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16. Infrastructure and Services

16.1 Introduction

This Chapter of the ESIA describes the context of the Öksüt Project in relation to infrastructure and services. It then describes potential impacts on land use associated with the construction, operational and decommissioning phases of the Öksüt Project.

16.1.1 Objectives

The specific objectives of this infrastructure and services impact assessment are to:

- Describe infrastructure and services baseline Turkey, Kayseri Province, Develi District and neighbourhoods in the social study area.
- Identify the potential positive and negative impacts of Project;
- Develop attainable mitigation measures to enhance positive impacts and reduce or avoid negative impacts;
- Develop management and monitoring measures to be implemented throughout the life of the project.

16.2 Summary Policy Context

See chapter 13 for the policy context.

16.3 Scope and Assessment Methodology

See chapter 13 for the scope and assessment methodology.

16.4 Baseline

16.4.1 Education Infrastructure¹

Education in Turkey is the responsibility of the Ministry of National Education. The National Education System in Turkey is defined under the National Education Basic Act No. 1739, and consists of both “formal education” and “non-formal education”. Formal education covers the institutions of: pre-primary education, primary school, secondary school, high school and higher education. Non-formal education focuses instead on institutions and training including: Practical Arts Colleges for Girls, Maturation institutes, technical education centres for adults, public education centres, reading and writing courses, vocational courses, social-cultural courses, vocational training centres, professional education centres, science and art centres, guidance and research centres, private courses/classes, and open education primary and high schools.

The Constitution of the Turkish Republic provides for the right of learning and education for its citizens, and that the legal provisions define the right to education, including through compulsory, free state-school primary education for all citizens of both sexes and the establishment and operation of higher education institutions. Following provisions in the Constitution, Turkey has a highly centralised governance structure where education policy is steered by the Ministry of National Education (MoNE) and, at the tertiary level, by the Council of Higher Education (YÖK). Government programmes, development plans and national education councils guide policy implementation, while schools have

¹ This section focuses more on the infrastructure related to education. Aspects of educational achievement, linked to the skills available for local employment, are covered in *Chapter 14: Economics and Employment*.

little autonomy and limited capacity to respond to the direct needs of their students. Education is publicly funded, but schools can receive contributions from parents through their school-parent associations².

The OECD reports³ that one of the key issues facing the Turkish education system includes the high proportion of the population below the age of 15, putting Turkey as one of the highest among OECD countries. This makes access to and completion of education of this young population a priority. While improvements have been made, quality and equity remain a challenge. Priorities for the education system include⁴:

- improving equity between regions and urban and rural areas;
- addressing the needs of disadvantaged students;
- preparing quality teachers and school leaders;
- improving access to and completion of upper secondary education, vocational education and training (VET), and tertiary education;
- strengthening links to the labour market;
- adequately funding the education system.

Formal Education

Twelve years of formal education is compulsory for students from the age of 6 to 18 years old and is free of charge at public schools and open to all children regardless of language, race, sex or religion.

- Pre-primary education (or kindergarten) is optional and available for children who have not yet reached school age (i.e. children under 5 years old).
- Primary education is compulsory for children aged between 5 and 10 years old.
- Secondary school is for students between the ages of 10 to 14.
- High school is for students between 14 and 18 years old.

Secondary and high school became compulsory in 2012 in order to increase participation rates and increase the duration of compulsory attendance to 12 years⁵. (It should be noted that prior to this legal change, 'Elementary school' was the term used for "primary school" and is so referenced later in this chapter for those who attended under the former system). High school encompasses general, vocational and technical high schools providing four years of education. On successful completion of this stage, students are awarded with their high school diploma.

Higher education is voluntary and available for those students who have obtained their High School Diploma. Currently as at 2015, there are 193 universities in Turkey, entrance to which is regulated by a national examination, ÖSYS⁶. High school graduates are assigned to a university according to their performance on this entrance exam. Higher education incorporates the following facilities: universities, faculties, institutes, higher education schools, higher vocational education schools and conservatories.

Education models are adapting to current requirements. This includes Mobile education, which requires students in settlements or neighbourhoods without sufficient student population to support a school to be enrolled in the nearest school. Transportation to and from school is then provided by the State. This mode seeks to provide access to the compulsory education required by Turkish school-age citizens. It is common in areas such as the social study area, where neighbourhoods are not able to provide appropriate education infrastructure locally. Boarding schools are another option for students to complete their education. Boarding schools are within the public school system and are free to attend,

2 Education Policy Outlook, OECD (2013) (accessed at: http://www.oecd.org/edu/EDUCATION%20POLICY%20OUTLOOK%20TURKEY_EN.pdf)

3 OECD (2013)

4 OECD (2013)

5 OECD (2013)

6 Student selection and placement system

however fees for accommodation will be payable if the student does not receive a scholarship. Scholarships are awarded to students who pass an entry exam and attain a certain grade.

Use of technology in education is improving nationally through a number of initiatives. One such initiative includes the Government-initiated Movement to Increase Opportunities and Technology (FATİH Project) instituted from 2011-2014, which sought to integrate state-of-the-art computer technology into Turkey's public education system. The intention of the FATİH project was to deliver education enriched through technology including class use of smart boards, student use of tablet computers and e-books, to lift Turkey from its current ranking of 76th of 110 countries for access to education. The Project has been implemented in 52 schools in 17 Provinces across Turkey, with a total of 12,800 tablet PCs issued to 9th grade students as part of a pilot program⁷.

Provincial infrastructure

The Provincial Directorate of National Education of Kayseri reports that there are 963 educational institutions in the Province. In Kayseri, the total number of classrooms is 10,132, taught by 16,863 teachers to 283,135 students. Student-teacher ratios differ at each level of education. The total number of students per classroom is 28 in primary schools, 27 in general education and 26 in vocational and technical schools⁸. Schools and their learning environments face many challenges, including a population influx from rural to urban areas.

District infrastructure

In the Develi District, there are 108 educational institutions and 698 classrooms, with a total of students 15,002 and 792 teachers. In Develi, the number of students per classroom is significantly lower at the primary level compared to that in Kayseri and higher for vocational and technical schools⁹, as shown in Table 16-1 below. This could be due to a historical focus to meet only primary education requirements in the study area and so investment into general and higher education is catching up through modes described above (e.g. through mobile education).

Table 16-1: Student-Teacher Ratios¹⁰

Area	Primary	General Education	Vocational and Technical Schools
Kayseri Province	28:1	27:1	26:1
Develi District	19:1	25:1	31:1

There are two schools for children with special needs in the District, and two state schools which have special classrooms for children with special needs, both in primary and at high school level. Further, there are two classrooms for hearing-impaired children in state schools¹¹.

Neighbourhood infrastructure

In the social study area, all school-aged children are registered to attend school at facilities indicated in Table 16-2. However, there are limitations to education infrastructure located in the study area. Viable student numbers are required to maintain school facilities at the neighbourhood level, and, consistent with an aged population in the study area, a number of facilities have closed over recent years as a result of the following circumstances¹²:

- Pre-primary education; if student numbers fall to less than 10;
- Primary schools; if student numbers fall to less than 9;

⁷ Mobile Pedagogy and Perspectives on Teaching and Learning (2013), IGI Global (ed. DMcConatha).

⁸ Provincial Directorate of Natural Education of Kayseri, 2014. <http://kayseri.meb.gov.tr/>.

⁹ Kayseri – Develi District Directorate of National Education, 2015. <http://develi.meb.gov.tr/>.

¹⁰ TurkStat, Educational Statistics 2014

¹¹ Survey, Key Informant Interview with the Develi District Director of National Education, December 2014.

¹² Key Informant Interview with District Director of National Education, December 2014.

- Secondary schools; if student numbers fall to less than 60.

Pre-primary education is available in most neighbourhoods. The school is closed in Gömedi neighbourhood due to insufficient student numbers in the settlement to keep the facility open.

Primary education can also be completed in most neighbourhood schools, but even primary students can travel to Develi to study, as they do in Gömedi and Tombak. Some schools, such as the primary school in Sarıca, have major infrastructure problems (including issues with heating and toilet facilities located outside), yet students still attend rather than travel to Develi.

Table 16-2: Education Facilities in the Study Area¹³

Settlement	Pre-Primary	Primary	Secondary	High
Öksüt	✓	✓	M	M
Zile	✓	✓	M	M
Yukarı Develi	✓	✓	✓	M
Epçe	✓	✓	✓	M
Gazi	✓	✓	✓	M
Yazıbaşı	unknown	✓	M	M
Sarıca	unknown	✓	M	M
Gömedi	X	M	M	M
Tombak	unknown	M	M	M
Sindelhöyük	✓	✓ (3)	✓	M
Çayırözü	✓	✓	✓	M
Soysallı	✓	✓	✓	M

Key: ✓ Facility available; X Not available; M mobile education used.

The major issues regarding education relate to mobile education and alternatives. The key challenges facing mobile education identified during baseline research was the irregularity of transport and subsequent impact on attendance students. The school bus service is free of charge and supported by government, however it does not run concurrently to the academic year and begins a month after the September term commences. During this period parents must pay for transportation to ensure students can get to school. The implications of this were raised during research in Zile; high school students have a limit of 10 days absence before dismissal from the school, and parents reiterated the challenge of relying on the government-provided transport services. It was reported that in 2014, the students could not attend the school for a month.

Alternative educational facilities were also a concern for parents. During the women's focus group discussions, mothers expressed concerns about the vulnerability of secondary school students registered to attend boarding schools. The parents are not comfortable with sending their children to boarding schools, citing that they are too young to live away from home for the duration of school studies.

In all of the neighbourhoods of the study area, young people who entered and passed the university exam can register to attend university, whether in Kayseri or in another Province.

16.4.2 Health Infrastructure¹⁴

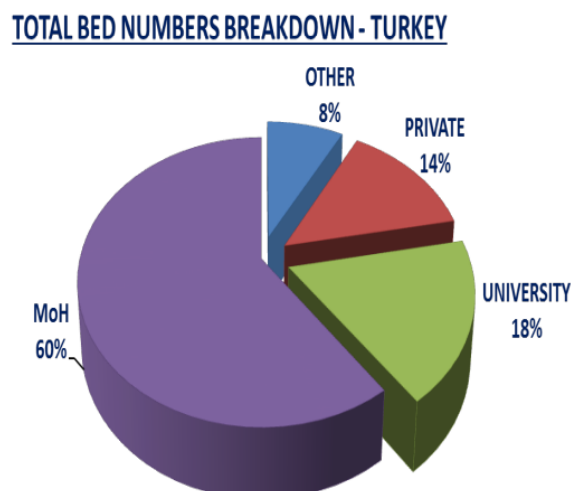
There are approximately 2,100 hospitals in Turkey, 34% of these are private, accounting for 14% of available hospital beds in the country (Table 16-3). Between 2000 and 2010 the number of hospitals in

¹³ Baseline Survey and Focus Group Discussions, December 2014

¹⁴ This section focuses more on health infrastructure. Aspects of the health system and trends are covered in in *Chapter 17 on Community Health, Safety and Security*.

the country increased rapidly. The majority of private hospitals are located in İstanbul, Ankara and İzmir provinces with 48% of all private hospitals and 56% of private beds located in one of these three provinces. The hospital bed occupancy rate in State hospitals is 64% compared to 51% in private hospitals¹⁵.

Table 16-3: Breakdown of Hospital Beds in Turkey, by Sector¹⁶



Provincial Level

The health sector in Kayseri is undergoing continuous growth and provides important medical services to the Provinces of Sivas and Yozgat. The Kayseri Regional Training and Research Hospital is currently under construction and once it is completed it is expected that Kayseri will be an important medical centre in the region. Table 16-4 provides a summary of all medical institutions in Kayseri Province.

Table 16-4: Medical Institutions in Kayseri Province¹⁷

Medical Institution	Quantity
University Hospital	1
Military Hospital	1
State Hospital	9
Private Hospital	11
Oral and Dental Health Centre	6
Eye Hospital	2
Gynaecology and Obstetrics Hospital	1
Children's Hospital	1
Chest Diseases Hospital	1
Otorhinolaryngology (Ear, Nose and Throat) Centre	1
Heart Diseases Centre	2
Dialysis Centre	4
Oncology Centre	1
Laboratory and Medical Imaging Centre	2

¹⁵ Health Statistics in Turkey Life Science and Health Care Report, 2012.

¹⁶ Source : WHO , Turkish Statistics Institute, Ministry of Health

¹⁷ www.TRhastane.com – State and Private Medical Institutions Guide, 2014

Medical Institution	Quantity
Total	43

According to the ORAN (Orta Anadolu Kalkinma Ajansi, Middle Anatolia Development Agency) 2014-2023 Region plan¹⁸, Kayseri has a higher density of hospital beds per capita than the national average. In 2013 Kayseri Province had 30.7 hospital beds per 10,000 people. Despite the high density of beds in the province, the level of care is considered low compared to national average as there are no specialist physicians in the districts of Akkışla, Felahiye, Hacılar, Özvatan, Sarioğlan and Yeşilhisar. Table 16-5 provides a summary of the health care statistics for Kayseri.

Table 16-5: Health Care Capacity Kayseri¹⁹

Facility	Quantity
Hospital	30
Beds	3,974
Qualified Beds	1,685
Intensive Care Beds	544
Number of Family Medicine Units	377
Number of 112 Emergency Care Stations	27
Number of 112 Emergency Care Ambulances	53

The majority of hospitals in the Province have contracts with insurance companies and several admit patients from abroad to increase the paying patient population, creating an economic benefit to the medical sector. A high number of foreign patients are increasingly coming to Turkey for medical treatment due to the affordable and the relatively high standard of care they receive compared to their home nation. One of the state hospitals receiving foreign patients is located in Kayseri. Although foreign patients visit some hospitals in Kayseri, the number is limited due to poor infrastructure, including a lack of direct flights from foreign destinations, limited foreign language skills of medical staff, and limited hotel facilities in the province. Overall this suggests the competition for Province residents for beds in Kayseri health facilities due to foreign paying patients is low.

In 2015, Turkish company ATM Sağlık Kayseri Yatırım ve İşletme Anonim Şirketi, with IFC funding, signed the country's first Public Private Partnership (PPP) with the Ministry of Health to build the Kayseri Integrated Health Campus located in Kayseri City. The project is set to develop, design, finance, construct and provide services for the Kayseri Integrated Health Campus. The project is one of the first PPPs in the Turkish healthcare sector and is part of the Ministry of Health's Health Transformation Program aiming to:

- Renovate the insufficient healthcare infrastructure that is unable to meet the increasing healthcare demands;
- Consolidate small state-owned hospitals under one campus;
- Increase service quality and efficiency in state-owned hospitals.

The Kayseri Integrated Health Campus will cover a construction area of 464,095 m² (including 342,509 m² of hospital buildings) and will comprise a multi-specialty main hospital with 1,083 general treatment beds and 200 psychiatric beds, a 200 bed centre for physical therapy and rehabilitation, a 100 bed high security psychiatric hospital, an administration building and a technical service centre.

18 <http://docplayer.biz.tr/204115-Tr72-bolgesi-2014-2023-mevcut-durum-analizi.html>

19 http://sbu.saglik.gov.tr/Ekutuphane/kitaplar/health_statistics_yearbook_2013.pdf

The construction period is three years, expected to commence in 2016, to be followed by an operational period of 25 years. The Ministry of Health will move staff from several existing public hospitals in Kayseri to the newly built campus and from there will continue providing clinical services.

District Level

Develi District has one service building used jointly by the Community Health and District Health Directorates. The State hospital, located in the city of Develi, has 75 beds shared amongst an adult, maternity and children's, and dental wards. The emergency health service station has one ambulance, ten emergency medical technicians, four paramedics and two health officers working as drivers. Develi does not have any private medical service health facilities but there are seven private dental clinics²⁰, which suggests that, compared to national level data, private dentistry services are filling the gap left in public dental funding, identified above. Table 16-6 provides a summary of all medical facilities in Develi District.

Table 16-6: Develi State Medical Facilities²¹

Medical Facility	Quantity
Family health centres	28
Emergency health services station	1
State Hospital	1
Total	30

There are currently plans to construct a new 70 bed hospital in Develi, almost doubling the number of beds available in the District; construction is due to start within the next six months. In key informant interviews with health officials in Develi, the capacity in the town can be supplemented by services in Kayseri, which is less than 30km away. In situations where additional services are needed, three fully equipped ambulances are available to take patients to the larger city²².

There are currently 28 health centres across Develi District, which employ ten midwives and one nurse. These health centres used to be open 7 days a week, but due to a declining rural population in most neighbourhoods, health centres are now only open on specific days of the week, with medical staff rotating between these centres. If a resident needs to receive medical treatment when their health centre is closed they must travel to the nearest open health centre or state hospital, so the distances to the closest open health centre varies depending on the day of the week.

Neighbourhood Level

Health services at the neighbourhood level are limited, and availability of services is generally declining with a decrease in population. Health care centres are located in all neighbourhoods within the social study area with the exception Zile, Yazıbası and Tombak. In most cases, the health centres are only open on specific days of the week and are used for examination purposes during the physician's visits. Epçe is the only neighbourhood with a health centre which is open all week. Family medical services are provided through the health centres at regular intervals, while for major health issues people attend the Develi State Hospital. The settlements located within the social study area were formerly villages but have recently had their status changed to neighbourhoods. In the villages, the family practitioner service is mobile and they visit the villages at regular intervals as the settlements are away from the health care facilities in the district/city centre. However in urban areas such as neighbourhood, district, etc. people visit the family practitioner if they need to. This means that residents within the social study

²⁰ Develi İlçe Sağlık Müdürlüğü ve Toplum Sağlığı Merkezi Bilgi Notu, 2014.

²¹ Develi İlçe Sağlık Müdürlüğü ve Toplum Sağlığı Merkezi Bilgi Notu, 2014.

²² Key informant interview, 22 January 2016.

area now must travel to their nearest health care facility rather than access health care through the mobile family practitioner.

A summary of the days the health care centres are open in each neighbourhood is provided in Table 16-7.

Table 16-7: Settlements in the Social Study Area: Health Clinic Opening Schedule²³

Settlement	Health Centre Opening Time	Distance to Develi State Hospital
Epçe	Active health centre open throughout the week with a permanent midwife. The doctor visits Epçe once a week on Wednesday at 10 am.	18 km
Gazi	Monday (for 2 hours)	18 km
Gömedi	Wednesday – Physician and midwife	15 km
Öksüt	Wednesday	24 km
Sarıca	Thursday between 11 -11.30 am	17 km
Tombak	-	7 km
Yazıbaşı	-	10 km
Yukarı Develi	Family doctor visits once every 15 days on Wednesday between 10 -11 am. Private health centre – does not receive government support.	4 km
Zile	No active health centre, family doctor visits every Wednesday. For major issues residents visit the State Hospital in Develi.	12 km
Sindelhöyük	Health Clinic with 1 permanent midwife. There are 2 Family doctors for the villagers. They visit the settlement two days for each in a week.	10 km
Çayırözü	Health Clinic but there is no permanent health official in the settlement. Family doctor is visiting the settlement once a week.	20 km
Soysallı	Health Clinic but there is no permanent health official in the settlement. Family doctor is visiting the settlement once a week	12 km

16.4.3 Transport infrastructure

Public Transport

Transport networks in the region are good on the express ways linking regional centres, but road quality deteriorates in rural areas, with some neighbourhoods isolated during winter due to impassable roads. Most neighbourhoods in the study area are connected to Develi District Centre via private buses, shared taxi or private vehicles. Sarıca and Tombak report the greatest transport network issues as they do not have direct public transportation from their neighbourhood to Develi. Those from Sarıca instead use the public bus from Yahyalı to Develi which departs every hour. In Tombak, villagers report having difficulty in accessing the District Centre due to high vehicle and taxi prices. Table 16-8 summarises public transport access in the study area.

²³ Baseline Survey, December 2014 and key informant interviews January 2016.

Table 16-8: Summary of Access to Public Transport²⁴

Settlement	Distance to Develi (Km)	Distance to Kayseri (Km)	Asphalt Road	Public Bus	Private Bus (Shared taxi)	Private Car	School Bus
Sarıca	15	63	Yes	X (from Yahyalı)	X	X	X
Gömedi	13	55	Low Quality			X	
Yazıbaşı	10	53	Yes			X	
Öksüt	23	70	No		X	X	X
Gazi	19	67	Yes		X	X	X
Tombak	13	60	Low Quality		X	X	X
Yukarı Develi	4	48	Yes		X	X	
Epçe	18	60	Low Quality			X	X
Zile	13	60	Yes		X	X	X

Public transport connections from Öksüt to Develi are limited to two services every Saturday and Sunday departing at 07:30 and 15:30. Most residents travel to the district centre via private cars.

For Sindelhöyük, Soysallı and Çayırözü, the three settlements in the study area and along the power line, residents use the Develi-Niğde highway, which has no issues, even during winter months. The settlements are 10, 12 and 20 km respectively from Develi. Minibuses have regular schedules to Develi and private cars and ride share are common.²⁵

The main public roads within the social study area include:

- The 38-51 express way.
- A secondary road which runs south from the 38-51 express way from Yazıbaşı, passing through Gömedi, Epçe, Gümüşören, Kozluca, Şihli.

Kayseri Metropolitan Municipality controls maintenance of the road, while the Gendarmerie is responsible for the public security of the route. The Gendarmerie have routine controls on the intersection at the entrance of Yazıbaşı quarter.

The key road users of the Yazıbaşı road include:

- Traffic associated with the mobile education system operating in the area. During winter and summer terms the road is very busy with shuttle buses transporting students from the villages to the mobile schools;
- Agricultural equipment particularly during cultivations season, with a large number of oversized and slow farm vehicles on the roads;
- Hourly buses travelling from Yahyalı to Develi;
- Daily and regular transport to Develi District Centre, with traffic numbers particularly high on Tuesdays when people from the rural community visit the Develi market.

²⁴ Baseline research Dec 2014

²⁵ Key informant interviews, Jan 2016

16.4.4 Accommodation

Houses in the study area differ in size and in quality, depending on the standard of living of the household and are reported to be owned by their occupants. The majority of houses are split over two levels, are made from either brick or reinforced concrete and are often rendered, and the householders build many of their homes themselves. Figure 16-1 shows the different types of houses in the study area.

Figure 16-1: Housing in the Study Area²⁶



²⁶ Photographs December 2014



House in Tombak



House in Tombak-2



House in Zile



House in Zile-2



House in Gazi

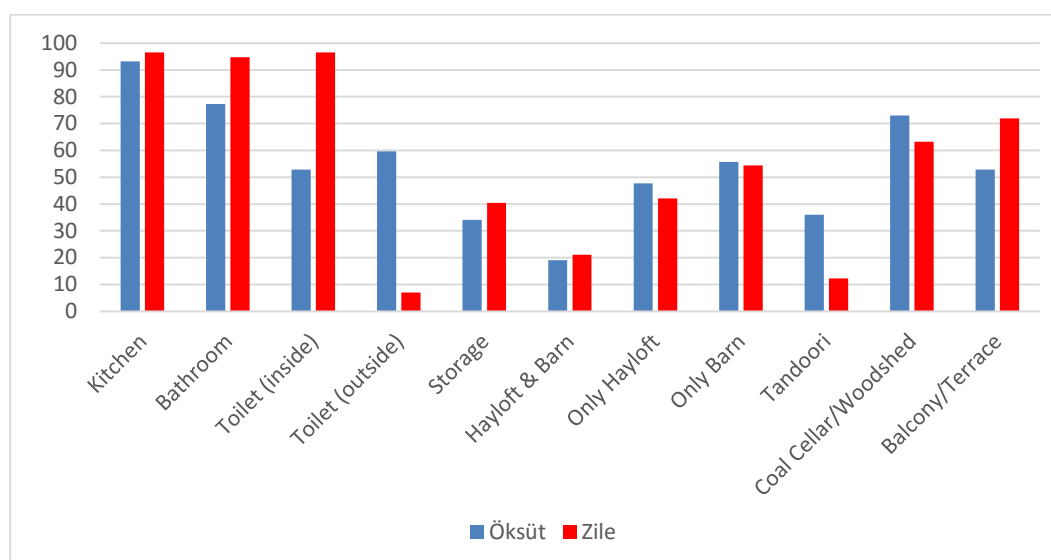


House in Gazi-2



Household surveys conducted in Öksüt and Zile provide indicative information on the smaller rural settlements. The existing facilities in Öksüt and Zile houses are described in Figure 16-2 as reported during the baseline research household survey. The existing facilities in the houses and the building structures are correlated with the income status of the households, in particular, the type of toilets and whether kitchens are separate from the living room. All households surveyed have haylofts, barns or both, and the majority of the households in both Öksüt and Zile have separate haylofts and barns (rather than combined facilities).

Figure 16-2: Facilities in Öksüt and Zile Neighbourhood Homes (%)²⁷



In Develi, current estimates of available flats are near 100 properties. Owners usually prefer to sell their flats as rental is less profitable. Average rental prices are between 400–600 TRY and the costs is linked to size, location and condition. In the last five years, inflation is reported to be 10-15% per year²⁸.

16.4.5 Energy

Electricity infrastructure in the social study area is well provided, with all neighbourhoods connected to the grid from a number of substations in the region, and reporting good accessibility to electricity and no problems with cuts in power supplies. The electricity supply to the Project area is sourced from a number of substations, and is generated from a variety of renewable and non-renewable sources.

Baseline research also included discussion of heating sources for households in the study area. Interviews and focus group discussions revealed the following information by neighbourhood, as described in Table 16-9 below.

Table 16-9: Household Energy Sources²⁹

Settlement	Household Energy Source(s)
Epçe	<p>Predominantly coal and wood, with household solar sources</p> <ul style="list-style-type: none"> Wood is purchased (not collected) Consumption of one tonne each of coal and wood per household per year
Gazi	<p>Predominantly wood, collected from household gardens, with household solar sources</p> <ul style="list-style-type: none"> Use profile is typically one tonne of wood and one tonne of coal per year Wood collected from household gardens or purchased from Develi Any coal used is purchased from Develi and stored in the home coal cellar Some households collecting cow dung 42 households receive coal aid from the government, as determined by the Social Assistance and Solidarity Foundation
Gömedi	<p>Cow dung, coal and wood, with household solar sources</p> <ul style="list-style-type: none"> Wood is predominantly collected from household gardens/land, and a small number of households purchase additional wood

²⁷ Baseline research, Dec 2014

²⁸ Key informant interview, 17 February 2016.

²⁹ Baseline research, Dec 2014 and key informant interviews 2016.

Settlement	Household Energy Source(s)
Öksüt	Predominantly wood, collected from household gardens, with household solar sources <ul style="list-style-type: none"> Wood collected from household gardens or purchased from Develi Any coal used is purchased from Develi Households receiving coal aid from the government (20%)
Sarıca	Predominantly coal or wood, with household solar sources <ul style="list-style-type: none"> Wood collected from household gardens, and any greater demand than supply is purchased from Develi (one tonne of wood is 400 TRY) Coal is purchased from Develi; consumption is almost 4 tonnes per year per household
Tombak	Predominantly coal or wood, with household solar sources <ul style="list-style-type: none"> 7 households receive coal aid from the Government
Yazıbaşı	Predominantly cow dung, with household solar sources <ul style="list-style-type: none"> households can purchase additional coal (for any household demand greater than supply from dung) A few households receive coal aid from the Government No wood is used for heating
Yukarı Develi	Predominantly cow dung, with household solar sources <ul style="list-style-type: none"> If households have wood on their land/in the home garden, this is used Purchase of wood is not common A few households receive coal aid from the Government
Zile	Predominantly coal or wood, with household solar sources <ul style="list-style-type: none"> Coal is purchased from Develi Wood collected from household gardens (70%) or purchased from Develi One or two houses using cow dung 10% of households receive coal aid from the government
Sindelhöyük	Predominantly coal, cow dung or wood with electricity <ul style="list-style-type: none"> Also almost every residence has solar energy panel
Çayırözü	Predominantly coal, cow dung or wood with electricity <ul style="list-style-type: none"> Also almost every residence has solar energy panel Willow trees planted along the canal between the highway and the wetland area are intended for firewood
Soysallı	Predominantly coal, cow dung or wood with electricity <ul style="list-style-type: none"> Also almost every residence has solar energy panel

The above table suggests that the majority of households within the study area tend to be as self-sufficient as possible to meet their household fuel needs, tending to use household wood and solar supplies before purchasing any additional wood or coal. Further, there were households reported to be receiving coal aid in almost all neighbourhoods. These households are considered poor compared to other households in the settlement, as determined by the Government based on household income levels.

16.4.6 Water Supply

This section presents information obtained from qualitative baseline data gathering with each of the neighbourhoods in the study area, to describe water sources for households, livestock and irrigation purposes. Further information on water resources is presented in *Chapter 10: Water Resources*, which documents results from the SRK Hydrocensus Report (2013). Information on water supply alternatives considered by OMAS and the process of selection of the Project water supply is set out in *Chapter 4: Alternatives*.

Water is supplied to Zile through a potable water distribution network comprising three neighbourhood water storage depots, from developed springs and water supply wells. The irrigation water for farming is provided from hand-dug wells, deep well, and various springs. During baseline research in Zile, it was reported at that time that water is a major problem in the area. Water is to be provided from the Gıcık Tunnel³⁰ which means that the households will therefore be paying water bills. The water supply was reported to be sufficient in winter; however, droughts in summer present a challenge for householders. The *muhtar* of Zile reported that all of the households are using the water provided from the Gıcık Tunnel, while female research participants reported that the households at lower elevations cannot receive water from the Tunnel, although reasons for this are not clear. Male research participants stated that Zile has been receiving its water from Kızılağıl since mining-related activities commenced. The mixed reports and reported water sources suggest that for some households, there may be challenges in paying for water provided through the Tunnel.

The SRK Hydrocensus Report stated that Öksüt residents utilize water from different sources for drinking, livestock, agricultural, and general household purposes. Four springs provide the neighbourhood's drinking water. The water depots are 500 m apart and the water transmission line to the village is 1.2 km long. Irrigation water is sourced from hand-dug wells and a number of low-yield wells; most wells are less than 7-8 m in depth with a radius of approximately 1 m. The hand dug-wells located near the Zamantı Diversion Tunnel were reported to have become dry following Tunnel construction.

Water is supplied to Gazi from the Zamantı River. Residents reported that there had been water quality problems up until a solution had been implemented five months ago, to the satisfaction of the neighbourhood residents. The increase in the water quality is expected to have positive impacts on the agricultural production and also on the economic value of the lands. The SRK Hydrocensus Report described that the water source of the neighbourhood were groundwater wells, producing 8 L/s, with neighbourhood water depots located in the Tepekümcesi region. The villagers obtain water from hand-dug wells and the Öksüt Stream for irrigation purposes.

Gömedi residents reported that they have significant irrigation water problems, so all farming is dry farming. Three fountains were reported by female research participants in the Community Mapping exercise, while the neighbourhood drinking water was reported to be provided from a spring in Büyükpınar, with a 40 m³ depot near the spring from which tap water is distributed, along with a depot in the neighbourhood. However, in the dry season this source is insufficient, and well water to a 75 km³ depot located at Asar ridge provides backup³¹.

Epçe residents use the water depots in the neighbourhood provide drinking water for households while the use of a rain-fed lake for livestock watering is available. The local residents pay 15 TRY per hour for use of the lake, reported to cause economic difficulties. A water cooperative has been active in Epçe since 1972.

Women participants in the Yazıbaşı research reported that water is pumped to households and that the neighbourhood lacks an irrigation water source. There is a water depot in the neighbourhood, with drinking water sourced from deep wells. Livestock water is provided through two rain-fed ponds. Research participants reported that a lack of irrigated agriculture had contributed to out-migration.

In Sarıca, irrigation water is provided from DSI wells, and while the water level decreases in July, the neighbourhood receives sufficient water at other times. The drinking water of the neighbourhood is provided from Öksüt and the residents reported that they are pleased with the water quality. Farmers were reported to be using the wells for payment of 18 TRY per hour.

Tombak's drinking water is supplied via a potable water supply network, and residents there reported no water problems. A water cooperative has been active in Tombak since 1980.

³⁰ This tunnel is part of "the Zamantı Regulator and the Derivation Tunnel" project, intended to regulate the water in Zamantı River, which is in the Seyhan Basin, and derivate it to Develi Sub-Basin.

³¹ SRK (Hydrocensus Report, 2013)

Yukarı Develi research participants reported that they are experiencing problems both with decreased water levels, and inefficient and inadequate services from KASKİ (water and sewage administration of Kayseri province). It was reported that the neighbourhood has problems with both potable and livestock water. Neighbourhood drinking water is sourced from the mountains, which varies seasonally. Additionally, the population served varies seasonally. During summer (when there are more households placing demand on available water resources), water is provided from Sindelhöyük, whereas the winter population is served by mountain water only. Residents raised complaints during social baseline research about the deterioration of water quality and the high cost of water. This issue is subject to further and ongoing stakeholder engagement and research currently.

Sindelhöyük water is supplied from the Erciyes springs. There is one water depot for the settlement that is sufficient for community use. Previously, water from the Gıcık Tunnel was connected, but did not allow the settlement to discontinue use from the Erciyes. There are no reported drinking water wells. Animals receive water from the nearby canal and others in barns are provided with water from the existing water line.

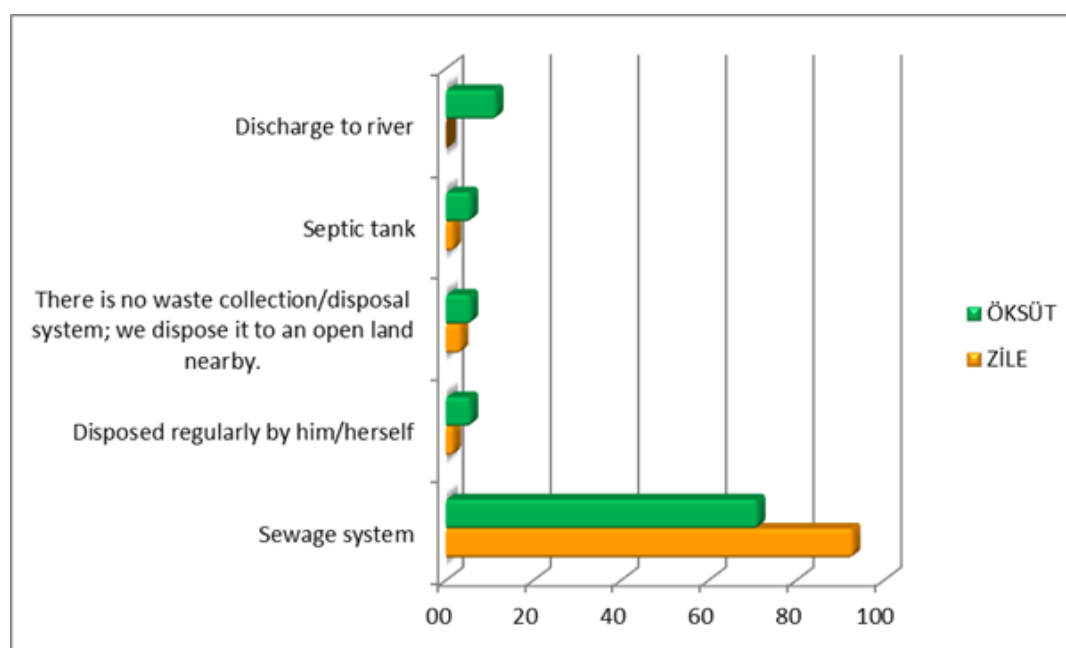
Residents of Çayırözü receive sufficient amounts of water from the Gıcık Tunnel. While the region has good quantities of water, the quality is poor. Prior to getting water from the Tunnel, wells were used, but the water contained high levels of arsenic.

Soysallı relies upon a well that is sufficient for the village. It is collected in a depot and distributed to houses. The supply is sometimes not sufficient in summer months. There is a connection to the Gıcık Tunnel, but because this also serves the nearby Yeşilhisar District as well, the quantity was not fully sufficient, making the village continue to use the existing well.

16.4.7 Waste Management and Sanitation

The household survey in Öksüt and Zile neighbourhoods provide indicative information about the means of handling household waste. Figure 16-3 presents results from Öksüt and Zile, indicating that a sewage system connection is most common across both neighbourhoods. In Öksüt, 71.3% of the surveyed households report to have a sewage system connection, while 11.5% discharge their wastes to the river, 5.7% dispose their wastes to an open land and the remaining 5.7% use a septic tank. In Zile, 93% of the surveyed households have a sewage system, 3.5% dispose of their household sewage to open land, and the remainder dispose to the river or septic tank.

Figure 16-3: Waste Handling System in Öksüt and Zile³² (%)



Waste disposal in the remainder of the study area varies by neighbourhood, as indicated in the following Table 16-10.

Table 16-10: Waste Disposal by Settlement³³

Settlement	Waste disposal method
Gazi	Waste stored outside and collected twice per week (domestic waste only). Cow dung waste is used for energy; construction wastes accumulate / not collected by the municipality.
Gömedi	No central waste storage or collection point. Each household disposes of their own waste.
Sarıca	Waste collected twice per week by the municipality (every Tuesday and Saturday). Storage containers in the neighbourhood are limited, leading to some households disposing of waste to their land. No sewage system; sewage disposed to particular points for periodic collection by a vacuum truck. Concern about potential illness due to the absence of a sewage system.
Tombak	Waste storage containers have not yet been provided from the municipality Waste collected once per week. Issue of concern is odour.
Yazıbaşı	Comingling of all wastes at a central point in the neighbourhood ('the ashtray') including animal and household wastes. Decaying waste is causing environmental pollution, odour and snake problems.
Yukarı Develi	Neighbourhood sewage system was completed in 2005; this waste is collected every two days.
Epçe	Not reported.
Sindelhöyük	There is sewage line in the settlement, but not in operation yet.

³² Baseline research, Dec 2014

³³ Baseline research, Dec 2014 and key information interviews 2016.

Settlement	Waste disposal method
	People use silage pits for sewage disposal and the sewages are being given to the Yay Lake at the moment. Domestic waste is collected by the municipality 3-4 days a week
Çayırözü	There is no sewage system in the settlement and silage pits are now used. Municipality has a sewage system project for Çayırözü in 2016 investment program. Domestic waste is collected by the municipality 2 times in a week.
Soysallı	There is no sewage system in the settlement and residents use silage pits for sewage disposal at each household. Municipality has a project for Soysallı to construct a depot for the sewage and to pump it to the treatment plant which is in Sindelhöyük. Domestic waste is collected by the municipality.

16.4.8 Communication and Postal Services

Mobile networks and mobile phones are available in all of the neighbourhoods in the social study area. Although the local population is pleased with the quality of the services provided in general, there is a significant dissatisfaction in particular about the GSM operators and the quality of Internet access in the neighbourhoods of Tombak and Yazıbaşı. Additionally, there is no library in the neighbourhoods, except for that which was established through contributions of the local population, in the coffeehouse of Yukarı Develi. Develi District has a post office, used by neighbourhoods in the study area.

Table 16-11 presents infrastructure in the study area, as reported by residents during the social baseline research. The community maps created during the women's focus groups discussions show the location of services in each settlement (Figure 16-4 to Figure 16-15).

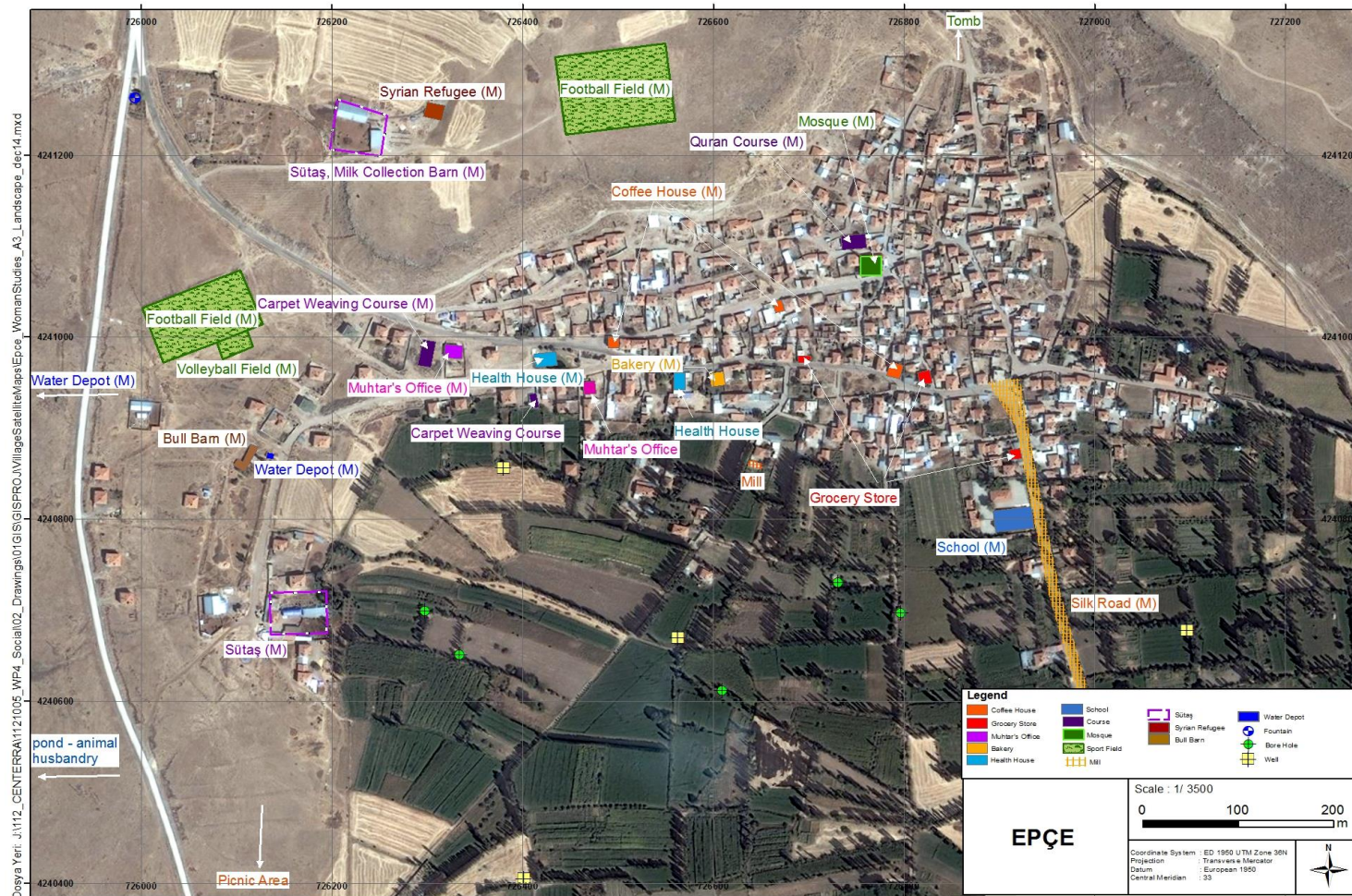
Table 16-11: Infrastructure Services by Settlement³⁴

Settlement	Service		
Epçe	▪ Coffeehouse	▪ Grocery Store	▪ Bakery
	▪ <i>Muhtar</i> Office	▪ School	▪ Health house
	▪ Transportation	▪ Sports / playground / picnic grounds	▪ Mosque
Gömedi	▪ <i>Muhtar</i> Office	▪ School	▪ Health house
	▪ Transportation	▪ Sports / playground / picnic grounds	
Yazıbaşı	▪ Market	▪ <i>Muhtar</i> Office	▪ School
	▪ Health house	▪ Transportation	▪ Petrol Station
	▪ Sports / playground / picnic grounds	▪ Mosque	
Öksüt	▪ Coffeehouse	▪ Grocery Store	▪ Market
	▪ <i>Muhtar</i> Office	▪ School	▪ Health house
	▪ Transportation	▪ Sports / playground / picnic grounds	▪ Mosque
Sarıca	▪ Grocery Store	▪ Market	▪ <i>Muhtar</i> Office
	▪ School	▪ Health house	▪ Sports / playground / picnic grounds
	▪ Mosque		
Tombak	▪ <i>Muhtar</i> Office	▪ School	▪ Health house
	▪ Mosque		
Gazi	▪ Coffeehouse	▪ Grocery Store	▪ Bakery
	▪ Market	▪ Post Office	▪ <i>Muhtar</i> Office
	▪ School	▪ Health house	▪ Transportation
	▪ Petrol Station	▪ Sports / playground / picnic grounds	▪ Mosque
Zile	▪ Coffeehouse	▪ Library	▪ <i>Muhtar</i> Office
	▪ School	▪ Health house	▪ Transportation
	▪ Sports / playground / picnic grounds	▪ Mosque	
Yukarı Develi	▪ Coffeehouse	▪ Grocery Store	▪ Library
	▪ <i>Muhtar</i> Office	▪ School	▪ Health house
	▪ Transportation	▪ Sports / playground / picnic grounds	▪ Mosque
Soysallı	▪ Coffeehouse	▪ Health house	▪ Quarar Course
	▪ <i>Mukhtar</i> Office	▪ Graveyard	▪ School
	▪ Water Depot	▪ Mosque	▪ Post Office

³⁴ Baseline research, December 2014 and February 2016.

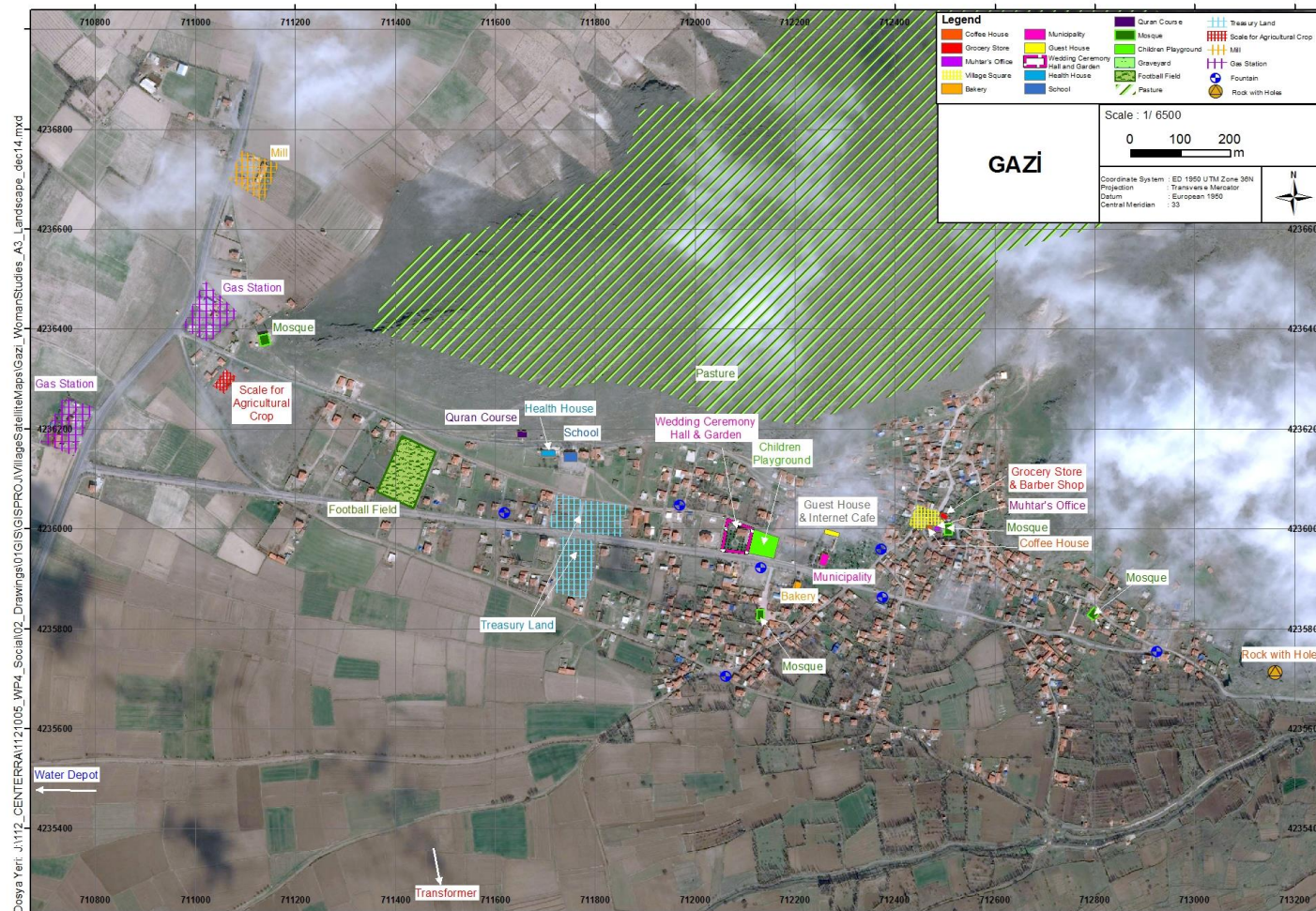
Settlement	Service		
Sindelhöyük	<ul style="list-style-type: none"> Children Park Mosque <i>Muhtar</i> Office 	<ul style="list-style-type: none"> Wedding hall School 	<ul style="list-style-type: none"> Graveyard Health house
Çayırözü	<ul style="list-style-type: none"> Health house Graveyard School 	<ul style="list-style-type: none"> Post office Sendiremeke substation 	<ul style="list-style-type: none"> Quran course Mosque

Figure 16-4: Epçe Community Map³⁵



³⁵ Epçe Women's Focus Group Discussion

Figure 16-5: Gazi Community Map³⁶



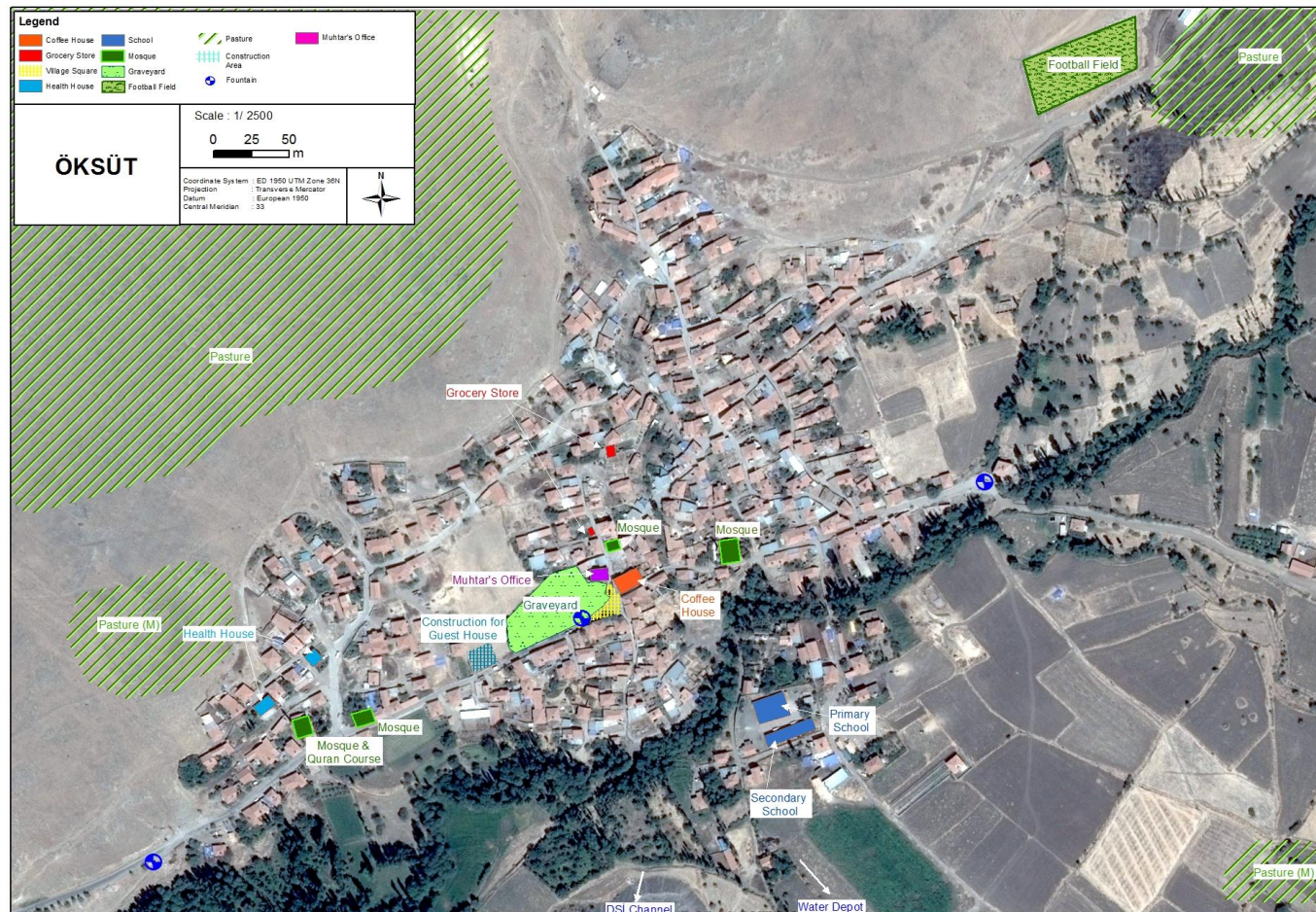
³⁶ Gazi Women's Focus Group Discussion

Figure 16-6: Gömedi Community Map³⁷



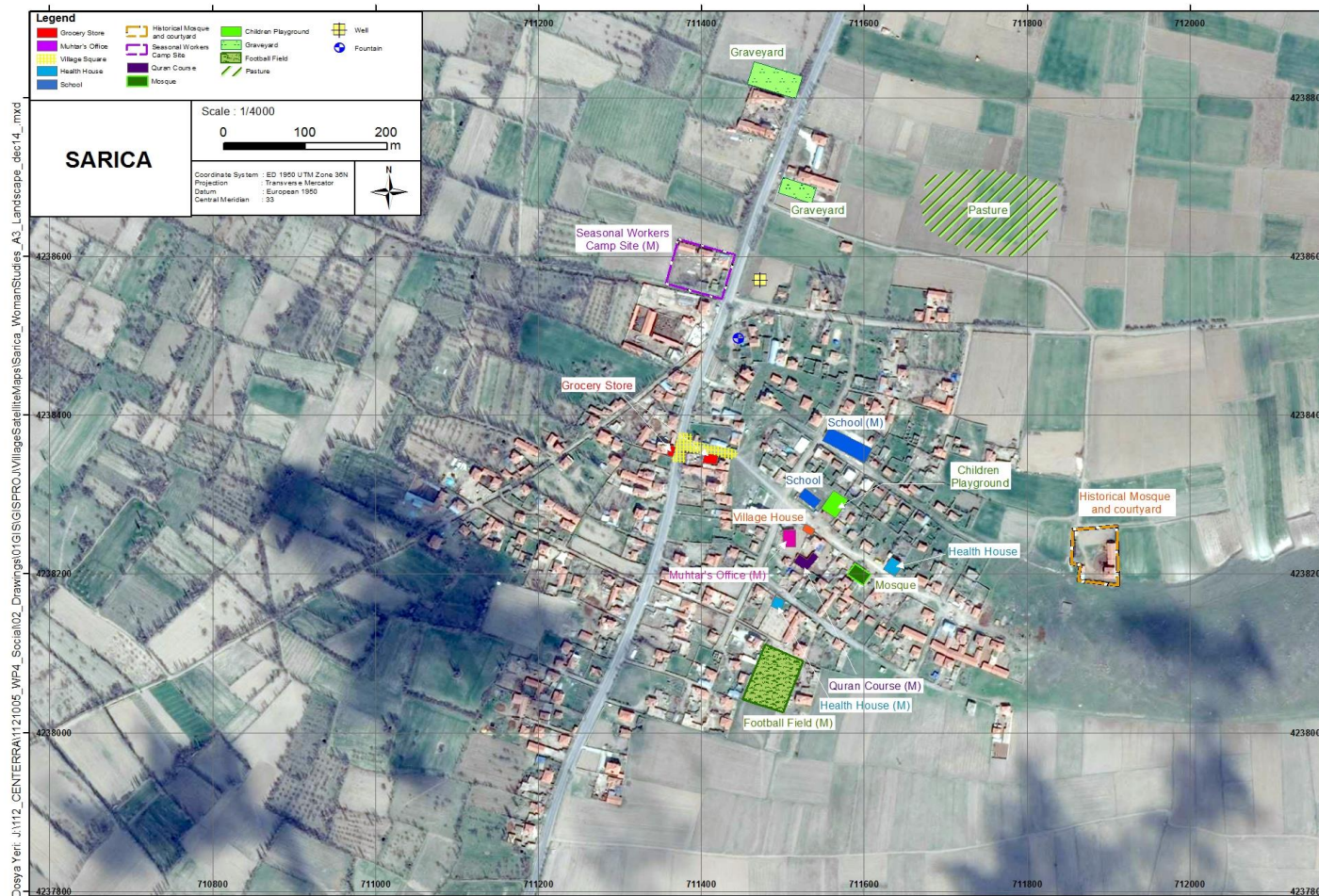
³⁷ Gömedi Women's Focus Group Discussion

Figure 16-7: Öksüt Community Map³⁸



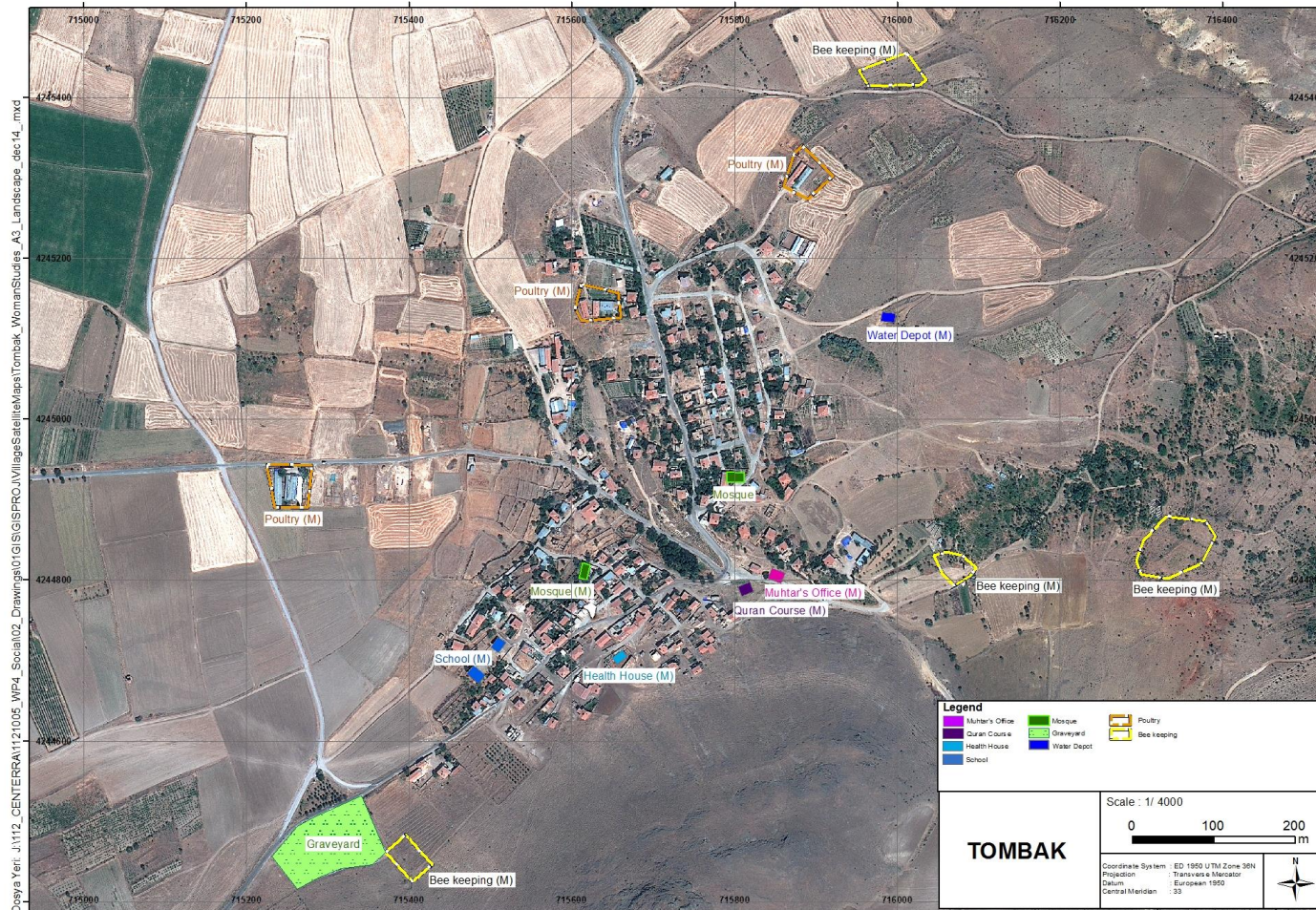
³⁸ Öksüt Women's Focus Group Discussion

Figure 16-8: Sarica Community Map³⁹



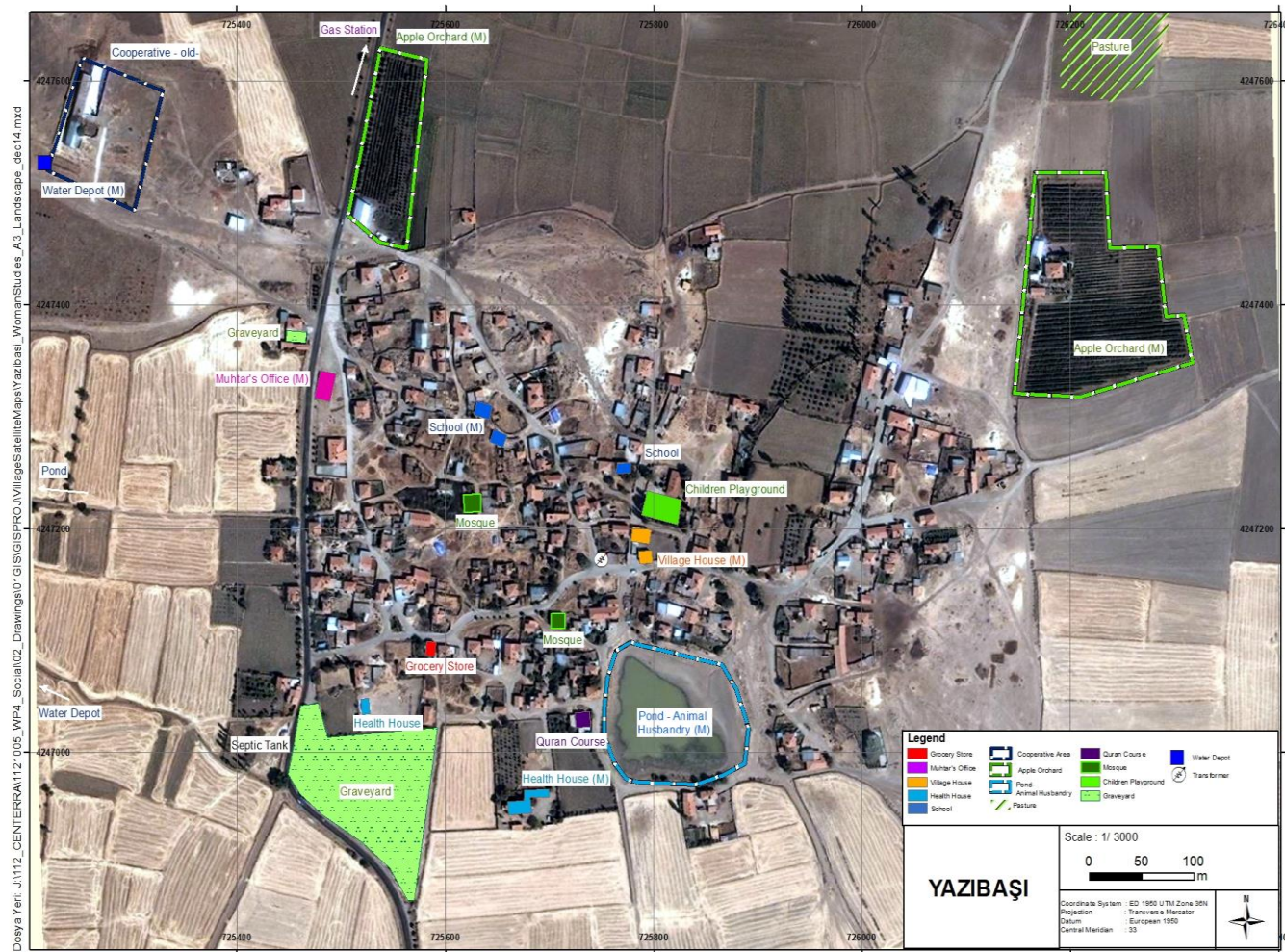
³⁹ Sarica Women's Focus Group Discussion

Figure 16-9: Tombak Community Map⁴⁰



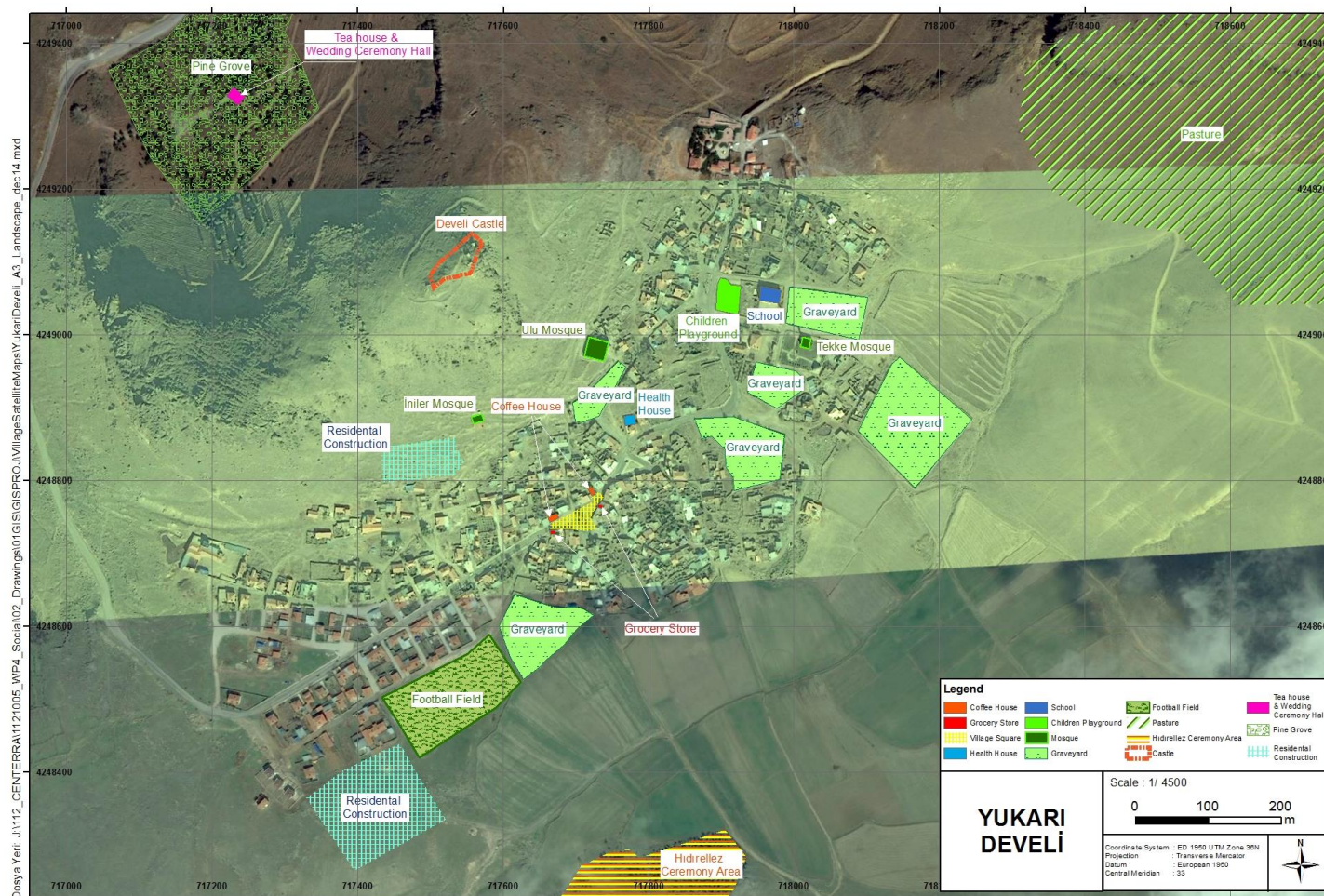
⁴⁰ Tombak Women's Focus Group Discussion

Figure 16-10: Yazıbaşı Community Map⁴¹



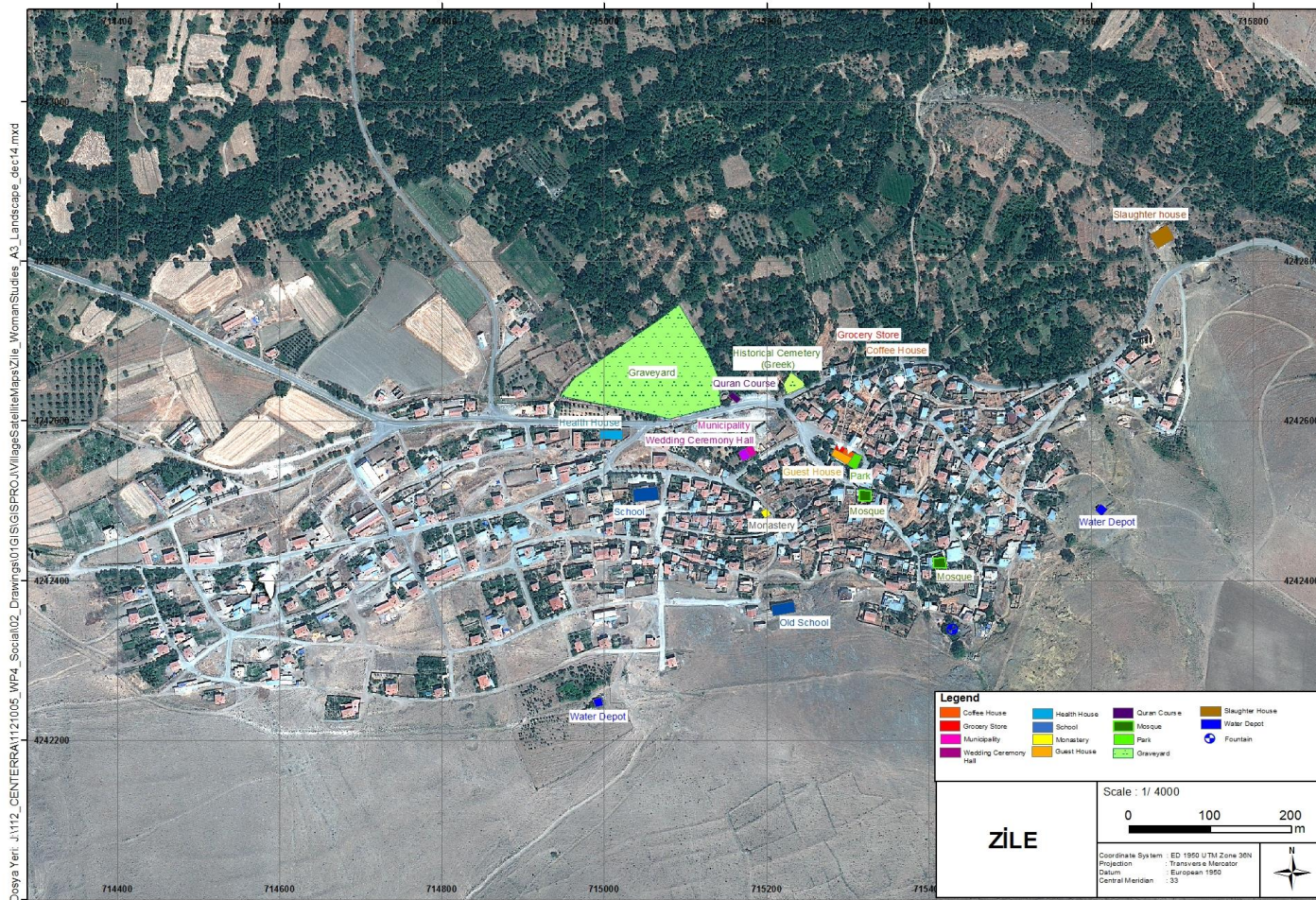
⁴¹ Yazıbaşı Women's Focus Group Discussion

Figure 16-11: Yukarı Develi Community Map⁴²



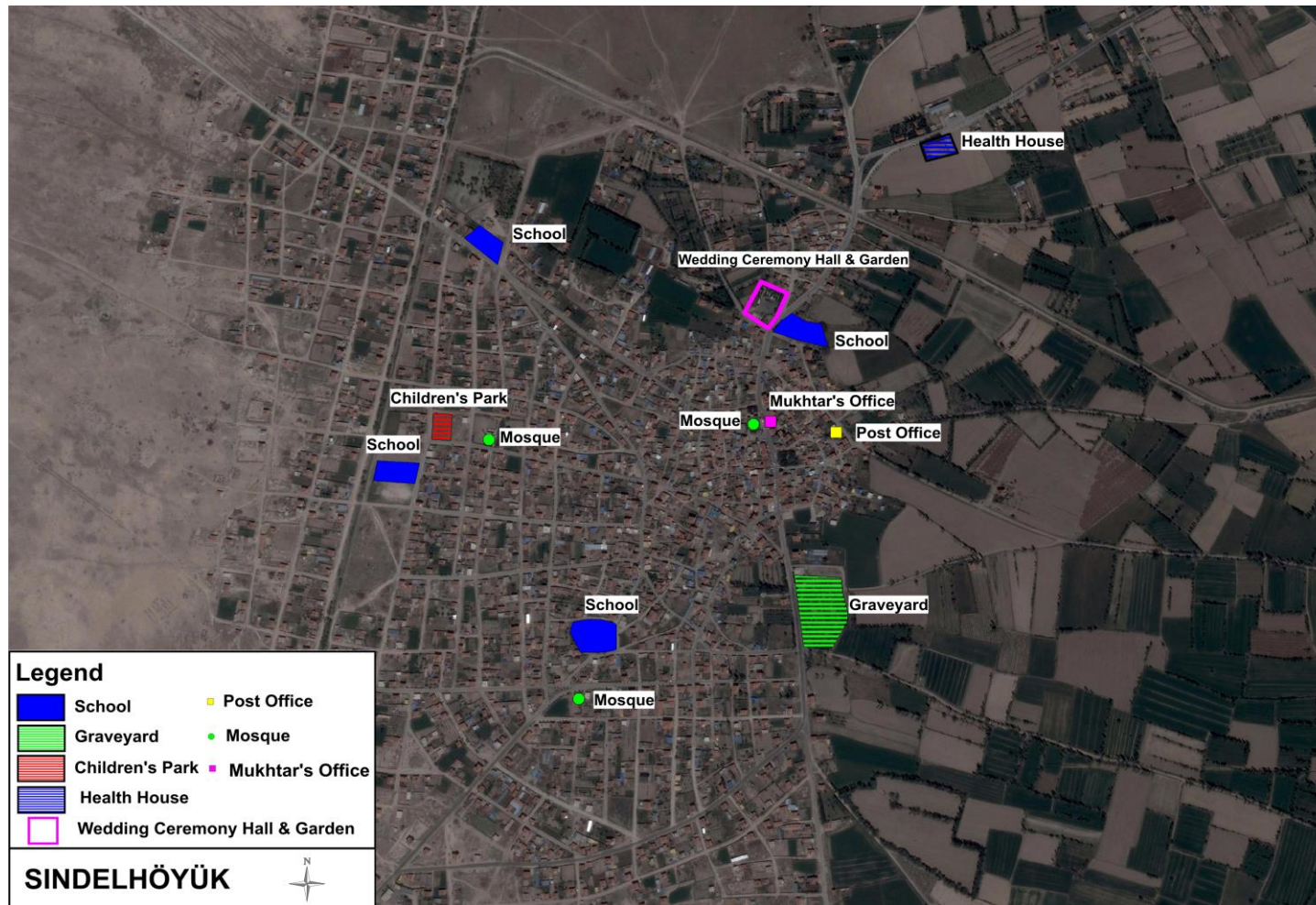
⁴² Yukarı Develi Women's Focus Group Discussion

Figure 16-12: Zile Community Map⁴³



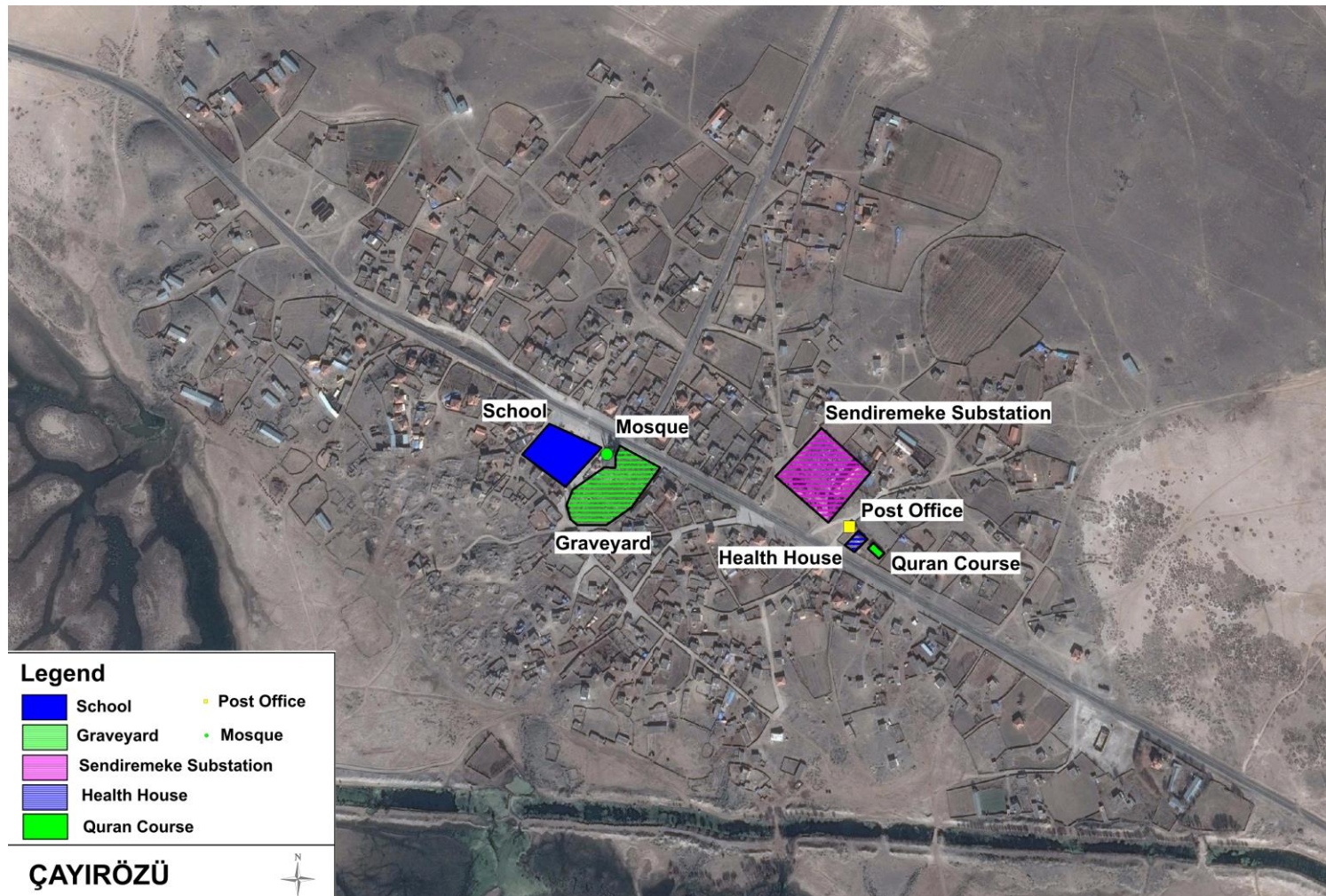
⁴³ Zile Women's Focus Group Discussion

Figure 16-13: Sindelhöyük Community Map⁴⁴



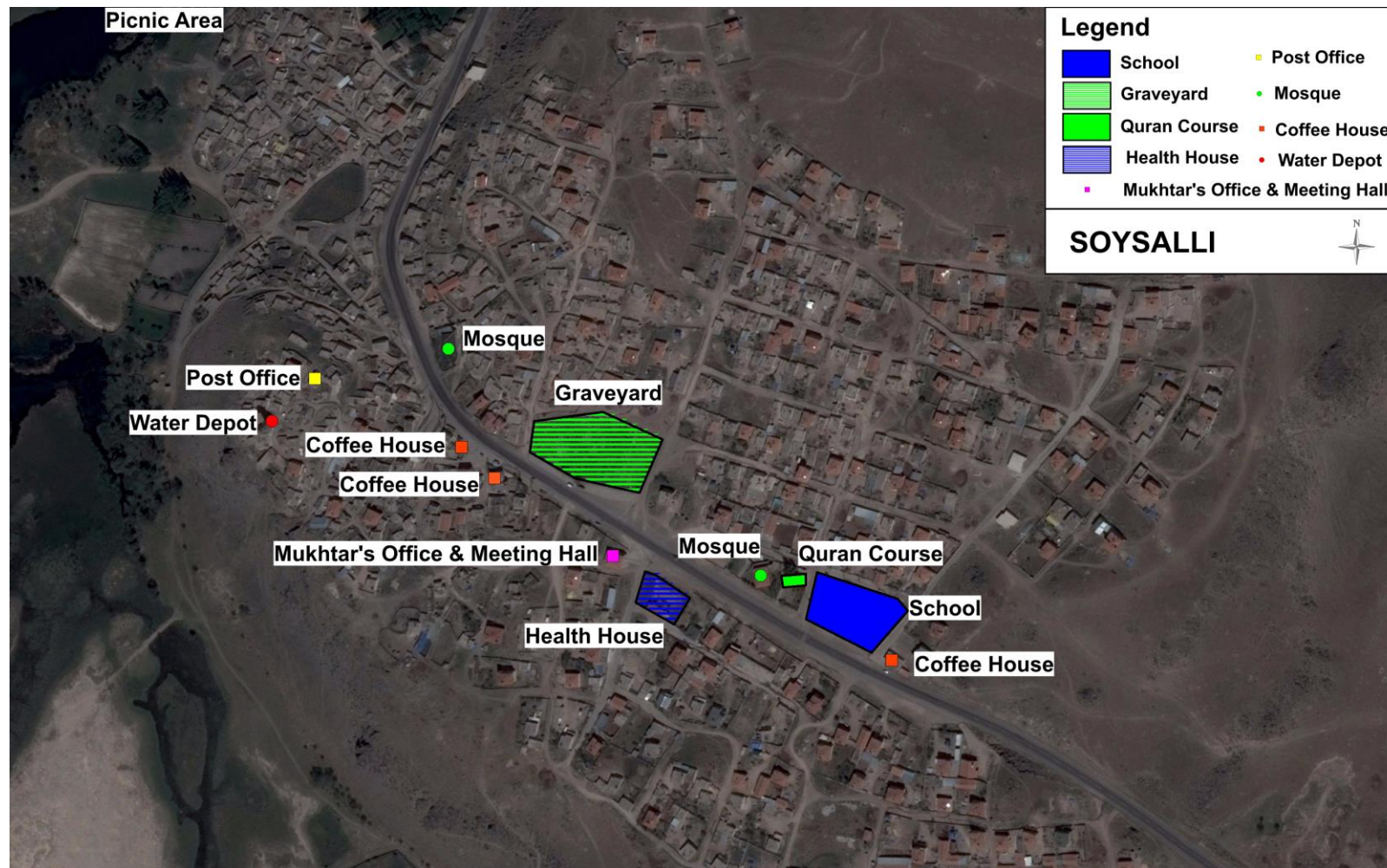
⁴⁴ Key informant interview 2016.

Figure 16-14: Çayırözü Community Map⁴⁵



⁴⁵ Key informant interview 2016.

Figure 16-15: Soysalli Community Map⁴⁶



⁴⁶ Key informant interview 2016.

16.4.9 Emergency Services

All neighbourhoods have access to all emergency services: gendarmerie (police/security), ambulance, fire brigade. Security from the gendarmerie is provided from the municipality administration, for all neighbourhoods in the study area.

16.4.10 Community Facilities

The majority of the residents in the neighbourhoods either spend time within the neighbourhood for recreation with friends and relatives, or travel to Develi for leisure activities. Activities are gendered: in winter women usually come together in one of the households for visits, and in every neighbourhood there is a Kuran Course for the female population, which is generally more active during the winter months. The majority of the male population spend their leisure time at coffeehouses in the neighbourhoods. However, during baseline research, almost all male participants stated that they do not have much leisure time, as they are engaged in both agricultural and animal husbandry activities.

Neither male nor female research groups did not mention special places of worship, except mosques at which men attend only. The Kuran course for women's attendance only is held in a purpose-built venue or in the home of one of the women participants in the course.

16.5 Impact Assessment

This section identifies and assesses impacts related to infrastructure and services.

Scoped In

Impacts on the social study area population will occur during the Project's construction, operations and closure phases. Anticipated impacts include:

- Change in demand for education and health services
- Change in energy, water and road infrastructure

Scoped Out

No impacts were scoped out.

16.5.1 Construction Phase Impacts and Mitigation Measures

Change in Demand for Education and Health Services

Impact Assessment

Impact	Change in demand for education and health services
Receptor Sensitivity⁴⁷	High
Impact Magnitude	Direct, long term, localised and highly unlikely to occur Negligible impact magnitude
Significance	Negligible

Given that Project facilities have been placed away from settlements, possible impacts to existing infrastructure and ability to access infrastructure have been reduced. Such an impact would be considered to have a high sensitivity. The impact could be direct, long term and localised. However, the

⁴⁷ Sensitivity for social impacts, unlike environmental impacts that are linked to the quality and rarity of the receptor, is linked to the consequence of a change and whether a change would impair (or benefit) quality of life. "Very high" would seriously impair (or substantially improve) quality of life. "Low" would be a change from baseline conditions, but not impair or change the quality of life.

likelihood is highly unlikely to occur. The unlikely nature of the impact leads to a negligible magnitude and a significance of negligible.

Impacts related to a change in demand for education and health services are linked closely with impacts related to influx. This impact category is considered separately given the importance of education and health, yet does not differ substantially from the considerations around influx.

Baseline information and research sought to understand the quantity and quality of existing infrastructure and to consider how any project component might impact upon that infrastructure or limit peoples assess.

Current trends indicate a trend toward closing existing education infrastructure in smaller settlements as the populations migrate out of the area. The quality of infrastructure is of varying quality and the concept of mobile education where students travel to Develi on a daily basis or as boarding students in student accommodation is common.

Health services, too, are seen to be declining with a decrease in population. Only one settlement, Epçe, has a health facility open all week. Like education, people travel to Develi for health services, in particular to the Develi State Hospital, the destination cited for people with major health issues.

With the Project location being removed from settlements, there is no predicted impact on the existing infrastructure or the ability to access the infrastructure. Such an impact would be considered to have a high sensitivity. The impact is direct, long term and localised. However, the likelihood is highly unlikely to occur. The unlikely nature of the impact leads to a negligible magnitude and a significance of negligible.

Impact Mitigation

While no specific mitigation is needed for an impact of negligible significance, the high sensitivity of education and health services means that the topic will be considered in planned stakeholder engagement activity. Planned engagement will investigate whether Project activities have limited the population's ability to access education and health infrastructure and services.

The Construction Impacts Management Procedure (OMAS-HSEC-PRC-006) includes instructions in the event of planned disruption to any infrastructure. If such a possibility will arise, potentially affected settlements are to be informed of the date, time and duration of disruption.

Residual Effects

Residual effects related to education and health infrastructure remain **negligible**.

Change in Energy, Water and Road Infrastructure

Impact Assessment

Impact	Change in energy, water and road infrastructure
Receptor Sensitivity	Medium
Impact Magnitude	Direct, long term, localised and unlikely to occur Low impact magnitude
Significance	Negligible

The impact topic on energy, water and road infrastructure assesses the possibility of changes – negative and positive – for nearby communities.

Electricity infrastructure in the study area is well-provided, yet the additional energy needs for the mine will require the construction of the powerline, thereby avoiding any competition with all neighbourhoods connected to the grid from a number of substations in the region.

Water demand is estimated at 35 L/s and supply is to be sourced for two licensed water wells form land owned by OMAS near the village of Epçe. Water will be used for the in-pit water management, heap leach facility and domestic waste treatment. These wells are not linked to community infrastructure and

water balance results are discussed in *Chapter 10: Water Resources*. Aquifer drawdown, which could influence the way that settlements assess and utilise existing infrastructure was determined to be negligible after mitigation and commitments to monitoring. In relation to road alignment, discussed below, the road has been planned to avoid water depots outside Yazıbaşı, Gömedi and Epçe.

Road infrastructure will be related to the 16 km access road, which will connect the mine with the public highway southeast of Develi. The access road will leave the Develi highway just north of the turning to Yazıbaşı, and will bypass the neighbourhoods of Yazıbaşı and Gömedi, before running south parallel to the public road where it will turn to the west near the neighbourhood of Epçe. There will be two connections with the Turkish road network, near Epçe and just outside Yazıbaşı. The design of the access road, intended for the sole use of the mine, avoids nearby neighbourhood and therefore does not include any upgrade of existing infrastructure.

Project design, including some of the alternatives considered in design and used to avoid contact with existing infrastructure, has reduced the chance of interfering with current energy, water and road infrastructure. Potential positive impacts are also not likely as there is no added benefit of the Projects planned sourcing of energy and water, or any benefits from the upgrade of existing roads.

Energy, water and road infrastructure are considered to have a high sensitivity. Potential impacts are direct, long term and localised. However, like the previous consideration of impact on education and health infrastructure, changes are highly unlikely to occur. Impact magnitude is negligible, as is the overall determination of significance.

Impact Mitigation

While no specific mitigation is needed for an impact of negligible significance, the importance of water, in particular, will require close coordination between the Environmental Coordinator and team responsible for external affairs. Water monitoring results will need to be periodically communicated with potentially affected communities. This is important to avoid the perception that OMAS water use could be affecting local water supplies.

The Construction Impacts Management Procedure (OMAS-HSEC-PRC-006) includes instructions in the event of planned disruption to any infrastructure. If such a possibility will arise, potentially affected settlements are to be informed of the date, time and duration of disruption.

Residual Effects

Residual effects related to energy, water and road infrastructure remain **negligible**.

16.5.2 Summary of Impacts and Mitigation Measures

A summary of potential impacts and proposed mitigation measures as described above are summarised in Table 16-12 below.

Table 16-12: Impacts and Mitigation Measures

Impact	Receptor	Receptor Sensitivity	Impact Categorisation	Impact Magnitude	Potential Effect Significance	Design and Mitigation Measures	Management Plans, Policies and Procedures	Residual Effect Significance
Change in demand for services	All neighbourhoods	High	Direct Long Term Localised Highly Unlikely	Negligible	Negligible	Planned stakeholder engagement activity to investigate whether Project activities have limited the populations' ability to access education and health infrastructure and services.	Stakeholder Engagement Plan (OMAS-ESMS-SEP-PLN-001)	Negligible.
Change in energy, water and road infrastructure	All neighbourhoods	Medium	Direct Long Term Localised Unlikely	Negligible	Negligible	Undertake water monitoring as per the Water Resources Management Plan. Communicate water monitoring results with potentially affected communities. Follow requirements of Construction Impacts Management Procedure	Water Resources Management Plan (OMAS-ESMS-WR-PLN-001) Stakeholder Engagement Plan (OMAS-ESMS-SEP-PLN-001) Construction Impacts Management Procedure (OMAS-HSEC-PRC-006)	Negligible.

16.6 Monitoring Requirements

The following Table 16-13 specifies the Monitoring requirements for this aspect.

Table 16-13: Infrastructure and Services Monitoring Requirements

Source Document	Monitoring Location	Parameters	Frequency
Stakeholder Engagement Plan (OMAS-ESMS-SEP-PLN-001)	<ul style="list-style-type: none"> Meetings with muhtars and communities 	<ul style="list-style-type: none"> Grievance Register Stakeholder Engagement Register 	<ul style="list-style-type: none"> Ongoing and monthly reviews
Water Resources Management Plan (OMAS-ESMS-WR-PLN-001)	<ul style="list-style-type: none"> Communities 	<ul style="list-style-type: none"> Water monitoring records (including participatory monitoring, as appropriate) 	<ul style="list-style-type: none"> Ongoing and monthly monitoring