Project location is in the middle of the city and as a result, all residents and business are connected to the main water supply, electricity grid and gas supply.

4.3.4.8.3 IT and Communications

There are multiple private internet companies and these companies also deliver phone services. Telecom services used to be a public enterprise but it was privatized in 2005.

4.3.4.8.4 Waste Management

District municipalities are responsible for the collection of solid wastes. As mentioned in Section 4.5.5.1.2, the Director of Cleaning Services in Yenimahalle Municipality stated that solid waste produced by residents is collected on a daily basis. Solid wastes collected are taken to the landfills of the Metropolitan Municipality of Ankara in the eastern and northwestern most parts of the city. Medical wastes will be collected by the Metropolitan Municipality while hazardous wastes will be collected by licensed companies, and then taken to licensed recovery or disposal facilities.

4.3.4.8.5 Education Infrastructure

Education in Turkey is governed by a national system, which was established in accordance with the Republic Reforms. It is a state supervised system designed to produce a skilful professional class for the social and economic institutes of the nation. Primary and

secondary public education is free and accessible in Turkey although there is also private education provision.

According to the World Bank (2010), the percentage of primary school enrolment is 104%. In 2012, the total expenditure on education in Turkey amounted to 39 billion Turkish Lira. Table 4-27 below presents the number of public and private schools, the number of students by gender and the number of teachers.

Table 4-27. Education Indicators of Ankara

Public and Private Schools	Number of the Schools	Number of Total Students	Female Students	Male Students	Number of Teachers
Preschool	264	56,356	27,010	29,346	3,487
Primary School	838	309,913	150,590	159,323	18,084
Secondary School	604	297,707	144,481	153,226	16,033
High School	474	270,454	132,137	138,317	20,040
TOTAL	2,180	934,430	454,218	480,212	55,514

Source: www.meb.gov.tr

Table 4-28 below details existing education facilities in the six Mahalles. Ayvali has the highest number of schools. Although Yenicağ has just one primary school and high school, it is close enough to other Mahalles for children to access high schools outside of the Mahalle.

Table 4-28. Education Facilities in the Surrounding Mahalles

School	Keciören		Yenimahalle			
	Ayvali	Asagieglence	Yunusemre	Isinlar	Varlık	Yeniçağ
Primary school	5	3	2	1	1	1
High school	1	2	1	1	0	0
University	2	0	0	0	0	0
Total	8	5	3	2	1	1

Source: Etlik IHCP Socio- Economic Baseline Survey: Community Level Questionnaire, Apr.2013

4.3.4.8.6 Health facilities

Eight healthcare facilities are providing service to the six Mahalles. Information about the existing healthcare facilities in the surrounding Mahalles is presented in Table 4-29.

Table 4-29. Healthcare Facilities in the Surrounding Mahalles

Health Care Facilities	Kecioren		Yenimahalle			
	Ayvali	Asagieglence	Yunusemre	Isinlar	Varlık	Yenicag
Cottage hospital	2	1	0	0	1	1
Hospital	0	0	0	0	2	1
Total	2	1	0	0	3	2

Source: Etlik IHCP Socio- Economic Baseline Survey: Community Level Questionnaire, Apr.2013

The region has adequate primary healthcare provision but Muhktars state that for more detailed treatment services, they must use Numune hospital, which is approximately 10 km away from the Project site.

4.3.4.8.7 *Religious Buildings and Public Amenities*

The population of the Project site is considered to be almost 100% Muslim. As a result, mosques are the most important religious buildings. There are nine mosques in the six Mahalles.

A municipal park surrounds the north and west part of the Project site with a running / walking trail⁵. The trail is heavily used for exercise, although many of these users are known to be pedestrians rather than those exercising. There are three other municipal parks close to the Project area.

4.3.4.9 Health Baseline

According to OECD Health at Glance report 2012, in 2010, EU member states devoted on average(unweight) 9.0% of their GDP to health spending in 2010(Figure 4-26), up significantly from 7.3% in 2000, but down slightly from the peak of 9.2% reached in 2009 following the economic crisis which started in many countries in the middle of 2008. In many countries, public spending on health was maintained in 2009 while GDP was falling strongly, but this was followed in 2010 by the implementation of a range of measures to reduce government health spending as part of broader efforts to reduce large budgetary deficits and debts (see Indicator 5.2).The Netherlands had the highest share of its GDP allocated to health in 2010 (12%), followed by France and Germany (both at 11.6%). This share remains well below the United States where health expenditure accounted for 17.6% of GDP in 2010. The share of health spending in GDP was lowest in Romania and **Turkey**, at around 6%. It has moved since 2003 to extend public coverage for health services for a larger proportion of the population in Turkey.

⁵ Walking trails are provided by the Metropolitan Municipality, where residents' of Mahalles can undertake basic sport activities; it has a soft surface with small exercise equipment. Security at these facilities is providing by the Municipality

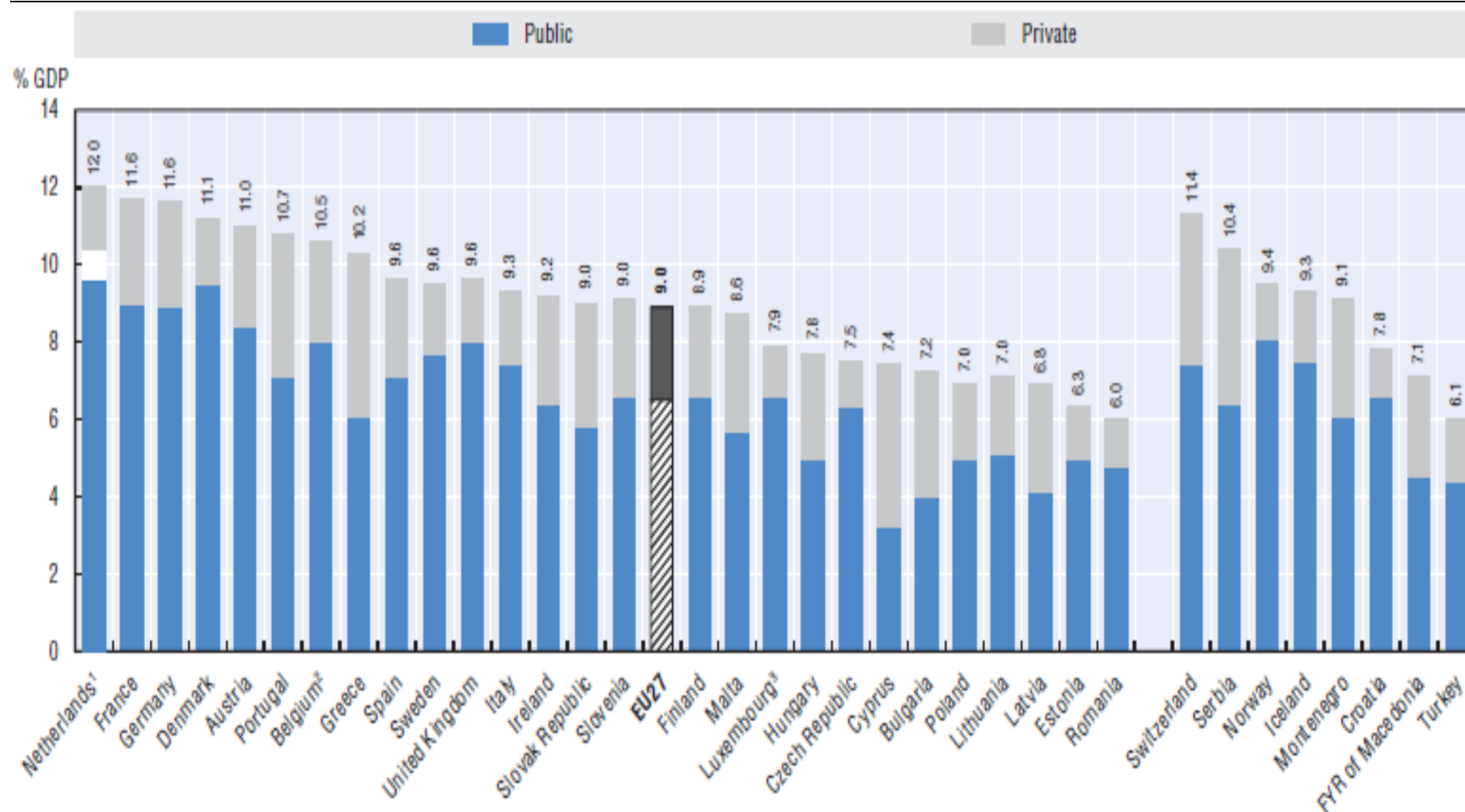


Figure-4-26. Total health expenditure as a share of GDP, 2010 (or nearest year)

Source: www.who.int

In the regional area general statistics for birth and death rates and prevalent diseases for Kecioren, Yenimahalle Districts and Ankara were not available at the time of writing. However national level data is available from the World Health Organization (2010). General health baseline indicators are presented in Table 4-30. This Table represents general information on Turkey and so it is expected that statistics on life expectancy rates and probabilities of dying will be more positive for Ankara given the higher quality and access of health care in the city.

Table 4-30. Health Statistics of Turkey

Characteristics	Figure
Total population	72,752,000
Gross national income per capita (PPP international \$)	16,940
Life expectancy at birth m/f (years)	73/78
Probability of dying under five (per 1 000 live births)	15
Probability of dying between 15 and 60 years m/f (per 1 000 population)	123/68
Total expenditure on health per capita (Intl \$, 2010)	1,161
Total expenditure on health as % of GDP (2010)	6.7

Source: *www.who.int*

The MoH has one hospital in Kecioren (which actually falls outside the Mahalles of the Project area) and two hospitals in Yenimahalle in addition to private and university hospitals. The human resources of these hospitals are summarised in Table 4-31 as an indicator of existing health provision in the Project locality.

Table 4-31. Human Resources of the Hospitals in Kecioren and Yenimahalle

Name of the Hospital	Status of Hospital Employees	Number of Employees
Atatürk Chest Diseases And Chest Surgery Training And Research Hospital	Number of Specialists	116
	General Practitioner Dr. number	6
	Number of Doctor of Dental	2
	Nurse	229
	Midwife	19
	Other Health Personnel	276
	TOTAL	648
Gazi Mustafa Kemal State Hospital ⁶	Number of Specialists	60
	General Practitioner Dr. number	7
	Number of Doctor of Dental	4
	Nurse	74

⁶ Gazi Mustafa Kemal State Hospital is one of the Hospitals which are planning to be closed in the scope of Health Campus Projects.

Name of the Hospital	Status of Hospital Employees	Number of Employees
	Midwife	22
	Other Health Personnel	75
	TOTAL	242
Yenimahalle State Hospital	Number of Specialists	60
	General Practitioner Dr. Number	4
	Number of Doctor of Dental	2
	Nurse	105
	Midwife	21
	Other Health Personnel	76
	TOTAL	268

4.4 Stakeholder Engagement

4.4.1 Objectives of Stakeholder Engagement

Stakeholder engagement is a two-way process of communication between the Project Company and its stakeholders. It is a key part of the ESIA process, allowing stakeholders to express their views about the Project. The SEP presented in Appendix-J has been developed with the aim of explaining how the Etlik IHCP will communicate with stakeholders that may be directly or indirectly affected by and / or interested in the Project. The SEP summarises engagement activities undertaken to date and includes details of the approach and mechanisms proposed for future engagement with stakeholders. It also includes details of a grievance mechanism for stakeholders to raise any concerns related to the Project.

In accordance with international best practice, including EBRD PR10, the purpose of the SEP is to:

- Ensure a technically and culturally appropriate approach to engagement with all key stakeholders;
- Ensure the adequate and timely sharing of information with affected stakeholders and other interested parties;
- Provide sufficient opportunity for stakeholders to express their opinions and concerns; and
- Ensure that these concerns are incorporated into project decision-making processes during all stages of the project lifecycle.

4.4.2 Stakeholder Engagement Approach

Stakeholder engagement has been divided into four stages, the first two of which have already been undertaken:

- Phase 1: Initial Engagement
- Phase 2: Impact Assessment
- Phase 3: Impact Assessment Disclosure
- Phase 4: Project Implementation

A range of tools have been used for stakeholder engagement as part of this project. The specific methods used have, and will, vary across the different stakeholder groups and particular consideration has, and will, be made towards vulnerable groups, as described in Section 4.3.4.4.5.

Specific tools for engagement include:

- Public meetings;
- Project brochure;
- Project website;
- Grievance mechanism;
- Communication with the Project Company Public Relations Officer;
- Newspapers;
- Public notices;
- Radio; and
- Phone calls.

4.4.3 Stakeholder Identification

In order to develop an effective SEP it has been necessary to determine exactly who the stakeholders are and understand their priorities and objectives in relation to the Project. By classifying stakeholders it has been possible to develop a plan that is tailored to the needs of different stakeholder groups. Different issues are likely to concern different stakeholders and so different types of stakeholders have been grouped based on their connections to the Project. Having an understanding of the connections of a stakeholder group to the Project helps identify the key objectives of engagement.

A list of the organisations and individuals identified to date is presented in the SEP. Table 4-32 highlights the stakeholder groups identified and their connection to the Project.

Table 4-32. Connection of Stakeholders to the Project

Stakeholder Groups	Stakeholder Type		Connections to the Project
	Affected Party	Other Interested Party	
Local Communities			
• Muktars of 6 affected Mahalles • Residents of 6 affected Mahalles • Users of local public amenities • Users and employees of Etlik Specialised Hospital • Residents of SGK housing • Employees of surrounding government institutions and public amenities • Principal communities to be served by EIHCP • Wider community in the catchment area of the new hospital	√		Households and communities that will receive impacts (positive or negative) as a result of the Project – e.g. positive employment opportunities, provision of medical care or negative impacts associated with traffic congestion. The residents of SGK housing have already been relocated to new housing. This group leased SGK housing from the government as part of their benefits as senior civil servants.
Local Businesses that will be closed or relocated			
• Owner of the kiosks, café and amusement park and sports complex on the edge of the Project site • Taxi stand • Etlik Specialised Hospital catering business	√		These businesses on the Project site will need to be relocated as a result of the Project once the construction phase has been completed.
Government			
• MoH • Social Security Institution (SGK)	√		The centralization of the state hospitals into large health complexes will have impacts upon the operations of the MoH. SGK owns social housing and archive buildings in the Project area. These buildings will need to be demolished as a result of the Project.
Local Administrations			
• Metropolitan Municipality of Ankara • Yenimahalle Municipality • Keçiören Municipality		√	Local government of primary political importance to the Project with permitting requirements that must be met by the Project and responsibilities for waste management, infrastructure and traffic management. The Project Company will have to work in cooperation with the municipalities.
Employees			
• Employees of the hospitals that will be closed • Construction Staff	√	√	The amalgamation of multiple hospitals into one large health complexes will have social and economic impacts on health professionals of MoH and their patients. The construction and operation of the large EIHCP will require substantial labor effort and employment
NGOs			

Stakeholder Groups	Stakeholder Type		Connections to the Project
- Turkish Medical Association - Health Workers' Union	√	√	Turkish Medical Association took legal action against the MoH, the Constitutional Court upheld their objection to the reorganization of health care in Turkey Health Workers' Union achieved to reemployment of subcontractor workers of the closed Etlik Specialized Hospital in other hospitals of the MoH.
Academics			
- Yıldırım Beyazıt University - Turgut Özal University	√	√	Both universities have a medicine department. It is important to engage with the universities for future cooperation as they have a general interest. Additionally, staff and students of the universities may experience some direct impacts such as increased traffic congestion.

4.4.4 Previous and Planned Stakeholder Engagement Activities

This section outlines the previous stakeholder engagement activities undertaken during scoping and the main impact assessment as well as planned ESIA disclosure activities and activities during project implementation. The timeframe for stakeholder engagement is detailed in Table 4-33 while stakeholder engagement activities are detailed in Table 4-34.

Table 4-33. Stakeholder Engagement Timeframe

Phase	Dates	Stakeholder Groups
Phase 1: Initial Engagement	November 2012 to February 2013	MoH SGK Mukhtars,
Phase 2: Impact Assessment	March 2013 to May 2013	Local residents, Mukhtars, Businesses, Academics, NGOs, impacted government bodies
Phase 3: IA Disclosure Draft ESIA Disclosure	60 days from May 2013 to July 2013 (draft ESIA);	Local residents, Mukhtars, Businesses, Academics, NGOs, impacted government bodies
Phase 4: Project Implementation	Project approval - end of operation	*Local residents *Mukhtars, Patients Employees, Businesses, Academics, NGOs,

Table 4-34. Stakeholder Engagement Activities

Engagement Activities Undertaken			
Stakeholder	Engagement Methods	Main Objectives	Specific Discussion Areas
MoH SGK	In-Depth Interviews	Identify Stakeholders Identify directly and indirectly affected people	*The aim of the Project *The scope of the Project
Local residents Mukhtars Businesses Academics NGOs	*Community Level Survey *Surveys with businesses *In-depth interviews with municipalities, academics and NGOs *Public Participation Meeting	*Identifying the negative impacts *Identifying the positive impacts *Identifying the impact indicators *Providing recommendations on mitigation and enhancement measures to strengthen the positive effects and minimize the negative effects of the Project.	Impacts of the construction and operation phases.
Future Engagement: Impact Assessment Disclosure			
Stakeholder	Engagement Methods	Main Objectives	Specific Discussion Areas
Local residents Mukhtars Businesses Academics NGOs Impacted Government Departments	Newspaper Community Meetings Website Provision of Draft ESIA document	To make the final ESIA available to all interested and affected stakeholders. Inform Project design and management plans	Content of ESIA Key positive and negative impacts Residual impacts and manners in which they can may be mitigated
Future Engagement: Implementation			
Stakeholder	Engagement Methods	Main Objectives	Specific Discussion Areas
Local Residents, Employees, Patients	Media notifications of project progress Community consultation events Updating SEP and Sustainability reporting On-going Community liaison and grievance logging, resolution and reporting Phone line and postal and email address	*Identifying the negative impacts *Identifying and advertising the positive impacts *Identifying the impact indicators *Providing recommendations on mitigation and enhancement measures to strengthen the positive effects and minimize the negative effects of the Project.	Impacts of the construction phase -focusing on those raised at the ESIA stage, such as road safety, and any unforeseen impacts Impacts of the operation phase.

4.4.5 Outcomes

This section lists the key concerns and recommendations raised during stakeholder engagement to date. One of the main concerns expressed was traffic and traffic management and the impacts this would have on local residents. Concerns were also expressed over the construction phase and in particular the associated noise and dust as well as the behaviour and conduct of construction workers. However the positives of the Project were also raised and it is hoped that the Project will boost the local economy and create jobs. Below is a list of the key issues identified by stakeholders, including concerns, expectations and recommendations:

Concerns of Stakeholders:

- Traffic load will be increased; resulting from additional construction vehicles on already busy commuter roads.
- There is expected to be a large number of people using the site on a daily basis.
- Construction period of the campuses will create environmental pollution; resulting from excavation works and the exhaust of machinery and vehicles used during the construction phase, resulting from construction traffic and machinery, especially during activities such as excavation and drilling.
- Associated with an influx of approx. 4,000 construction workers, many living in worker (temporary) accommodation near the site.
- Trespassers onto the construction site may be at risk serious accident or injury if they come near construction activities or vehicles.
- Concerns over the protection of the tumulus (a mound of earth and stones raised over an ancient grave) on site, which was known by residents on the nearby mahalles.
- Prices of houses will increase;
- Lack of car parking;
- Noise, dust and pollution problems associated with construction;
- Decreasing the level of income for private hospitals;
- PPP model is privatization of health services. State have to protect all citizen's life right and provision of health services is the most important need for public;
- Transparency of the tender process for hospital contracts.
- Healthcare services should be accessible and free to all;
- The relationship between the MoH and the private sector.
- Etlik Specialized Hospital canteen. 2 additional businesses will also be affected (a taxi stand and leisure complex)
- Clarity about project schedule

Expectations of Stakeholders

- Job opportunities;
- Improved access to health services;
- Increased income for local businesses;
- Economic benefits to the local economy;
- Improved access to health care and the provision of a new, state of the art medical facility for a large proportion of the Ankara population, specially elderly population
- Improved infrastructure.

Recommendations of Stakeholders

- The need for adequate security measures;
- The need for construction of the subway to be completed as soon as possible;
- Careful siting of the temporary workers camp away from residential areas;
- Hiring of local people;
- Traffic awareness campaign for local people;
- Sufficient road network.

4.4.6 Grievance Mechanism

A grievance mechanism is a process that enables any stakeholder to make a complaint or a suggestion about the way a project is being planned, constructed or implemented. It enables stakeholder views to be received and considered and is key to achieving a successful relationship between the Project, the local community and other stakeholders. The grievance mechanism being implemented for the Project is detailed in the SEP in Appendix-J, Section 7.

4.5 Impacts on Physical Environment

4.5.1 Air Quality

4.5.1.1 Construction Phase

Impact Definition

The two major sources of potential impacts on air quality during construction phase of the Project are the generation of dust from demolition of existing buildings, earthworks, movement of vehicles on unpaved surfaces, and the release of engine emissions from construction equipment and vehicles at the construction sites and workers accommodation. Dust rising from earthwork including drilling and vehicle movement could be significant particularly during dry weather conditions and may cause problems to nearby houses, public areas and institutions (e.g. shopping center, SHW facility, high school).

The exhausts from construction equipment, diesel-fueled units and vehicles will also result in release of exhaust gases such as nitrogen oxides (NO_x), sulfur dioxide (SO₂) and carbon monoxide (CO).

Impact Assessment

This ESIA has used the emission factors which have been derived from the Coordinated European Particulate Matter Emission Inventory Program (CEPMEIP) study, presented in the European Monitoring and Evaluation Programme (EMEP)/European Environmental Agency (EEA) Emission Inventory Guidebook 2009, Tier 1 default emission factor to estimate PM₁₀ emissions during construction and demolition activities. For ease of reference it is 0.0812 kg/m²-year.

The next stage of the assessment process is to estimate the approximate surface areas of the buildings to be demolished. These are given in Table 4-35 below along with the estimated time required for demolition and the predicted dust generation.

Table 4-35. Information Regarding Building Demolishment

Building Name	Area (m ²)	Time Required for Demolition (days)	Predicted Dust Generation (kg/hour)
Specialist Hospital	31,680	120	0.294
SGK Housing	8,400	90	0.078
SGK Archive and Storage	18,995	120	0.176

Total emission from demolition activities will be 0.548 kg/hour which is lower than the limit value of 1.0 kg/ hour given in Table 2-1 in Annex 2 of the RCIAP for emissions from non-point sources.

To facilitate site preparation, 4,528,599 m³ of excavation will be required. It is estimated that of these arising 2,497,207 m³ of this will transported to landfill whilst 2,031,392 m³ will be used for backfilling. Machinery to be used to enable these works are given in Table 4-36 below.

Table 4-36. Machinery to be Used in Excavation Works

Machine	Excavation where material goes to landfill	Excavation for producing backfilling material
Tracked Excavator	8	7
Trucks	113	23
Loader	1	1
Bulldozer	-	1
Pumper	-	1

The following emission factors have been used for calculation of dust emissions from excavation, loading, transport and unloading (see Table 4-37). These emission factors were given in the RCIAP.

Table 4-37. Emission Factors

Activity	Without mitigation	With mitigation
Excavation	0.025 kg/ton	0.0125 kg/ton
Loading	0.010 kg/ton	0.005 kg/ton
Transportation	0.7 kg/km-hour	0.35 kg/km-hour
Unloading	0.010 kg/ton	0.005 kg/ton
Storage	5.8 kg/ton-ha-day	

In dust emission calculations density of soil is assumed as 1.6 ton/m³. Considering the fact that excavation will last 170 days, and total working hours a day will be 16, hourly amount of material to be going to landfill will be (2,497,207 m³ / 170 days/ 16 hours/day=) 918 m³. Assuming soil density is 1.6 ton/m³, hourly amount will be 1468.8 ton.

Amount of material to be stored for later use in backfilling will be (2,031,392 m³ / 170 days/ 16 hours/day=) 746.8 m³, which is 1195 ton/hour.

For excavated material or spoil that will go to landfill, emissions only from excavation and loading are taken into account while that from transportation until trucks leave the site is omitted.

Trucks carrying spoil to the temporary storage area in the Project Site can take 14 m³ of soil. Hence, daily number of trucks to make rounds between excavation area and spoil storage site will be (746.8 m³ / 14 m³/round =) 53 rounds. Taking the average distance from excavation site to the storage site as 500 m, a round trip will be 1 km. Sample calculation for uncontrolled case will be 0.7 kg/km-hour x 1 km/round x 53 round/day x 1 day/16 hours = 2.32 kg/hour.

Dust emissions expected to arise from soil handling have been calculated, and results are presented below.

Table 4-38. Dust Emissions

Activity	Spoil going to landfill (kg/hour)		Spoil stored for backfilling (kg/hour)	
	Uncontrolled	Controlled	Uncontrolled	Controlled
Excavation	36.72	18.36	29.88	14.94
Loading	14.69	7.34	11.95	5.98
Transportation	-	-	2.32	1.16
Unloading	-	-	11.95	5.98

Emissions from construction machinery, i.e. trucks and other heavy machines, are calculated using Exhaust Emission Factors for Nonroad Engine Modeling - Compression-Ignition (Report No. NR-009A) of United States Environmental Protection Agency (EPA).

EPA emission factors, which are given according to engine power of the machines, are used to estimate NO_x, HC and CO and PM concentrations. Engine power of machines and corresponding exhaust emission coefficients are given in Table 4-39.

Table 4-39. Engine Power of Construction Machinery

Machine	Engine Power (HP)	Emission Coefficients (g/HP-hour)			
		HC	CO	NOX	PM
Tracked Excavator	261.9	0.4	1.0	4.5	0.4
Trucks	349.6	0.3	1.0	4.5	0.4
Loader	197	0.4	1.0	4.5	0.4
Bulldozer	92.5	0.4	1.0	4.5	0.4
Pumper Truck	189	0.4	1.0	4.5	0.4

Considering daily working time of 16 hours, exhaust emissions are calculated using these coefficients, and presented in Table 4-40. It is assumed that number of trucks that will be at the site for loading materials to be carried to landfill is 7, and hence, total number of trucks will be 30 with those 23 carrying materials to the temporary storage site. For other machines, numbers of vehicles given in Table 4-36 are used.

Table 4-40. Exhaust Emissions from Construction Machinery

Machine	Number of Machines	Engine Power (HP)	Emissions (kg/hour)			
			HC	CO	NOX	PM
Tracked Excavator	15	261.9	1.57	3.93	17,68	1,57
Trucks	30	349.6	3.15	10.49	47,20	4,20
Loader	2	197	0.16	0.39	1,77	0,16
Bulldozer	1	92.5	0.04	0.09	0,42	0,04
Pumper Truck	1	189	0.08	0.19	0,85	0,08

Particulate emissions from construction machines will be considered in combination with dust emissions from soil works. Total dust emission is 53.76 kg/hour. Adding particulate from machines, total emission will be 59.81 kg/hour, which exceeds the limit value of 1.0 kg/hour in the RCIAP. Hence, according to this regulation, dust dispersion modeling should be carried out.

A Gaussian dispersion model was used to model dispersion of dust to be generated during soil handling and site leveling activities. This model is actually a tool to check whether or not there is a need to run a more sophisticated model to obtain more accurate results. Since the

model results show that dust concentration expected at the sensitive receptors are under legal limits there is no need to carry out a sophisticated model e.g. ISCST3.

The model assumes that 80% of the total dust is settleable dust while 20% is suspended. It is also assumed that all activities are carried at the same point and continuous within a daily working period of 16 hours. Controlled emission values are considered where such emission control techniques as using covered vehicles, loading and unloading without sluing are applied.

Change of settleable dust concentrations with respect to distance are given in Table 4-41 and Figure 4-26 while change of suspended dust concentration with respect to distance is given in Table 4-42 and Figure 4-27.

Table 4-41. Change of Settleable Dust Concentration (mg/m²-hour) with Distance

Direction	100 m	200 m	300 m	400 m	500 m	600 m	700 m	800 m	900 m	1000 m
N	6,691.5	1,922.3	892.0	514.4	335.1	235.9	175.3	135.5	108.0	88.1
NNE	4,465.7	1,282.4	595.0	343.1	223.5	157.3	116.9	90.4	72.0	58.8
NE	4,465.7	1,282.4	595.0	343.1	223.5	157.3	116.9	90.4	72.0	58.8
ENE	6,691.5	1,922.3	892.0	514.4	335.1	235.9	175.3	135.5	108.0	88.1
E	8,912.5	2,561.4	1,188.8	685.6	446.6	314.5	233.7	180.7	144.0	117.5
ESE	8,912.5	2,561.4	1,188.8	685.6	446.6	314.5	233.7	180.7	144.0	117.5
SE	8,912.5	2,561.4	1,188.8	685.6	446.6	314.5	233.7	180.7	144.0	117.5
SSE	8,912.5	2,561.4	1,188.8	685.6	446.6	314.5	233.7	180.7	144.0	117.5
S	8,912.5	2,561.4	1,188.8	685.6	446.6	314.5	233.7	180.7	144.0	117.5
SSW	8,912.5	2,561.4	1,188.8	685.6	446.6	314.5	233.7	180.7	144.0	117.5
SW	6,691.5	1,922.3	892.0	514.4	335.1	235.9	175.3	135.5	108.0	88.1
WSW	6,691.5	1,922.3	892.0	514.4	335.1	235.9	175.3	135.5	108.0	88.1
W	6,691.5	1,922.3	892.0	514.4	335.1	235.9	175.3	135.5	108.0	88.1
WNW	6,691.5	1,922.3	892.0	514.4	335.1	235.9	175.3	135.5	108.0	88.1
NW	6,691.5	1,922.3	892.0	514.4	335.1	235.9	175.3	135.5	108.0	88.1
NNW	4,465.7	2,561.4	595.0	343.1	223.5	157.3	116.9	90.4	72.0	58.8

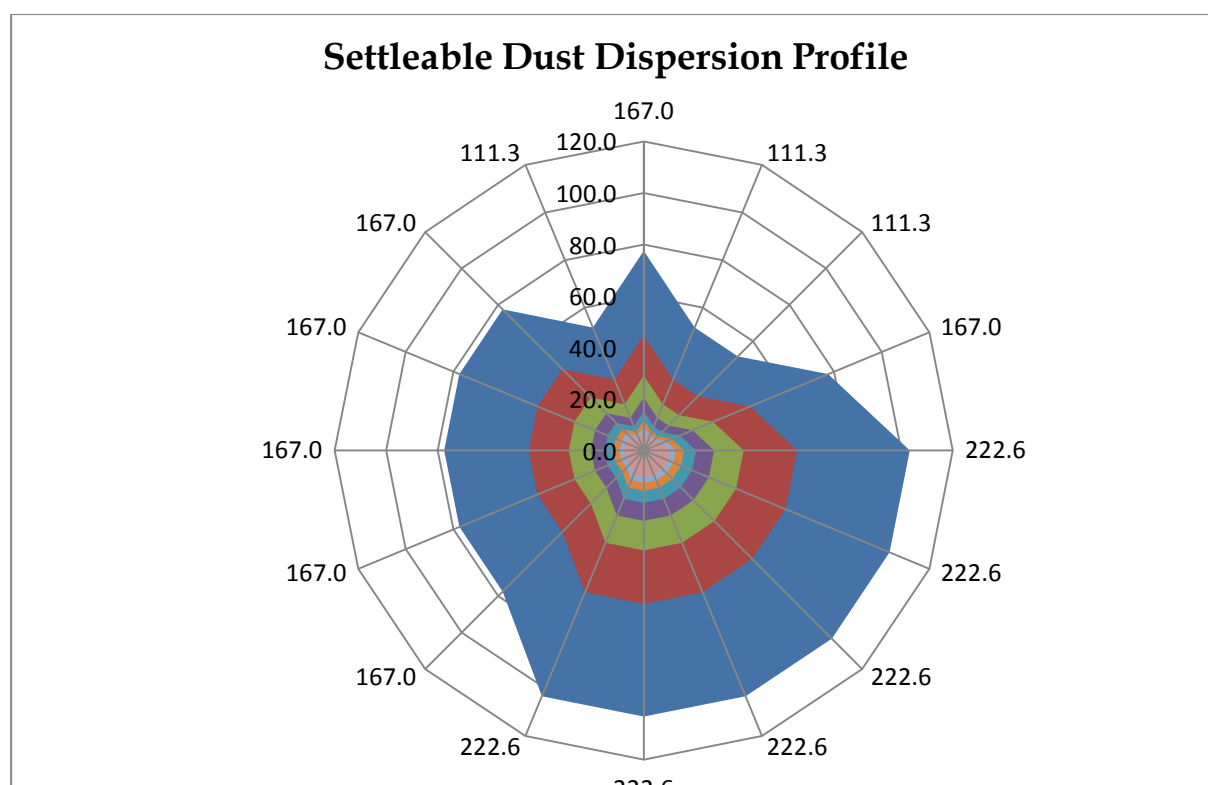


Figure 4-26. Settleable Dust Dispersion Profile

Table 4-42. Change of Suspended Dust Concentration ($\mu\text{g}/\text{m}^3$) with Distance

Direction	100 m	200 m	300 m	400 m	500 m	600 m	700 m	800 m	900 m	1000 m
N	580.3	167.0	77.5	44.7	29.1	20.5	15.2	11.8	9.4	7.7
NNE	386.9	111.3	51.7	29.8	19.4	13.7	10.2	7.8	6.3	5.1
NE	386.9	111.3	51.7	29.8	19.4	13.7	10.2	7.8	6.3	5.1
ENE	580.3	167.0	77.5	44.7	29.1	20.5	15.2	11.8	9.4	7.7
E	773.5	222.6	103.3	59.6	38.8	27.3	20.3	15.7	12.5	10.2
ESE	773.5	222.6	103.3	59.6	38.8	27.3	20.3	15.7	12.5	10.2
SE	773.5	222.6	103.3	59.6	38.8	27.3	20.3	15.7	12.5	10.2
SSE	773.5	222.6	103.3	59.6	38.8	27.3	20.3	15.7	12.5	10.2
S	773.5	222.6	103.3	59.6	38.8	27.3	20.3	15.7	12.5	10.2
SSW	773.5	222.6	103.3	59.6	38.8	27.3	20.3	15.7	12.5	10.2
SW	580.3	167.0	77.5	44.7	29.1	20.5	15.2	11.8	9.4	7.7
WSW	580.3	167.0	77.5	44.7	29.1	20.5	15.2	11.8	9.4	7.7
W	580.3	167.0	77.5	44.7	29.1	20.5	15.2	11.8	9.4	7.7
WNW	580.3	167.0	77.5	44.7	29.1	20.5	15.2	11.8	9.4	7.7
NW	580.3	167.0	77.5	44.7	29.1	20.5	15.2	11.8	9.4	7.7
NNW	386.9	111.3	51.7	29.8	19.4	13.7	10.2	7.8	6.3	5.1

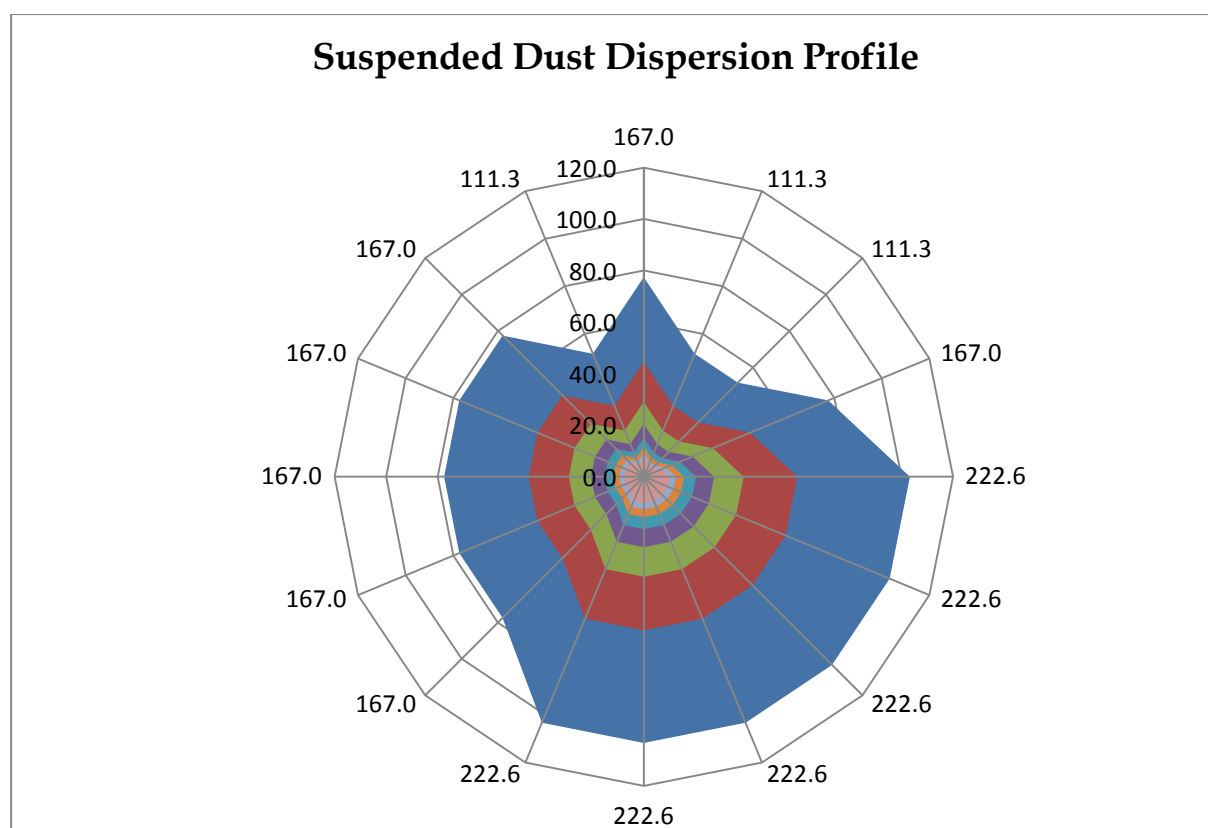


Figure 4-27. Suspended Dust Dispersion Profile

The respective limit values given in the Turkish RCIAP for settleable and suspended dust concentrations $300 \text{ mg/m}^2\text{-day}$ and $100 \text{ }\mu\text{g/m}^3$. On the other hand, EU suspended dust (PM_{10}) limit values on daily and annual basis are $50 \text{ }\mu\text{g/m}^3$ and $40 \text{ }\mu\text{g/m}^3$. Settleable and suspended dust concentrations are below the corresponding limit values at distances 700 m and 500 m, respectively. The most extensive excavation works will be between Specialist Hospital area and the Maternity Hospital. Thus, considering that as the center of excavation works, dust reaching the closest sensitive receptors, Polyclinic and Maternity Hospital are not expected to adversely affect due to construction works.

Impact evaluation carried out according to the impact assessment methodology given in Section 4.1 is presented below.

	Direct	Indirect	Induced
Impact Type	There is direct interaction with the nearby communities and patients staying in the Polyclinic and Maternity Hospital.		
Impact Duration	Temporary	Short-term	Long-term
	Excavation activities that heavily generates dust will last more than one year.		
Impact Extent	Local	Regional	International
	According to outcomes of the modeling study, i.e. limit values are met at distances of 700 m and 500 m and not regarded as significant beyond this distance.		
Impact Scale	Immediate surroundings of the Project Site		

Impact Frequency	Construction period				
Magnitude	Positive	Negligible	Small	Medium	Large
	Dust concentrations are calculated as below legal limits at receptors.				
Receptor Sensitivity	Low		Medium		High
	Patients will stay in the Polyclinic and the Maternity Hospital which will continue to operate during construction of the Project.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Mitigation Measures

- All inner roads (with the Project site) and areas where trucks move including excavated and leveled areas will be watered regularly under warm, dry and windy weather conditions;
- Material will be loaded and unloaded without sluing;
- 30 km/hour speed limit will be set and enforced on non-paved roads;
- The top of the trucks will also be covered while carrying the excavation materials to landfill of the Metropolitan Municipality;
- The exhaust emissions of the heavy machinery will regularly be measured, controlled and recorded by site staff from authorized institutions;
- Necessary permits from the Local Environmental Committee if 24 hour working are required.

Residual Impacts

Impact significance will be minor since impact magnitude will be negligible by taking the proposed mitigation measures.

4.5.1.2 Operation Phase

Impact Definition

In the scope of the Project, there will be a tri-generation plant having six units of natural gas-fired engines. Three units of the tri-generation plant will be located in the southern technical building while the other three will be in the northern technical building.

In addition to the tri-generation plant, there will be also eight natural gas-fired boilers in order to satisfy heat and hot water demand of the Project. Three of them among eight boilers will be installed for back up purpose and will only be operated in case other boilers are out of order due to break-down.

Emissions, especially NO_x , to be originated from tri-generation plant and boilers are considered as the major and continuous source of air emissions during operational phase.

The tri-generation system which will be comprised of six gas engines, each with an electrical installed capacity of 2.7 MW_e , will have a total installed electrical capacity of 16.2 MW_e . Its nominal thermal power is about 36 MW_t . Moreover, each of the boilers has a thermal installed capacity of 10 MW_t and total installed thermal capacity for boilers will be 80 MW_t . Total installed nominal thermal power of the Project is about 116 MW_t . Since total thermal power of the Project is higher than 50 MW_t , the Project is in the scope of IFC Environmental, Health and Safety (EHS) Guidelines for Thermal Power Plants as well as EC IPPC Reference Document on Best Available Techniques (BREF) for Large Combustion Plants. Relevant emission limits/guideline values stipulated in these documents are presented together with the emission data in Table-4-43.

During normal operation period for cold weather conditions in Ankara (in between November and April according to the long-term temperature averages), three boilers will be in operation to secure heat and hot water demand together with the tri-generation plant. On the other hand, during severe winter conditions, which are proposed to occur in a maximum of 30 days between December and February according to long-term monthly average temperatures in Ankara, in addition to three boilers, two additional boilers will be in operation. In other words, during severe winter conditions, a total of five boilers and tri-generation plant will be in operation to secure heat, hot water and electricity supply. During hot periods (in between May and October) when there is no need for heat supply, only one boiler will be in operation for satisfying hot water demand together with the tri-generation plant.

Table 4-43. Air Emissions and Stack Properties

	Parameter	Values for Each Unit	National Limit Values	IFC Guideline Values for Power Plants	BREF Guideline Values
Engine	NO_x (as NO_2)	56 mg/Nm^3 (@dry, 15% O_2) 151 mg/Nm^3 (@dry, 5% O_2) 0.868 kg/h	500 mg/Nm^3 (@dry, 5% O_2)	200 mg/Nm^3 (@dry, 15% O_2)	20-75 mg/Nm^3 (@dry, 15% O_2)
	O_2	10.6%	-	-	-
	H_2O	10.1%	-	-	-
	Stack Gas Flow Rate	15,500 Nm^3/h (dry)	-	-	-
	Stack Gas Exit Temperature	95°C	-	-	-
	Stack Gas Exit Velocity	22.6 m/s	-	-	-
	Stack Internal Diameter	0.6 m	-	-	-
	Stack Height	22 m	-	-	-
Boiler	NO_x (as NO_2)	50 mg/Nm^3 (@dry, 3% O_2) 0.542 kg/h	800 mg/Nm^3 (@dry, 3% O_2)	240 mg/Nm^3 (@dry, 3% O_2)	50-100 mg/Nm^3 (@dry, 3% O_2)
	O_2	-	-	-	-

	Parameter	Values for Each Unit	National Limit Values	IFC Guideline Values for Power Plants	BREF Guideline Values
	H ₂ O	-	-	-	-
	Stack Gas Flow Rate	10,843 Nm ³ /h (@dry)	-	-	-
	Stack Gas Exit Temperature	200°C	-	-	-
	Stack Gas Exit Velocity	4.38 m/s	-	-	-
	Stack Internal Diameter	1.1 m	-	-	-
	Stack Height	18 m	-	-	-

As seen in Table 4-43, NO₂ emissions to be originating from both the gas engines and the gas-fired boilers are in compliance the strictest values stipulated in the EC IPPC BREF for Large Combustion Plants.

An air quality modeling study has been carried out for these units by considering the above cases which are changing according to weather conditions. Air quality modeling study has been performed based on the design and emission assumptions shown in Table 4-43. These assumed parameters are regarded as robust and are derived from a comparable plant.

Three different cases have been developed regarding number of boilers operated during different periods of the year as defined in the above paragraphs. Air quality modeling study has been performed for these three cases defined below:

- 1) Operational case for cold weather conditions (between November and April): six units of gas engines in the tri-generation plant and three units of gas-fired boilers
- 2) Operational case for severe weather conditions (a total of 30 days between December and February): six units of gas engines in the tri-generation plant and five units of gas-fired boilers
- 3) Operational case for hot weather conditions (between May and October): six units of gas engines in the tri-generation plant and one unit of gas-fired boiler

To model emissions from this Project an AERMOD model, was employed. AERMOD is widely regarded as one of the most developed computer models estimating hourly, daily and yearly GLC's on the basis of the real time values. Model allows calculations of different dispersion models for different sources (point, volume, line) from isolated stacks to fugitive pollutants. Additionally, it considers conditions like aerodynamic waves and turbulence which in this instance could arise from new buildings. AERMOD model developed by USEPA is one of the most developed computer models estimating hourly, daily and yearly GLC's on the basis of the real time values. Model comprises the calculations of different dispersion models for different sources (point, volume, line) from isolated stacks to fugitive pollutants. Additionally, it considers conditions like aerodynamic waves and turbulence.

AERMOD is working in a network system defined by the user and calculations are made for corner points of each receiving environment segments forming the network. The network system used by AERMOD model can be defined as polar or Cartesian. Additionally, detailed calculations can be made at the discrete receptor points, which can be determined out of the network system.

AERMOD uses four different data given below:

- Wind direction, wind speed, temperature, mixing height, (depends on user's choice) hourly meteorological data set including wind profile exponential and potential vertical temperature difference.
- Coordinates and heights of each element in the network system defined as receiving environment.
- Data sets including source coordinates based on a starting point determined by the user, source height, diameter, emission rate, temperature and flow rate.

The results of the model are suitable for the preparation of dispersion maps including whole dispersion area. Therefore, the assessment of regional air quality under different scenarios (e.g. different treatment conditions, various pollution sources or varying seasonal conditions) is possible.

In the scope of modeling study that estimates NO₂ GLC in ambient air by the help of mathematical calculations is comprised of following items:

- 7 km x 7 km "Dispersion Area" for analyzed source is determined.
- A rectangular grid system for the determined dispersion area is prepared with a grid system of 100 m x 100 m and information on latitude, longitude and elevation is obtained.
- Information about the pollutant sources in the dispersion area is obtained.
- Hourly meteorological data of a representative year is obtained.
- Hourly, daily and annual average GLC values of pollutants in the ambient air are estimated by being run of the model after transferring the information stated in the above steps.

Long term meteorological data needed for modeling studies is obtained from the regional meteorological stations. In this study, Ankara Meteorological Station is considered as suitable and representing meteorological station and the meteorological data recorded in this station was used in the modeling study. Long term meteorological for last ten years and five years hourly wind data (in between 2006 and 2011) are evaluated for selection of representative year. As a result of this study, wind data of 2010 is selected as most appropriate year for air quality modeling study. Hence, the hourly wind data measured in 2011 was used in the modeling study. Elevation data with 100 m grid interval were used with the modeling.

As mentioned above, determination of a study area and dividing up this area into receiving environment segments are necessary for AERMOD. Rectangular area defined as study area for this study is selected by considering the proposed plant to be located at the center. The network system is within the 7 km × 7 km area in east- west and north-south directions and it includes nodes with 100 m intervals.

Composition of each operational case and maximum GLC values calculated by the modeling studies throughout the year are presented in Table 4-44. According to the modeling results, maximum of the NO₂ GLC values calculated within the area of influence of the Project via dispersion model by using design data (see Table 4-43), are well below the national ambient air quality limit values. When the contribution of the proposed Project to the ambient air quality of the close environment is examined, it is understood that the Project is expected to form respectively 25% and 10% of the relevant short-term and long-term ambient air quality standards. Therefore, the Project will satisfy the stringent requirement of the IFC defined in the EHS Guideline for Thermal Power Plants and General EHS Guideline documents.

According to the figures illustrating NO₂ gas dispersion in ground level, NO₂ gases originating from the stacks of the proposed Project will be dispersed into the atmosphere of the neighboring quarters which are in a distance of two kilometers. The maximum GLC values were calculated at approximately 1.5 km in the northwest direction and at approximately 0.5 km in the south direction for short-term and long-term basis respectively. Since the maximum GLC values and maximum average GLC values are well below the national ambient air quality limits and in line with the stringent IFC requirement, adverse impacts on ambient air quality and residents within the area of influence are not expected.

According to hourly measurement data of 2012 of the Ministry of Environment and Urbanization, average background NO₂ concentration of Ankara city is about 55 µg/m³. Therefore, the cumulative impact with the realization of the Project is expected to be 50% of the ambient air quality standards and thus, it will be within the acceptable limits regarding the background ambient air quality and contribution of the Project to the background.

Table 4-44. Ground Level Concentrations Calculated by Modeling Studies for Each Operational Case

#	Case	Unit Configuration	Period	NO ₂ Ground Level Concentration (µg/m ³)	Limit Value (µg/m ³)
1	Cold Weather Conditions (between November and April)	3 gas engines + 1 boiler at the Northern Technical Building and 3 gas engines + 2 boilers at the Southern Technical Building	Hourly	41.8 (x: 0484400, y: 4425300)	200 (50 for IFC requirement)
			Daily	13.9 (x: 0485600, y: 4423600)	-
			Annual (Avg. of Period)	2.8 (x: 0485600, y: 4423600)	40 (10 for IFC requirement)

#	Case	Unit Configuration	Period	NO ₂ Ground Level Concentration (µg/m ³)	Limit Value (µg/m ³)
2	Severe Weather Conditions (between December and February)	3 gas engines + 2 boilers at the Northern Technical Building and 3 gas engines + 3 boilers at the Southern Technical Building	Hourly	43.2 (x: 0484400, y: 4425300)	200 (50 for IFC requirement)
			Daily	16.3 (x: 0485600, y: 4423600)	-
			Annual (Avg. of Period)	3.2 (x: 0485600, y: 4423600)	40 (10 for IFC requirement)
3	Hot Weather Conditions (between May and October)	3 gas engines at the Northern Technical Building and 3 gas engines + 1 boiler at the Southern Technical Building	Hourly	19.3 (x: 0485700, y: 4425400)	200 (50 for IFC requirement)
			Daily	10.1 (x: 0485600, y: 4423600)	-
			Annual (Avg. of Period)	3.6 (x: 0485500, y: 4423600)	40 (10 for IFC requirement)

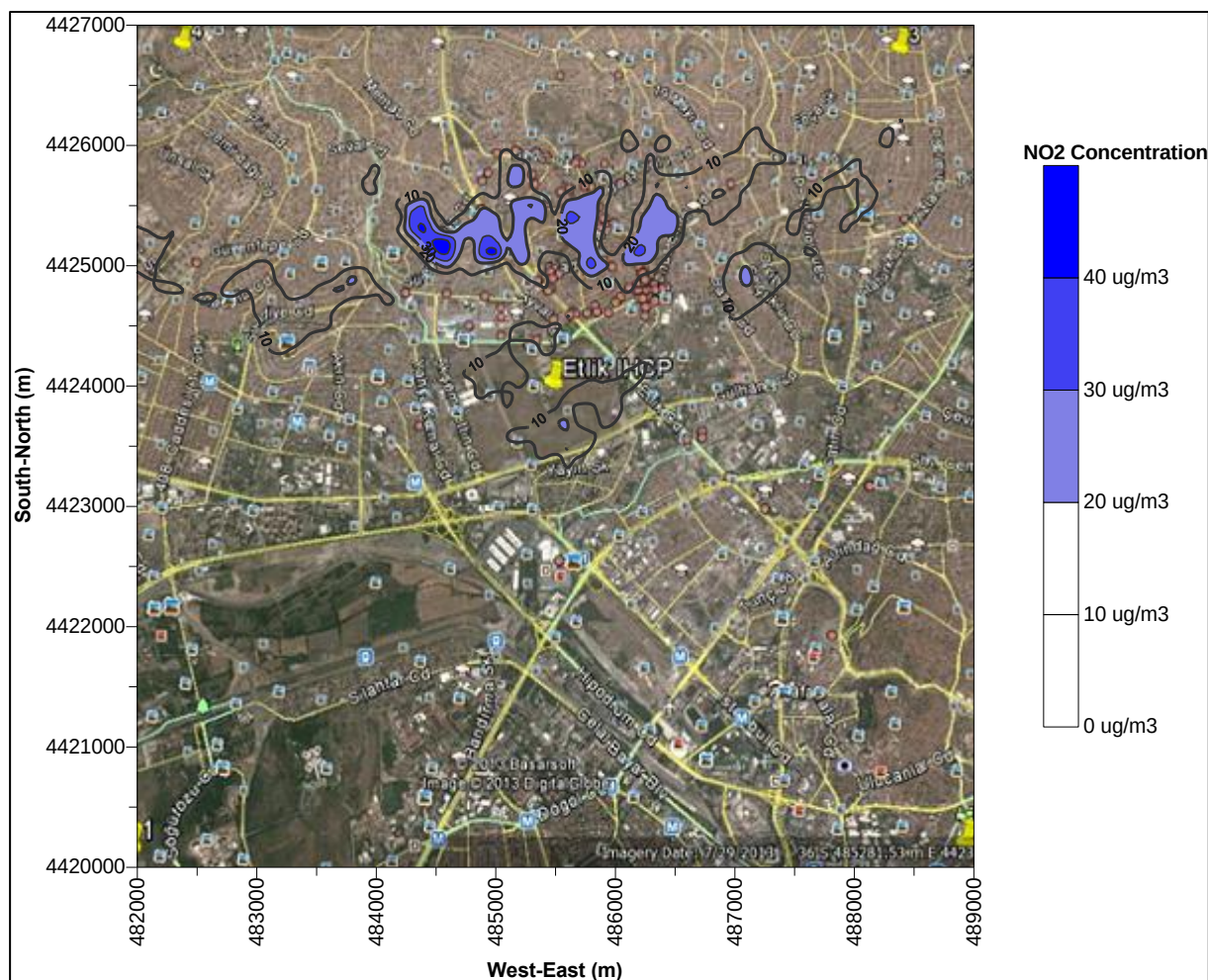


Figure 4-28. Hourly GLC Dispersion of NO₂ for Case 1 (Normal Winter Conditions)

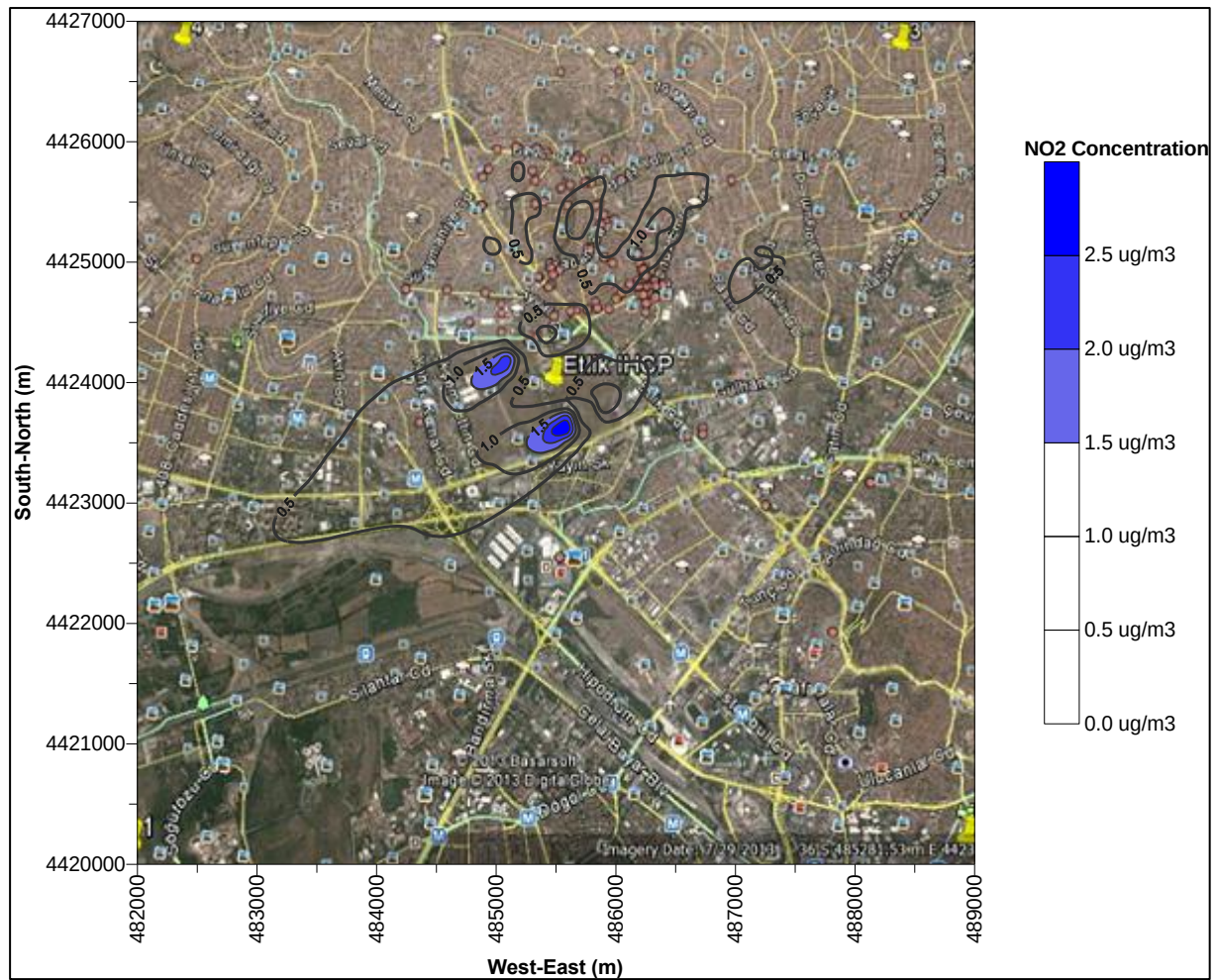


Figure 4-29. Annual GLC Dispersion of NO₂ for Case 1 (Normal Winter Conditions)

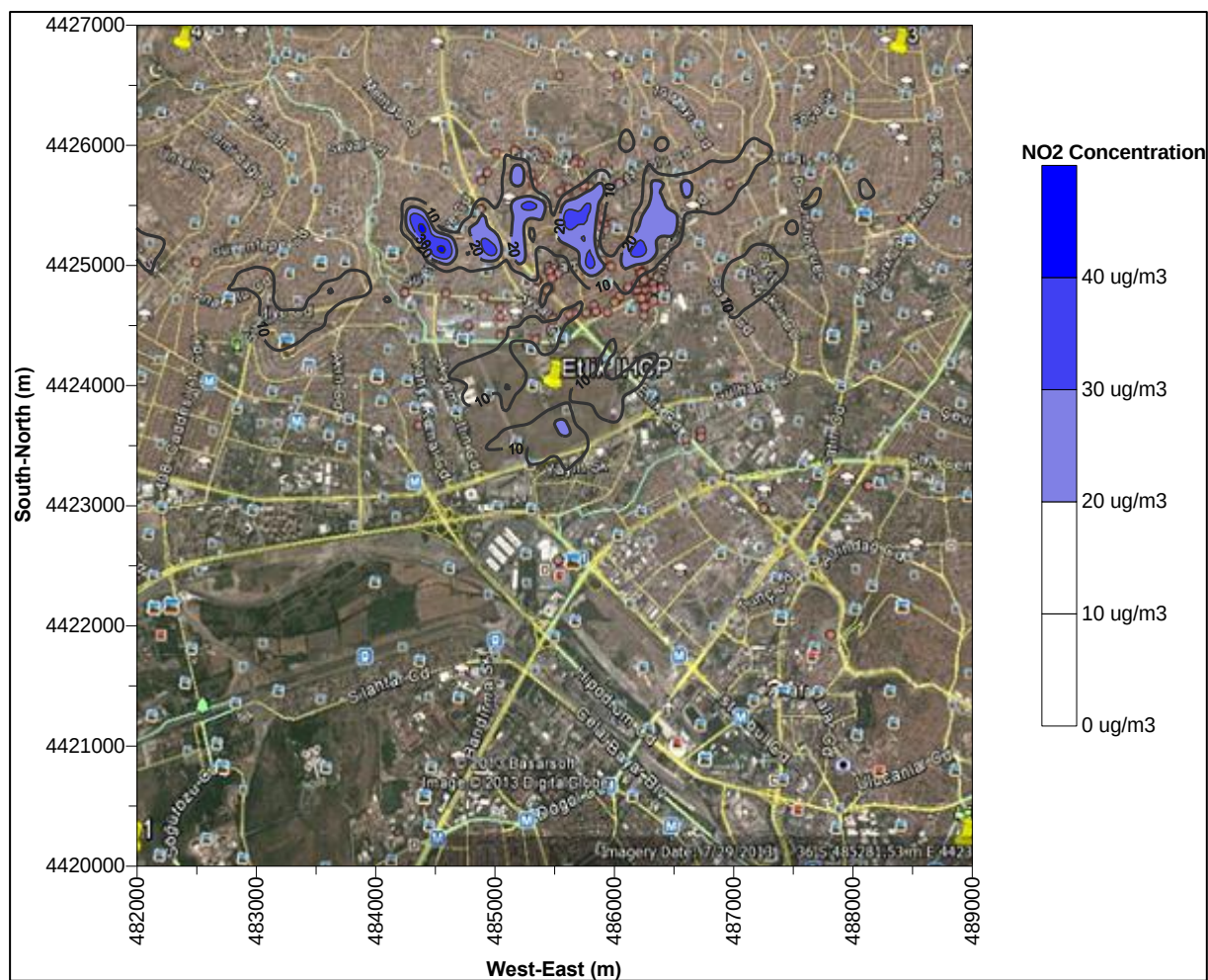


Figure 4-30. Hourly GLC Dispersion of NO₂ for Case 2 (Severe Winter Conditions)

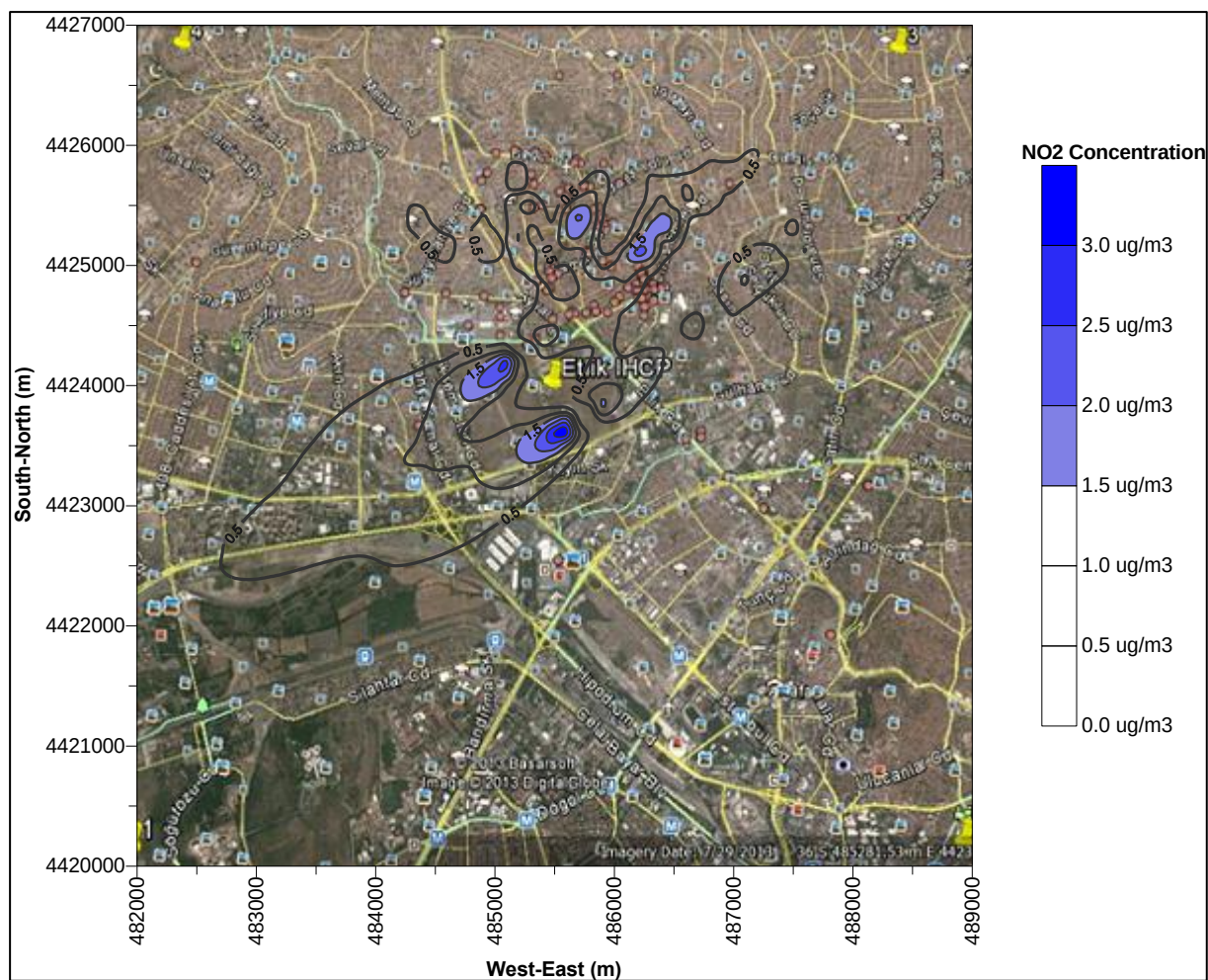


Figure 4-31. Annual GLC Dispersion of NO₂ for Case 2 (Severe Winter Conditions)

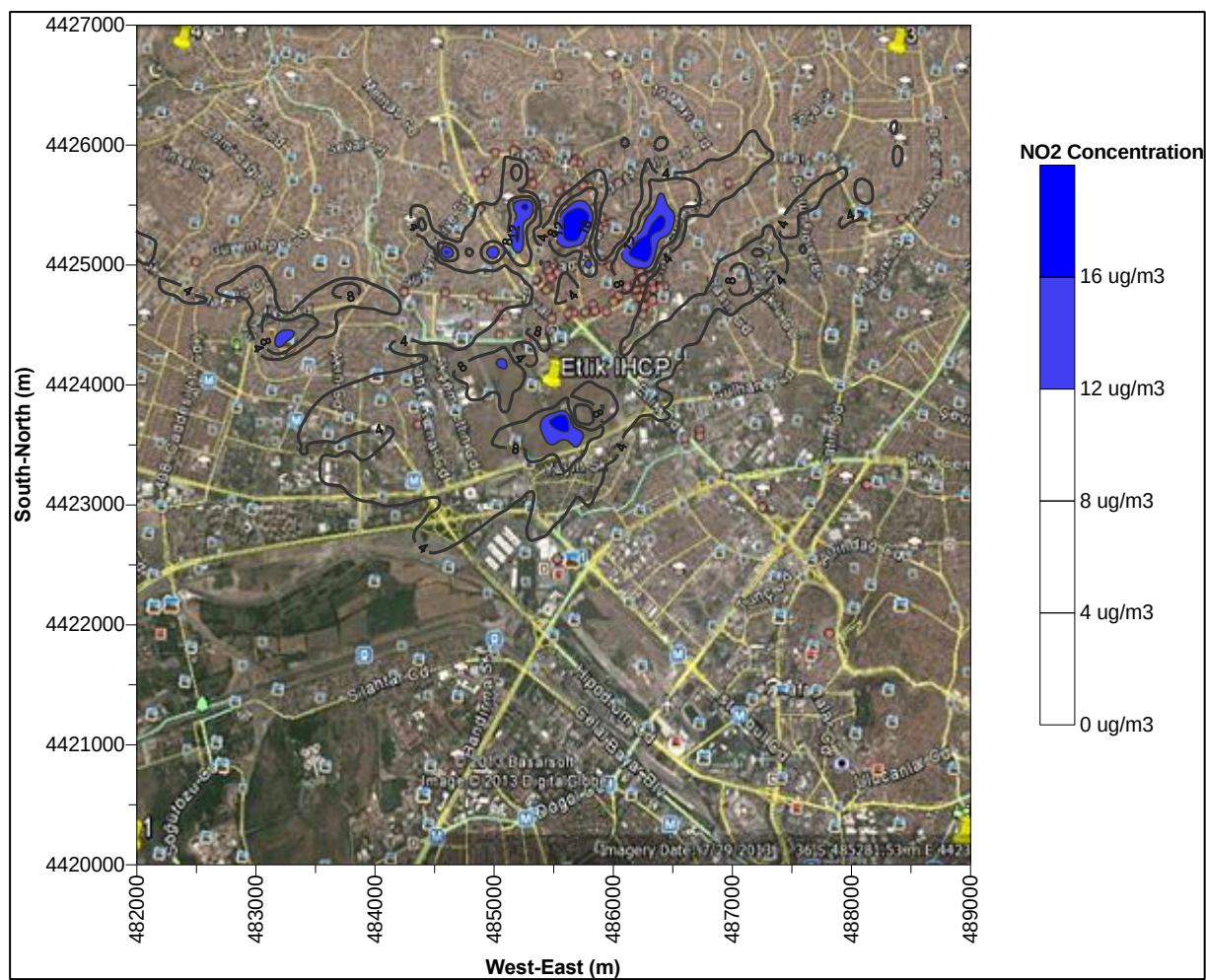


Figure 4-32. Hourly GLC Dispersion of NO₂ for Case 3 (Hot Weather Conditions)

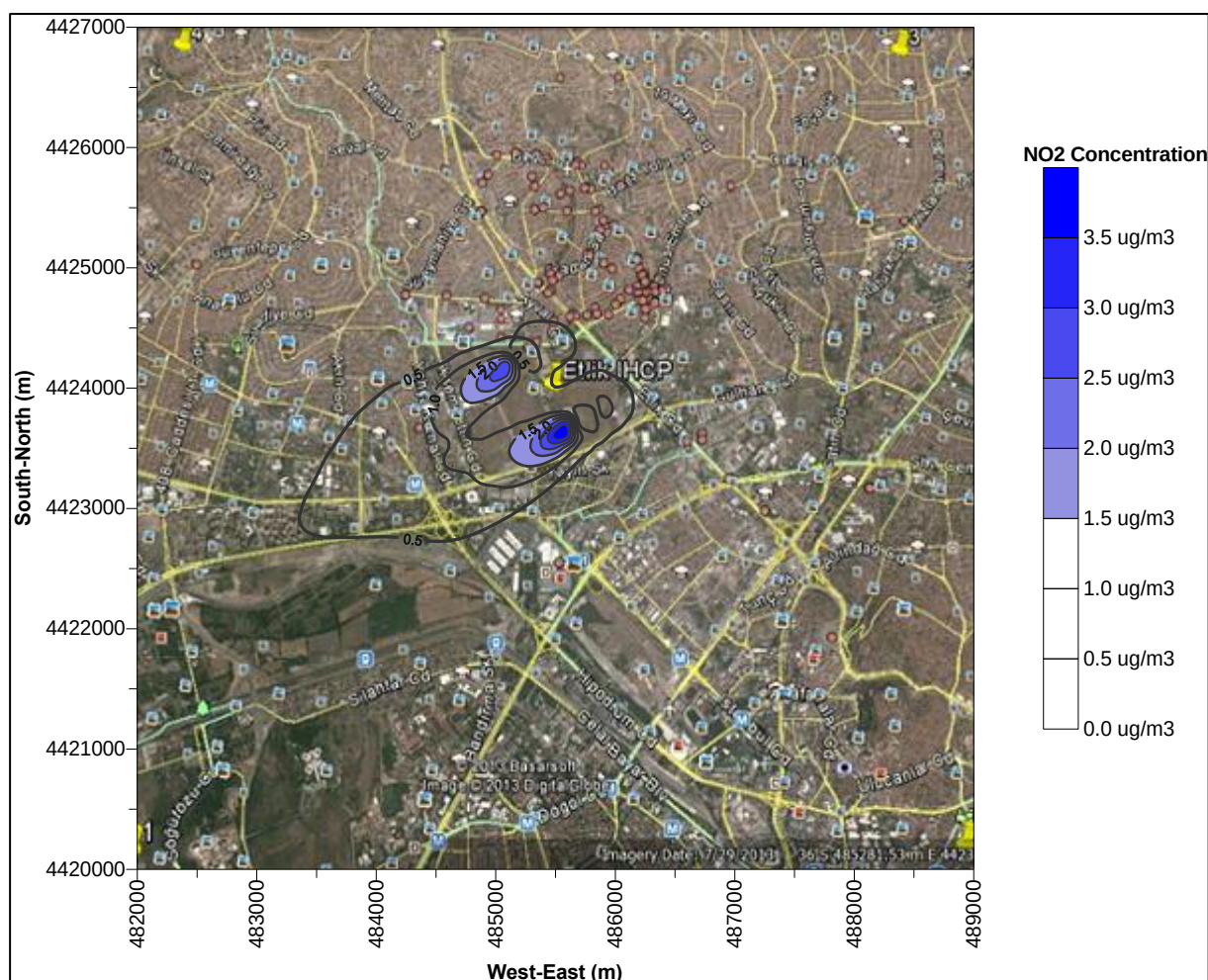


Figure 4-33. Annual GLC Dispersion of NO₂ for Case 3 (Hot Weather Conditions)

Greenhouse Gas Emissions

Greenhouse gas (GHG) emissions to be originated from tri-generation plant and heating system (boilers) are calculated by using equations and emission factors defined by the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories. The following equation defined for the calculation of GHG from stationary combustion (i.e. tri-generation plant and heating system).

$$\text{GHG Emissions} = \text{Fuel Consumption} \times \text{Emission Factor}$$

GHG Emissions: Emissions of a given GHG by type of fuel (kg GHG)

Fuel Consumption: Amount of fuel combusted (TJ)

Emission Factor: Default emission factor of a given GHG by type of fuel (kg GHG/TJ)

As mentioned in the above sections, both tri-generation plant and heating system will utilize natural gas. Maximum natural gas consumption of each gas motor within the tri-generation plant will be 777 Nm³/h. Moreover, each boiler in the heating system will consume 1,100 Nm³/h. Annual natural gas consumption is calculated by considering following assumptions and cases:

- Tri-generation plant will be operated 365 days and 24 hours in a year.
- Five boilers in the heating system will be operated during severe weather conditions predicted approximately 30 days in a year.
- During cold weather conditions other than severe weather conditions (predicted approximately 5 months), three boilers will be operated for heating and hot water supply.
- During hot weather conditions which is predicted approximately 6 months in Ankara, one boiler will be operated for hot water supply.

Annual natural gas consumption of tri-generation plant is calculated as:

$$\text{Fuel} = 777 \text{ Nm}^3/\text{h}/\text{one unit} \times 6 \text{ units} \times 24 \text{ h}/\text{day} \times 365 \text{ days}/\text{year} = 40,839,120 \text{ Nm}^3/\text{year}$$

Annual natural gas consumption of boilers is calculated as:

Fuel consumption of boilers = (fuel consumption in severe weather conditions) + (fuel consumption in cold weather conditions) + (fuel consumption in hot weather conditions)

$$\begin{aligned} \text{Fuel} &= (1,100 \text{ Nm}^3/\text{h}/\text{one unit} \times 5 \text{ units} \times 30 \text{ days}/\text{year} \times 24 \text{ hours}/\text{day}) + \\ & (1,100 \text{ Nm}^3/\text{h}/\text{one unit} \times 3 \text{ units} \times 5 \text{ months}/\text{year} \times 30 \text{ days}/\text{month} \times 24 \text{ hours}/\text{day}) + \\ & (1,100 \text{ Nm}^3/\text{h}/\text{one unit} \times 1 \text{ unit} \times 6 \text{ months}/\text{year} \times 30 \text{ days}/\text{month} \times 24 \text{ hours}/\text{day}) \\ &= 3,960,000 + 11,880,000 + 4,752,000 = 20,592,000 \text{ Nm}^3/\text{year} \end{aligned}$$

Total annual natural gas consumption is calculated as:

Total annual natural gas consumption = natural gas consumption in tri-generation plant + natural gas consumption in boilers

$$\begin{aligned} \text{Total annual natural gas consumption} &= 40,839,120 \text{ Nm}^3/\text{year} + 20,592,000 \text{ Nm}^3/\text{year} \\ &= 61,431,120 \text{ Nm}^3/\text{year} \end{aligned}$$

Default emission factors on net calorific basis of fuel are defined in the IPCC Guideline:

GHG Emission factor  for CO₂ is 56,100 kg GHG/TJ on a Net Calorific Basis
for CH₄ is 1 kg GHG/TJ on a Net Calorific Basis
for N₂O is 0.1 kg GHG/TJ on a Net Calorific Basis

Net calorific value for natural gas is defined as 0.000048 TJ/kg in the IPCC Guideline. The density of natural gas is 0.67 kg/m³.

$$\begin{aligned}\text{CO}_2 \text{ Emission} &= 56,100 \text{ kg CO}_2/\text{TJ} \times 0.000048 \text{ TJ/kg} \times 0.67 \text{ kg/m}^3 \times 61,431,120 \text{ Nm}^3/\text{year} \\ &= 110,832,552.4 \text{ kg CO}_2/\text{year}\end{aligned}$$

$$\begin{aligned}\text{CH}_4 \text{ Emission} &= 1 \text{ kg CO}_2/\text{TJ} \times 0.000048 \text{ TJ/kg} \times 0.67 \text{ kg/m}^3 \times 61,431,120 \text{ Nm}^3/\text{year} \\ &= 1,975.6 \text{ kg CH}_4/\text{year}\end{aligned}$$

$$\begin{aligned}\text{N}_2\text{O Emission} &= 0.1 \text{ kg CO}_2/\text{TJ} \times 0.000048 \text{ TJ/kg} \times 0.67 \text{ kg/m}^3 \times 61,431,120 \text{ Nm}^3/\text{year} \\ &= 197.6 \text{ kg N}_2\text{O}/\text{year}\end{aligned}$$

In order to calculate total GHG emissions, CH₄ and N₂O emissions had to be converted to CO₂ equivalent units. 1 kg CH₄ is equivalent to 21 kg CO₂ as well as 1 kg N₂O is equivalent to 310 kg CO₂. By considering this information, total GHG emission is calculated as followings:

$$\begin{aligned}\text{Total GHG emissions} &= \text{CO}_2 \text{ eq. of CO}_2 \text{ emissions} + \text{CO}_2 \text{ eq. of CH}_4 \text{ emissions} + \\ &\quad \text{CO}_2 \text{ eq. of N}_2\text{O emissions}\end{aligned}$$

$$\begin{aligned}\text{Total GHG emissions} &= 110,832,552.4 \text{ kg CO}_2\text{eq.}/\text{year} + (1,975.6 \times 21) \text{ kg CO}_2\text{eq.}/\text{year} + \\ &\quad (197.6 \times 310) \text{ kg CO}_2\text{eq.}/\text{year} \\ &= 110,935,296 \text{ kg CO}_2/\text{year} = \underline{110,935.3 \text{ tones CO}_2/\text{year}}\end{aligned}$$

Traffic Emissions

A traffic survey study was performed in the scope of the proposed Project in order to determine the peak hour periods for the mornings and evenings, to determine current traffic volume on the surrounding roads of the Project Site and to determine operational phase traffic load increase due to the Project. As a result of this study, morning peak period was determined as ranging from 07:30 to 09:30 with a traffic load of roughly 10,650 vehicles/hour. Evening peak period was determined as ranging from 17:00 to 19:00.

According to the projections given in this study report, an increase in traffic load with an increment of 5,930 vehicles for morning and evening rush hour is expected in the operation phase of the proposed Project. During passage of the vehicles on the surrounding roads of the Project Site, exhaust emissions (especially NO_x, CO and dust) will be originated. In this section of the ESIA Report, emission load due to increasing traffic are calculated and assessed.

Exhaust emissions of the vehicles are calculated by using emission factors given in the European Monitoring and Evaluation Programme (EMEP)/European Environment Agency (EEA) Air Pollutant Emission Inventory Guidebook 2013 (see Table 4-45). The average emission factors for NO_x and dust emissions given in the table were calculated by considering that proportion of gasoline, diesel and LPG fueled vehicle are the same and all

vehicles have engine with equal to or lower than 2 liters. Since the types and proportion of vehicles increased due to the Project are not mentioned in the traffic assessment report, it is assumed that traffic load will be increased due to passenger cars.

Table 4-45. Emission Factors for Exhaust Emissions of Passenger Cars

Fuel Type	Emission Factors for Passenger Cars given in the EMEP/EEA Air Pollutant Emission Inventory Guidebook 2013 (Tier 2 Method)	
	NO _x (g/km)	Dust (g/km)
Gasoline	1.482	0.002
Diesel	0.661	0.086
LPG	0.620	0.002
Average	0.921	0.029

The following assumptions were considered in calculation of exhaust emissions due to passenger cars:

- Vehicles travel 1 km distance at the surrounding roads of the Project Site considering the average length of one side of the Project Site which is approximately 1 km and traffic flow and road connections in the surrounding roads.
- Exhaust emissions are calculated for rush hour periods during mornings and evenings which are the periods of consecutive two hours, since traffic increment for other hours were not calculated in the traffic survey study.

Exhaust emission calculations for morning and evening rush hours are as follows:

$$\text{NO}_x \text{ emissions (as NO}_2\text{) (kg/h) = 5,930 vehicles} * 1 \text{ km} * 0.921 \text{ g/km.vehicle} / 2 \text{ hours (rush hour period)} / 1000 \text{ g/kg} = 2.73 \text{ kg/h}$$

$$\text{Dust emissions (as PM}_{10}\text{) (kg/h) = 5,930 vehicles} * 1 \text{ km} * 0.029 \text{ g/km.vehicle} / 2 \text{ hours (rush hour period)} / 1000 \text{ g/kg} = 0.09 \text{ kg/h}$$

An air quality modeling study has been carried out for NO₂ pollutant to be originated from the traffic increment. Since the dust emission due to traffic increment is well below 1 kg/hour which is the lower limit for modeling need stipulated in the Turkish Regulation on Industrial Emission Control and is at negligible level which is approximately 0.09 kg/hour, air quality modeling study was not performed for dust emissions regarding that the impact will be at negligible level.

Air quality modeling study was performed by using AERMOD which is widely regarded as one of the most developed computer models. Details about the model were given in the above paragraphs of this section. In the scope of modeling study that estimates NO₂ GLC in ambient air by the help of mathematical calculations is comprised of following items:

- 7 km x 7 km "Dispersion Area" for analyzed source is determined.

- A rectangular grid system for the determined dispersion area is prepared with a grid system of 100 m x 100 m and information on latitude, longitude and elevation is obtained.
- Pollutants due to the traffic load increment are calculated by using emission factors.
- Hourly meteorological data of a representative year is obtained.
- Hourly, daily and annual average GLC values of pollutants in the ambient air are estimated by being run of the model after transferring the information stated in the above steps.

The traffic increment in the surrounding roads is not a continuous source for air pollutants since it will have an instant effect and be limited to the morning and evening rush hours. Moreover, impacts on air quality will be limited to the close vicinity since dispersion is generally limited. Therefore, impacts on air quality due to traffic increment are assessed separately from the impacts of trigeneration plant since maximum ground level concentrations and air pollutant dispersion of these two different pollution sources will be observed at different locations. Dispersion maps for the pollutants originated from these sources (i.e. traffic and trigeneration plant) also confirm this statement and assessment approach.

Maximum GLC values calculated by the modeling studies throughout the year are presented in Table 4-46. According to the modeling results, maximum of the NO₂ GLC values via dispersion model for traffic load are well below the national ambient air quality limit values. When the contribution to the ambient air quality of the close environment is examined, it is understood that the impact due to traffic increment is expected to form respectively 29% and 14% of the relevant short-term and long-term ambient air quality standards. Since the maximum GLC values and maximum average GLC values are well below the national ambient air quality limits and close to the stringent IFC requirement, adverse impacts on ambient air quality and residents within the area of influence are not expected.

Table 4-46. Ground Level Concentrations of NO₂ Calculated by Modeling Studies for Traffic

Parameter	Period	NO ₂ Ground Level Concentration (µg/m ³)	Limit Value (µg/m ³)
NO ₂	Hourly	58.6 (x: 0484900, y: 4423200)	200 (50 for IFC requirement)
	Daily	18.8 (x: 0484900, y: 4423200)	-
	Annual	5.5 (x: 0484900, y: 4423200)	40 (10 for IFC requirement)

According to the figures (see Figure 4-34 and Figure 4-35) illustrating NO₂ gas dispersion in ground level, dispersion of NO₂ gases due the traffic increment will be limited to the very close vicinity of the road since maximum GLC values were calculated on the road.

According to hourly measurement data of 2012 of the Ministry of Environment and Urbanization, average background NO₂ concentration of Ankara city is about 55 µg/m³. Therefore, the cumulative impact with the realization of the Project is expected to be 57% of the ambient air quality standards at the maximum GLC's location and thus, it will be within the acceptable limits regarding the background ambient air quality and contribution of the Project to the background.

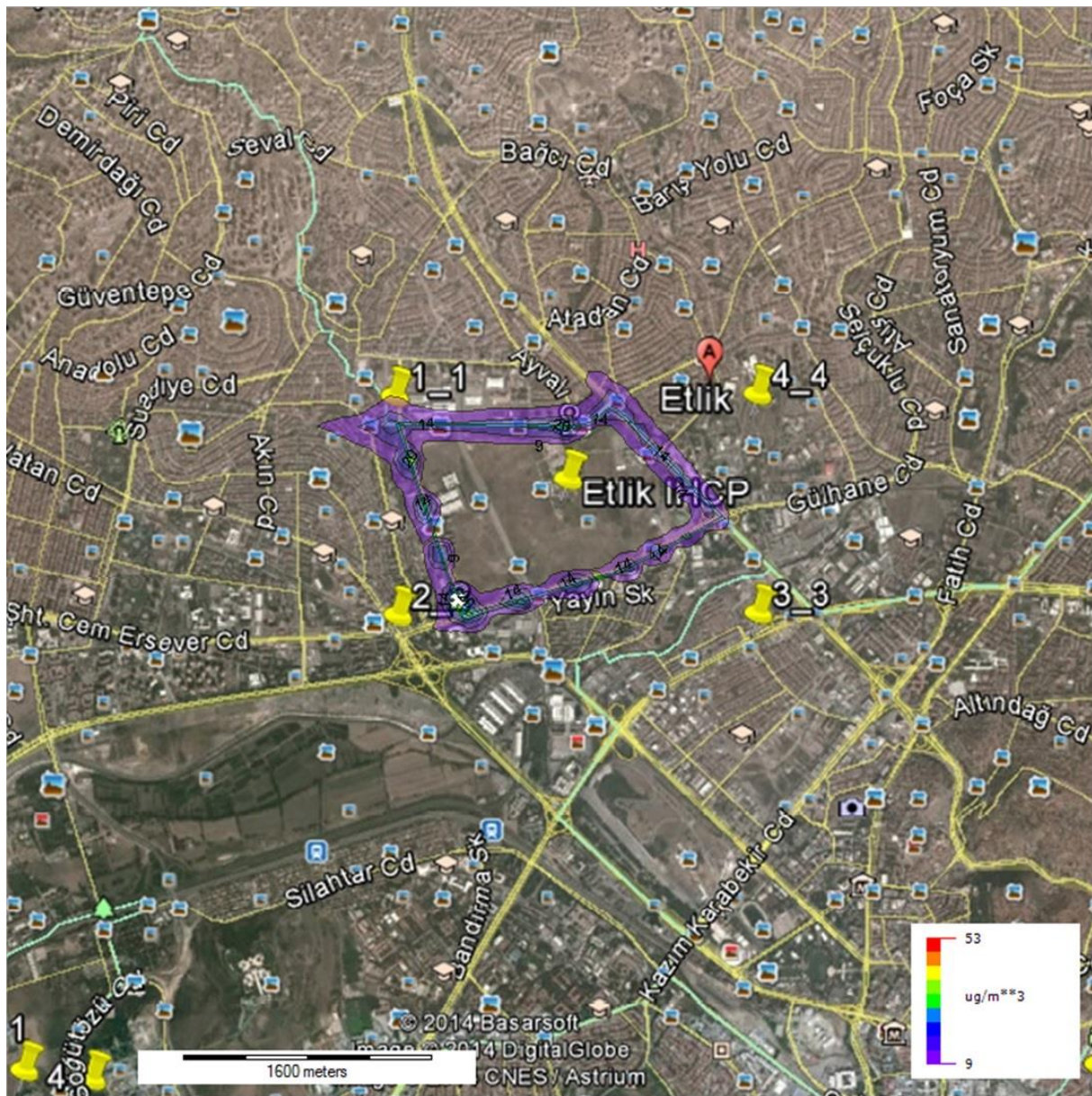


Figure 4-34. Hourly GLC Dispersion of NO₂

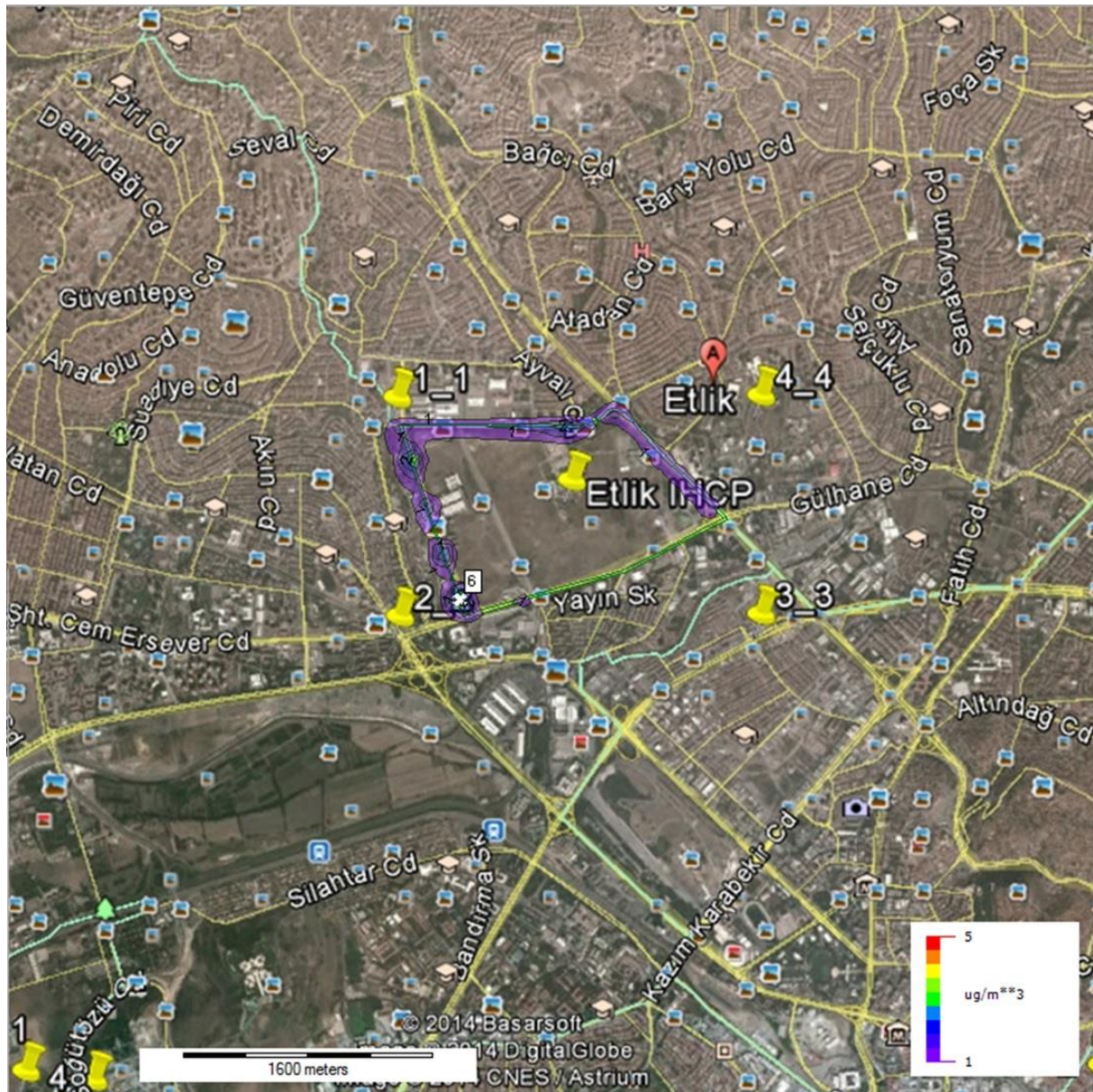


Figure 4-35. Annual GLC Dispersion of NO₂

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Chapter 4 is presented below.

	Direct	Indirect	Induced
Impact Type	There is direct interaction with the nearby communities and patients staying in the Forensic Hospital from emission to air associated with the tri-generation plant.		
Impact Duration	Temporary	Short-term	Long-term
	Permanent		
	During the entire health campus operation		
Impact Extent	Local	Regional	International
	According to outcomes of the modeling study (see Figure 4-28 and 4-33),		

	emissions are expected to reach only the neighboring Quarters.				
Impact Scale	Narrow – Ground Level Concentration expected at the receptors are below the pertinent national legal limits and IFC’s stricter requirement.				
Impact Frequency	N/A				
Magnitude	Positive	Negligible	Small	Medium	Large
	Residual impact magnitude is lowered with enhanced design and BREF compliance.				
Receptor Sensitivity	Low		Medium	High	
	Medium – Vulnerability of patients to be staying in the hospital and residents in the impact area will not be major since calculated GLCs are very minor than the national limit value, i.e. at most 55 µg/m³ near the core. Moreover, according to Air Quality Index (AQI) of EPA, it is in good level.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

4.5.2 Noise

4.5.2.1 Construction Phase

Impact Definition

Construction phase of the proposed Project has the potential to create noise through the use of equipment and increased road traffic. Also, vibration may be caused by the drilling and demolition activities. Noise and vibration may cause temporary nuisance to the neighboring hospitals, i.e. the Specialists Hospital and the Maternity Hospital, and people living in the surrounding settlements and working in the nearby institutions.

Impact Assessment

Noise that will be generated by construction machinery and equipment is calculated using their sound power levels, which are given in Table 4-47.

Table 4-47. Machinery to be Used in Excavation Works

Machine	Excavation where material goes to landfill	Excavation for producing backfilling material	Sound Power (dBA) (L _p)*
Tracked Excavator	8	7	108
Trucks	113	23	102
Loader	1	1	112
Bulldozer	-	1	93
Pumper	-	1	107

* Source: <http://www.nottinghamcity.gov.uk>

Trucks will make rounds between the site and the off-site landfill (see Section 2.11) while trucks carrying backfilling material will make rounds within the site between excavation area and the backfill material storage site. As it is the case for the construction stage dust emission calculations, it is assumed that number of trucks that will be at the site for loading materials to be carried to landfill is 7, and hence, total number of trucks will be 30 with those 23 carrying materials to the temporary storage site.

Total sound power from multiple machinery is calculated using the formula below:

$$10 \log \sum_{i=1}^n 10^{L_{pi}/10}$$

Using this formula, total sound power level of all machines to be used in excavation is calculated as 122.53 dBA.

The next step is to calculate the change of sound power level with distance from source. This is to predict sound level reaching the sensitive receptors. For this purpose the following formula is used:

$$L_{eq} = L_{wt} + 10 \log \frac{Q}{4\pi r^2}$$

where

- Leq: Equivalent sound level;
- Lwt: Sound power level;
- Q: Directional Coefficient (taken as 2);
- r: Distance from source.

Here, atmospheric absorbance and geographical and artificial barriers (buildings etc.) are omitted to consider the worst-case. Also, it is assumed that all the machinery is working at the same point and at the same time. Equivalent sound level with respect to distance is presented in Table 4-48 and Figure 4-36.

Table 4-48. Change of Sound Level with respect to Distance

Distance (m)	Equivalent Sound Level (Leq)
0	122.53
50	80.57
75	77.05
100	74.55
125	72.61
150	71.03
175	69.69
200	68.53

Distance (m)	Equivalent Sound Level (Leq)
225	67.50
250	66.59
300	65.01
400	62.51
500	60.57
750	57.05
1000	54.55
1500	51.03
2000	48.53
2250	47.50
2500	46.59
2750	45.76
3000	45.01

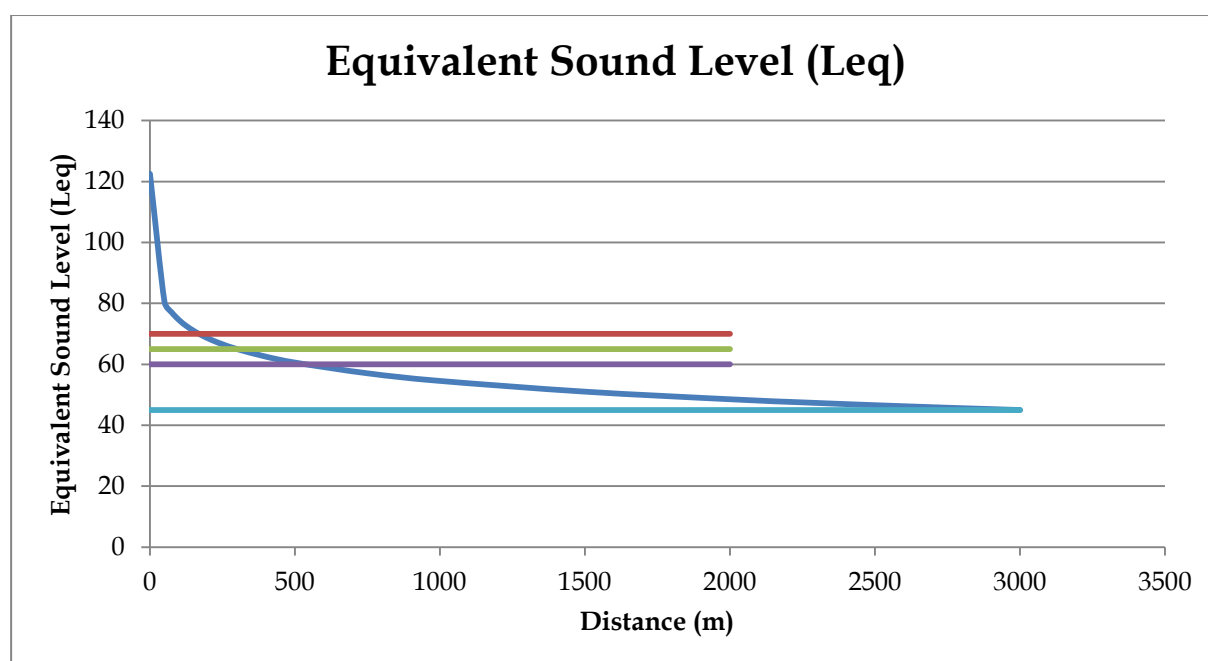


Figure 4-36. Equivalent Sound Level vs Distance

Limit value for environmental noise given in Appendix VII of the Regulation Assessment and Management of Environmental Noise is 70 dBA for construction sites. According to this regulation, construction activities can continue during evening and nighttime provided that necessary permission is obtained from the Local Environmental Committee through applying to the Provincial Directorate of Environment and Urbanization. In this case, limit values are 65 dBA and 60 dBA for the evening and nighttime, respectively. IFC limit values on noise according to EHS Guidelines on Environmental Noise Management, are 55 dBA for day-time (07:00-22:00) and 45 dBA for night-time.

From Table 4-48 and Figure 4-36, it can be seen that equivalent sound level drops below 45 dBA, i.e. the most stringent limit value, at a distance of 3000 m from the source.

With the same assumption that construction activities are concentrated between specialist hospital and SGK housing, the nearest sensitive receptor, Polyclinic is around 800 m away from the temporary excavated material storage area.

Referring to the baseline measurements conducted at the Polyclinic and the Maternity Hospital (see Section 4.3), background noise levels at these receptors are almost the same as that is calculated for those receptors for construction level. Hence, these receptors are not considered sensitive to construction noise.

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct		Indirect		Induced	
	There is direct interaction with the nearby communities and patients staying in the Polyclinic and Maternity Hospital.					
Impact Duration	Temporary	Short-term		Long-term		Permanent
	Excavation and general construction activities that generate most of the noise will last more than one year.					
Impact Extent	Local		Regional		International	
	According to outcomes of noise calculations, the nighttime noise limit of 45 dBA stipulated by the IFC, i.e. the most stringent limit, will be satisfied at a distance of 3000 m from the construction site without mitigation.					
Impact Scale	Surroundings of the Project Site					
Impact Frequency	Construction period					
Magnitude	Positive	Negligible	Small	Medium	Large	
	Without mitigation there will be temporary but high noise nuisance in the surrounding houses, institutions and amenities.					
Receptor Sensitivity	Low		Medium		High	
	Minor - Nearly the same level of noise is expected to be observed at the closest sensitive receptors, i.e. the Polyclinic and the Maternity Hospital.					
Impact Significance	Positive	Negligible	Minor	Moderate	Major	

Mitigation Measures

- Temporary excavated material storage site will lie in south north direction at the eastern border of the construction site with the two hospitals that will continue to service. Hence, it is considered to act as a sound barrier;
- Noise curtains will be installed in case noise level cannot be reduced to limits with other noise reduction measures; and

- Regular maintenance of the machinery will be made to reduce noise from the machinery.

Residual Impacts

Impact significance is considered to be minor since impact magnitude will be negligible by taking the proposed mitigation measures.

4.5.2.2 Operation Phase

Impact Definition

The trigeneration plant as well as various pumps and other equipment could generate noise if unscreened. And, occasional noise will occur due to the emergency generators and helicopter movement as well as ambulance movements on the nearby roads and increased traffic during, in particular, rush hours. Here, it should be noted that there has long been an active heliport in the Project site with a considerably high traffic. However, during consultations with the public no complaints have been raised about the helicopter noise so it has been scoped out of further consideration.

Embedded Mitigation Measures

All noise generating machinery and equipment including the trigeneration plant will be located in buildings with isolated inner walls. Also, buildings in the campus will be designed to fulfill limit values of 35 dBA and 40 dBA (L_{eq}) for closed window and open window, respectively, given as "Limit Values for Interior Noise Level" in Table 9 in Annex-VII of the RAMEN.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct		Indirect		Induced	
	There is direct interaction with the patients staying in the health campus and nearby communities.					
Impact Duration	Temporary	Short-term		Long-term	Permanent	
	Impact will be observed during health campus operation.					
Impact Extent	Local		Regional		International	
	No major nuisance is expected since the embedded mitigation measures are incorporated in the design. only in the core and towers.					
Impact Scale	Only a few number of patients staying in the towers might suffer from noise at a low level due to measures that will be in place.					
Impact Frequency	Almost continuous since the trigeneration plant will be operated continuously except times in which it is under maintenance.					

Magnitude	Negligible	Small	Medium	Large	
	Negligible – Level of noise reaching the patients will be very low thanks to design restrictions stipulated in the RAMEN.				
Receptor Sensitivity	Low	Medium	High		
	Part of the patients staying at the campus may be very vulnerable to noise.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Additional Mitigation Measures

Impact significance is considered negligible with the embedded mitigation measures that are considered in the design. No additional mitigation measures are proposed.

Residual Impacts

No residual impact is expected to occur on patients or the nearby communities.

4.5.3 Water, Soil and Groundwater

4.5.3.1 Construction Phase

Impact Definition

During construction phase of the Project, drinking and potable water will be required for usage by construction staff and for cleaning of construction equipment. In addition, water will be used in construction activities such as dust suppression and concrete preparation. Number of construction workers will vary during construction phase, and it will be 4000 at peak. Assuming a daily water use of 150 L/cap-day, in the worst-case scenario, water consumption will be 600 m³/day at peak. Amount of wastewater will be equal to this amount assuming also that all the water consumed by personnel will be converted to wastewater. In addition to domestic wastewater generated as a result of personnel use, silty water will be generated at the concrete batching plant.

Domestic wastewater may cause soil and groundwater contamination if directly discharged onto soil. Concrete batching wastewater may result in siltation of the soil surface, and hence poor vegetation.

Embedded Mitigation Measures

There is a branch of sewerage system passing through the Project site, and there are connection points along this branch. Connection to the sewerage system will be made through this line. Wastewater that will be discharged to the sewerage system will be conveyed to the municipal wastewater treatment plant of the Metropolitan Municipality of Ankara. According to interviews made by the ESIA team with the relevant officers from the Ankara Water and Sewage Administration (ASKI), rehabilitation of the existing branch of the

sewerage line may be required, and such rehabilitation works will be performed only in coordination with the ASKI. Hence, no adverse impacts, due to direct discharge of wastewater onto soil are expected.

Oil change and refueling of only heavy machinery will be made at the site by specially equipped trucks. Metal sheets will be placed on the ground to prevent spills. In addition, there will be spill kits on those trucks for immediate action in case of fuel or oil spills. Hence, soil and subsequent groundwater contamination is not expected due to oil change and refueling at the site.

There may be accidental spills or leakage of construction chemicals, fuel and other chemicals to be used in the site. Such spills or leakages may result in soil and groundwater pollution.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct	Indirect		Induced	
	Direct interaction between the receiving media, i.e. soil and groundwater. Indirect impacts due to soil and groundwater pollution include poor plant growth and illnesses.				
Impact Duration	Temporary	Short-term	Long-term		Permanent
	Construction period				
Impact Extent	Local	Regional		International	
	Impact on groundwater may affect a broader area than the surroundings of the Project Site while contaminants move with the groundwater along the downstream part of the basin.				
Impact Scale	Communities using groundwater along the downstream part of the basin and vegetation in the Project site				
Impact Frequency	Low – adequate sewerage infrastructure is already in place since the Project site is located in an urban area. Also, the Project Company will implement measures to prevent oil and fuel spills. Therefore, frequency of soil contamination is expected to be low.				
Magnitude	Negligible	Small	Medium		Large
	Although impact extent will be a wide area, i.e. downstream part of the basin, impact frequency and duration is insignificant.				
Receptor Sensitivity	Low	Medium		High	
	High due to threats to community health and plant growth since there are people using the groundwater extracted in the upstream part of the basin and growing vegetables using this water might be adversely affected by pollution.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Additional Mitigation Measures

- Concrete batching wastewater will be taken to a sedimentation tank to reduce suspended solids content. Settled solids will be carried to landfill with other excavated material. Supernatant will be used in watering roads for dust suppression;
- Secondary containment tanks will be built around the chemical and fuel tanks. In case of any spills on the ground despite all measures, contaminated soil will be immediately stripped, and taken to the hazardous waste temporary storage area.

Residual Impacts

Impact significance will be negligible since magnitude will be negligible due to further reduced frequency and scale thanks to the additional mitigation measures proposed.

4.5.3.2 Operation Phase

Impact Definition

Wastewater to be generated during operational phase will include domestic wastewater. Water consumption of the main hospital is predicted as 1,800 m³/day. Of this amount, 450 m³/day will be hot sanitary water while 1,350 m³/day will be regular utility water consumption. Including water consumption of hotel, forensic hospital, and rehabilitation hospital, the total water consumption is expected to be around 1,900 m³/day.

All the water consumed is assumed to be converted into wastewater. Water consumption and wastewater generation in the hotel is estimated to be 31,000 L/day. The portion of this wastewater excluding that coming from toilets is regarded as grey water, and it is estimated as 28,650 L/day (28.65 m³/day). Grey water will be treated to be used in irrigation of gardens pursuant to the standards stipulated in the WPCR.

There will be also contaminated wastewater discharged from medical wards and operating theatres (e.g. body fluids and excreta, anatomical waste), laboratories (e.g. microbiological cultures, stocks of infectious agents), pharmaceutical and chemical stores; cleaning activities (e.g. waste storage rooms), and x-ray development facilities. Especially that portion of wastewater causes severe damage in the environment when discharged to the receiving bodies without proper treatment.

Leakages and spills of fuel, oil, chemicals, waste oil and hazardous waste have the potential to result in soil and subsequent groundwater contamination if not suitably stored.

Embedded Mitigation Measures

According to up to date information obtained from the design team, the portion of the wastewater that will come from hotel kitchen will be “grey water”, and it will be used in irrigation after proper treatment. Hazardous wastewater from laboratories will be treated in

a treatment plant outside the hospital building before discharge to the municipal sewerage system. Detailed design of this treatment plant has not been completed yet. Also, site runoff will be collected in an equalization basin before discharge to the municipal network. This will prevent very high loads to the system in precipitation times.

Besides impacts on water quality, the extra flow load that will be brought to the sewerage system is an important issue that has been considered and addressed by the Project design. Although the health campus will replace the existing hospitals, there may be an additional load due to high number of visitors. In this regard, the authorized people from the ASKI stated that a new large municipal wastewater treatment plant is planned to be constructed in two years, and put into operation. The new treatment plant is planned to be constructed urgently since it is intended to serve as the second stage of the existing municipal wastewater treatment plant of Ankara (see also Section 2.11). Since the Project's construction is planned as 3.5 years, operation of the new municipal wastewater treatment plant will be commenced before the health campus is erected. Another issue regarding the wastewater infrastructure is that discharge of wastewater will be at a single point rather than multiple points, i.e. from hospitals to be replaced. For this issue, the Project Company will design the sewage branch passing through the site accordingly for proper connection to the system.

Moreover, a wastewater treatment plant will be installed for treatment of laboratory and other process wastewater. Details of the design of this wastewater treatment plant are not available at this stage. The wastewater treatment plant will be designed to ensure compliance with the wastewater discharge criteria given in the Regulation of ASKI on Wastewater Discharge to Sewer.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Chapter 4 is presented below.

Impact Type	Direct	Indirect		Induced
	Direct interaction between the receiving media, i.e. soil and groundwater. Indirect impacts due to soil and groundwater pollution include poor plant growth and illnesses.			
Impact Duration	Temporary	Short-term	Long-term	Permanent
	Operational phase			
Impact Extent	Local	Regional		International
	Impact on groundwater may affect a broader area than the surroundings of the Project Site while contaminants move with the groundwater along the downstream part of the basin.			
Impact Scale	Communities using groundwater along the downstream part of the basin and vegetation in the Project site			
Impact Frequency	High amount of fuel, chemicals and wastes will be stored, and probability of leakage or spills might frequently occur.			
Magnitude	Negligible	Small	Medium	Large

	Impact frequency might be significant where impacts are long-term and might affect a large area.				
Receptor Sensitivity	Low	Medium		High	
	High due to threats to community health and plant growth since there are people using the groundwater extracted in the upstream part of the basin and growing vegetables using this water might be adversely affected by pollution.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Additional Mitigation Measures

- Hazardous chemicals and wastes will be stored in concrete-sealed areas;
- Fuel tanks will be placed in secondary containments to prevent spills and leakages onto soil;
- In line with the IFC's Guidelines for Healthcare Facilities, waste segregation measures will be employed to minimize entry of solid waste into the wastewater stream, including:
 - Procedures and mechanisms for separate collection of urine, feces, blood, and vomit from patients treated with geno-toxic drugs to avoid their entry into the wastewater stream;
 - Collection of large quantities of pharmaceuticals for separate treatment or return to manufacturer. Small quantities of mild, liquid pharmaceuticals, excluding antibiotics or cytotoxic drugs, may be discharged to sewer systems with a large water flow. The facility-specific waste management plant will adopt these measures.
- In line with the PR3 of the EBRD, in order to eliminate soil and subsequent groundwater pollution, pesticides will be handled, stored, applied and disposed of in accordance with good international industry practice such as the Food and Agriculture Organization International Code of Conduct on the Distribution and Use of Pesticides; and
- The products that fall in World Health Organization Recommended Classification of Pesticides by Hazard Classes 1a (extremely hazardous) and 1b (highly hazardous); or Class II (moderately hazardous) will not be used.

Residual Impacts

Impact significance will be negligible when the proposed mitigation measures are in place.

4.5.4 Geo-hazards

Impact Definition and Embedded Mitigation Measures

The most significant geo-hazard during the operational phase is earthquake, and thus was a focus for the design team. The design of all the buildings in the health campus will be made according to the criteria stipulated in the relevant legislation on earthquakes (e.g. the Regulation on buildings to be constructed in potential earthquake areas). Regarding this, the design team also makes the necessary arrangements for building evacuation and escape routes in case of such incidents.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct	Indirect		Induced	
	Direct impact on construction workers, health campus employees, patients and visitors				
Impact Duration	Temporary	Short-term	Long-term	Permanent	
	Operational phase				
Impact Extent	Local	Regional		International	
	Impact might be observed within the premises of the health campus.				
Impact Scale	Negligible thanks to design considerations for earthquake and emergency safety				
Impact Frequency	Potential is minor since the Project site is in the fourth degree earthquake zone.				
Magnitude	Negligible	Small	Medium	Large	
	Only few small injuries might be observed when people try to escape from buildings in case of an earthquake.				
Receptor Sensitivity	Low	Medium		High	
	There will patients with low mobility. They will be particularly at risk since it is difficult to escape from in case of an earthquake.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Additional Mitigation Measures

Furthermore the project has included to manage additional risks (for instance to patients of low mobility) to within acceptable levels.

Residual Impacts

Impact significance is already considered as minor without any other additional measures.

4.5.5 Waste

4.5.5.1 Solid Wastes

4.5.5.1.1 Construction Phase

Impact Definition

Solid waste expected to be produced at the construction sites and workers accommodation during the construction phase of the Project can be classified as

- (i) domestic solid waste;
- (ii) construction wastes;
- (iii) packaging wastes; and
- (iv) excavated material.

Domestic solid wastes and packaging wastes will be produced by the construction staff at both the workers accommodation sites and the construction sites. Construction wastes, to be produced as a result of construction works of the Project, are expected as cables, copper, empty containers of various size, steel etc. Spoil due to leveling will also be generated.

Domestic solid waste will be generated by the construction staff. Considering the worst-case scenario with peak number of 4,000 of workers, amount of domestic solid waste generated will be around 4,600 kg assuming rate of waste generation as 1.15 kg/cap-day. This calculated figure also includes the packaging waste that is comprised of empty containers of drinks, packages of foods etc. mainly from the construction camp site.

Besides domestic solid wastes, there will be packaging and recyclable wastes, e.g. steel, plastic and wood, from construction and demolition of existing buildings. However, quantify of such wastes is not known at this stage.

Waste arising from the demolition of buildings and excavated material has been calculated by the design team as 2,497,207 m³.

Dumping of solid wastes in an uncontrolled manner could result in soil and groundwater contamination. Also, if the management of solid waste is not controlled it has the potential to attract vermin and insects and cause bad odor in the environment. Separate collection of packaging waste is important since it may be recycled or recovered to gain additional economic benefits and reduce pressure on raw materials.

Vegetable top soil is lost if it is not separated from other portion of soil in the excavation site.

Embedded Mitigation Measures

Keçiören and Yenimahalle municipalities will collect solid wastes generated at the construction site on a daily basis, and transport it to the landfills of the metropolitan municipality. Also, Astaldi, a member of the Joint Venture, has been implementing a waste segregation process for packaging wastes of construction materials. Those packaging waste will be collected by the staff of a licensed packaging waste recycling firm.

Dumping of excavated material on the other hand mostly damages landscape. In this respect, the temporarily stored excavated material will be taken to the landfills (e.g., Çadırtepe and Mamak) and excavated material licensed disposal areas of the metropolitan municipality.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct		Indirect		Induced	
	Direct impact on soil and groundwater quality					
Impact Duration	Temporary		Short-term		Long-term	
	Permanent		Construction phase			
Impact Extent	Local		Regional		International	
	Impact on groundwater may affect a broader area than the surroundings of the Project Site while contaminants move with the groundwater along the downstream part of the basin.					
Impact Scale	Communities using groundwater along the downstream part of the basin and vegetation in the Project site					
Impact Frequency	Minor due to existing infrastructural conditions					
Magnitude	Negligible		Small		Medium	
	Large		Although impact extent will be a wide area, i.e. downstream part of the basin, impact frequency and duration is insignificant.			
Receptor Sensitivity	Low		Medium		High	
	High due to threats to community health and plant growth since there are people using the groundwater extracted in the upstream part of the basin and growing vegetables using this water might be adversely affected by pollution.					
Impact Significance	Positive	Negligible	Minor	Moderate	Major	

Additional Mitigation Measures

- Vegetable top soil will be stored in a separate part of the temporary storage area;
- Top of vegetable soil piles will be grassed to prevent losses;
- Vegetable top soil will then be used in landscaping works at the end of construction;

- A robust site-specific waste management plan will be prepared, and implemented by the construction site management for separate collection of different types of wastes and temporary storage of wastes.

Residual Impacts

Impact significance will be negligible with the proposed mitigation measures.

4.5.5.1.2 *Operation Phase*

Impact Definition

Solid waste expected to be produced during the operation phase of the Project can be classified as (i) domestic solid waste and (iii) packaging wastes.

There are no statistical data on amount of solid waste generated at hospitals. Also, current solid waste generation at the hospitals to be closed was not measured. On the other hand, calculation of amount of solid waste to be generated may not be necessary. According to data of Turkish Statistical Institute for the year 2010, average solid waste generation rate is 1.14 kg/cap-day in Turkey. In the health campus, there will be around 50,000 daily visitors and outpatients in addition to 3,566 inpatients at full occupancy situation. Regarding this, average solid waste generation in the health campus is assumed as 0.2 kg/cap-day, which results in total solid waste generation of around 10.7 ton/day.

According to interviews of the ESIA team with the authorized people from Keçiören and Yenimahalle municipalities, they can handle the additional load that will be brought about by the health campus.

Embedded Mitigation Measures

Solid waste to be generated at the health campus will be temporarily stored at the waste storage area next to the Technical Building at the south (see Appendix-C), and collected by these municipalities, and taken to the landfills of Ankara Metropolitan Municipality (see Section 2.11). Hence, adverse impacts of improper waste management such as soil pollution and odor are not expected to be observed.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct	Indirect		Induced
	Direct impact on soil and groundwater quality as well as community due to odor			
Impact Duration	Temporary	Short-term	Long-term	Permanent
	During operational phase			

	Local	Regional	International
Impact Extent	Impact on groundwater may affect a broader area than the surroundings of the Project Site while contaminants move with the groundwater along the downstream part of the basin.		
Impact Scale	Communities using groundwater along the downstream part of the basin and vegetation in the Project site. Impact extent due to odor will be very narrow – only employees working in waste handling.		
Impact Frequency	Very low considering robust waste management activities will be in place		
Magnitude	Negligible	Small	Medium
	Magnitude will be small since frequency is very low.		
Receptor Sensitivity	Low	Medium	High
	Soil in the Project site does not have high fertility, and include diverse species. However, vegetation structure and communities using groundwater at the downstream might be affected.		
Impact Significance	Positive	Negligible	Minor
			Moderate
			Major

Mitigation Measures

The waste management infrastructure of the relevant municipalities and the planned waste management arrangements at the site are considered to be appropriate, and any other mitigation measures are not proposed at this stage.

Residual Impacts

Impact significance is already considered as minor without any other additional measures.

4.5.5.2 Hazardous Wastes

4.5.5.2.1 Construction Phase

Impact Definition

Hazardous wastes expected to be generated in the construction phase of the Project are oily rags, used air and oil filters, waste fluorescents, used cartridges as well as waste oil, waste vegetable oil, waste batteries and accumulators and worn-out tyres. Quantification of hazardous waste including waste oil, waste vegetable oil, waste batteries and accumulators and worn-out tyres is not possible at this stage since there are no typical figures for that. Moreover, since there are many licensed collection and intermediate storage companies in Ankara, hazardous waste management is not expected to be problematic.

According to the technical staff from the Project Company, asbestos is not an issue since all the buildings were constructed after asbestos had been ceased to be used in buildings.

Embedded Mitigation Measures

These hazardous wastes might cause soil, water and groundwater contamination if they are not properly collected, stored and disposed of. However, in order to ensure compliance with the regulatory requirements, hazardous wastes will be stored in a concrete-sealed, fenced and covered temporary storage area in order to prevent spill and leakages onto soil and protect it from precipitation. Besides, hazardous wastes will also be taken to the same area as ITC is also planning to erect a hazardous waste landfill at Çadırtepe.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct		Indirect		Induced		
	Direct impact on soil and groundwater quality						
Impact Duration	Temporary		Short-term		Long-term		
	Permanent						
During construction phase							
Impact Extent	Local		Regional			International	
	Health campus premises and the basin along which groundwater may carry pollutants.						
Impact Scale	Severe damage especially to soil quality in a very limited part of the Project site and potential pollution in groundwater.						
Impact Frequency	Very low due to planned mitigation measures to comply with regulatory requirements						
Magnitude	Negligible		Small		Medium		
	Large						
Small due low extent of severe impacts and very low frequency due to planned mitigation measures.							
Receptor Sensitivity	Low		Medium			High	
	Soil in the Project site does not have high fertility, and include diverse species. But, communities using groundwater and plants grown with this groundwater at the downstream part of the basin might be under impact.						
Impact Significance	Positive	Negligible	Minor	Moderate	Major		

Residual Impacts

Impact significance is considered minor with the existing infrastructure and provided that proposed mitigation measures are taken.

4.5.5.2.2 *Operation Phase**Impact Definition*

There will be limited amount of hazardous wastes such as empty containers of chemicals, used cartridges, fluorescent lamps, used batteries and oily rags or equipment resulting from maintenance works as well as other types which are waste oil, waste vegetable oil, waste batteries and accumulators and worn-out tyres. Amount of hazardous waste will depend on frequency of maintenance activities and also need for repair works. Therefore, it is not possible at this stage to quantify wastes.

The impacts associated with the hazardous wastes to be generated during operational phase are the same as those associated with the construction phase wastes.

Embedded Mitigation Measures

A waste storage area will be built next to the technical building at the south (see Appendix-C). Since this temporary waste storage area will be surface-sealed and closed, it will not allow spills or leakages of hazardous wastes onto soil.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct		Indirect		Induced	
	Direct impact on soil and groundwater quality					
Impact Duration	Temporary		Short-term		Long-term	
	Permanent					
Impact Extent	Construction phase					
	Local		Regional		International	
Impact Scale	Health campus premises and the basin along which groundwater may carry pollutants.					
Impact Frequency	Severe damage especially to soil quality in a very limited part of the Project site and potential pollution in groundwater.					
Magnitude	Very low due to planned mitigation measures to comply with regulatory requirements					
	Negligible		Small		Medium	
Receptor Sensitivity	Large					
	Small due low extent of severe impacts and very low frequency due to planned mitigation measures.					
Impact Significance	Minor		Medium		Major	
	Soil in the Project site does not have high fertility, and include diverse species. However, communities using groundwater and plants grown with this groundwater at the downstream part of the basin might be under impact.					
Impact Significance	Positive	Negligible	Minor	Moderate	Major	

Mitigation Measures

Impact significance will be Minor with the infrastructure described above, and at this stage there are no other mitigation measures to propose.

4.5.5.3 Medical Waste

4.5.5.3.1 Construction Phase

Impact Definition

In the construction phase, medical waste will be generated in emergency response cases and vaccination in infirmary to be established in the site.

Medical waste has hazardous and infectious content, and causes extremely adverse impacts in worker and public health (e.g. many diseases) as well as soil and groundwater when it is not handled properly.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct		Indirect		Induced	
	Direct negative impact on workers’ and community health					
Impact Duration	Temporary		Short-term		Long-term	
					Permanent	
Impact Extent	Local		Regional		International	
	Project site and the downstream part of the groundwater basin					
Impact Scale	Not quantifiable but it is expected that there will be increase in illnesses and number of people going to hospital, thus pressure in medical service infrastructure. Decrease in workforce.					
Impact Frequency	Major infectious and toxic waste will be present but quantity will be minor since only first aid will be made at the site.					
Magnitude	Negligible		Small		Medium	
					Large	
Receptor Sensitivity	Low		Medium		High	
	Sensitivity of workers’ is major since medical waste is highly infectious and likely to cause illnesses, and hence decrease workforce.					
Impact Significance	Positive	Negligible	Minor	Moderate	Major	

Mitigation Measures

- Medical wastes that will be generated during medical aid operations in the infirmary will be put in double layered red colored medical waste bag with the label "Medical Waste", pursuant to the Medical Waste Control Regulation;

- Used injectors and other sharp edged materials in the infirmary will be put in closed containers made of hard plastic;
- Medical waste will be taken to the nearest health institution by the camp site doctor.

Residual Impacts

Impact significance is considered as minor if the proposed mitigation measures are in place.

4.5.5.3.2 Operational Phase

Impact Definition

In operational phase, medical waste will include the followings:

- Microbiological laboratory wastes;
- Waste blood samples and objects contaminated with blood;
- Used surgery clothes;
- Dialysis wastes (wastewater and equipment);
- Air filters containing bacteria and viruses;
- Injector needles;
- Broken glasses and similar objects.

According to data of Turkish Statistical Institute for 2010, amount of medical waste for inpatients and outpatients is 5.32 kg/cap and 0.2 kg/cap, respectively. Condensing of medical waste generation at one point rather than hospitals in discrete locations is not expected to affect the current waste management system since the responsible party to collect medical waste is Ankara Metropolitan Municipality. Furthermore, based on an assumption that there will be 30,000 outpatients considering the daily 50,000 people flow in the campus will be in the hospitals and be generating 6,000 tons of waste per day. Assuming that the number of outpatients increase by 40% as result of the better efficiency of the new hospital campus, the amount of waste may increase only by 2,000 tons, which will not be a significant increase to current waste generation from the existing hospitals.

Medical waste has hazardous and infectious content, and causes extremely adverse impacts in worker and public health (e.g. many diseases) as well having the potential to affect soil and groundwater when it is not handled properly.

Embedded Mitigation Measures

A waste storage building will be constructed near the southern Technical Building, and medical wastes will be temporarily stored in this area to prevent contamination.

According to the Medical Waste Control Regulation, medical wastes are collected from medical institutions by the licensed vehicles of the Metropolitan Municipality of Ankara, and then taken to the disposal facility. As mentioned in Section 2.11 medical wastes will be taken to the incineration plant to be erected in a landfill of the metropolitan municipality.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct	Indirect		Induced	
	Direct negative impact on workers’ and community health				
Impact Duration	Temporary	Short-term	Long-term	Permanent	
	During operational phase				
Impact Extent	Local	Regional		International	
	Project site and the downstream part of the groundwater basin				
Impact Scale	Threats on the patients’ and visitors’ health				
Impact Frequency	There is a risk of interaction between people and highly infectious and toxic waste if waste management practices other than storage are not robust.				
Magnitude	Negligible	Small	Medium	Large	
	Magnitude is medium due to threats on health and considerable frequency				
Receptor Sensitivity	Low	Medium		High	
	High - especially considering immunity compromised patients staying in the hospital.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Mitigation Measures

In order to ensure there is a sound management system, medical waste management activities will be carried out according to the Medical Waste Management Plan to be prepared by the health campus management in the context of the Health Care Waste Management System (HCWMS). The proposed outline of this plan, provided by the MoEU, is given in ESMMP (see Appendix-D). In the context of the HSWMS, the health campus management will undertake regular assessment of waste generation quantities and categories to facilitate waste management planning, and investigate opportunities for waste minimization on a continuous basis.

The plan will contain a range of measures for instance to eliminate adverse impacts of medical wastes, medical wastes will be put in double layered red colored medical waste bag with the label “Medical Waste”, pursuant to the Medical Waste Control Regulation. Used injectors and other sharp materials will be put in closed containers made of hard plastic.

Residual Impacts

Impact significance is considered as minor since impact frequency and hence magnitude will become lower provided that the proposed mitigation measures are taken.

4.5.5.1 Radioactive Waste

4.5.5.1.1 Construction Phase

In the construction phase, there will be no radioactive waste.

4.5.5.1.2 Operational Phase

Impact Definition

In operational phase, radioactive wastes include solid, liquid, and gaseous materials that have been contaminated with radionuclides. Radioactive waste originates from activities such as organ imaging, tumor localization, radiotherapy, and research / clinical laboratory procedures, among others, and may include glassware, syringes, solutions, and excreta from treated patients. If these radioactive wastes are not managed properly then serious and irreversible adverse impacts on human and all living beings may generate.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct	Indirect	Induced
	Direct negative impact on workers' and community health		
Impact Duration	Temporary	Short-term	Long-term
	During operation phase		
Impact Extent	Local	Regional	International
	Project site and the areas subject to the waste stream flow until final disposal		
Impact Scale	Not quantifiable but it is expected that there will be increase in illnesses and number of people going to hospital, thus pressure in medical service infrastructure. Decrease in workforce.		
Impact Frequency	As the operational activities in the campus will be continuous and the radioactive materials will be a part of medication in certain facilities mentioned above, there will be continuous releases of such radioactive wastes.		
Magnitude	Negligible	Small	Medium
			Large

	Magnitude is medium due to threats on health and considerable frequency				
Receptor Sensitivity	Low	Medium		High	
	High – especially considering the waste type as radioactive.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Mitigation Measures

- Storage of radioactive waste in containers labeled with the radioactive symbol to limit dispersion, and secure behind lead shields.
- Management according to national requirements and current guidelines from the International Atomic Energy Agency, IAEA (2003) as well as the IFC's Environmental, Health and Safety Guideline for Health Care Facilities (April 30th, 2007)
- Management of Waste from the Use of Radioactive Materials in Medicine, Industry and Research. IAEA Draft Safety Guide DS 160, 7 February 2003.
- Preparation of radioactive substance management plan prior to the operation

Residual Impacts

Impact significance is considered as minor provided that the proposed mitigation measures are in place.

4.5.6 Traffic

Impact Definition

There will be a major influx of vehicles especially in the operational phase of the Project. Outcomes of this traffic assessment study are given in Section 4.3.1.5.

In the construction phase, number of trucks bringing construction material into site and taking excavated material and demolition debris from the site will increase significantly.

According to the outcomes of the traffic assessment study, the extra load to be generated when health campus becomes operational was estimated about 5,930 vehicles/h.

Embedded Mitigation Measures

Emergency, visitors drop-off and logistics arrangements have been considered and incorporated into the health campus design to prevent traffic congestion in the campus.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Section 4.2 is presented below.

Impact Type	Direct		Indirect		Induced	
	Direct negative impact on surrounding communities					
Impact Duration	Temporary		Short-term		Long-term	
	Permanent		Long-term impact for the duration of the Project existence			
Impact Extent	Local		Regional		International	
	Surrounding roads and junctions					
Impact Scale	The impact is considered to be major scale because the number of vehicles expected to use the existing roads will be more than one third of the existing number of vehicles.					
Impact Frequency	Major - There will be daily movement of vehicles over 3000 vehicles per hour					
Magnitude	Negligible		Small		Medium	
	Large		Large - There will be serious traffic congestion in the surrounding roads and junctions where there is already traffic jam in especially rush hours and attendant increased risk of accidents.			
Receptor Sensitivity	Low		Medium		High	
	High - Local commuters and residents have been identified as sensitive receptors for this type of effect.					
Impact Significance	Positive	Negligible	Minor	Moderate	Major	

Mitigation Measures

During interviews with the authorized people from the Metropolitan Municipality carried out by the ESIA team, it was learned that the municipality is currently implementing a project with Gazi University to prepare the Main Transportation Plan for Ankara. This project considers future developments in the city including the two health campuses. In the context of this project, questionnaires are being conducted with 35,000 households. This plan is aimed to understand the needs of the transportation infrastructure and recommend necessary investments and arrangements to have a proper transportation system in the city. This project is believed to include significant measures to reduce negative impacts of the Project (and other proposed developments) on the local traffic.

In addition to the measures and improvements that are expected to be developed through the project mentioned above, outcomes of the Traffic Study that was carried out by the design team will also be made use of for reducing traffic congestion (see Section 4.3.1.5). In this regard, outcome of the Traffic Study will be shared with the Metropolitan Municipality to be taken into consideration with the outcomes of the other study mentioned above.

In addition, a Traffic Management Plan (TMP) has been developed and presented in the ESIA Report in Appendix-K. The TMP is intended to be used as a guideline for the Project Company and/or its sub-contractors to prepare site-specific traffic management plans.

Residual Impacts

Impact significance is considered as moderate provided that the proposed mitigation measures are in place.

4.6 Impacts on Biological Environment

4.6.1 Ecology

Impact Definition

It is expected that, there will only be limited or no impacts on both flora and fauna of the region during both the construction and operational phase due to the low biodiversity of the project area. On the other hand these impacts can be addressed to four main issues:

- Habitat loss due to the permanent land clearance for the Project site;
- Noise disturbance to fauna;
- Possible release or introduction of alien or invasive species during the landscape works;
- Excavation works and land clearance on proposed construction site of the facility,
- Clogging of plants' stomata due to dust emission in association with excavation and transportation of materials.

There is no endemic or threatened plant species identified as present on the project site. Additionally based on the surveys, fauna species rarely visit the project site due to the current poor habitat quality and this makes noise created by the facility will not be a crucial disturbance factor for the inhabiting faunal community around the region.

Impact Assessment

Impact evaluation carried out according to the impact assessment methodology given in Chapter 4 is presented below.

Impact Type	Direct		Indirect		Induced	
	Direct negative impact on local flora and fauna structure					
Impact Duration	Temporary	Short-term	Long-term		Permanent	
	Long-term impact for the duration of the Project existence					
Impact Extent	Local		Regional		International	
	The premises of the Project site					
Impact Scale	The impact scale is considered to be narrow because fauna species are barely visit the project site due to the current poor habitat quality and this makes noise created by the facility will not be a crucial disturbance factor for the inhabiting faunal community around the region.					
Impact Frequency	Continuous					
Magnitude	Positive	Negligible	Small		Medium	Large

	Small – Mainly due to narrow scale of impacts				
Receptor Sensitivity	Low	Medium		High	
	Low – Poor biodiversity in the area because of severe habitat degradation over years				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Mitigation Measures

- Post construction landscaping works, will use native species will be used and measures will be in place to stop the accidental transfer of invasive species to the region.
- In order to reduce impacts on vegetation to be formed through landscaping works, an Integrated Pest Management system will be established in line with PR3 of the EBRD. This system will ensure
 - minimizing or, where possible, elimination of the use of pesticides minimizing the hazards and risks to health and environment from the use of pesticides;
 - reducing the levels of harmful active substances by replacing the most dangerous with safer (including non-chemical) alternatives;
 - selecting pesticides that are low in human toxicity, known to be effective against the target species, and have minimal effects on non-target species and the environment
 - using low-input or pesticide-free plantation;
 - minimizing damage to natural enemies and preventing the development of resistance in pests.

Residual Impacts

The project site is of limited ecological value and makes an insignificant contribution to local biodiversity. Furthermore the project site does not provide any ecosystem services. With the mitigation suggested above in place, in light of this minor sensitivity significant effects are not probable.

4.7 Impacts on Social Environment

4.7.1 Resettlement

Impact Description

The EIHCP is part of a wider Health Transformation Project. The development of the Campus Project will require 1.07km² of land which is located between Yenimahalle and Kecioren Districts of Ankara. Prior to 2006, the land comprised of parcels owned by the

Municipality of Yenimahalle and the SGK. After 2006 the land was owned by the Treasury. The Treasury granted land use rights to the MoH for the purpose of providing healthcare services. The land is owned and will remain owned by the Treasury for the life of the Project. The transfer of the land to the Treasury was completed in accordance with Article 30 of the Expropriation Law (see Section 3.2.1 for details).

The following facilities were located on the area:

- 1) Publicly owned and managed facilities:
 - a) SGK housing complex;
 - b) National archive;
 - c) Etlik Specialised Hospital;
 - d) Zübeyde Hanım Maternity and Child Hospital; and
 - e) Dışkapı Polyclinic.
- 2) Publicly owned and privately managed enterprises:
 - a) Canteen operating within the Etlik Specialised Hospital;
 - b) Taxi stand; and
 - c) Leisure Complex.

Out of these facilities, the following have already been closed but not yet demolished as part of Project Development:

- 1) SGK housing complex;
- 2) Etlik Specialised Hospital; and
- 3) Canteen operating within the Etlik Specialised Hospital

A description of each of the facilities on site is provided in Table 4-49.

Table 4-49. Facilities on the Project Site

Facility	Description	Status
SGK Housing Complex	The housing complex was an SGK owned and managed facility. In Turkey civil servants are provided with housing that can be leased for between 3-5 years. The housing complex accommodated 72 such families. All residents have now moved from the housing, either into new SGK owned housing, privately rented housing or have bought their own homes. It is understood that SGK housing contracts can be terminated by SGK and in this case, a six month notice period was given to the families regarding termination of contract.	The housing complex is still on the site but no longer in use for residential purposes.

Facility	Description	Status
National Archive	The National Archive is a government owned and SGK managed facility and plans have been made to move the archive to another location in Ankara.	The Archive still continues to serve but SGK is building a new building for this institution. The institution expected to move, as soon construction will be finished.
The Etlik Specialised Hospital	The Etlik Specialised Hospital is a MoH owned and MoH managed facility. It has already closed and will be demolished prior to construction of the Project. It is understood that Medical and other MoH staff were reallocated by the General Directorate of Health Services. Staff were consulted on their preferred options for relocation to new workplaces and many were offered their first choice. Some teams, such as the theatre teams, were moved as units. It is also understood that workers' unions were active during the process, especially guiding those employed by sub-contractors. In total, approximately 1,100 workers were affected by this process, 800 of whom were MoH staff.	No longer in use
Zübeyde Hanım Maternity and Child Hospital and Dışkapı Polyclinic	The Zübeyde Hanım Maternity and Child Hospital and the Dışkapı Polyclinic will continue to operate through the construction of the Project. Both facilities are MoH owned and MoH managed. When the Project becomes operational the facilities will be closed and demolished. It is not yet known what will happen to the services at these hospitals or whether they will be transferred to the Project.	Still in Operation
Canteen	The canteen operating out of the Etlik Specialized Hospital was closed as a result of the closure of the Hospital. The facility was leased from the MoH and the canteen privately managed. It is understood that the owner of the business received unofficial notice two months before hospital closure and written notice one month before termination of lease. The canteen employed less than 10 people although the exact number is not known. Clarification needs to be made as to what provisions were made for any early termination of lease and whether these were met.	Closed

Facility	Description	Status
Taxi Stand	A taxi service operating out of a building owned by the Ankara Metropolitan Municipality is expected to be relocated 10 metres away from its current position. The taxi service is privately run but monitored by the Ankara Chamber of Drivers. Car owners are shareholders in the taxi stand, sharing monthly rental fees and expenses. 36 cars are operated at the taxi stand, each with individual owners.	Expected to be moved
Leisure Complex	The leisure complex consists of cafés, a restaurant and sports facilities which are operated out of buildings owned by the Ankara Metropolitan Municipality. The facilities are privately operated by a local business operator. The leisure complex and the Metropolitan Municipality have contract valid thru 2023. The Metropolitan Municipality and the design team is trying to postpone the relocation of the complex as much as possible. The leisure complex is expected to be moved after construction and the Municipality is responsible of its relocation due to their contract. The exact number of employees is not known, although it is within the range of 10 – 49 employees.	Will be closed moved to an alternative land when construction starts

Impact Assessment

Physical move of the 72 families from the housing complex by SGK was completed by November 2012. Also the canteen at the Etlik Specialized Hospital had ceased to operate by that time due to the hospital closure.

On the project site, no further physical displacement will be required. However, the leisure complex will need to be moved thus causing some economic displacement involving the business operator and the employees. The taxi stand and service is expected to remain in place with a minor adjustment of its location by about ten meters. There is additional potential for economic displacement related to the closure of the twelve hospitals once the Etlik complex becomes operational.

All the residences and business were and are located on public land concerning various government entities such as SGK for housing, Ministry of Health for the canteen and potential businesses in the hospitals yet to be closed, and the Municipality of Ankara for the leisure center. The Project Company will undertake further review of the processes involved in displacement that has already occurred and the assessment of the expected economic displacement yet to occur. Based on this review and assessment, mitigation measures will be developed to assure the project related physical and economic displacement is in line with

international best practice and requirements. This task demands coordination with respective government entities involved.

4.7.2 Influx

Impact Description

Approximately 4,000 workers will be required for construction, with up to 3,000 of these being housed in temporary worker accommodation (see Section 2.7.1). It is expected that construction workers will mainly come from within Ankara and neighbouring cities.

During the operation phase, it is estimated that over 10,000 workers will be required 24 hours a day, 7 days a week. It is also anticipated that up to 50,000 people may use the site on a daily basis over a 24 hour period. This figure includes staff, patients and visitors.

Whilst it is unlikely that there will be any permanent in-migration to the area, 50,000 people visiting the Project site each day is an increase of approximately 50% on current baseline conditions (i.e. based on the fact that the total population of the 6 local mahalles is 107,321). It has been estimated that there are approximately 35,000 – 40,000 people living within 500m of the Project site, and so the numbers projected will mean a considerable increase in people moving around the area. Key impacts associated with this influx in people are likely to be traffic noise, congestion and impacts associated with interactions with construction workers. There is not expected to be any increase in pressure on local infrastructure as most workers will be sourced from within the local area.

Air quality and noise impacts associated with traffic are assessed in Sections 4.5.1 and 4.5.2 respectively. This section assesses interactions with construction workers and traffic congestion.

4.7.2.1 Interactions with Workers During Construction

Impact Description

Stakeholders have expressed concern over construction workers causing social problems within the local communities and impacting on safety and security. These concerns have come about as a result of previous projects where there have been issues with construction workers. An example is the construction of the Antares shopping mall when construction workers were reported to have verbally harassed women. This in turn led to physical aggression between construction workers and some local residents.

Impact Assessment

Impact Type	Direct		Indirect		Induced	
	This is an induced impact, resulting as a consequence of the Project.					
Impact Duration	Temporary	Short-term	Long-term		Permanent	
	Throughout construction					
Impact Extent	Local		Regional		International	
	Impacts are expected to be local in nature.					
Impact Scale	This impact will affect residents and workers in the immediate vicinity of the Project site.					
Impact Frequency	Ongoing throughout construction					
Magnitude	Positive	Negligible	Small	Medium	Large	
	Small to Medium: Harassment may increase levels of anxiety, particularly for women and may act as a barrier to people using local amenities.					
Receptor Sensitivity	Low		Medium		High	
	Receptor sensitivity is considered to be low due to it being a <i>relatively</i> middle class area with well-educated people.					
Impact Significance	Positive	Negligible	Minor	Moderate	Major	

Mitigation Measures

- A strict code of conduct will be developed and implemented for construction workers, outlining expected behavior with respect to their daily interactions with local residents and users of public amenities. This will be part of the labour force management plan to be developed for the project;
- The labour force management plan will also include requirements for induction and training on expected behaviors and on disciplinary procedures (including dismissal procedures for unacceptable conduct). Construction workers will be made aware of the grievance mechanism and stakeholder engagement process, explaining that stakeholders have the right to register grievances through a formal procedure.

Residual Impacts

Impacts are expected to reduce to **negligible** with the implementation of the described mitigation measures.

4.7.2.2 Traffic Congestion

Traffic congestion is another impact associated with influx to the Project site. It is discussed in Section 4.5.6.

4.7.3 Local Economy and Local Livelihoods

The Project is expected to result in benefits to the local economy and therefore local people. These benefits are expected through both construction and operation. Economic impacts are also expected around the hospitals to be closed as a result of the Project.

4.7.3.1 Benefits to the Local Economy and Local Livelihoods During Construction and Operation

Impact Description

The Project is located in a lower to middle class area with thriving local businesses. Whilst construction workers are likely to be sourced from the local area, the additional 4,000 construction workers will be working directly in and around the site for approximately 42 months. This is likely to increase trade for local businesses, e.g. the shops in the shopping mall. During the operation phase, up to 50,000 people are expected to visit the hospital complex each day, which could further boost trade for local businesses.

In addition, the Project will be a major employer in the area with opportunities during both construction and operation. Opportunities for local people are most likely to be for non-medical staff positions during operation, of which 4,700 will be required. The Project also expects to recruit 5,700 clinical staff, but these will be recruited from the existing hospitals which are planned for closure.

Additional employment opportunities will also be created through the growth of local business trade. Therefore the Project is expected to boost the local economy and more broadly, enhance employment opportunities in Ankara.

Impact Assessment

Impact Type	Direct	Indirect	Induced
	Both direct and indirect positive impacts resulting from the Project		
Impact Duration	Temporary	Short-term	Long-term
	The impact is expected to be long-term , commencing with construction and lasting for the life of the Project.		
Impact Extent	Local	Regional	International
	The impact will be local in extent, but with some knock-on benefits to the Ankara economy.		
Impact Scale	This impact will affect residents and local businesses in the immediate vicinity of the Project site.		
Impact Frequency	Throughout construction and operation		

Magnitude	Positive	Negligible	Small	Medium	Large
	Positive impacts on local residents and businesses				
Receptor Sensitivity	Low		Medium	High	
	Receptor sensitivity is expected to be medium . Unemployment levels suggest that people are available to take up new employment opportunities and local businesses are in a position to be able to benefit from the additional people visiting the area as a result of the Project.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Enhancement Measures

- Etlik IHCP will have a Business Ethics Policy/Good Neighbor Policy that commits the Project to 'Buy Local';
- The Project will also develop and implement human resources policies that will include requirements and targets around the hiring of local workers. In addition, there will be clauses around gender equality and non-discrimination with specific targets for ensuring equal opportunities.

Residual Impact

Positive impacts will be enhanced with the implementation of the enhancement measures described.

4.7.3.2 Economic Impacts as a Result of Hospital Closure

Impact Description

This Project will result in the closure of existing state hospitals in Ankara. The exact hospital closures associated with Etlik are currently not known but it is expected that up to 13 hospitals may close as a combined result of the Etlik and Bilkent IHC Projects. The closure of hospitals will impact on contracted hospital workers in particular (retrenchment of approximately 10,000 contract staff across 13 hospitals). Hospital closures will also impact on local businesses within the vicinity of the hospitals as well as privately run hospital canteens. Patients residing close to these hospitals will also have to travel further (and pay more for their transport) to reach Etlik IHCP.

Impact Assessment

Impact Type	Direct		Indirect		Induced	
	The economic impact resulting from hospital closure is a direct negative impact.					
Impact Duration	Temporary		Short-term	Long-term	Permanent	
	Impact is considered long term as they may occur throughout the operation phase.					
Impact Extent	Local		Regional		International	
	The impact will be contained locally within Ankara.					
Impact Scale	The scale of this impact will be large , due to the large number of people using the hospitals (hospital workers, patients), local businesses and the different localities involved.					
Impact Frequency	Ongoing					
Magnitude	Positive	Negligible	Small	Medium	Large	
	Direct impact in regional extent for large number of people					
Receptor Sensitivity	Low		Medium		High	
	Receptors are considered to have a high sensitivity, unemployment may increase; transportation fees will also increase for the patients and some staff. Local businesses also rely on the presence of the hospitals for business, particularly pharmacies.					
Impact Significance	Positive	Negligible	Minor	Moderate	Major	

Mitigation Measures

Baseline survey shows that closure process of Etlik Specialized Hospital has already created economic losses on local businesses. Etlik IHCP and BIHCP could lead negative impacts on contracted hospital workers local businesses near by the hospitals and canteens of the hospitals. It will also create extra transportation fee for patients and the hospital workers. Etlik IHCP will work on the areas below to minimize negative impacts;

- Etlik IHCP will prepare human resource for hospital workers;
- Tender process of commercial areas will be transparent and the local shops and canteens of the hospitals can get opportunity to work in Etlik IHCP;
- Etlik IHCP will work in cooperation with the Metropolitan Municipality for alternative transportation ways to the campus area.

Residual Impacts

Residual negative impacts are expected despite the proposed mitigation measures. Therefore, the MoH needs to conduct a close follow-up including enhancement measures to be covered in ESAP.

4.7.4 Community Health, Safety and Security

Traffic was a key concern of stakeholders for this the Project. These concerns were particularly focused on the operation phase, but traffic was also a concern during construction. Key issues associated with traffic include congestion (covered Section 4.5.6), impacts on air quality and noise (covered in Sections 4.5.1 and 4.5.2 respectively) and impacts on health and safety which are covered here.

Other impacts identified include security measures in and around the site, issues associated with the poor management of waste and hazardous materials, infectious disease control and impacts associated with emergency events, such as fire. Security measures, infectious disease control and emergency events are described below and impacts associated with hazardous waste described in Section 4.5.5.2.

The key receptors for these impacts are the residents of the six Mahalles surrounding the Project site, local businesses, the existing hospital workers and patients, the Yıldırım Beyazıt and Turgut Özal Universities, as well as members of the general public who use the local amenities and commuters using the local road networks. It is worth noting that between 10 and 40% of the population, living in the local area is aged over 60 years (with Varlık Mahalle having the highest elderly population at 40%). These stakeholders may be particularly sensitive to impacts associated with community, health and safety.

4.7.4.1 Health and Safety Impacts Associated with Increased Traffic during Construction and Operation

Impact Description

As mentioned in Section 4.5.1.1, it is estimated that during construction there will be an additional 136 trucks carrying excavated material to the landfill. There will be also trucks carrying construction materials to the site. During operation the additional vehicles would be approximately 3,800 vehicles per hour. A key issue associated with an increase in traffic is the increased potential for accidents affecting other drivers, passengers or pedestrians.

Impact Assessment

Impact Type	Direct	Indirect	Induced
	Impacts are considered induced impacts as they result as a consequence of the Project.		
Impact Duration	Temporary	Short-term	Long-term
	Throughout construction and operation		
Impact Extent	Local	Regional	International
	Impacts are expected to be local in nature		
Impact Scale	Impacts would affect local road users, pedestrians and those living and working in close proximity to the road network.		

Impact Frequency	Throughout construction and operation				
Magnitude	Positive	Negligible	Small	Medium	Large
	Medium: Although health and safety impacts associated with traffic may be infrequent, impacts could be very serious, even fatal. This is also an issue of specific stakeholder concern.				
Receptor Sensitivity	Low		Medium		High
	Medium: Local residents are highly sensitive to traffic impacts given this is already a heightened concern. However, there are a relatively high proportion of elderly people living in the local area.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Mitigation Measures

- A Traffic Management Plan will be developed and implemented by the Project Company to adequately manage traffic within the Project site. This will be done in close coordination with the Metropolitan Municipality. Efforts will be made to identify measures to improve traffic flow on busy commuter roads. An outline traffic management plan is presented in Appendix-K;
- Additional studies are currently being undertaken to better understand traffic flows around the Project area, to assess how Project-related traffic will affect traffic more broadly across Ankara. The results of these studies will feed into the Traffic Management Plan for the Project, which will be disclosed as part of stakeholder engagement activities;
- The Project will implement an awareness raising campaign with local stakeholders regarding the risks related to the movement of heavy vehicles and increased traffic in the area. The main focus of this campaign will be during the construction phase and will focus on local residents, children (in schools) and the users of local amenities. It will be implemented in coordination with local community groups and the Mukhtars. Details of this campaign will be presented as part of ongoing stakeholder engagement activities;
- An Emergency Response Plans is being developed for the Project. This will provide details of what will happen in the case of a major traffic related incident and define roles and responsibilities. This plan will also be disclosed as part of the stakeholder engagement activities;
- Warning signs will be placed at gates through which truck enter and exit from the construction site.

Residual Impacts

Impacts are expected to reduce to **minor** with the implementation of the described mitigation measures.

4.7.4.2 Security Within and Around the Project Site during Construction and Operation

Impact Description

Concern has been raised by stakeholders regarding security of the site during construction and the potential for accidents and injury to people who might enter the site. Security will be needed on site. There is no real history of violence or negative interactions between security and local populations in Ankara. Security is highly regulated in Turkey through Law No. 5188 on Private Security Services. However, the inappropriate use of force to secure the site in the event of any incident could compromise the safety and security of individuals in the locality. This in turn, could have impacts on the reputation of the Project Company.

During operation, the hospital complex will contain a high security forensic hospital for convicted criminals with mental health issues and criminals charged with crimes who are undergoing mental assessment. Without appropriate security such a unit could result in critical impacts on community health, safety and security. The Project Design includes important security measures for this unit (see Section 2.6.2). The management of the high security forensic unit will be the joint responsibility of the MoJ and the MoH. .

All security personnel will be trained and will operate in accordance with the 'International Code of Conduct for Private Security Providers' as well as Turkish Law No. 5188 on Private Security Services.

Impact Assessment

Impact Type	Direct		Indirect		Induced	
	Impacts are considered induced impacts as they are a consequence of the Project.					
Impact Duration	Temporary	Short-term	Long-term		Permanent	
	Throughout construction and operation					
Impact Extent	Local		Regional		International	
	Impacts are expected to be local in nature, with the Project site.					
Impact Scale	Impacts would affect local communities.					
Impact Frequency	Throughout construction and operation					
Magnitude	Positive	Negligible	Small	Medium	Large	
	Medium: Any accidents as a result of trespasses on site during construction could be very serious, even fatal but there are appropriate security measures included in the Project design to prevent entry to the site. Any breaches in security at the high security forensic unit could have very serious consequences if criminals with mental					

	health issues escaped. However, robust security measures have been incorporated into the design of the Project which makes this highly unlikely.				
Receptor Sensitivity	Low	Medium	High		
	Medium: Local residents have raised security in and around the Project site as a key concern.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Mitigation Measures

- Measures will be taken to discourage entry onto the construction site during construction. This will cover fencing and requirement for identity cards to enter the site;
- Engagement activities prior to construction will ensure that local stakeholders are informed of the risks and consequences of entering the site;
- Security personnel will patrol the site area to prevent any unauthorized access onto the site. They will also ensure that protocols for entering the construction site are enforced;
- A management plan for security personnel will be developed and implemented by the Project Company outlining expectations around security, in line with international and Turkish law. This will be done in coordination with the MoJ and MoH who have joint responsibility for security in the forensic unit in order to understand planned security protocols. Moreover, as mentioned in Section 2.6.2, security measures in the Forensic Hospital will include high fences, motion detectors and CCTV. The rooms in the part of the Forensic Hospital where criminals with mental health issues stay will be equipped with locked windows, reinforced glasses and double locking systems. Hence, the Forensic Hospital will be physically isolated from other hospitals in the campus;
- The grievance mechanism for the Project will capture all grievances raised in relation to security and safety issues. These will be addressed promptly and actions will be taken.

Residual Impacts

Impacts are expected to reduce to **minor** with the implementation of the described mitigation measures.

4.7.4.3 Infectious Disease Control

Impact Description

In such a large health campus environment, the spread of infectious diseases has been considered a key impact during the operational phase. Infectious diseases can be spread as a result of improper waste management practices (especially medical waste), through air

conditioning systems and as a result of poor sterilization, primarily during operations and medical treatment. Given the international concern about super bug originated in Southern Europe and other part of the world as well as the large number of the patients and staff in the hospital complex, specific attention to in-hospital infection control and management is required.

The project design assumes that robust health management practices will be followed and that any spread in infectious diseases will be an unlikely, non-routine event, only resulting from poor management practices.

Impact Assessment

Impact Type	Direct		Indirect		Induced	
	Impacts are considered induced impacts as they are a consequence of the Project.					
Impact Duration	Temporary	Short-term	Long-term		Permanent	
	Throughout operation					
Impact Extent	Local		Regional		International	
	Impacts are expected to be local in nature, but any breaches in infectious disease control could be regional in nature.					
Impact Scale	Impacts would primarily affect hospital patients and staff.					
Impact Frequency	Throughout operation					
Magnitude	Positive	Negligible	Small	Medium	Large	
	Medium: Any spread of infectious diseases could have very serious consequences. However, robust management practices will be followed in the hospital, which makes this unlikely.					
Receptor Sensitivity	Low		Medium		High	
	Medium: Whilst this is considered to be a non-routine unlikely event, stakeholders would be very sensitive to such an outbreak.					
Impact Significance	Positive	Negligible	Minor	Moderate	Major	

Mitigation Measures

- The prevention of the spread of infectious diseases all waste management and hazardous material management plans will be actively enforced by the Project Company and their implementation monitored.
- Infectious disease control will be managed as part of the Dual Management system specified in Appendix-A. The specific details for infectious disease management had not yet been confirmed at the time of writing and will need to be established as a matter of priority.

- An occupational health and safety management system will be established for all staff with specific training on exposure to vector-borne diseases. In particular, in accordance with IFC guidelines, this management system will ensure:
 - the separation of clean/sterilized and dirty/contaminated material and people flows;
 - development and inclusion of adequate disinfection / sterilization procedures and facilities;
 - adequate space for the storage of recyclable materials for pick-up;
 - adequate supplies of potable water to reduce the risk of exposure to water borne diseases;
 - selection of heating, ventilation and air conditioning systems that provide isolation and protection from airborne infections;
 - provision of hazardous material and waste storage and handling areas;
 - treatment and exhaust systems for hazardous and infectious agents; and
 - the selection of easily cleaned building materials that do not support microbiological growth, are slip resistant, non-toxic and non-allergenic.

Residual Impact

Impacts are expected to reduce to **minor** with the implementation of the described mitigation measures.

4.7.4.4 Healthcare Provision

Impact Description

The main consequence of this Project is the provision of a new, state of the art medical facility providing improved health services for a large proportion of the Ankara population. This service will be available to the most vulnerable and poorest for free through the “green card” system. This will have a beneficial effect on the wider community.

Impact Assessment

Impact Type	Direct		Indirect		Induced	
	The impact to health provision is a direct positive impact.					
Impact Duration	Temporary		Short-term	Long-term	Permanent	
	Impact is considered long term as they may occur throughout the operation phase.					
Impact Extent	Local		Regional		International	
	The Project is expected to attract people regionally and internationally for health care and treatments.					
Impact Scale	The impact scale of health provision is large, due to the large numbers of people who will be using the health complex each day.					
Impact	Ongoing					

Frequency					
Magnitude	Positive	Negligible	Small	Medium	Large
	Direct impact in international extent for large number of people				
Receptor Sensitivity	Low		Medium	High	
	Receptors are considered to have a high sensitivity, where they are readily willing to take up the opportunities presented through the new health services provided by the health complex, particularly given that other hospitals are closing, leaving them more dependent on the Etlik IHCP.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Enhancement Measures

Access to the healthcare facilities will be improved, regional development will be contributed, efficiency and quality of healthcare services will be improved, new technologies will be used, and bed capacities of the Ankara will be increased due to the Forensic Hospital.

Residual Impact

Impacts will be **positive**.

4.7.4.5 Emergency Event: Fire Safety

4.7.4.5.1 Construction Phase

Impact Description

Fire incident that may occur during construction is an important issue that may affect construction staff and possibly a small percentage of the local population.

Impact Assessment

Impact Type	Direct		Indirect		Induced	
	Induced negative impacts as it results as a consequence of the Project.					
Impact	Temporary	Short-term	Long-term		Permanent	
Duration	Impact is considered short term as it may occur throughout the operation phase.					
Impact Extent	Local		Regional		International	
	Impact is expected to be local in nature.					
Impact Scale	It is likely to affect a small percentage of the local population, therefore the impact is considered small scale.					
Impact Frequency	Infrequent					
Magnitude	Positive	Negligible	Small	Medium	Large	
Receptor	Low		Medium		High	

Sensitivity					
Impact Significance	Positive	Negligible	Minor	Moderate	Major

Mitigation Measures

The actions to be taken will be stated in the pertinent section of the Construction Management Plan to be prepared by the engineering, procurement and construction (EPC) Contractor of the SPV. The emergency response related to fire cases that may happen in the construction site includes:

- *initial response;*
- *emergency team's intervention;*
- *general evacuation.*

It is of fundamental importance that initial response action is taken urgently and as resolutely as possible against fire when its onset is first detected.

Anyone detecting any incipient fire shall immediately:

- shout out loud "**FIRE!**" in order to draw the other workers' attention;
- take the closest fire extinguisher which will be available at the site and use it to tackle incipient fire.

The worker shall remain thereat until occurrence of any of the following:

- order of evacuation given by voice;
- arrival of emergency team;
- obvious existence of a serious risk;
- significant delay of emergency team's intervention;

The worker shall behave as summarized below:

- *arrival of the emergency team* = the worker leaves the place where the fire is located and moves to the emergency gathering point;
- *obvious existence of serious risk* = the worker leaves the place where the fire is located and informs the emergency team, upon its arrival, about the danger;
- *significant delay in emergency team's arrival* = the worker leaves the place where the fire is located and informs the emergency team about the danger.

The Emergency Coordination shall cause the notice of emergency to be given to the workers and shall make arrangements so as to take action set described above.

The emergency team shall immediately go to the place where the emergency reportedly occurred and shall:

- disconnect the electric power supply, if any; and
- extinguish residual fire hotbeds by using fire extinguishers.

In the event of fire which cannot be easily brought under control, the Fire Brigade shall be promptly called for a decisive intervention; in such a case, personnel will be ordered to evacuate.

In the event of fire involving the fuel station, the Fire Brigade shall be promptly called and the site will be promptly evacuated.

In the highly unlikely event of fire of moderate severity, the emergency team shall try to extinguish it by using fire extinguishers from a windward position and at a safety distance.

The emergency team shall withdraw from the dangerous area in the event the risk was to become unacceptable of upon arrival of the Fire Brigade.

Residual Impacts

Impacts are expected to reduce to **negligible** with the implementation of the described mitigation measures.

4.7.4.5.2 Operational Phase

Impact Description

The risk of fire in health care facilities is significant due to the storage, handling, and presence of chemicals, pressurized gases, boards, plastics, and other flammable substrates. As a result of this, life and fire safety was one of the primary concerns in the design process. Therefore, detailed studies for fire safety arrangements have been carried out. Firefighting arrangements for the current phase of the Project are presented in Section 3.3.4. Key management decisions such as location of fuel tanks, fire hoses and water reels are of great importance for immediate and sufficient response in a fire case and these were incorporated into the Project design to ensure rapid response as required. Given the nature of forensic/psychiatric hospital where tightened security measures are in place, specific attention should be paid to the life and fire safety issues.

Impact Assessment

Impact Type	Direct		Indirect		Induced	
	Induced negative impacts as it results as a consequence of the Project.					
Impact Duration	Temporary	Short-term	Long-term		Permanent	
	Impact is considered long term as they may occur throughout the operation phase.					
Impact Extent	Local		Regional		International	
	Impact is expected to be local in nature.					
Impact Scale	It is likely to affect a small percentage of the local population, therefore the impact is considered small scale.					
Impact Frequency	Infrequent					
Magnitude	Positive	Negligible	Small	Medium	Large	
Receptor Sensitivity	Low		Medium		High	
Impact Significance	Positive	Negligible	Minor		Moderate	Major

Mitigation Measures

A third party life and fire safety audit will take place to ensure that the Project complies with Turkish life and fire safety law and standards as well as international benchmarks and will develop a life and fire safety master plan. SPV will develop an Emergency Preparedness and Response Plan and Policy that will outline the roles and responsibilities of SPV and government emergency response units. The Plan will also outline the organizational structure for responses, communication, procedures, training and resources for responding to emergencies. This plan will identify all major accident and hazard risks and outline measures in the event of a major accident or hazard. These measures will include response to not only fire, but also flood and earthquake. The Emergency Preparedness and Response Plan will also contain measures for review of response procedures and other measures at least on an annual basis.

Residual Impact

Impacts are expected to reduce to **minor** with the implementation of the described mitigation measures.

4.7.5 Access to Services and Infrastructure

Impact Description

There are a number of key services within the local area surrounding the Project site. These include:

- two universities;
- 13 primary schools and five high schools in six Mahalles;
- Antares shopping mall;
- local Municipal offices;
- Military hospital;
- local sports facility and amusement park;
- local cafes and restaurants;
- metro retail market;
- a municipal park;
- a high-school;
- the governor's house;
- facility of the State Hydraulic Works (DSI);
- facility of State Highways at the south; and
- a technical works facility of the Metropolitan Municipality of Ankara.

People from within the locality, as well as regionally, use these public services and are the main receptors.

As part of the Etlik and Bilkent IHCP, 13 local hospitals in Ankara will close, which will mean that local stakeholders will have a change in their health care provision facility.

There is concern amongst stakeholders that the increase in traffic associated with the Project will result in increased travel times to reach local services. There is already dissatisfaction with current transportation infrastructure and so there is significant concern about additional impacts as a result of the Etlik IHCP.

In addition, the new healthcare services of EIHCP may not be as accessible as the 6 current hospitals that are planned for closure. This will particularly affect the poorest, who are more likely to use the State hospitals that are closing.

Impact Assessment

Impact Type	Direct		Indirect		Induced	
	An induced negative impact resulting as a consequence of the Project					
Impact Duration	Temporary	Short-term	Long-term		Permanent	
	The impact is expected to be long-term , lasting the duration of the Project					
Impact Extent	Local		Regional		International	
	The impact will be localised .					
Impact Scale	The scale is expected to be small , effecting local residents only.					
Impact Frequency	An on-going impact.					
Magnitude	Positive	Negligible	Small	Medium	Large	
	Busy roads may increase journey time to schools, health services and other services, which is a concern expressed by stakeholders in all Mahalles.					
Receptor Sensitivity	Low		Medium		High	
	Receptor sensitivity is expected to be high . Existing traffic problems in the locality suggest that people would be very sensitive to impacts that may reduce their access to services. In addition, those impacted by reduced access to healthcare as a result closing 6 state hospital are likely to be poorer families.					
Impact Significance	Positive	Negligible	Minor	Moderate	Major	

Mitigation Measures

- The traffic management plan will be the basis for reducing the traffic load. The Metropolitan Municipality is responsible of the implement measures to ensure traffic safety such as schools and hospitals in places, which are important for pedestrian safety, identify and. Alternative public transportation ways are planning for accessing to the Project site. SPV is continuing negotiations about this public services with the Metropolitan Municipality.
- A new subway to the Project area is currently under construction. The Project Company will work with the local municipality to support campaigns encourage people to use public transport to minimize vehicle traffic.

Residual Impacts

Impacts are expected to reduce to **minor** with the implementation of the described mitigation measures.

4.7.6 Occupational Health, Labor and Working Conditions

Impact Description

The Project Company will be responsible for human resources for the construction period and for non-clinical staff for the operations period. Turkey is currently in the middle of a harmonisation process with the European Union and labour laws are being reviewed to ensure alignment. The Project will comply with national labour, social security and occupational health and safety laws as well as the principles and standards of ILO convention. The national principles embodied in the ILO convention are:

- The abolition of child labour: The Project Company will not employ children under the age of 18.
- The elimination of forced labour: Forced labour is contrary to the Constitution of the Republic of Turkey and the European Convention on Human Rights. The Human Resources policy of the SPV will be compatible with the European Convention on Human Rights and the Turkish Constitution.
- The elimination of discrimination: Turkish Labour Law Article 5 states “Discrimination based on language, race, sex, political opinion, philosophical beliefs and religion is not permissible in the employment relationship”.
- Collective bargaining: Under the Act of Collective Bargaining Agreement on Trade Unions Act No. 6356 and 4857 Labour Law, workers have the right to collective bargaining and other rights.

Labour Law (4857) applies to all establishments and to their employers, employees, employer’s representatives and employee representatives, irrespective of the subject matter of their activities. The SPV is yet to develop a formal grievance procedure for workers although an informal procedure is in place. It is expected that the SPV Human Resources policy will have provisions for:

- Age;
- Wages;
- Working hours;
- Disabled employees;
- Non-employee workers (i.e. sub-contractors);
- Health and safety; and
- Workers camps.

Receptors for occupational health and safety impacts include direct Project Company employees, all sub-contractors and MoH staff working at the hospital complex. Additional receptors include employees and sub-contractors working in industries that support the hospital operations.

4.7.6.1 Construction and Implementation Phase

The impacts in this section are considered together for both the construction and operation phase as similar consequences can arise from both phases. During the construction phase, 4,000 workers will be employed at peak construction times in months 16, 18 and 25. A camp site will be established to accommodate up to 3,000 of these workers. During operation, the hospital complex is expected to employ up to 10,000 including medical staff, technical staff, service and maintenance staff, administration and waste management. As a consequence of Project activities, the following impacts will be considered:

- **Occupational Health and Safety:** Construction work involves high risk activities with the potential for accidents that may result in injuries and potential fatalities. During operation, cleaning, medical, waste management and other staff will be exposed to clinical waste including sharps, other hazardous waste which may expose hospital staff to general infections, blood-borne pathogens and other infectious materials during care and treatment, as well as during collection, handling, treatment and disposal of medical waste. While the SPV and MoH will implement procedures to manage health and safety risks, meeting EBRD PR2 standards may be a challenge, especially for some contractors.
- **Workers' Rights:** Although workers employed directly by the MoH and SPV are likely to have workers' rights in line with the ILO conventions including collective bargaining rights, these need to be clearly written into management practices. In particular, SPV and the MoH must ensure that direct employees can work free of any discrimination, regardless of race, religion or belief, gender, disability, age, nationality, sexual orientation or ethnicity. In addition, Responsible Procurement processes must work to ensure the supply chain do not violate workers' rights, do not use child labor or forced labor and allow freedom of association and collective bargaining.
- **Retrenchment:** The hospitals that are planned to be closed for the operational phase of the health campus projects will result in the retrenchment of some 4,807 employees. Health Workers' Union took an active role in the closure of Etlik Specialized Hospital in 2012 and the union achieved to reemployment of subcontractor workers of the closed Etlik Specialized Hospital in other hospitals of the MoH. It is expected that the health workers unions will be involved in the closure process of the hospitals to minimize the retrenchment. Health Workers' Union has the highest member population in the Turkey and the officially authorized union for the collective bargaining but for the equal representation other unions should also be involved to the process.

- However, Etlik complex will hire totally 3,919 contracted workers. Contracted staff of the MoH is considered to be hired in the Health complex to minimize retrenchment. MoH is planning to hire redundant contracted workers with service procurement of the health complex. Retrenchment of workers will be undertaken in line with national law and international best practices, and will include providing skills to enable individuals to secure alternative employment. For the collective dismissal situations *“Consultations with union shop-stewards to take place after the said notification shall deal with measures to be taken to avert or to reduce the terminations as well as measures to mitigate or minimize their adverse effects on the workers concerned”* according to Labour Law Article 29.
- **Workers’ Accommodation:** The Project will build a construction camp on site for construction workers for up to 3000 workers. Workers’ living conditions need to be of international standard to ensure on-site living conditions provide adequate sanitary and waste management and the provision of potable water. These standards will be maintained for the lifespan of workers’ accommodation.

Occupational Health, Labor and Working Conditions Impact Assessment

Impact Type	Direct		Indirect		Induced	
	Impacts to Occupational Health, Labour and Working Conditions are likely to be direct negative .					
Impact Duration	Temporary	Short-term	Long-term	Permanent		
	Impacts relating to labour and working conditions could be short term.					
Impact Extent	Local		Regional		International	
	Impacts are expected to be local in nature.					
Impact Scale	The impact scale is quite large due to the number of employees associated with the Project during construction and operation.					
Impact Frequency	Due to existing Turkish labour laws, impact frequency is expected to be negligible .					
Magnitude	Positive	Negligible	Small	Medium	Large	
	- Occupational health and safety impacts: medium where the entire workforce and supply chain could be exposed to risk over a long period of time if not managed effectively. - Workers’ rights: medium due to the ongoing nature of the impact and the stress levels this causes workers, even if not all workers are exposed to problems related to workers’ rights. - Retrenchment :Medium as the Project may result in the retrenchment of some of the 4,807 non-medical contracted hospital workers at the end of the construction period. . - Workers’ accommodation: medium as it could potentially impact on up to 75% of the construction workforce and be an ongoing problem during the construction phase.					
Receptor Sensitivity	Minor		Medium		Major	

	Receptors are expected to be of low sensitivity as many of them are educated and will have a good understanding of their rights. However there are exceptions. Minor skilled contractors living in construction camps may be more vulnerable to exploitation, as are low skilled staffs along the supply chain. Women, ethnic minorities and minority religious groups may also be more vulnerable to discrimination at the workplace. However, given the existing legislation protecting workers rights, the overall sensitivity of receptors is therefore considered minor .				
Impact Significance	Positive	Negligible	Minor	Moderate	Major
	Medium: Retrenchment Minor: Occupational health and safety, workers' rights and workers' accommodation.				

Mitigation Measures

The following mitigation measures will need to be implemented to avoid impacts to receptors related to workers' rights, health and safety, retrenchment and workers' accommodation.

- The Project has already drafted an occupational health and safety management plan which will be a subset of the overall ESMMP system, tailored to the needs of the Project and the construction and operation phases. This plan will set standards that will be met by SPV, MoH and all contractors and sub-contractors. It will include the following:
 - Measures will be outlined to prevent accidents, injury and illness / disease;
 - Provision of personal protective equipment will be outlined along with its uses;
 - Provision of preventative and protective measures relating to the modification, substitution or elimination of hazardous conditions or substances; and
 - Documentation and reporting of occupational accidents, illness / disease and incidents, emergency prevention, preparedness and response arrangements.
- The Project will create and implement a health and safety management system for the Project. It will include mandatory health and safety training courses for SPV workers and contractors, including handling hazardous material and medical waste. The training will take place prior to work starting on construction and operation. Training course attendance will be recorded and monitored by the Project. The Project will also monitor the implementation of occupational health and safety regulations by contractors through twice yearly audits by health and safety specialists. If contractors are found to be breaching the laws on occupational health and safety, it will result in the loss of the contract.
- The health and safety management system will also incorporate the following measures in compliance with IFC standards for health facilities: staff and visitors will be provided with information on infection control; and universal standards will be developed to treat all blood and other potentially infectious materials. These are described further in the

health and safety management system, including measures for compliance with internal exposure guidelines.

- The Project will abide by Turkish laws and regulations and ILO conventions when gaps are identified between national legislation and international standards. The Project will monitor the implementation and compliance to these standards by contractors and sub-contractors across the supply chain.
- SPV will require all contractors to sign an anti-corruption and responsible procurement policy. Thus for all contractor contracts, the Project will make explicit reference to the need to abide by Turkish Law and ILO conventions in relation to labor and welfare standards, freedom of association and reference must be made to child and forced labor. Emphasis will also be placed on anti-discrimination measures. Where young people below the age of 18 years are employed, it will be made clear that they will not be employed in hazardous work and their work will be subject to an appropriate risk assessment.
- SPV will liaise with the MoH to ensure alignment of both parties to Turkish law and ILO conventions with respect to workers' rights and anti-discrimination measures.
- Workers will have contracts which clearly state the terms and conditions of their employment and their legal rights. Information will include, but not be limited to, entitlement to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity / paternity or holiday). All workers will be able to join trade unions of their choice and have the right to collective bargaining. Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights prior to any employment contract to be signed.
- Wages, benefits and conditions of work offered will be comparable to those offered by equivalent employers in Ankara.
- Although an informal grievance mechanism is in place, the Project and all contractors will put in place a formal worker grievance mechanism. The SPV grievance mechanism will be open to all SPV staff and their contractors. The Turkish Government also has a general grievance mechanism that is used for patient rights. "184-Patient Rights" is a phone line developed for patients living across the country and is accessible 24/7. The grievance mechanism will be publicly advertised by the Project in the workforce. It will be easily accessible by workers, free of retribution and will allow anonymous complaints to be raised and addressed.
- In the case where contractors are unable or unwilling to address issues raised through their grievance mechanism or through the SPV grievance mechanism, SPV will take actions to remedy the situation which might result in the loss of the contract by the contractor.

- A management plan will be put in place for the construction camp, outlining not only a code of conduct for construction workers but also measures for managing the camp to ensure adherence to international standard for providing a safe environment that is clean and with adequate sanitary and waste management and the provision of potable water. Provisions will also be made for outlining the minimum amount of space for each worker, laundry and cooking facilities, the provision of first aid and medical facilities, heating and ventilation. The management provisions will also make it clear that workers are free to move to and from employer provided accommodation in accordance with a code of conduct with respect to the surrounding community.
- A retrenchment plan will be put in place to mitigate adverse effects of job losses on the workers concerned.
- All management plans described above much clearly outline key roles and responsibilities and a monitoring framework.

Residual Impacts

If all workers related management plans and practices are put in place and international conventions are abided by and monitored, then the overall residual impact to working conditions will be **positive** with mitigation measures providing a secure and safe working environment free of discrimination.

4.7.7 Cultural Heritage

Impact Description

The baseline data shows that there is no cultural assets were observed during initial site visit made by the ESIA expert except for a tumulus (see Section 4.3.3) which was found during an archaeological survey on the site. The tumulus was thought to be an underground shelter or archive and storage location in the past with the hill thought to be a probable tomb. The outcome of the archaeological survey resulted in a Project design change to ensure the preservation of the site. Therefore, the potential consequence of this is a preservation and management of the tumulus, which is the receptor of this impact.

Impact Assessment

Impact Type	Direct	Indirect	Induced
	A direct positive impact resulting from the Project		
Impact Duration	Temporary	Short-term	Long-term
	The impact is expected to be permanent ; since the tumulus will now be managed under the protection of Ministry of Culture.		
Impact Extent	Local	Regional	International
	The impact will be local .		

Impact Scale	The scale will be small .				
Impact Frequency	N/A				
Magnitude	Positive	Negligible	Small	Medium	Large
	As a result of the ESIA archaeological survey, the tumulus was discovered and protection policies have now been prepared to manage and preserve the site.				
Receptor Sensitivity	Low	Medium		High	
	Receptor sensitivity is expected to be minor given it has little social importance but is an historic site of interest.				
Impact Significance	Positive	Negligible	Minor	Moderate	Major

The Project is expected to have a **positive** impact on the protection of the tumulus on the Project site.

Enhancement Measures

According to the archaeological survey, it was confirmed that tumulus will be protected according to the Code of Protection of Cultural and Natural Properties and managed by the Ministry of Culture. The Project will liaise with the Ministry of Culture to ensure the safe management and protection of the site.

Residual Impacts

If enhancement measures are in place, then the Project will continued to have a positive impact on cultural heritage.

4.8 Cumulative Impacts

4.8.1 Introduction

Cumulative effects result from the combined impacts of multiple developments. The impacts of a development in isolation may not be significant but when combined with other projects it may become significant.

Similarly, the project should not be considered in isolation. In the assessment of potential environmental effects, it is important to include projects that may begin construction or operation within the same period as that of the proposed development. This Cumulative Impact Assessment (CIA) seeks to determine the effect of the development in combination with the other planned changes in the wider area and provide an assessment of the likely significance of any changes.

Cumulative effects are understood to be changes to the environment that are caused by an action in combination with other past, present and future actions (Hergmann et al. 1999). These may include:

- Effects over a larger area;
- Effects over a longer period of time;
- Effects on areas of special environmental sensitivity due to interactions with other actions; and,
- Other existing and future actions.

The assessment of cumulative effects is required at the project level in EIA by the European Community Directive 'The Assessment of Certain Public and Private Projects of the Environment' (85/337/EEC) as amended by Council Directive 97/11/EC.

The Bilkent IHC Project is developed concurrently in Ankara as the Etlik IHCP (see the satellite image in Appendix-L that shows locations of both projects in the city). Both of these projects are large urban development projects, and environmental and social impacts associated with these projects need to be assessed in the context of a cumulative impact assessment. In addition, as there will be a shopping mall within the commercial zone of the Project Area, this needs to be taken into account in terms of the people flow into the area.

Details of the cumulative impact assessment process implemented in the context of this ESIA are provided below.

4.8.2 Assessment Methodology

There are numerous methods for assessing cumulative effects including models, matrices and threshold analysis. The method adopted within this assessment includes an initial appraisal of project types likely to occur in the vicinity and the potential for them to contribute to cumulative effects. An assessment as to the potential effects on sensitive receptors is then undertaken.

The assessment of cumulative effects is intended to be an iterative process with the results of the assessment informing the proposed development's design and its environmental mitigation.

The methodology adopted comprises three stages:

Stage 1: Identification of development with the potential for cumulative effects

Identification of the projects to be considered utilized information collated from desk studies, planning searches, consultations with statutory and non-statutory consultees, local residents and site surveys.

The area of search is determined by the nature of the development and the local environmental conditions. This is dictated by:

- The nature of the project identified; and
- The spatial extent of environmental receptors potentially affected by the proposed development.

This CIA also considers the timescale for the development of identified projects with the potential for cumulative effects.

Stage 2: Identification of Sensitive Receptors

This CIA identifies key receptors within the receiving environment that are likely to be affected by the combined effects of the proposed developments. The assessment team identified the receptors via a scoping exercise; these receptors were further refined during the subsequent stages of the ESIA process.

Stage 3: Assessment of cumulative effects and mitigation measures

The cumulative effects are described and where possible and practicable mitigation measures proposed. In some cases, however the mitigation of cumulative impacts may not be within the control of the proponent.

The methodology adopted has aimed to focus on the identification of any significant effects that may occur due to the construction and operation of the Project in combination with identified and significant projects/developments in the locality.

4.8.3 Cumulative Environmental Impacts

4.8.3.1 Air Quality

Dust generation during construction activities, exhaust emissions from vehicles and the trigeneration plant emissions are considered in this section. Referring to the map given in Appendix-L, Bilkent IHCP is located far enough (i.e. 8 km as the crow flies) from the Project Site not to result in a cumulative air quality impact in interactive or additive manner.

4.8.3.2 Noise

Noise and vibration impacts due to construction activities in both project sites only have the potential to effect receptors in close proximity.. Therefore, construction and operational noise at Bilkent IHCP site (i.e. 8 km as the crow flies) will not contribute to the noise impact of the Project due to the separation distance between the sites.

4.8.3.3 Infrastructure

Another important concern is the handling capacity of wastewater, solid waste, medical waste and hazardous waste of the municipal infrastructure. The most important aspect of this issue is creating a point source rather than sources distributed over the city (i.e. the hospitals to be closed). To ensure capacity is, or will be made available in time for operation the team carried out consultations with the authorized staff of the relevant district municipalities and the Metropolitan Municipality responsible for waste collection in the city. During these consultations, the authorized staff stated that infrastructure of the municipalities would be capable of solid waste and medical waste collection.

Moreover, as it is mentioned in Section 2.1, the Metropolitan Municipality will erect a new wastewater treatment plant and an incinerator. This will serve as the second stage of the existing municipal wastewater treatment plant, whose first stage capacity is already fully occupied in the current situation.

4.8.4 Social Cumulative Impacts

4.8.4.1 Population

Ankara and the Bilkent Health campuses will be the biggest health campuses of the Turkey and the campuses will serve nearby cities such as Çorum, Kırıkkale, Kırşehir, Yozgat, Çankırı, Karabük, Kastamonu, Zonguldak, Bartın and Bolu. And a total of up to 100,000 people will be visiting both Project sites each day.

As it is being planned to construct a shopping mall in the commercial zone allocated for this purpose within the existing boundaries of the Project area, possible population flow to the area will increase additionally apart from the proposed health complex. On the other hand to come to a definitive conclusion about the cumulative impact, details of the shopping mall must be known and it has not been designed yet. Hence, it is recommended to take into account that there will be cumulative impacts associated with the shopping mall to be erected next to the main hospital. This items need to be followed up during monitoring works of the Etlik IHC Project.

4.8.4.2 Livelihood and Ankara economy

Both projects will provide development opportunity for the province of Ankara. Ankara's economy is expected to receive a further small boost from health tourism, where the Project expects to attract international patients.

4.8.4.3 Health Provision

The main consequence of these Projects is the provision of a new, state of the art medical facility providing improved health services for a large proportion of the Ankara population. This service will be available to the most vulnerable and poorest for free through the “green card” system. This will have a beneficial effect on the wider community.

Access to the healthcare facilities will be improved, regional development will be contributed, efficiency and quality of healthcare services will be improved, new technologies will be used, and bed capacities of the Ankara will be increased.

5 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

An “Environmental and Social Management and Monitoring Plan (ESMMP)” has been prepared for construction and operational phases of the Project. ESMMP presents the relevant mitigation measures for environmental and social impacts along with proposed monitoring to check effectiveness of mitigation measures. It also defines parties responsible for monitoring environmental issues.

ESMMP (see Appendix-D) is supported with the following sub-plans:

- Waste Management Plan, which defines all types of wastes to be generated throughout the lifetime of the Project, presents guidelines for proper waste management practices such as transferring, keeping records and monitoring (see Appendix-M);
- Traffic Management Plan, defines responsibilities and procedures to be followed for a sound traffic management on and off the site (see Appendix-K).

The MoH and the Project Company are responsible for establishing an Environmental and Social Management System (ESMS) and implement the ESMMP and supporting sub-plans. 2U1K as the consultant of the Project Company will support the Project Company during the establishment of such ESMS for the realization of the Project. In this respect, general framework of such ESMS is outlined in the ESMMP in the Appendix-D of the ESIA Report.

REFERENCES

- [1]: Ankara Etlik Integrated Health Campus Project Preliminary Feasibility Report, Republic of Turkey Ministry of Health Public Private Administration Office, Ankara, 2009.
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- [URL-2] Official website of the General Directorate of State Meteorological Works (www.mgm.gov.tr).
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