

GIS-Based Real Estate Legislation Information System Design: The Case of İzmir, Foça

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by

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- I have acknowledged all major sources of assistance.
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Date: 21.06.2023

GIS-Based Real Estate Legislation Information System

Design: The Case of İzmir, Foça

Abstract

It is estimated that the world population will reach 8.5 billion in 2025 and 9.7 billion in 2050. It is foreseen that the land will be used more intensively in the future due to the mentioned population increase. For this reason, the management of limited and non-renewable land is a necessity. While planning the land management, the management of the real estates (e.g. building, parcel) and the legislations (e.g. law, regulation) are other issues that need to be planned.

While the real estate is a source of income for the citizens due to its economic value, it has been the subject of tax for the states. Therefore, the need to legally evaluate, define and registry real estates has appeared. This need is also present in the Cadastre 2014 vision. In the current study, the main motivation is to present the legal legislations that real estates are subject to due to different criteria (e.g. owner, location, type, intended purpose, acquisition form, encumbrance). This presentation can be made both by using the province, county, neighborhood/village, block, parcel information of the real estates and by clicking on the real estates. In this context, a GIS-based real estate legislation information system was designed in the Foça/İzmir, which was selected as the study area. For this purpose, a comprehensive national legislation inventory was prepared by determining active laws (general and private) regarding real estate. In the continuation of the study, the real estates were associated with the legislation, taking

into account their location and attributes. As a result of the mentioned association, the legislation information is located in the attribute table together with the guiding link. In this way, it is foreseen that the stakeholders will be prevented from experiencing aggrievements after the purchase and sale processes in the free market. Pecuniary loss and intangible damages (e.g. penalties, usage constraints, loss of immovable) that may arise in lawsuits, transactions and implementations will be minimized. In addition to all these, a model has been established to automate the updating of the data used in the information system. At the end of the study, the diversity of services for each real estate has been increased. As a result, legislative information, which will enable more accurate decisions to be made, is presented to the user in a inquirable form with a simple interface.

Keywords: Real estate, legislation, GIS, ownership, land management

CBS Tabanlı Taşınmaz Mevzuatı Bilgi Sistemi

Tasarımı: İzmir, Foça Örneği

ÖZ

Dünya nüfusunun 2025 yılında 8.5 milyara, 2050 yılında ise 9.7 milyara ulaşacağı tahmin edilmektedir. Bahsedilen nüfus artışından kaynaklı gelecekte arazinin daha yoğun kullanılacağı öngörülmektedir. Bu sebeple sınırlı ve yenilenemeyen arazinin yönetimi bir zorunluluktur. Söz konusu arazinin yönetiminden bahsederken, bütünlük parçası durumundaki taşınmazların (ör. Bina, parsel) ve bu taşınmazlara ilişkin mevzuatın (ör. Yasa, yönetmelik) yönetimi de planlanması gereken diğer hususlardandır.

Geçmişten günümüze taşınmaz, sahip olduğu ekonomik değerden dolayı vatandaşlar için bir gelir kaynağı olurken, devletler için verginin konusu olmuştur. Dolayısıyla taşınmazın yasal olarak ölçülmesi, tanımlanması ve kayıt altına alınması ihtiyacı ortaya çıkmıştır. Bu ihtiyaç Kadastro 2014 vizyonunda da yerini almıştır. Tam da bu amaca hizmet eden mevcut çalışmada temel motivasyon, taşınmazlara ait il, ilçe, mahalle/köy, ada, parsel bilgilerini kullanarak ya da taşınmazların üzerine tıklayarak farklı kriterlerden dolayı (ör. Maliki, konumu, türü, kullanım amacı, iktisap şekli, takyidatı) tabii olduğu yasal düzenlemeleri tek bir uygulama üzerinden sunmaktır. Bu kapsamda pilot bölge olarak seçilen İzmir ilinin Foça ilçesinde CBS tabanlı bir taşınmaz mevzuatı bilgi sistemi tasarlanmıştır. Bunun için taşınmazla ilgili aktif yasalar (genel ve özel) belirlenerek kapsamlı bir ulusal mevzuat envanteri

ıkarılmıřtır. alıřmanın devamında tařınmazlar, konumu ve znelikleri dikkate alınarak mevzuatlarla iliřkilendirilmiřtir. Bahsedilen iliřkilendirme sonucunda mevzuat bilgisi, ynlendirici link ile birlikte znelik tablosundaki yerini almıřtır. Bu sayede serbest piyasadaki alım-satım srelerinin ardından paydařların mađduriyet yařamasının nne geileceđi ngrlmektedir. Yanlıř mevzuata gre yrtlen dava, iřlem ve faaliyetlerde ortaya ıkabilecek maddi ve manevi kayıplar da (r. Para cezası, kullanım kısıtı, tařınmazın kaybı) byk lde azaltılacaktır. Tm bunlara ek olarak, bilgi sisteminde kullanılan verilerin gncellenmesini otomatikleřtirmek iin bir model kurulmuřtur. Sonu olarak her bir tařınmaz iin hizmet eřitliliđini arttırıp, daha dođru kararlar verilmesini sađlayacak mevzuat bilgisi, sade bir ara yz ile sorgulanabilir Őekilde kullanıcıya sunulmuřtur.

Anahtar Kelimeler: Tařınmaz, mevzuat, CBS, mlkiyet, arazi ynetimi

I'd like to dedicate this thesis to my family.

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Table of Contents

Declaration of Authorship.....	ii
Abstract	iii
Öz.....	v
Acknowledgment	viii
List of Figures	xi
List of Tables.....	xiii
List of Abbreviations.....	xiv
1 Introduction.....	1
2 Land Management Legislation in Turkey	7
3 Materials and Methods	10
3.1 Determination of the relative user needs	13
3.2 Study area	14
3.3 Determination of the main and sub-criteria.....	15
3.4 Data collection and preparation of Geodatabase	18
3.5 Control of land cover with environmental plan.....	21
3.6 National legislation inventory regarding the determined criteria.....	24
3.7 Content analysis of legislation for the location of the real estate.....	32
3.7.1 Surface water and its legislation	32
3.7.2 Conservation area and its legislation	35

3.7.3	Agricultural land area and its legislation	38
3.7.4	Settlement area and its legislation.....	40
3.8	Associating the national legislation with real estates	41
3.9	Information system model.....	43
4	Results and Discussion.....	46
4.1	Building-based query	47
4.1.1	Building-based identify query.....	47
4.1.2	Building-based HTML Popup query.....	51
4.2	Parcel-based query	52
4.2.1	Parcel-based identify query.....	52
4.2.2	Parcel-based HTML Popup query.....	56
5	Conclusion and Recommendations.....	58
	References	60
	Appendices.....	71
	Appendix A.1 Data Usage Permission Form prepared by Izmir Metropolitan Municipality, Department of Maps and GIS	72
	Appendix A.2 Data Usage Permission Form prepared by Izmir Metropolitan Municipality, Department of Zoning and Urban Development	73
	Appendix B Publications from the Thesis.....	74
	Curriculum Vitae	75

List of Figures

Figure 1.1 Main pillars of the study	5
Figure 2.1 Number of legislations by land readjustment types.....	9
Figure 3.1 Stepwise illustration and components of the designed information system	12
Figure 3.2 Current real estate applications, (a) Parcel inquiry application, (b) Land registry information inquiry application, (c) ATLAS application	14
Figure 3.3 Study area	15
Figure 3.4 Approved 1:100,000 scale environmental plan	22
Figure 3.5 Land cover map	23
Figure 3.6 The sketch showing the definitions in the Coast Law No. 3621	35
Figure 3.7 The surface area covered by protected areas in the region of interest.....	36
Figure 3.8 Approved Foça SPEA boundary.....	38
Figure 3.9 Legislation map	43
Figure 3.10 Real estate legislation information system model, (a) for the owner of the real estate, (b) for the location of the real estate, (c) for the type of the real estate, (d) for the intended purpose of the real estate, (e) for the acquisition form of the real estate, (f) for the encumbrance of the real estate.....	44
Figure 4.1 Querying the owner of the real estate located on block 10729 parcel 10	47
Figure 4.2 Querying the location of the real estate located on block 10729 parcel 10	48
Figure 4.3 Querying the type of the real estate located on block 10729 parcel 10... 48	48
Figure 4.4 Querying the intended purpose of the real estate located on block 10729 parcel 10	49
Figure 4.5 Querying the acquisition form of the real estate located on block 10729 parcel 10	50
Figure 4.6 Querying the encumbrance of the real estate located on block 10729 parcel 10.....	50
Figure 4.7 Querying the location of the real estate located on block 514101 parcel 772	51
Figure 4.8 Querying of different real estates for the same main criterion	52
Figure 4.9 Querying the owner of the real estate located on block 10002 parcel 2..	53

Figure 4.10 Querying the location of the real estate located on block 10002 parcel 2 53

Figure 4.11 Querying the type of the real estate located on block 10002 parcel 2... 54

Figure 4.12 Querying the intended purpose of the real estate located on block 10002 parcel 2 55

Figure 4.13 Querying the acquisition form of the real estate located on block 10002 parcel 2 55

Figure 4.14 Querying the encumbrance of the real estate located on block 10002 parcel 2..... 56

Figure 4.15 Query of the same real estate for different main criteria 57

List of Tables

Table 2.1	Types of land readjustment	8
Table 3.1	Features of the main criteria.....	18
Table 3.2	Data and its source	20
Table 3.3	National legislation inventory	25
Table 4.1	Descriptions of field names in the attribute table	46

List of Abbreviations

TR	Turkish Republic
GIS	Geographic Information System
GDLRC	General Directorate of Land Registry and Cadastre
shp	Shape File
tiff	Tag Image File Format
SPEA	Specially Protected Environment Area
JPEG	Joint Photographic Expert Group
MS	Microsoft
UTM	Universal Transverse Mercator
WGS 84	World Geodetic System 1984
EPSG	European Petroleum Survey Group
gdb	geodatabase
TNGIS	Turkey National Geographic Information System

Chapter 1

Introduction

According to article 704 of the Turkish Civil Code No. 4721 of 2001 real estate consist of land, independent and permanent rights registered on a separate page in the land registry, and single spaces registered in the condominium register [1]. According to Taşdöğen [2], real estates are immovables that cannot be moved from one place to another without damaging the structure. Real estate is a limited resource that should be used in a planned manner due to the rapid increase in the world population [3]–[6]. Real estate, which is the subject of many implementations from taxation to valuation, from crediting to purchase and sale; It is used for purposes such as residence, rental, investment and production. Over time, real estate has turned into a reliable investment instrument with economic value [7]. While it is a source of income for citizens due to its economic value, it has been the subject of tax for central and local governments. The state-supported real estate sector in our country has entered a rapid and versatile development process for the last 30 years. The real estate sector, which funds nearly 250 sub-sectors, contributes to economic growth, large infrastructure projects and urban transformation projects [8]. Therefore, the need to legally evaluate, define and registry real estates has emerged [7]. In addition, legal legislations are important factors that directly affect the usage of real estate since they have the ability to restrict or expand property rights [9]. For this reason, its correct understanding and interpretation will minimize the problems that can be experienced based on real estate.

All of the laws, bylaws and regulations that are in force in a country are called legislation [10]. In the current study, an information system in which the legislation on property, inheritance and tax is associated with real estates is mentioned. While designing this information system, the laws (both general and private) published by the Grand National Assembly of Turkey (Turkish Parliament) were taken into

consideration. No data entry has been made for the regulatory and guiding “Regulations, Directives/Instructions and Circulars” prepared by the authorized offices (e.g. Ministries, public legal entities). After all these data entries, it is understood that real estates may be subject to one or more legal legislations due to different criteria. For example, real estates may be subject to legislations such as Condominium Law, Zoning Law, Tourism Encouragement Law, Soil Conservation and Land Use Law due to their intended purpose (e.g. residential, commercial, tourism, farmland). Real estates may be subject to legislations such as Turkish Civil Code, Condominium Law, due to its type (e.g. land and parcel, independent and permanent rights, single spaces). In addition, real estates may also be subject to legislations such as Expropriation Law, Law on Evaluation of Real Estate Property Owned by the Treasury and Amending the Value Added Tax Law and/or Law on Privatization Implementations for the owner (e.g. real person, legal entity). As can be seen from the examples, there are many legal legislations concerning real estate. These legal legislations are carried out by different public institutions. The existence of a large number of legal legislations that can cause legislative inflation and the fact that these legislations are carried out by different institutions make it difficult to understand and follow the legislation. This situation negatively affects the decision-making processes of real estate owners, real estate appraisers, lawyers, notaries, experts, mapping companies/offices and many other professional disciplines regarding real estate. In addition, lawsuit/case according to an incorrect legal legislation extends the processes and may cause pecuniary and intangible losses that are difficult to make up. In order to avoid the mentioned problems, the legislation related to the real estate is determined and presented to the user in the form of an information system.

There are several studies in the literature that classify the legislation related to land management and administration in Turkey. Cete [11] has conducted some studies to determine the effectiveness of the current legal status regulating land activities. As a result of the study, which was accepted as a doctoral thesis, it was determined that as of 2008, there are 88 laws, decree laws and bylaws related to land in our country. As a result of the determinations, it has been stated that there is an uncertainty and disorganization in the Turkish land laws. Among the main reasons for this situation, it is considered that the relevant legislation is not unity and it is prepared on a short-term basis in order to produce urgent solutions to the problems. In the Land Administration

System approach proposed as a solution to the mentioned shortcomings, “Land Law” and “Undersecretariat of Land Administration” are mentioned [12], [13]. Isiler [14] has made a detailed legislative analysis on land management. In this way, he has determined the laws concerning primary land management activities. Within the scope of these determined laws, implementations where spatial data are used or produced have been determined. Relevant laws have been examined and interpreted in terms of spatial data requirement. Candas [15] has proposed a model for establishing the legislative background for real estate valuation. Successful examples in Europe (e.g. Germany, Netherlands and Spain) which are similar in terms of legal and property systems are examined in order to create a model. In addition, the organizational structures of international organizations, which are accepted in terms of valuation standards all over the world, were also examined in order to form a basis for the model. Akdeniz [16] has analyzed real estate legislation on land management. In particular, legal legislations in the field of land registry and cadastre have been examined. In addition, suggestions were made for the improvement of the legislation for the problems frequently encountered in implementation. For example, it is mentioned that land management, which has an important role in social life, is only possible if the legal legislations on real estate have an effective structure. Basar [8] has investigated the effect of legal legislations on real estate development processes. As a result of the research, it has been determined that legal legislations have an important field among the problems experienced by the sector. Iban [17] has collected the legislation for rural areas (e.g. farmlands, pastures, forests) in a spatial data infrastructure. In this way, rural land use is modeled in accordance with the legislation [18]. Yagci [19] has analyzed the legal processes within the scope of real estate legislation during the building license purchase. As a result of the analysis, it was concluded that the current system in real estate development processes causes unnecessary time/paper waste and place problems. It has been suggested to use “electronic signature” to solve these problems. Polat and Alkan [20] have revealed the most related laws by using the Co-Concepts and Co-Citation Methods. Thus, it can be determined which law may be subject to change in case of any change. In this way, more mass and harmonious legislative arrangements can be made.

In the international literature, there are some attempts to design an information system based on real estate. For example, Cheplong [21] has proposed a GIS-based tax

information system for local governments. With the mentioned information system, it is aimed to spatial query the property tax records. The developed information system includes all spatial and non-spatial details of real estates to collect and update property tax information. At the end of the study, some queries (SQL) were made to verify the functionality of the database. Balogun [22] discusses the design and implementation of a GIS-based property tax information management system to solve the problem of low tax revenues from real estate and manage real estate taxation. The real estate properties in the mentioned system were collected from the property owners through surveys. Data generated in the field is combined in a GIS frame to automate the property tax assessment process. In this way, documents and photos of the properties were transformed into spatial information. As a result, it has been concluded that the Computer Assisted Mass Appraiser (CAMA) method used in property tax determination is efficient and effective, and can greatly improve the service provided by the property tax administration. Zhang [23] has designed a GIS-based information management system for standard land reserve to promote the development of cities and realize social public interests. In the designed system, it is aimed to integrate the whole process of land reserve projects with spatial information. In addition, it is aimed to effectively manage the land reserve, land supply and planning information. Finally, it is aimed to improve the rate of use of land resources and to establish the basis for land expropriation and registration. Hartikanti et al. [24] have aimed to develop a GIS-based tax system model for land and building. In the mentioned model, potential property tax values are mapped on a WEB basis. At the end of the study, users were able to inquire about potential land and building tax revenues per village, county and province. Additionally, taxpayers can use this model to obtain billing information and other services.

As can be seen, the legislation studies focused on real estate in the national literature are mainly related to the determination of the legislation. In addition, it is related to the classification of the legal legislations on which some land management implementations (e.g. subdivision, amalgamation, real estate valuation). In the international literature, it has been observed that the studies generally focus on the design of information systems related to tax management. During and after the literature review, no study was found that presents the legal legislations regarding the real estate due to its location, attributes and ownership. For this reason, the legal

legislations to which any real estate is subject can be known by experts. This study is focused on an information system where real estate owners can see all legal legislations concerning their real estate without the need for expert. In this way, real estate owners will be more aware in protecting and using their legal rights. After the purchase and sale process, especially the buyer will be prevented from experiencing any problems. The decision-making processes of experts (e.g. lawyers, real estate appraisers, experts, mediators, real estate advisors) working in real estate cases and valuation report preparation processes will be shortened. It will contribute to the elimination of Weaknesses (elimination of paper and pencil cadastre) and Threats (showing the entire legal status of the land) stated by Polat and Alkan [25] in their SWOT analysis for Cadastre 2014 performance in Turkey. In addition, the integration of TUCBS [25]–[27] created within the scope of Cadastre 2014 studies is also a case to be considered within the scope of the study. The spatial and attributive relationship between the real estate and the legislation is visualized in Figure 1.1. In this context, the three main pillars of the study connected with GIS; real estate (building, parcel), legislation (law) and criteria (spatial, attributive).

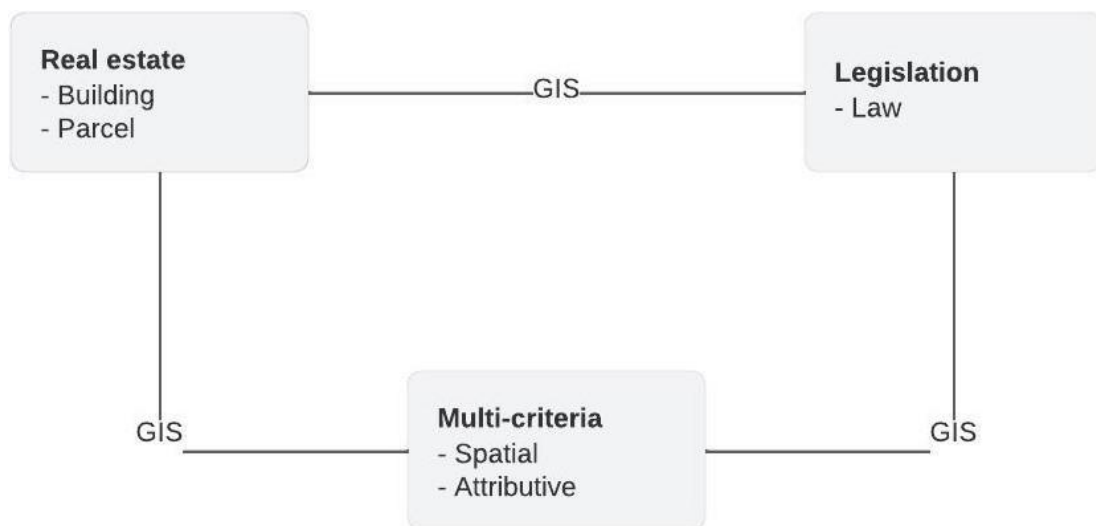


Figure 1.1: Main pillars of the study

Geographic Information Systems (GIS), which connects the three main pillars of the study, is an information system that manages the process of collecting, storing, processing and sharing the data of the earth to the user [28]. The theoretical emergence

of GIS was with a project carried out at Harvard University in the late 1960s [29]. In our country, meaningful developments were experienced only in the 1990s [30]. Different spatial data types (e.g. graphic data, verbal data) can be managed together with GIS. GIS is a technological platform that enables us to make decisions by establishing spatial relationships between data. GIS, which has a wide range of applications, is used in many different real estate fields from public implementations [31], [32], to the real estate investment market [33], from location allocation [34] to the valuation [35], [36]. In the “Eleventh Development Plan (2019-2023)” approved by the General Assembly of the Grand National Assembly of Turkey with the decision number 1225, it is mentioned that GIS will be benefited within the scope of disaster management [37]. In the “Strategic Plan (2019-2023)” prepared by the TR Ministry of Environment, Urbanization and Climate Change, it is mentioned that GIS will be beneficial within the scope of vulnerability maps reflecting the effects of climate change [38]. In the current study, GIS has been used effectively at every stage, from associating the legislation with the real estate and sharing the obtained information to the user within a system. While the “hp PAVILION” brand workstation [39] was used in the hardware part of the study, the “ArcGIS” from ESRI company [40] was used in the software part. While different modules embedded in the software (e.g. ArcMap, ArcCatalog library) are used for viewing and processing the data, digital storage areas in the workstation are used for backing them up.

In the continuation of the study, there are four main chapters consisting of “Land Management Legislation in Turkey”, “Materials and Methods”, “Results and Discussion” and “Conclusion and Recommendations”. In the “Land Management Legislation in Turkey” section, land management activities according to different fields and the legislation status of our country are examined. The process in which the real estates are associated with the legislation is in the “Materials and Methods” section with nine sub-titles. Then, the acquired features were queried in the “Results and Discussion” section. Finally, the outputs were concluded in the “Conclusion and Recommendations” section.

Chapter 2

Land Management Legislation in Turkey

Land management legislation is a set of rules that contain legal legislations about land-based implementations in a country. The policies developed by the responsible administrations regarding the land are put into practice with these legal legislations. Therefore, it is very important to understand the legislation in force. Efficient and sustainable land management will become possible for many sectors with the understanding of the legislation [8]. The information management functions of land management are usually provided by the national registry (e.g. land registry and cadastre, address registry, building and single space registry, tax registry) or information systems. As a result of studies, it has been determined [11];

- 95 Laws, Decree laws, Bylaws (direct),
- 300 Regulations (indirect), and
- 55 Public institutions

carries out land implementations in our country. The distribution of these implementations has been revealed as a result of the studies conducted by Cete [11] and Isiler [14]. The mentioned land implementations are given in Table 2.1. According to this table, activities for land readjustment are carried out in 18 different fields. This shows that the impact field of land management is quite extensive.

Table 2.1: Types of land readjustment [14]

Number	Types of land readjustment
1	Ownership right
2	Land register
3	Cadastre
4	Environmental and soil protection
5	Planning
6	Expropriation
7	Real estate valuation
8	Public properties
9	Forest
10	Waters and Mines
11	History, culture and natural property
12	Foundation
13	Zoning and Settlement
14	Parcel and Residence generation
15	Slum and Urban regeneration
16	Agriculture
17	Coast
18	Tax and Charge

The number of legislation related to land readjustment implementations expressed in Table 2.1 is given in Figure 2.1 [14]. According to this figure, the most intense types of land readjustment in terms of legislation are respectively “Ownership right”, “environmental and soil protection”, “waters and mines”, “expropriation”, and “tax and charges”.

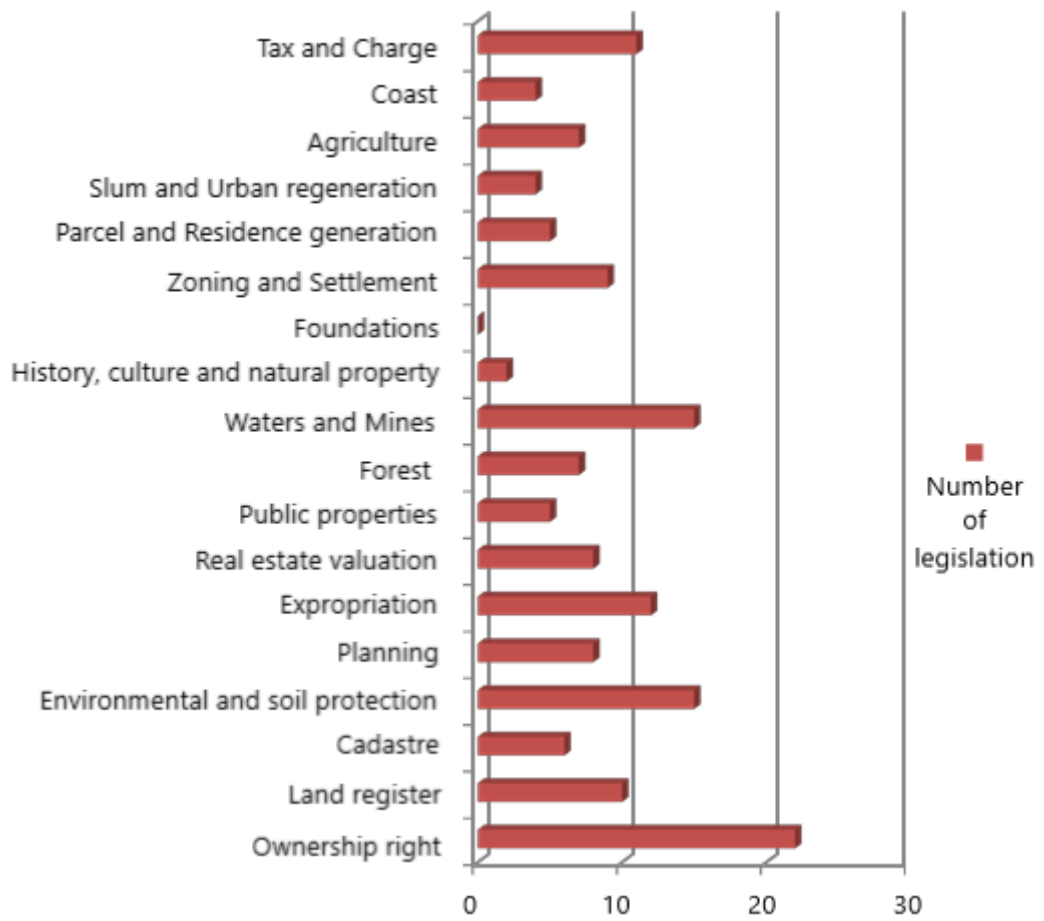


Figure 2.1: Number of legislations by land readjustment types [14]

Chapter 3

Materials and Methods

The legislation to which the real estate is subject is an important research topic that closely concerns many people (e.g. owner of the real estate, lawyer, real estate appraiser, expert, mediator, real estate consultant). However, until this time, no meaningful information has been provided to the public for the mentioned need. For this reason, in the study, an information system has been proposed in which six main criteria (e.g. owner, location, type, intended purpose, acquisition form, encumbrance of the real estate) are associated with the legislation in order to determine the authorities and responsibilities of real estates. The main question that guides the study is, “Is it possible to present the legal legislations to which the real estate is subject due to the six main criteria through a single platform?”. The primary users/stakeholders of the study is users who want to learn what legislation the real estate is subject to. It is foreseen that different institutions, from municipalities and special provincial administrations to ministries and general directorates, will use the system. In addition, the legislation on which the real estate is responsible can be seen without going to any public institution. The possibility of experiencing undesirable situations (e.g. penalty, usage constraint, loss of the real estate) will be minimized.

In order to gain all these relative benefits, a workflow diagram was created. The mentioned workflow diagram consists of analysis, synthesis and output stages. In the analysis stage, relative needs were revealed by taking reference from current applications, and then data and information were collected. In the synthesis stage, the information was combined and the results were evaluated. Finally, the output stage where the results are presented is discussed. In this direction, firstly, some web-based applications (e.g. parcel inquiry application, Land registry information inquiry application, ATLAS application) were examined and the relative user needs in these

applications were revealed. Then, the study area where the designed information system will be applied has been determined. Afterwards, main and sub-criteria were determined. According to the determined criteria, graphical and verbal data were obtained. The data located in the same coordinate system was stored in the geodatabase after preprocessing (e.g. generalization, normalization). Subsequently, spatial analysis processes (e.g. Overlay analysis, buffer analysis, digitizing) were carried out. In this way, the attribute information of the real estates has been made ready. Then, a model was established to automate the updating of the used data. Afterwards, the relationship of the real estates with the legislation was presented to the user in a inquirable form via GIS. All these are summarized in Figure 3.1.

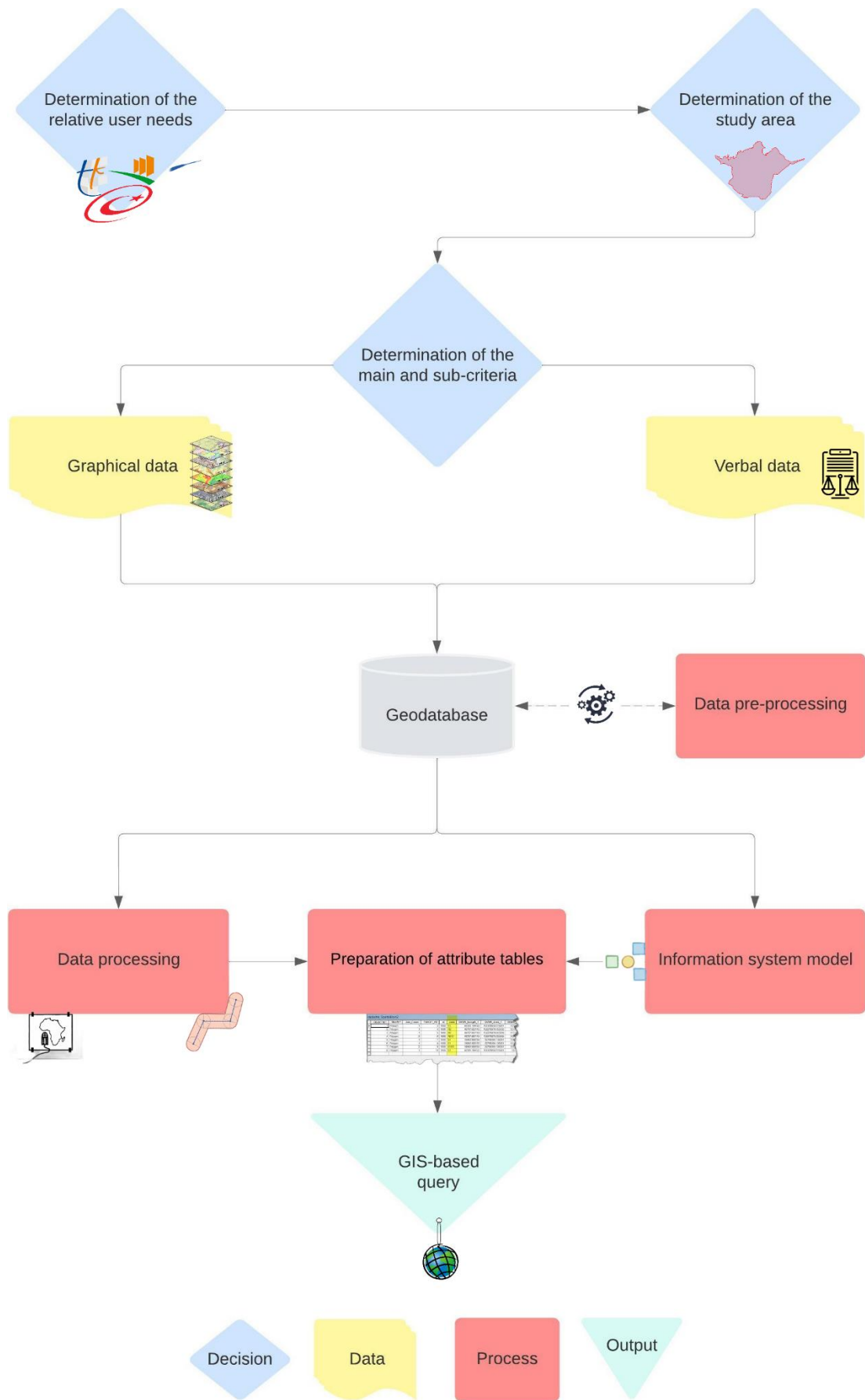
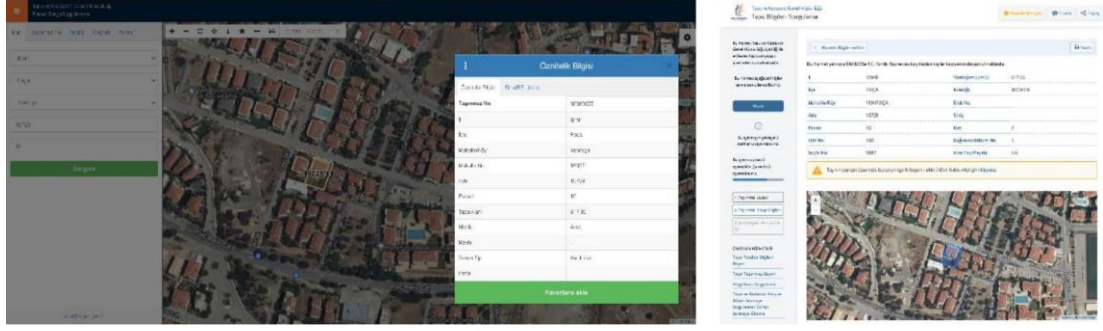


Figure 3.1: Stepwise illustration and components of the designed information system

3.1 Determination of the relative user needs

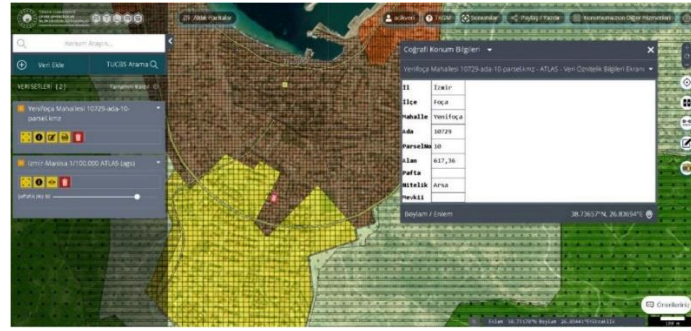
Today, there are two important applications named “Parcel inquiry” [41] and “Land Registry information inquiry” [42] offered to users by the General Directorate of Land Registry and Cadastre (GDLRC) (Figure 3.2 (a), Figure 3.2 (b)). While open access is possible to the parcel inquiry application, only users whose TR identity number is registered in TAKBIS can access the Land Registry information inquiry application. Queries can be made with or without introducing the real estate information (e.g. province, county, neighborhood/village, block, parcel) in the parcel inquiry application. In this way, various information (e.g. real estate number, title deed area, attribute, ground type) can be accessed about the real estate. On the other hand, the Land registry information inquiry application provides information such as "surface area, attribute, volume number, page number, land share, annotation, declaration, mortgage, easement" regarding the real estate. In addition to the GDLRC applications, the “ATLAS application” [43] published by the General Directorate of Geographic Information Systems is an open access application that provides geographic data (e.g. administrative boundaries, population density, transportation, hydrography, environmental plans) on real estate (Figure 3.2 (c)). The mentioned application also offers geographical data sets of many public institutions (e.g. GDLRC, General Directorate of Mapping, ILBANK Inc., Disaster and Emergency Management Presidency, Turkish Statistical Institute) in harmony with all open access and commercial GIS servers. In addition, the cadastral and zoning status of the real estates can be examined through the environmental plan.

All mentioned applications are frequently used and provide important information to users free of charge. However, considering the content of the mentioned applications, it is seen that no (legal) legislation information regarding the real estate is presented. The variety of the services offered regarding the real estate will increase with the current study.



(a)

(b)



(c)

Figure 3.2: Current real estate applications,
 (a) Parcel inquiry application, (b) Land registry information inquiry application,
 (c) ATLAS application

3.2 Study area

Yenifoça, which has a total area of 58.75 km² and a 25 km coastline, which includes four neighborhoods named Cumhuriyet, Fatih, Fevzi Çakmak and Mustafa Kemal Atatürk, has been determined as the study area. There is the Aegean Sea in the north, Aliğa county in the east, Eskifoça county in the west and south. The distance of Yenifoça to İzmir city/province center is approximately 70 km. It has hosted Rome, Byzantium, Genoese and Ottomans with its 3000 years of history based on documents. Yenifoça is a coastal town built around a port and thus developed maritime trade/sector. It is observed that the settlement expanded in a new moon shape in harmony with the topography, close to the coastal. Stone houses, which have a very important value in mythology, constitute the historical and cultural remains in the region/roi. For this reason, there are large natural and urban protected areas in the region. Thanks to the mentioned protected areas, the silhouette and environmental

values of the city have been largely preserved. Yenifoça is an important tourism center visited by local and foreign tourists, especially in summer. For this reason, the number of people living in the region varies in summer and winter months. The population, where approximately 10 thousand people live in winter [44], reaches 100 thousand in summer. Especially in recent years, it has been very popular among summer residents, so the real estate sector has developed significantly [45]. The study area with 10053 buildings and 8086 parcels is shared in Figure 3.3.

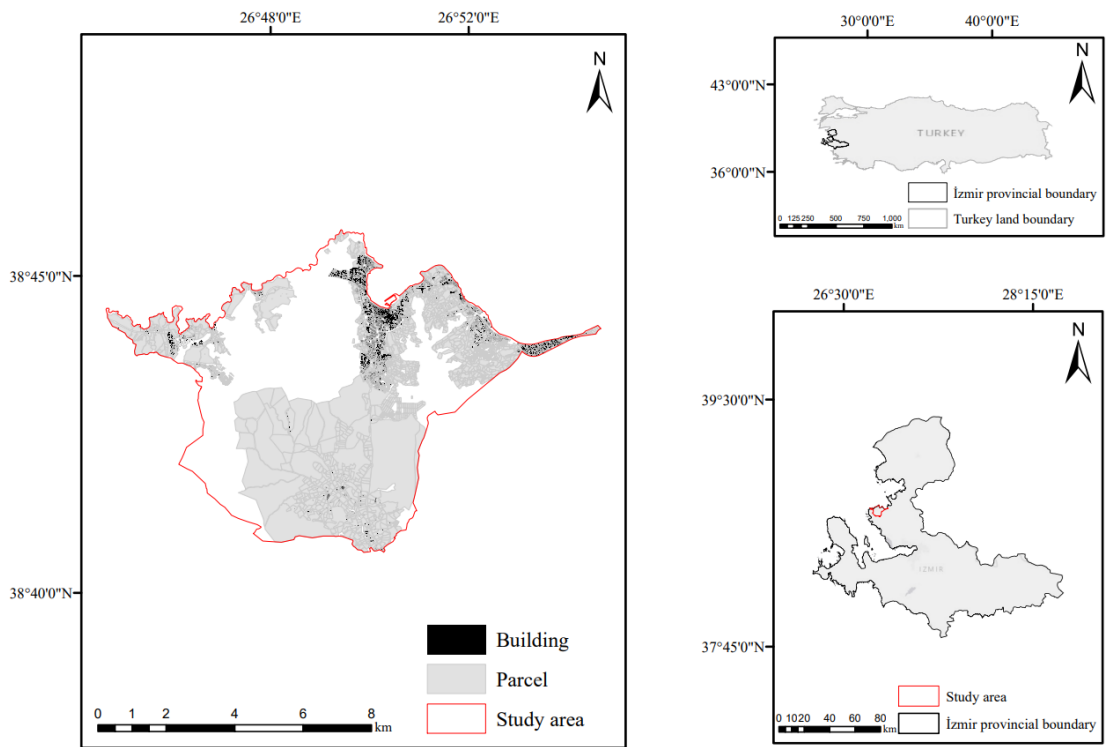


Figure 3.3: Study area

3.3 Determination of the main and sub-criteria

In this part of the study, the main criteria have been determined based on both the spatial and non-spatial features of the real estates. The main criteria are detailed below. The mentioned detail has been started with the main criteria of owner of the real estate, based on the expression “the person can own an real estate and operate of the real estate” [1] in article 683 of the Turkish Civil Code No. 4721 of 2001.

Owner of the real estate: refers to the person(s) owning the real estate (e.g. real person, legal entity). Real person is human. Legal entity is person or groups of property that are legally recognized as person and are organized to achieve a certain purpose [46]. Legal entities are divided into two as public legal entities (e.g. central and local administrations, regulatory and supervisory boards, public institutions and professional organizations in the nature of public institutions) and private legal entities (e.g. commercial companies, associations, foundations). In Article 46 of the Turkish Constitution No. 2709 of 1982 and Article 30 of the Expropriation Law No. 2942 of 1983, it is mentioned that the subject of expropriation consists of real estate properties in private ownership. In other words, it is mentioned that the property, resource and easement rights of public legal entities and institutions cannot be expropriated by another public legal entity. In this context, it is mentioned that a privately owned real estate and a public real estate under the control and usage of the State will not be subject to the same implementations, that is, the implementation changes according to the owner of the real estate [47]. For example, if the owner of any real estate is a real person, the real estate will be subject to expropriation and will therefore be subject to the Expropriation Law. If the real estate belongs to a public institution, it will be subject to regulations such as the “Law on Evaluation of Real Estate Property Owned by the Treasury and Amending the Value Added Tax Law” and the “Law on Privatization Practices”, which was seen as a means of liberation for the country's economy when it was first published [48].

Location of the real estate: represents the position of the property. With the mentioned main criterion, the legislative boundaries of the study area are determined and a legislative map is drawn up. For example, the real estate may be located within the coastal area, rural settlement area, metropolitan municipality borders/boundaries and/or protected area. Therefore, it may be subject to the Coastal Law, the Village Law, the Metropolitan Municipality Law and/or the Protection of Cultural and Natural Properties Law.

Type of the real estate: Turkish Civil Code No. 4721 of 2001, expresses which of the “land and parcel”, “independent and permanent rights” and “single spaces” registered to the Condominium belong to the real estate [1]. For this reason, due to the type of

real estate, it may be subject to regulations such as the Turkish Civil Code and the Condominium Law.

Intended purpose of the real estate: indicates which real estate is used for purposes such as residence, commercial, tourism facility, education, religious facility, agricultural land. For example, if the real estate is a single space, it may be subject to the Condominium Law and/or the Zoning Law. If the real estate is to be used for tourism purposes, it may be subject to the Tourism Encouragement Law. If the same real estate is to be used for agricultural purposes, it may be subject to regulations such as the Soil Conservation and Land Use Law. Intended purpose of the real estate is an economic index [9].

Acquisition form of the real estate: expresses the method for which the real estate was acquired (e.g. sale, donation, barter, inheritance, cadastre, type conversion). Due to the mentioned acquisition forms, the real estate may be subject to the Turkish Civil Code, the Cadastre Law, the Condominium Law.

Encumbrance of the real estate: indicates whether there is a right on the real estate such as any annotation, declaration, easement, timeshare, loan, lien, mortgage, restrictive covenant, lease. The examination of the mentioned obligations directly affects the transferability and use of the real estate. For example, a real estate on which a “right of way” has been established may be subject to the Turkish Civil Code. A real estate with the expression “management plan” in the declarations section may be subject to the Condominium Law. In addition, the main criterion mentioned corresponds to the expression “registration of private/public rights and restrictions based on land” in Cadastre 2014 [49].

Three of the six main criteria (Owner of the real estate, Acquisition form of the real estate, Encumbrance of the real estate) consist of imaginary data set, while three of them (Location of the real estate, Type of the real estate, Intended purpose of the real estate) consist of actual data set. All data consisting of the actual dataset are authoritative data “provided by an authoritative source that can be officially confirmed” [50]. In addition, five of the main criteria (Owner of the real estate, Type of the real estate, Intended purpose of the real estate, Acquisition form of the real estate, Encumbrance of the real estate) have attributive data, while one of them

(Location of the real estate) has spatial data. The features of all mentioned main criteria are shared in Table 3.1.

Table 3.1: Features of the main criteria

Data types		
Datasets	Spatial data	Attributive data
Actual data	Location of the real estate	Type of the real estate Intended purpose of the real estate
Imaginary data		Owner of the real estate Acquisition form of the real estate Encumbrance of the real estate

3.4 Data collection and preparation of Geodatabase

Information is not a spontaneous phenomenon, but is obtained by using data effectively. Therefore, it is impossible to talk about information without data. In addition, the process of transition from data to information is possible only with the existence of a certain information system. Information system is a mechanism that collects, stores, produces and distributes information in order to increase the decision-making ability of users [29]. Data generation is the most expensive and time-consuming process in the setup of an information system. Comert [51] shared that the ratio of data collection to total cost for an information system is 60-80%. The data acquisition process of the current study was also carried out carefully and a regular storage was made. The regular storage is only possible with the existence of a database. Database is a storage area that ensures the information or data is stored, updated and accessed in an organized and reliable way. Geographical database is the storage area where spatial data is organized in the most appropriate way [52]. Thanks to the mentioned geodatabase (gdb), spatial data and the information generated from this data can be stored in a digital area.

Graphic and verbal data consisting of actual dataset are shared with their sources in Table 3.2. The most important graphical data (obtained in this context) is the “Environmental plan (tiff file)”, which provides land cover to the study. Other data obtained within the scope of graphical data are “Country, Province, County, Neighborhood boundaries (shp file)” and “Building and Parcel geometries (shp file)”. The most important data obtained within the scope of verbal data is “legal legislations”. Other data obtained within the scope of verbal data are “intended purpose and type of the real estate” and “other information” presented/shared in the attribute table. Basemaps (e.g. environmental plan, master zoning plan) and many web-based applications (e.g. Legislation information system, Parcel query application, ATLAS application) were actively used to obtain data. The obtained data were positioned in a common coordinate system (WGS 84 / UTM zone 35N with 32635 EPSG code) and stored in the gdb as feature class.

Table 3.2: Data and its source

Data type	Data	Source	Source type
Graphical data	Land cover (e.g. Shore edge line, Protected area, Tourism facility area, Military area, Forest area, Grassland-Pasture, Urban built-up area, Urban development area, Farmland, Preferred usage area)	TR, Ministry of Environment, Urbanization and Climate Change - General Directorate of Spatial Planning - “Environmental Plan with a scale of 1:100,000” [53]	Open access
		Izmir Metropolitan Municipality - Department of Zoning and Urban Development - “Izmir Urban Master Zoning Plan with a scale of 1:25,000” (Appendix A.2)	Closed access
	Boundary (e.g. Country, Province)	TR, Ministry of National Defence - General Directorate of Mapping - “Turkey Civil Administrative Boundaries” [54]	Open access
	Boundary (e.g. County, Neighborhood) Geometry (e.g. Building, Parcel)	Izmir Metropolitan Municipality - Department of Maps and GIS (Appendix A.1)	Closed access
Verbal data	Intended purpose of the real estate (e.g. Residential, Commercial, Tourism, Public/Social)	Izmir Metropolitan Municipality - Department of Maps and GIS (Appendix A.1)	Closed access
	Type of the real estate (e.g. Land, Raw land, Parcel; Construction servitude, Condominium, Main structure)	TR, Ministry of Environment, Urbanization and Climate Change - GDLRC - “Parcel Query Application” [41]	
	Legislation (e.g. Law, Bylaw, Regulation)	TR, Presidency of Administrative Affairs - General Directorate of Law and Legislation - “Legislation Information System” [55]	Open access
	Other verbal property data (e.g. Block/Parcel number, Site, Layout)	TR, Ministry of Environment, Urbanization and Climate Change - GDLRC - “Parcel Query Application” [41]; TR, Ministry of Environment, Urbanization and Climate Change - General Directorate of Geographic Information Systems - “ATLAS Application” [43]	

3.5 Control of land cover with environmental plan

The environmental plan is defined in the Zoning Law No. 3194 of 1985. The environmental plan directs the sub-scale plans (e.g. master and implementation zoning plan) in accordance with the objectives and strategies of the spatial strategy plans. It determines the principles and criteria in line with general land use decisions. It can be prepared in the region, basin/catchment or province as a whole. The environmental plan is a whole with plan sheets, plan implementation provisions and plan explanation report [56]. Yılmaz [57] stated that the Zoning Law No. 3194 of 1985 defines the environmental plan in terms of its “subject”. The main principles regarding the environmental plan are explained in the Spatial Plans Formation Regulation of 2014. The mentioned regulation refers that the environmental plan can be prepared at different scales (e.g. 1:50,000, 1:100,000). In addition, it determines the basic construction and land use decisions, thus providing a balance between protection and use. In accordance with substance 102 of the Presidential Decree No. 1 [58], the metropolitan municipalities make and approve the environmental plans within the metropolitan municipality boundaries. In non-metropolitan provinces, the Ministry of Environment, Urbanization and Climate Change makes and approves.

The “İzmir-Manisa 1:100,000 scale environmental plan (approved on 29/03/2022)” was used to control the graphical data we obtained from the Izmir Metropolitan Municipality, Department of Zoning and Urbanization (See Appendix A.2). The use of the map named K17 was determined in the virtual tour made over the “Map Information Bank” [59]. The mentioned plan is shared with the study area in Figure 3.4.

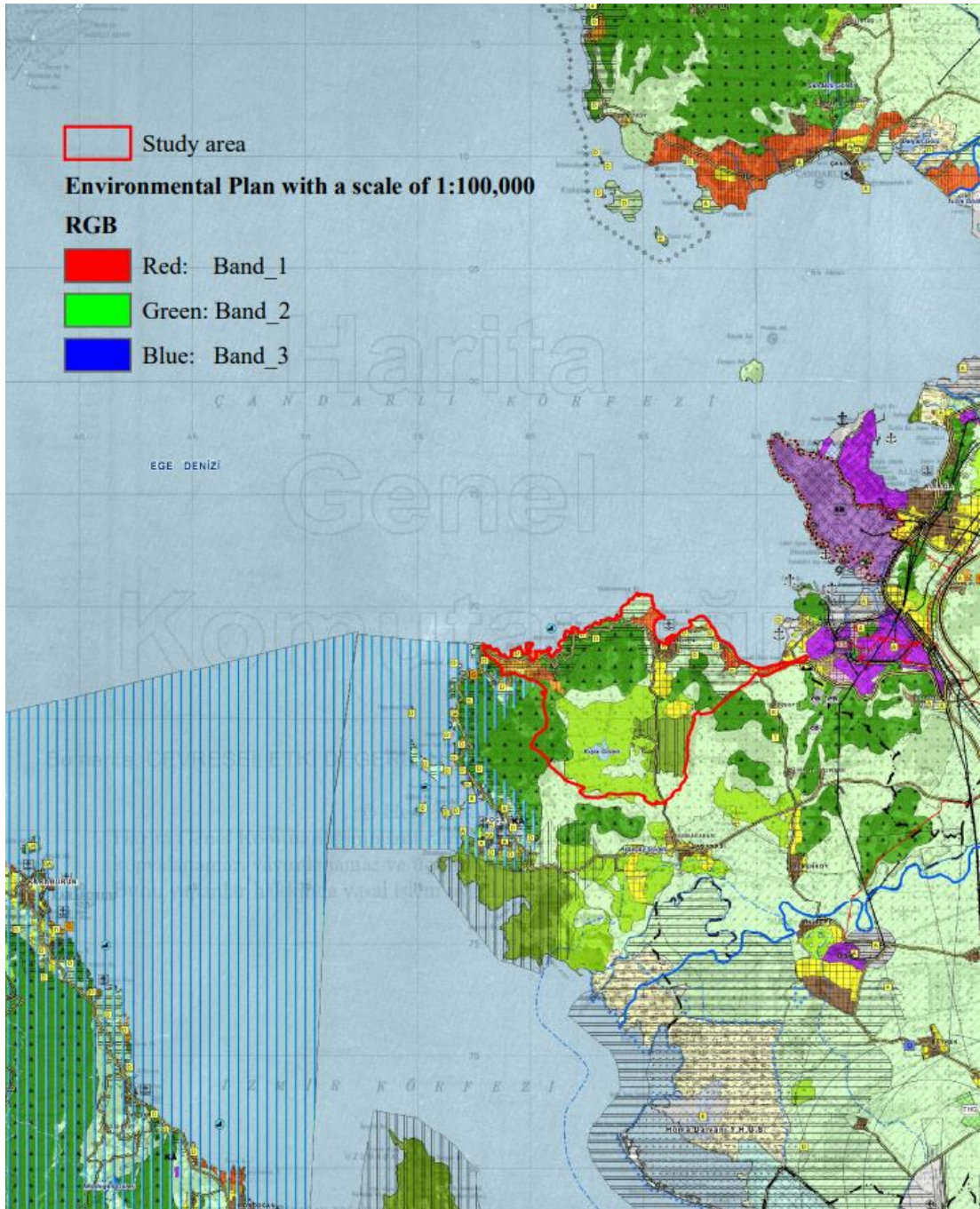


Figure 3.4: Approved 1:100,000 scale environmental plan [53]

The coordinated plan was compared with the digital land cover data in vector format (e.g. forest area, protected area, urban built-up area) obtained from the public institution. All land cover classes overlapped with the environmental plan spatially. Only the coastal area is not available in the obtained data. For this, the shore edge line has been digitized. Then, a buffer analysis was performed based on the coastal legislation [60]. In this way, the coastal area in polygon format was obtained. The land

cover controlled by the environmental plan is shared in Figure 3.5. The environmental plan was also used in the display of the map.

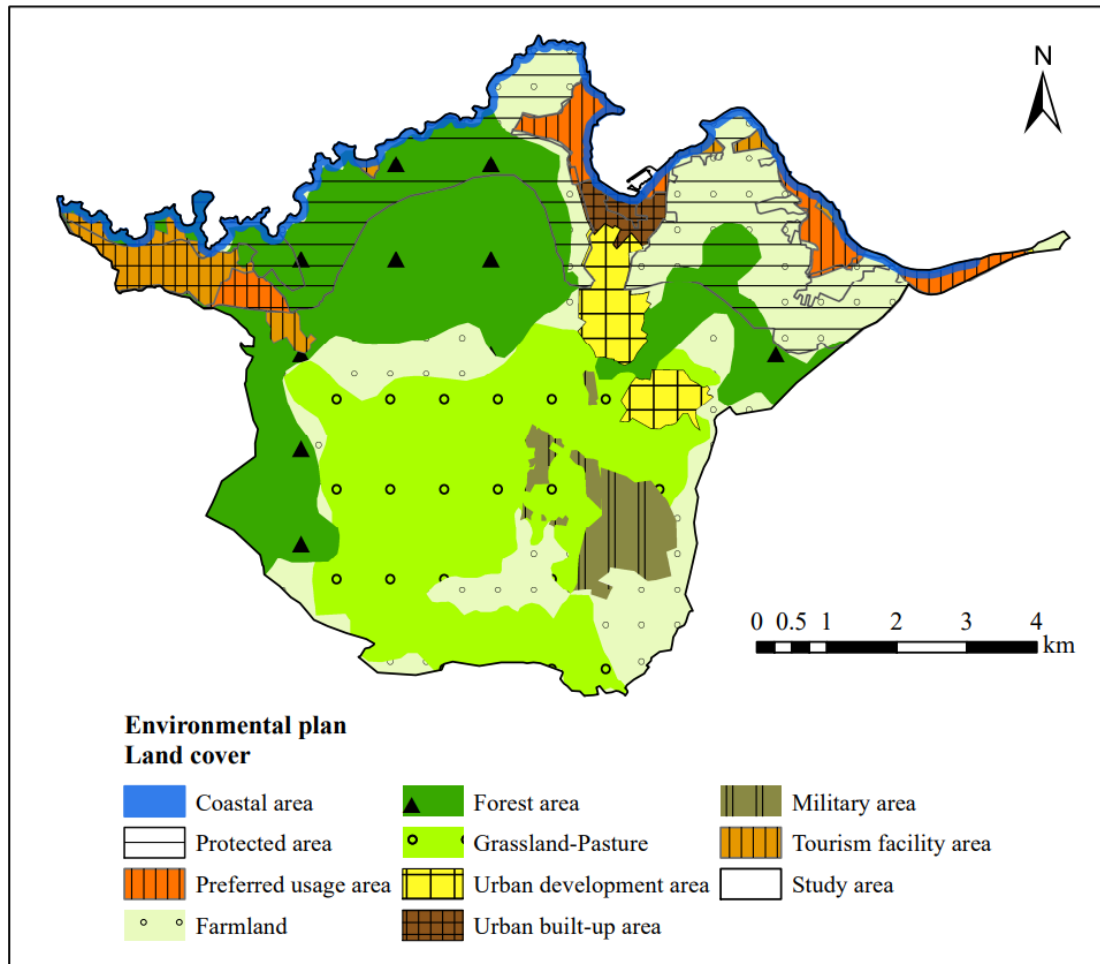


Figure 3.5: Land cover map

The term “land cover” has been used in the text and on the maps, but it has been seen that they are used interchangeably with “land use” in the literature. Although they mean similar things, it may not be correct to use them interchangeably. While land cover describes the natural and artificial objects that cover the surface of the land; land use means making use of land cover, including land management implementations [61]. In nutshell, land cover is the physical and biological structure of the earth's surface [62]; land use is the actions that people do and will do on land cover [63].

3.6 National legislation inventory regarding the determined criteria

According to the criteria determined in the previous stage of the study, the legal legislations related to the real estate were determined and a comprehensive national legislation inventory was prepared. Availability of an up-to-date database that will show which legislation to be used is in force and which has been repealed has been the most important stage of the process. For this, the Legislation Information System [55] (prepared for the legal texts determined to be in force, based on the “Reducing Laws, Bylaws and Regulations Project” [64],) was used. In the mentioned system, the legislation published in the Official Gazette is made into a single text and published in such a way that the users can follow the changes day by day. In this way, current legislation can be easily accessed.

Legislation data (in the form of verbal data) constitutes one of the three basic pillars of the designed system (the other two are real estate and criteria). At the same time, it is the original value of the study that distinguishes it from existing applications (e.g. parcel query application, land registry information query application, ATLAS application). As a result of the examinations, twenty nine (29) laws regarding real estate have been reached. The determined laws are classified according to main and sub-criteria and listed in Table 3.3. Most used five legislations were “Turkish Civil Code”, “Zoning Law”, “Condominium Law”, “Cadastre Law”, and “Tourism Encouragement Law” (n = 30, 21, 8, 8, and 5 times, respectively). In the continuation of the study, these laws were written on the attributes of the real estates with some analyzes (e.g. overlay analysis) and tools (e.g. select by location/attribute). In this way, real estate-legislation relationship was established and real estates were made ready for querying.

Table 3.3: National legislation inventory

Main Criteria	1 st Sub-criteria	2 nd Sub-criteria	1 st Legislation	2 nd Legislation	3 rd Legislation
Owner of the real estate	Legal entity	Public legal entity	Turkish Civil Code No. 4721 of 2001	Law on Evaluation of Real Estate Property Owned by the Treasury and Amending the Value Added Tax Law No. 4706 of 2001	Law on Privatization Implementations No. 4046 of 1994
		Private legal entity	Turkish Civil Code No. 4721 of 2001	Law on Evaluation of Real Estate Property Owned by the Treasury and Amending the Value Added Tax Law No. 4706 of 2001	Law on Privatization Implementations No. 4046 of 1994
	Real person		Turkish Civil Code No. 4721 of 2001	Expropriation Law No. 2942 of 1983	
Location of the real estate	Surface water	Coastal area	Coastal Law No. 3621 of 1990		
	Conservation area	Protected area	Protection of Cultural and Natural Properties Law No. 2863 of 1983		
		Specially protected environment area	Protection of Cultural and Natural Properties Law No. 2863 of 1983	Environmental Law No. 2872 of 1983	National Parks Law No. 2873 of 1983
	Tourism areas	Tourism facility area	Tourism Encouragement Law No. 2634 of 1982		

	Preferred usage area	Zoning Law No. 3194 of 1985		
Other land cover areas	Forest area	Forest Law No. 6831 of 1956	Cadastre Law No. 3402 of 1987	
	Military area	Military Restricted Zones and Security Zones Law No. 2565 of 1981		
Settlement area	Urban built-up area	Zoning Law No. 3194 of 1985		
	Urban development area	Zoning Law No. 3194 of 1985		
	Rural settlement area	Village Law No. 442 of 1924	Zoning Law No. 3194 of 1985	Special Provincial Administration Law No. 5302 of 2005
Agricultural land area	Farmland	Soil Conservation and Land Use Law No. 5403 of 2005		
	Grassland-Pasture	Rangeland Law No. 4342 of 1998	Cadastre Law No. 3402 of 1987	
	Wetland	Agricultural Reform Law on Land Readjustment in Irrigation Areas No. 3083 of 1984		
Working area	Industrial area	Organized Industrial Areas Law No. 4562 of 2000		
Responsibility area	Metropolitan municipality area	Metropolitan Municipality Law No. 5216 of 2004		

Type of the real estate		Municipality area	Municipality Law No. 5393 of 2005	Special Administration Law No. 5302 of 2005	Provincial
		Adjacent area	Special Administration Law No. 5302 of 2005	Provincial Municipality Law No. 5393 of 2005	
		Field	Soil Conservation and Land Use Law No. 5403 of 2005	Agricultural Reform Law on Land Readjustment in Irrigation Areas No. 3083 of 1984	
		Parcel	Zoning Law No. 3194 of 1985		
	Attribute:	Cadastral Land	Cadastral Law No. 3402 of 1987		
	Parcel	Raw soil/land	Soil Conservation and Land Use Law No. 5403 of 2005		
		Garden	Soil Conservation and Land Use Law No. 5403 of 2005	Zoning Law No. 3194 of 1985	
		Pasture	Rangeland Law No. 4342 of 1998	Cadastral Law No. 3402 of 1987	
		Construction servitude	Condominium Law No. 634 of 1965	Turkish Civil Code No. 4721 of 2001	
	Ground type:	Condominium	Condominium Law No. 634 of 1965	Turkish Civil Code No. 4721 of 2001	
	Building	Main real estate	Condominium Law No. 634 of 1965	Turkish Civil Code No. 4721 of 2001	
		Right of construction	Turkish Civil Code No. 4721 of 2001		

Intended purpose of the real estate	Independent and Permanent rights	Right of water source	Turkish Civil Code No. 4721 of 2001	Law on Groundwater No. 167 of 1960	
	Social/Public facility purposes	Green area	Zoning Law No. 3194 of 1985		
		Cemetery	Zoning Law No. 3194 of 1985		
		Education area	Zoning Law No. 3194 of 1985		
		Fire department	Zoning Law No. 3194 of 1985		
		Religious facility	Zoning Law No. 3194 of 1985		
		Social facility	Zoning Law No. 3194 of 1985		
		Other	Zoning Law No. 3194 of 1985		
	Tourism purposes	Apartment	Tourism Encouragement Law No. 2634 of 1982	Zoning Law No. 3194 of 1985	
		Hotel	Tourism Encouragement Law No. 2634 of 1982	Zoning Law No. 3194 of 1985	
		Hostel	Tourism Encouragement Law No. 2634 of 1982	Zoning Law No. 3194 of 1985	
		Camping area	Tourism Encouragement Law No. 2634 of 1982		
		Passage	Zoning Law No. 3194 of 1985		

Commercial and Industrial purposes	Restaurant	Zoning Law No. 3194 of 1985			
	Industry	Zoning Law No. 3194 of 1985	Organized Industrial Areas Law No. 4562 of 2000		
Residential purpose	Apartment	Zoning Law No. 3194 of 1985	Condominium Law No. 634 of 1965		
	Site	Zoning Law No. 3194 of 1985	Condominium Law No. 634 of 1965		
Acquisition form of the real estate	Derivative acquisition	Purchase and sale	Turkish Civil Code No. 4721 of 2001	Land Registry Law No. 2644 of 1934 Real Estate Tax Law No. 1319 of 1970	
		Donation	Turkish Civil Code No. 4721 of 2001		
		Transition	Turkish Civil Code No. 4721 of 2001		
		Barter	Turkish Civil Code No. 4721 of 2001		
	Original acquisition	Cadastre	Cadastre Law No. 3402 of 1987		
		Acquisitive prescription	Turkish Civil Code No. 4721 of 2001		
		Expropriation	Expropriation Law No. 2942 of 1983	Turkish Civil Code No. 4721 of 2001	
		Foreclosure	Turkish Civil Code No. 4721 of 2001	Execution and Bankruptcy Law No. 2004 of 1932	
	Encumbrance of	Annotations	Family residence annotation	Turkish Civil Code No. 4721 of 2001	

	Foundation annotation	Foundations Law No. 5737 of 2008	Turkish Civil Code No. 4721 of 2001
	Lease annotation	Turkish Civil Code No. 4721 of 2001	
	Commercial abandonment annotation	Execution and Bankruptcy Law No. 2004 of 1932	Turkish Civil Code No. 4721 of 2001
	Bankruptcy annotation	Execution and Bankruptcy Law No. 2004 of 1932	Turkish Civil Code No. 4721 of 2001
	Construction annotation in return for flat	Turkish Code of Obligations No. 6098 of 2011	Land Registry Law No. 2644 of 1934 Turkish Civil Code No. 4721 of 2001
	Protected area annotation	Protection of Cultural and Natural Properties Law No. 2863 of 1983	
Easement rights and Real estate liabilities	Easement rights	Turkish Civil Code No. 4721 of 2001	Expropriation Law No. 2942 of 1983
	Repurchase right	Turkish Code of Obligations No. 6098 of 2011	Turkish Civil Code No. 4721 of 2001
	Pre-emption right	Turkish Civil Code No. 4721 of 2001	
	Residence right	Turkish Civil Code No. 4721 of 2001	
	Usufruct right	Turkish Civil Code No. 4721 of 2001	

Real estate mortgage right	Mortgage	Turkish Civil Code No. 4721 of 2001
	Mortgage bond	Turkish Code of Obligations No. 6098 of 2011
	Annuity (charge) bond	Turkish Civil Code No. 4721 of 2001
Declarations	Annex	Turkish Civil Code No. 4721 of 2001
	Renewal registration in accordance with 22/a	Cadastré Law No. 3402 of 1987
	Statement of cadastral case	Cadastré Law No. 3402 of 1987 Turkish Civil Code No. 4721 of 2001
	Innovation	Cadastré Law No. 3402 of 1987
	Management plan	Condominium Law No. 634 of 1965
	Single space number change	Condominium Law No. 634 of 1965
	Statement of cultural and natural property	Protection of Cultural and Natural Properties Law No. 2863 of 1983
	Timeshare	Condominium Law No. 634 of 1965
Power of restriction	Settlement Law No. 5543 of 2006	

3.7 Content analysis of legislation for the location of the real estate

In this section, the areas and legislations belonging to the main criterion of “location of the real estate” were examined. The reason for this is that the main criterion of the location of the real estate has a more various legislative structure than the other main criteria. In this context, both the legislation and the literature on the examined legislation were used. As a result, the portrait of the laws has been revealed.

3.7.1 Surface water and its legislation

Coastal areas, which are the intersection of water and land, have played an important role in the development of the country due to their natural, socio-cultural and economic potential. For this reason, coastal areas are one of the areas where the earth's surface is used most intensively. It was also shared by the International Union of Geological Sciences (IUGS) that coastal areas are one of the 27 existing natural wealth/landmarks in the world [65], [66]. Some legal regulations have been developed in parallel with international developments for the conservation, integrated planning and sustainable management of the mentioned areas. However, the preparation of legal regulations by considering only water movements without considering the direct or indirect coastal dynamics (e.g. the effect of wind, tectonism, sedimentation) causes some problems for coastal areas and their management [67]. Because coastal legislation is a multi-parameter and site-specific issue. For example, the legislation on coasts is regional in France [68]. It has been stated that the coastal legislation of our country lacks this point of view [69].

While the world has a coastline of approximately 1 million km [70], our country has a coastline of 8333 km [71], [72]. Since this study was conducted in a coastal region, coastal legislation is within the scope of the research. In this context, the Coastal Law No. 3621 of 1990, which protects the coasts by considering their natural and cultural characteristics, has been examined. Regulation on implementation of the Coastal Law of 1990, which was prepared in accordance with Articles 5 and 16 of the Coastal Law,

has been also examined. In addition, the Spatial Plans Formation Regulation of 2014, which determines the principles for the planning of integrated coastal areas and guides the development plans, is among the legislations examined. In fact, coasts in Turkish law were first defined in the Turkish Civil Code of 1926 by stating that they were “under the control and usage of the state” [73], [74]. However, under this title, the focus is on the legislation that directly regulates the coasts. Article 5 of the Coastal Law states that “Coasts are under the control and usage of the State, and open to everyone's equal and free utilization, primarily by considering the public interest” [60].

Article 43 of the Turkish Constitution No. 2709 of 1982 [75] and Article 715 of the Turkish Civil Code No. 4721 of 2001 [1] mention that “the coasts are under the control and usage of the state and the public interest is primarily considered in benefiting from the coasts”. The expression “under the control and usage of the State” in both the Constitution and the laws indicates that these places will not be subject to private property. The fact that the coast is not subject to private ownership has been mentioned in every legal regulation starting from the Ottoman Code of Civil Law (Mecelle) numbered 1876 [68] with minor changes until today. For this reason, they cannot be transferred [76]. No one, including the State, has the right of ownership on the coasts, only the state has the authority and duty to control and supervise these properties [77]. The “public interest” mentioned in the legislation is the sum of the benefits that all members of the society have in common [73]. The public interest [78], which plays the role of a common interest for the life of the society, is such an element that it limits even the right to property given to the individual by the Constitution [48].

In order to carry out the review of the coast in a whole, some of the concepts in the legislation have been defined. Based on the 4th article of the Coastal Law No. 3621 (1990); Shoreline, Shore edge line, Shore and Coastline were defined. The sketch showing the definitions is shared in Figure 3.6.

Shoreline, refers to the line formed by the union of the points where the water touches the land. This line separating water and land is not fixed. It constantly changes according to meteorological events.

Shore edge line, refers to the natural boundary of the areas where water movements are formed in the land direction after the shoreline. In other words, it forms the line

between the coast and the real estates under private and/or public ownership. It is necessary to determine the shore edge line according to scientific data and techniques in order to carry out a sustainable planning and implementation on the coast and coastline [78]. In other words, the shore edge line is the determining factor in the potential construction demands in the coastal region. Determination of the shore edge line is made within the scope of the “Citizen's request” or “Detection program prepared by the Governorships”. The determination of the shore edge line is made by a commission consisting of at least 5 public officials by the governorships [79]. The coastline determined by the commission is approved by the Ministry of Environment, Urbanization and Climate Change, based on the Decree No. 644 [80].

Shore, refers to the natural transition area of various shapes surrounded by the coastline between the shoreline and the shore edge line. For this reason, shores are determined by determining the shoreline and shore edge lines. [47].

Coastline, refers to the area with a width of at least 100 meters horizontally in the direction of the land from the shore edge line. The coastline, which forms an integral/inseparable part of the coast [71], consists of two parts. The first 50 meters from the shore edge line constitute the first section. The following 50 meters constitute the second part. The second part of the coastline may be wider than 50 meters. For the mentioned areas, the right of public and limited construction has been admitted. In this way, the daily needs of the society can be met.

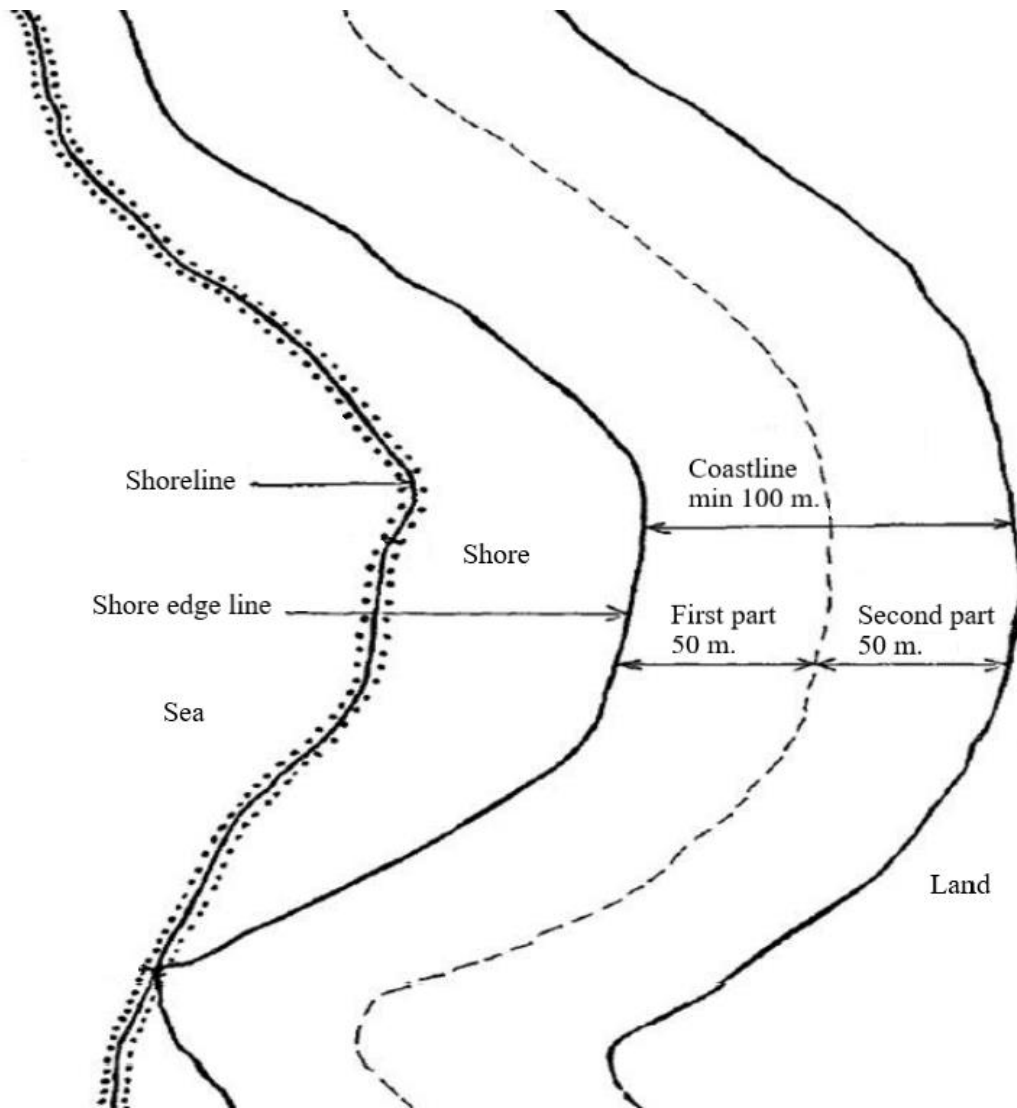


Figure 3.6: The sketch showing the definitions in the Coast Law No. 3621 [60]

3.7.2 Conservation area and its legislation

Protected areas are the remains/marks of various cultures from prehistory to the present day. They reflect the social, economic and architectural characteristics of the periods in which they existed [81]. These areas are declared as protected areas and they are tried to be protected as a whole within the scope of this special status [82]. In this context, according to the International Union for Conservation of Nature and Natural Resources (IUCN), more than 5% of the earth's surface is reserved as a protected area [83]. The types of protected areas are natural, archaeological, historical, urban and mixed (consisting of different protected areas). According to the Ministry of Culture

and Tourism, the total number of registered protected areas in Turkey as of 2021 is 22,233 [84]. 965 (4.34%) of these protected areas are located within the provincial borders of İzmir. The study area has a total of 18 protected areas, including 1 urban and 17 natural. The total size of the protected areas in the study area is approximately 15.56 km² (26.49% of the study area). The percentage produced from the total area of each protected area is shared as a pie chart in Figure 3.7. It is obvious that the protected area has an important weight for the study area.

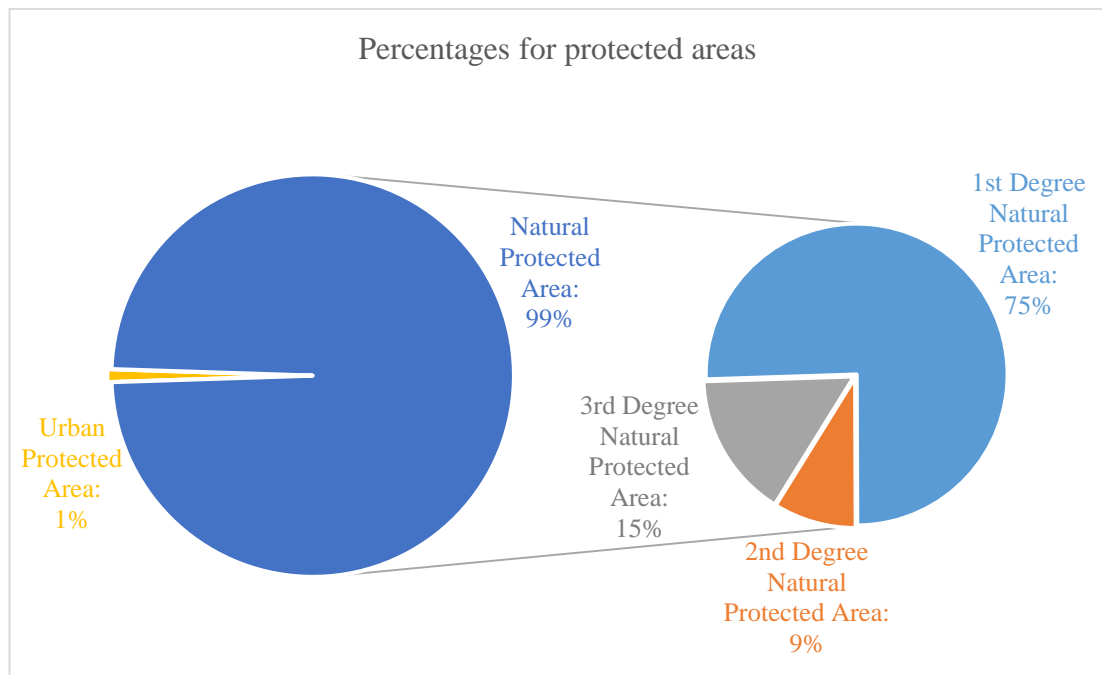


Figure 3.7: The surface area covered by protected areas in the region of interest

In terms of legislation, the Protection of Cultural and Natural Properties Law No. 2863 of 1983 has been examined. The purpose of the Law is to determine the issues related to the movable and immovable cultural and natural properties that need to be protected, to regulate the processes and activities to be carried out, and to take the necessary principles and implementation decisions. In the mentioned implementation decisions, it is explained which type and degree of construction is allowed in the protected area. For example, while construction is not allowed in 1st degree natural protected areas (sensitive area to be definitely protected); Tourism and service structuring is allowed in 2nd degree natural protected areas (qualified natural protection areas), and residential

construction is allowed in 3rd degree natural sites (sustainable conservation and controlled usage areas), albeit at low density. The main reason for mentioning the degree is that while some protected areas (e.g. natural, archaeological) are subclassified, some protected areas (e.g. urban) are not subclassified. In addition, private property owners whose real estate is registered and declared as a protected area have the opportunity to expropriate with Article 15, exchange with Article 17 of the mentioned Law. As a result, when an immovable on the protected area is queried, the Protection of Cultural and Natural Properties Law No. 2863 of 1983 will appear and it will be understood that this Law will be addressed.

Another area that encounters the Protection of Cultural and Natural Properties Law No. 2863 of 1983 is the Specially Protected Environment Area (SPEA). Although it is not located in the study area, it is located just on the border of the study area. SPEA is an obligation brought by the Barcelona Convention (Convention on the Protection of the Mediterranean Against Pollution) to the parties. In this way, it is aimed to protect natural and historical properties of ecological importance, which are not yet heavily polluted. Unlike other protected areas, there are settlements in SPEA and various activities continue [5]. However, the protection and transfer of SPEAs to future generations is guaranteed by international conventions. The Convention on the Protection of the World Cultural and Natural Heritage, published by UNESCO in 1972, is the primary legislation regarding SPEAs [5]. There are a total of 19 SEPAs in Turkey with an area of 3,805 km² (approximately 5% of Turkey's surface area) [85]. The sustainable management of SPEAs, which are even larger than the surface area of many countries, is very important in our country. The first SEPAs of our country were established in regions with touristic interests and activities [86]. Also, SPEAs can be under public or private ownership. Among the mentioned SEPAs, “Foça Specially Protected Environment Area (71.44 km²)”, which was published in the Official Gazette dated 21.11.1990 and numbered 20702, is adjacent to the study area (Figure 3.8). The most important factor in declaring the mentioned area as SEPA is the “*Monachus monachus*”, which is in danger of extinction and has about 400 left in the world today. In addition, Environmental Law No. 2872 of 1983 and National Parks Law No. 2873 of 1983, which were prepared to protect environmental values and eliminate existing environmental problems, are among the legislations that will be encountered as a result of query.



Figure 3.8: Approved Foça SPEA boundary

3.7.3 Agricultural land area and its legislation

70% of our lands are under low, moderate and high erosion pressure. Pastures that protect from many environmental disasters (e.g. erosion, vegetation fires, floods) and ecological problems, insure the existence of countries. They are also natural resources that can renew themselves [87]. Grasslands and pastures, which constitute the main feed source of animal husbandry/farming in the world, are an indispensable element of the biological life cycle that contains endemic species. While the grassland-pasture areas, which are referred to as “common properties” for the direct use of the public, were 44.2 million hectares throughout Turkey in the 1940s [88], it decreased to 12.9 million hectares in 2020 [89]. In the calculation, where the total area of Turkey is taken as approximately 78 million hectares, the grassland-pasture area of 56.4% has decreased to 16.5%. The part of the mentioned decline until 1965 is explained by the “Law of Providing Land to Farmers No. 4753 of 1945”, which ensures the distribution of approximately 10 million hectares of fertile grassland-pasture area as “field” [90], [91]. The remainder is explained by rural settlement [92], agricultural and mining

activities [93], excessive and irregular grazing [94]. This consistent decline will have been noticed because the Rangeland Law No. 4342 of 1998 was published in order to protect and improve our natural resources. This Law was published in line with the provision in Article 45 of our Constitution, “The State prevents the impropriety and destruction of agricultural lands and grasslands-pastures”. Even in EU countries, there is no such independent and comprehensive regulation [75].

In our history, the first comprehensive Law on pastures is "the Kanunnâme-i Arazi of 1858" [94]. However, current legislation has been taken into account within the scope of the study and the Rangeland Law No. 4342 of 1998, which consists of 7 chapters and 38 articles, has been examined. In addition to the mentioned Law, Cadastre Law No. 3402 of 1987 has also been examined. In addition, Rangeland Regulation of 1998, which regulates the procedures and principles in practice, has been examined. Rangeland Regulation of 1998 was published based on the 31st article of the Rangeland Law. In general, it is mentioned about the “determination”, “limitation”, “allocation/distribution” processes that regulate the protection, use, maintenance and improvement of rangelands. In addition, it is mentioned that “reclamation projects” that symbolize the sustainability of rangelands, and the intended purpose can be changed under certain conditions (Rangeland Law, article 14; Rangeland Regulation, article 8) [95], [96]. There is a total of 16.41 km² grassland and pasture area in the study area. This area constitutes approximately 28% of the study area. Due to the area it covers, grassland-pasture areas have an important weight for the study.

Another area that has the same importance (approximately 25% of the study area) is the farmlands, where the areal declining trend continues. Farmlands are areas that contribute to the employment of the population, produce essential foodstuffs, provide input to the industrial sector, contribute to exports, and constitute an important part of the national income [97]. The portion of agriculture in the Gross National Product (GNP) in Turkey is 7.5% in 2020 [98]. According to the data of Turkish Statistical Institute for the year 2020, the total agricultural area is 37,762 hectares, including grassland and pasture areas. The total agricultural area per capita is 0.28 hectares [99]. Soil Conservation and Land Use Law No. 5403 of 2005 is the legislation examined for the farmland. This Law determines the procedures and principles regarding the protection, development and use of farmlands. In addition, at the end of the text of this

Law, the farmland sizes of Turkey on the basis of Province/County are listed in four classes (e.g. wet, dry, planted, greenhouse land) [100]. In the mentioned list, it is stated that the county of Foça, where the study area is located, has a total of 203 decares of farmland.

Forest areas are another “ownerless property” [1] which is open to the use of the public due to its natural characteristics without an allocation process. For the forest area that cannot be used as private property [101], the Forest Law No. 6831 of 1956 and the Cadastre Law No. 3402 of 1987 were examined. The forest legislation in question puts forests under the rule and usage of the state. It prohibits activities that harm forests, vegetation, and water resources. It limits the use of land for other purposes in forested areas [102]. On the other hand, the issues regarding the removal of areas (e.g. various agricultural areas or lands that are useful for animal husbandry, residential areas, etc.) that have completely lost their forest attribute are mentioned in Article 169 of the Turkish Constitution No. 2709 [75] and Article 2 of the Forest Law No. 6831 [102].

As a result, the user whose real estate is located on one or more of the above-mentioned areas will encounter the legislations detailed above. Thus, the user will learn the legislation for which the real estate is responsible, and will be able to receive both legal and technical support.

3.7.4 Settlement area and its legislation

The Zoning Law No. 3194 of 1985 has been examined within the scope of the urban built-up area, the urban development area and the preferred usage area. The Spatial Plans Formation Regulation of 2014 is another legislation that has been examined since it clarifies the concepts of the mentioned Law. Spatial Plans Formation Regulation of 2014, which consists of 13 sections and 40 articles, is an important regulation that determines the procedures and principles regarding spatial or zoning planning in our country [103]. While the mentioned Regulation clarifies the levels of spatial plans of all types and scales, it contains provisions that make plan changes difficult [104]. The Planned Areas Zoning Regulation of 2017, which has explanatory provisions regarding the preparation of spatial plans, is another legislation examined.

The Tourism Encouragement Law No. 2634 of 1982 was examined within the scope of the tourism facility area. The purpose of the mentioned Law is to ensure that arrangements and preventions are taken to regulate and develop the tourism sector and to bring it into a dynamic structure and functioning [105]. Since the passing of the mentioned Law, the number of tourists coming/visiting our country has increased approximately 22 times and tourism revenues have increased approximately 62 times [106]. It is seen how beneficial results can be obtained if the laws are applied correctly. The last area covered under this title is the Military area. In this context, the Military Restricted Zones and Security Zones Law No. 2565 of 1981 and the Military Restricted Zones and Security Zones Regulation of 1983 were examined.

As a result, the user whose real estate is located on the mentioned areas will be guided to the legislation mentioned above, and it will be ensured that he/she continues in this direction.

3.8 Associating the national legislation with real estates

In this part of the study, the process of preparing the attribute tables presented to the user is detailed. This detailing process was carried out in two different ways for the main criteria with imaginary datasets (Owner of the real estate, Acquisition form of the real estate, Encumbrance of the real estate) and for the main criteria with actual datasets (Location of the real estate, Type of the real estate, Intended purpose of the real estate). Some WEB-based applications (e.g. title deed information query application) and publicly available sample title deeds were used for the main criteria with imaginary datasets. In this way, first the properties of the real estates, and then the responsible legislation informations were added to the attribute table. This was done for the main criterion with each imaginary dataset. As a result, half of the attribute table of the real estates was filled.

The remaining half was filled with main criteria with actual dataset. At this stage, data entry was made regarding the main criterion of the location of the real estate. For this, some analysis (e.g. spatial intersection analysis) based on land cover and building/parcel geometries were made. First of all, it was determined which real estate

is located on which area. In this way, the legislative boundary of each real estate and the legislative map of the region were created (Figure 3.9). Then, the legislations were processed collectively on the real estates using some analysis (e.g. Overlay analysis) and tools (e.g. Select by location/attribute). Thanks to this spatial analysis to be carried out with the vector data type, the legislation information embedded in the land cover will be transferred to the real estates related to the main criterion of location. These analysis, which are frequently used in GIS, are carried out by transferring the information in one layer to another layer [36]. In this way, the responsible legislative information and the guiding link are included in the attribute table. After this process, any real estate group subject to any legislation can be collectively selected and viewed. This viewing will enable to understand the widespread legislation distribution in the region and to plan some additional local/regional legal arrangements needed. Some WEB-based applications (e.g. parcel query application, ATLAS application) were used for the main criterion of the type of real estate. The types of real estates have been extracted from the mentioned WEB-based applications, and the legislation(s) for which they are responsible due to their type have been (manually) entered into the attribute tables of the real estates. Only the legislation entry has been made for the main criterion of the intended purpose of the real estate. Because Izmir Metropolitan Municipality, Department of Maps and GIS shared the real estates with the intended purpose information (see Appendix A.1). As a result, each real estate has been made ready for querying.

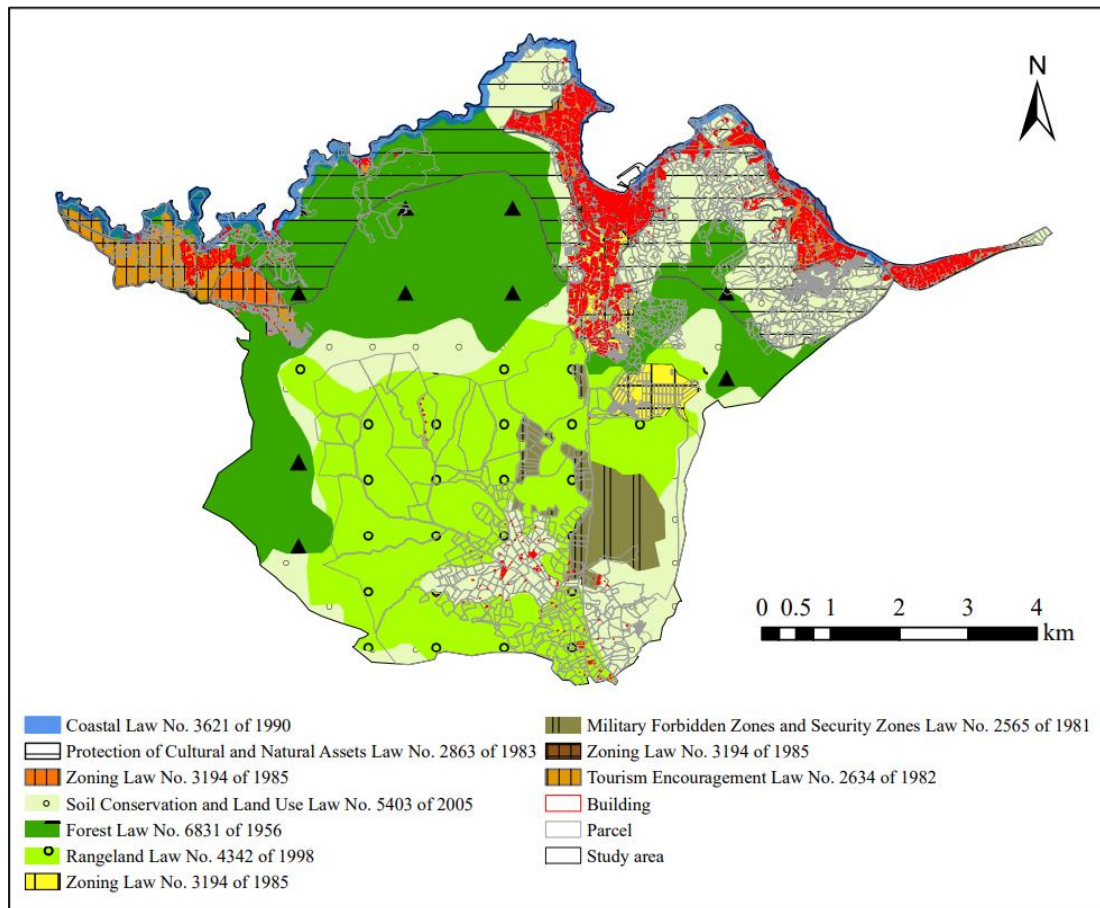


Figure 3.9: Legislation map

3.9 Information system model

Running one or more models in any GIS project is a common part of the process. The mentioned model is frequently seen especially in studies using GIS data that need to be updated [107], [108]. Modelbuilder is used to automate and associate a set of geoprocessing tools in ArcToolbox. It is an intuitive tool embedded in ArcGIS software. ModelBuilder, a powerful way to schematize the workflow, provides researchers with highly visual outputs by using shapes, colors, and symbols without using text-based instructions [109]. ModelBuilder can be edited and shared with others for use on a different dataset. In the current study, the model was used to automate the updating of graphical and verbal data collected from different sources. The input variables should be introduced to the model by the public institution(s) in the role of data provider (e.g. GDLRC). In the study, it was necessary to process very different data together. For this reason, the 55 institutions (e.g. General Directorates,

Metropolitan Municipalities, Governorships) that carry out activities for the land [11] should be included in the model process in cooperation. The output variable obtained as a result of running the model constitutes the input variable of the designed information system. Finally, the output variables of the model are stacked by overlay analysis and presented to the user in their most up-to-date form. The model that automates all the mentioned updates is shared in Figure 3.10.



Figure 3.10: Real estate legislation information system model, (a) for the owner of the real estate, (b) for the location of the real estate, (c) for the type of the real estate, (d) for the intended purpose of the real estate, (e) for the acquisition form of the real estate, (f) for the encumbrance of the real estate

The model was created with the ModelBuilder tool, but the model may not be able to perform complex geospatial processes alone. Because some high-level geospatial processes are performed with scripts using more advanced programming logic. Also, different software (e.g. Python, MS Excel) may need to be involved in the process. Python is used to create scripts, but models can be converted to scripts without using any programming language (not vice versa). In other words, it is possible to change from a visual programming language to a text-based programming language. However, no script was written as there was no complex geospatial process in the current study.

Chapter 4

Results and Discussion

Each real estate has been associated with the legislation according to spatial and attributive criteria. In order to better understand the established relationship, sample queries of both different main criteria on the same real estate and different real estates for the same main criteria were made on the basis of GIS. The results are shared with screenshots taken at 1:1000 scale. It is enough to click on the real estate of interest in order to access the mentioned attribute table. In this way, the legislation(s) can be seen together with the guiding link. In addition, both Identify and HTML Popup queries were made. In this way, screens in the different interfaces can be compared. Before the sample queries, the field names in the attribute table are explained in Table 4.1. In this way, a more understandable query process was carried out by becoming familiar with the attribute table.

Table 4.1: Descriptions of field names in the attribute table

Field name	Description
Object ID	Alphanumeric code used to identify real estates
Province	The name of the province where the real estate is located
County	The name of the county where the real estate is located
Neighborhood	The name of the neighborhood where the real estate is located
Block	The block number representing the real estate
Parcel	The parcel number representing the real estate
Title deed area	Total title deed area of the real estate
Position	The name of the position where the real estate is located
Layout	The name of the layout on which the real estate is located
Legislation	The name of the legislation for which the real estate is responsible
Link	Link to the responsible legislation

4.1 Building-based query

4.1.1 Building-based identify query

Sample query 1,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10729 block, 10 parcel was queried in terms of the main criterion of “owner”. The owner of the real estate is a “real person”. Since the real estate is subject to private ownership, “Turkish Civil Code” and “Expropriation Law” appear in the marked cell of the attribute table with the guiding link (Figure 4.1).



Figure 4.1: Querying the owner of the real estate located on block 10729 parcel 10

Sample query 2,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10729 block, 10 parcel was queried in terms of the main criterion of “location”. Since the real estate is located on the “urban built-up area”, “Zoning Law” appears in the marked cell of the attribute table with the guiding link (Figure 4.2).

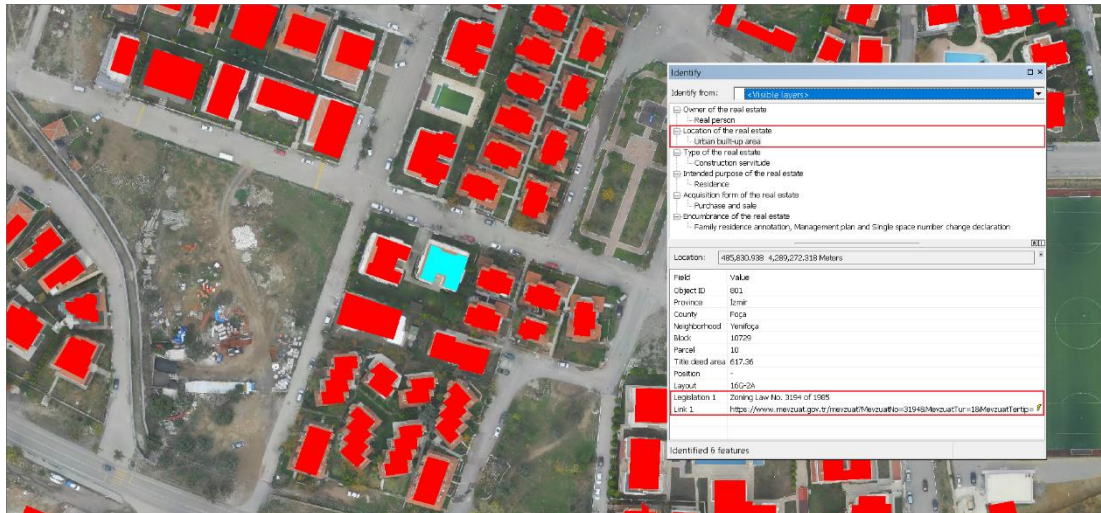


Figure 4.2: Querying the location of the real estate located on block 10729 parcel 10

Sample query 3,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10729 block, 10 parcel was queried in terms of the main criterion of “type”. Since the real estate has a “construction servitude” ground type, “Turkish Civil Code” and “Condominium Law” appear in the marked cell of the attribute table with the guiding link (Figure 4.3).

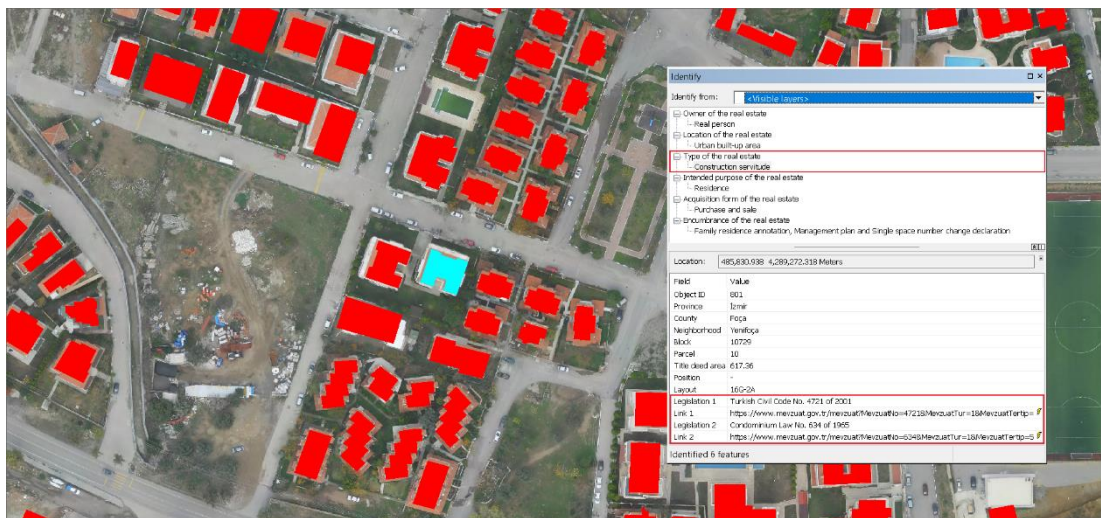


Figure 4.3: Querying the type of the real estate located on block 10729 parcel 10

Sample query 4,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10729 block, 10 parcel was queried in terms of the main criterion of “intended purpose”. Since the real estate is used for “Residence, Apartment” purposes, “Zoning Law” and “Condominium Law” appear in the marked cell of the attribute table with the guiding link (Figure 4.4).

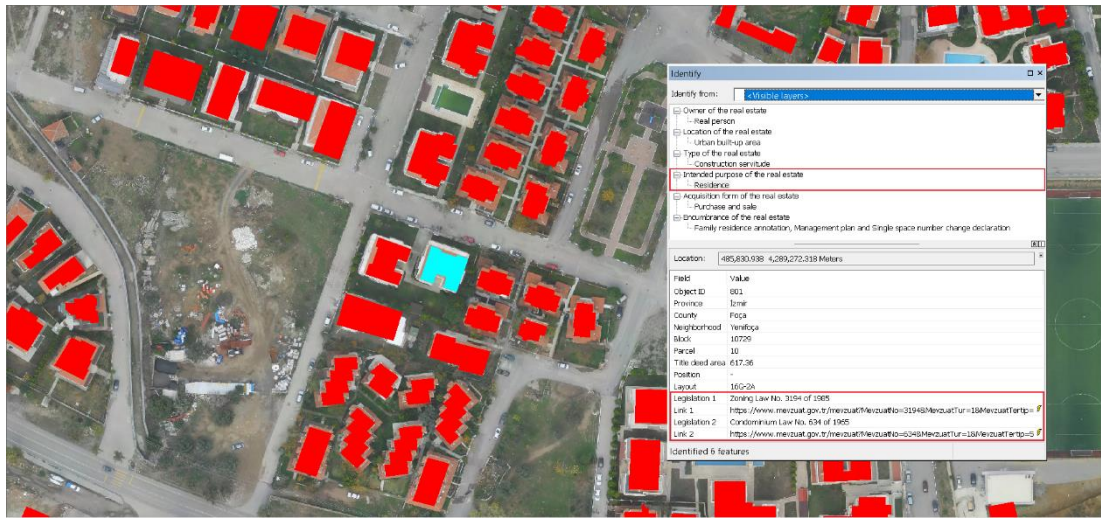


Figure 4.4: Querying the intended purpose of the real estate located on block 10729 parcel 10

Sample query 5,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10729 block, 10 parcel was queried in terms of the main criterion of “acquisition form”. Since the real estate was acquired from Foça Land Registry Office through “purchase and sale”, “Turkish Civil Code” and “Land Registry Law” appear in the marked cell of the attribute table with the guiding link (Figure 4.5).

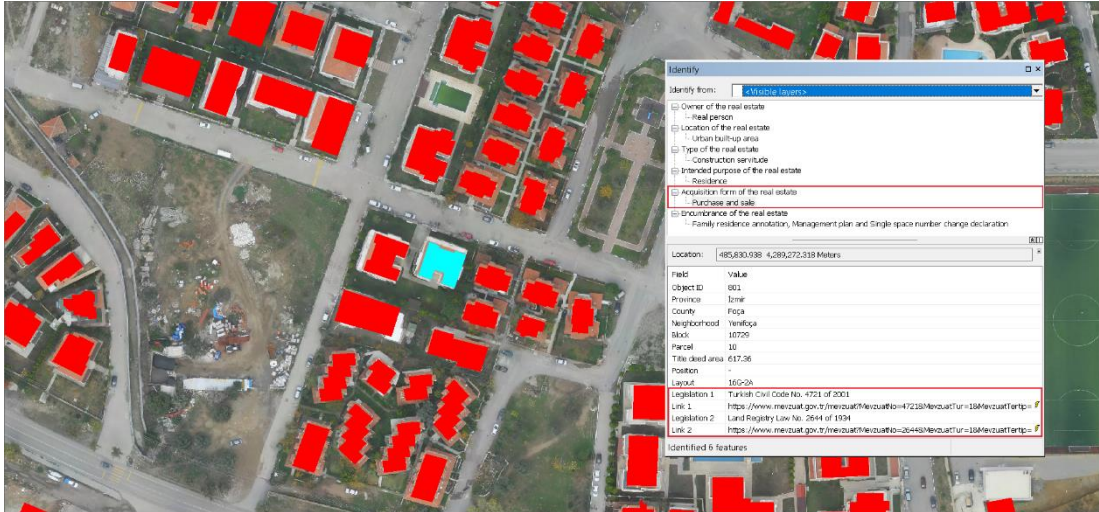


Figure 4.5: Querying the acquisition form of the real estate located on block 10729 parcel 10

Sample query 6,

The real estate located in İzmir Province, Foça County, YeniFoça Neighborhood, 10729 block, 10 parcel was queried in terms of the main criterion of “encumbrance”. Since the real estate has the “Family residence annotation”, “Management plan declaration” and “Single space number change declaration”, “Turkish Civil Code” and “Condominium Law” appear in the marked cell of the attribute table with the guiding link (Figure 4.6).

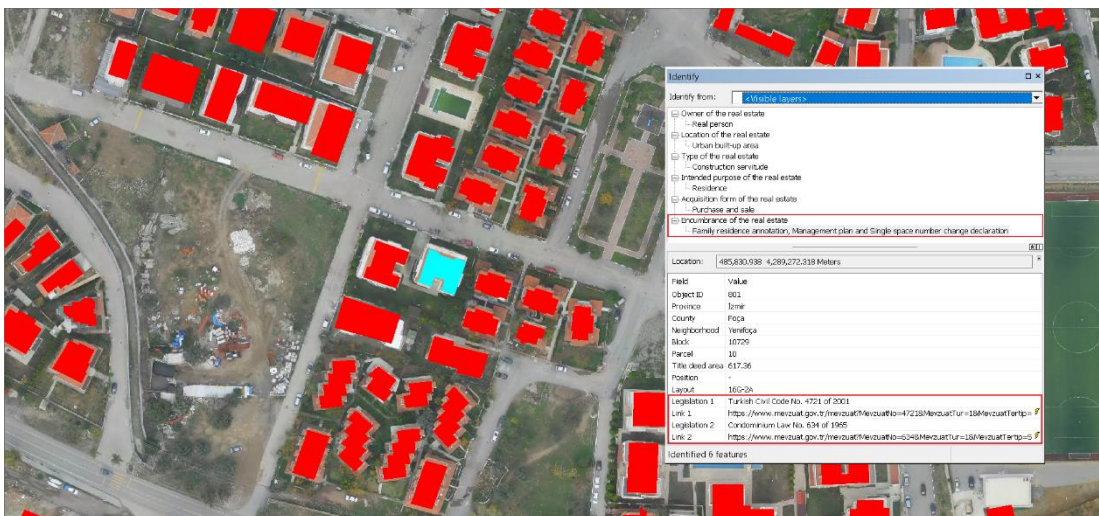


Figure 4.6: Querying the encumbrance of the real estate located on block 10729 parcel 10

4.1.2 Building-based HTML Popup query

Sample query 7,

A real estate has been queried above according to the features. However, real estates can have more than one feature for any main criterion. Although it is seen that this is generally valid for the main criteria of “location”, it is also valid for other main criteria. The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 514101 block, 772 parcel was queried in terms of the main criterion of “location”. The real estate is located on “coastal area”, “protected area” and “farmland”. Due to all these simultaneous spatial features, “Coastal Law”, “Protection of Cultural and Natural Properties Law” and “Soil Conservation and Land Use Law” appear in the marked cell of the attribute table with the guiding links (Figure 4.7). This query is proof that a real estate may be subject to more than one legislation at the same time due to its location. In addition, query illustrations were used to make the query more understandable in HTML Popup queries. Query illustrations are images that explain and embody a text/information. In these illustrations, which are included in the process with the “Image” field name, the object circled in red is the real estate being queried. In addition, there are common land cover near the real estate and a legend explaining the layers.

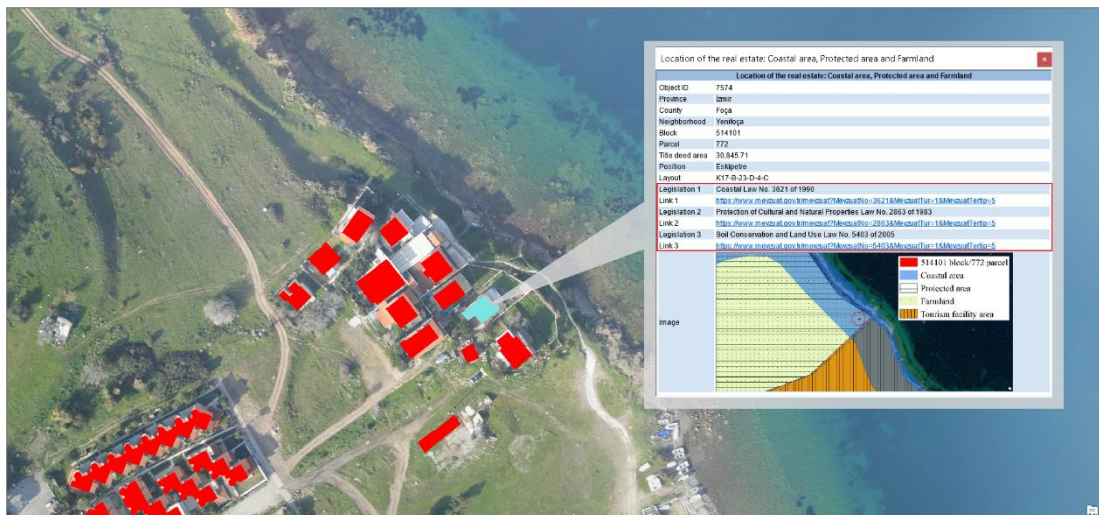


Figure 4.7: Querying the location of the real estate located on block 514101 parcel

772

Sample query 8,

In this sample query, the results of different real estates for the same main criterion are shared. The real estates located in İzmir Province, Foça County, Yenifoça Neighborhood, 514101 block, 772 parcel and 10729 block, 10 parcel were queried in terms of the main criterion of “location”. Since the real estates are located in the “urban built-up area”, “Zoning Law” appears in the marked cell of the attribute table. However, since the real estate on block 0, parcel 2191 is located on the “urban protected area”, “Protection of Cultural and Natural Properties Law” appears in the attribute table as Legislation 2 (Figure 4.8).

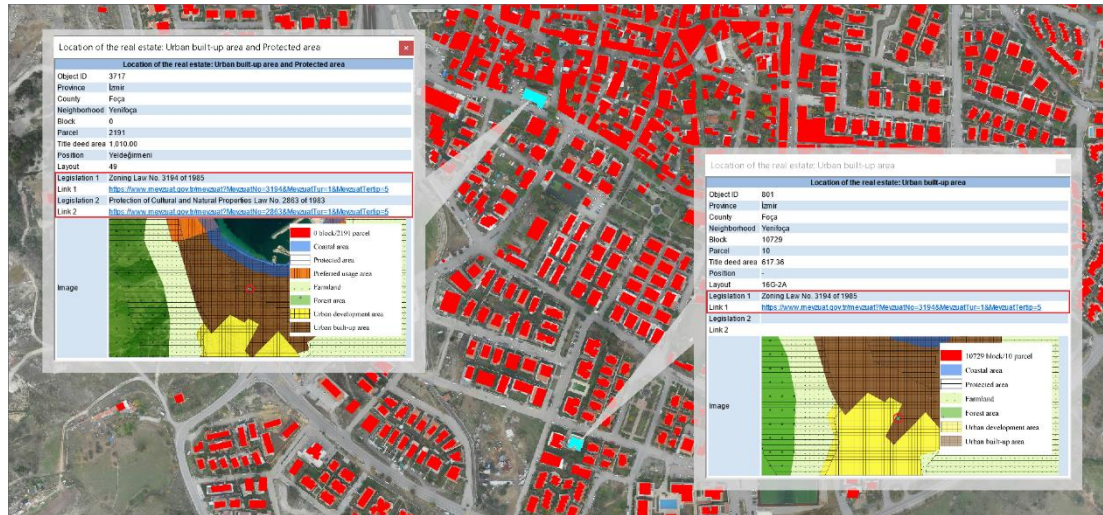


Figure 4.8: Querying of different real estates for the same main criterion

4.2 Parcel-based query

4.2.1 Parcel-based identify query

Sample query 9,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10002 block, 2 parcel, 3 number single space was queried in terms of the main criterion of “owner”. Since the owner of the real estate is a “real person”, “Turkish Civil Code” and “Expropriation Law” appear in the marked cell of the attribute table with the guiding link (Figure 4.9).

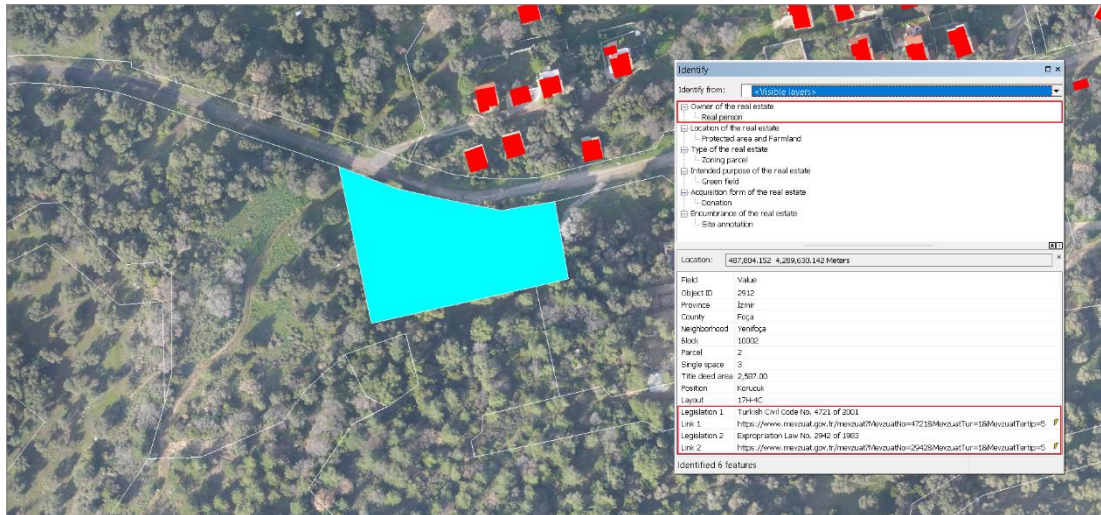


Figure 4.9: Querying the owner of the real estate located on block 10002 parcel 2

Sample query 10,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10002 block, 2 parcel, 3 number single space was queried in terms of the main criterion of “location”. Since the real estate is located on the “protected area” and “farmland”, “Protection of Cultural and Natural Properties Law” and “Soil Conservation and Land Use Law” appear in the marked cell of the attribute table with the guiding link (Figure 4.10).

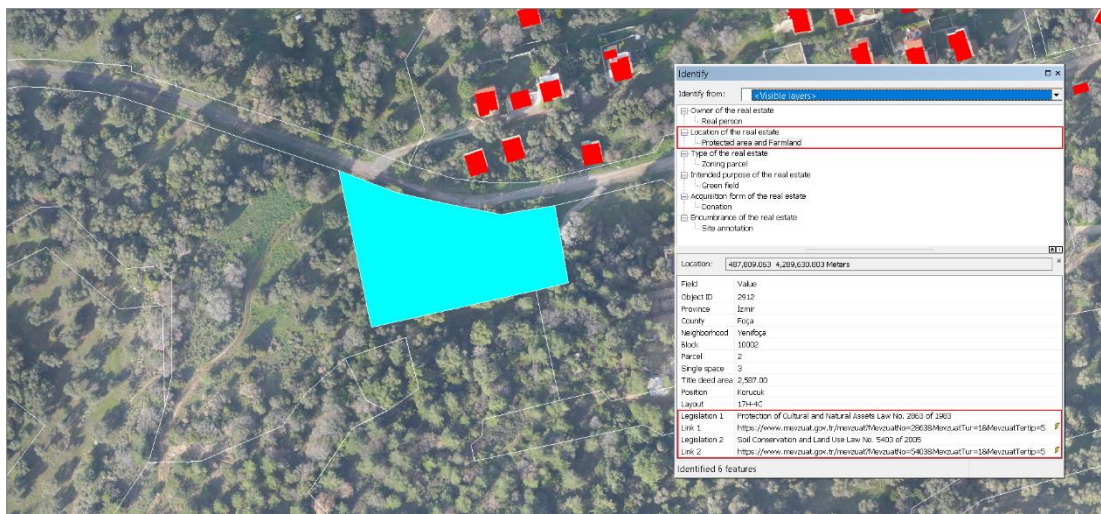


Figure 4.10: Querying the location of the real estate located on block 10002 parcel 2

Sample query 11,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10002 block, 2 parcel, 3 number single space was queried in terms of the main criterion of “type”. Since the real estate has the “parcel” attribute, “Zoning Law” appears in the marked cell of the attribute table with the guiding link (Figure 4.11).

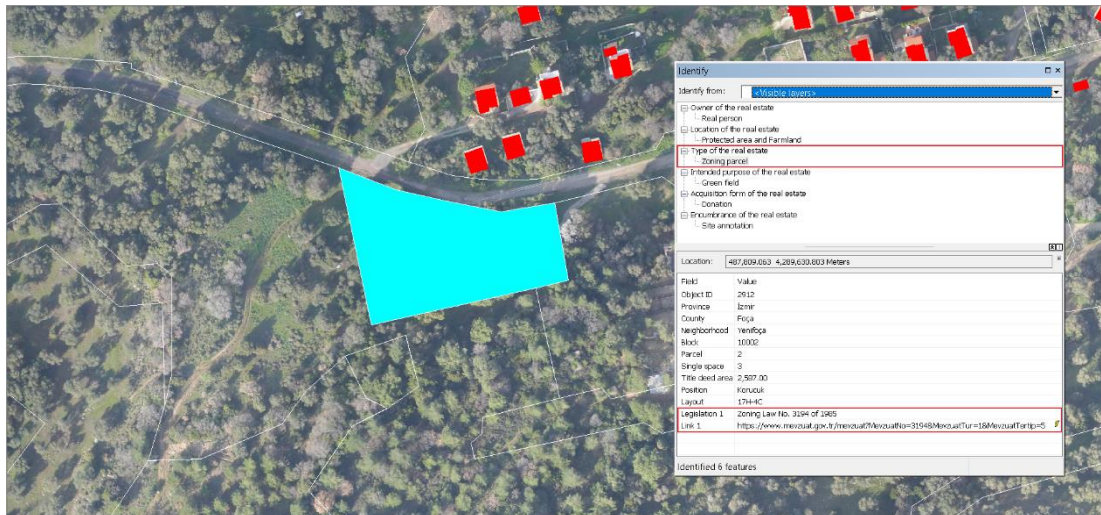


Figure 4.11: Querying the type of the real estate located on block 10002 parcel 2

Sample query 12,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10002 block, 2 parcel, 3 number single space was queried in terms of the main criterion of “intended purpose”. Since the real estate is used for “Green area” purposes, “Zoning Law” appears in the marked cell of the attribute table with the guiding link (Figure 4.12).

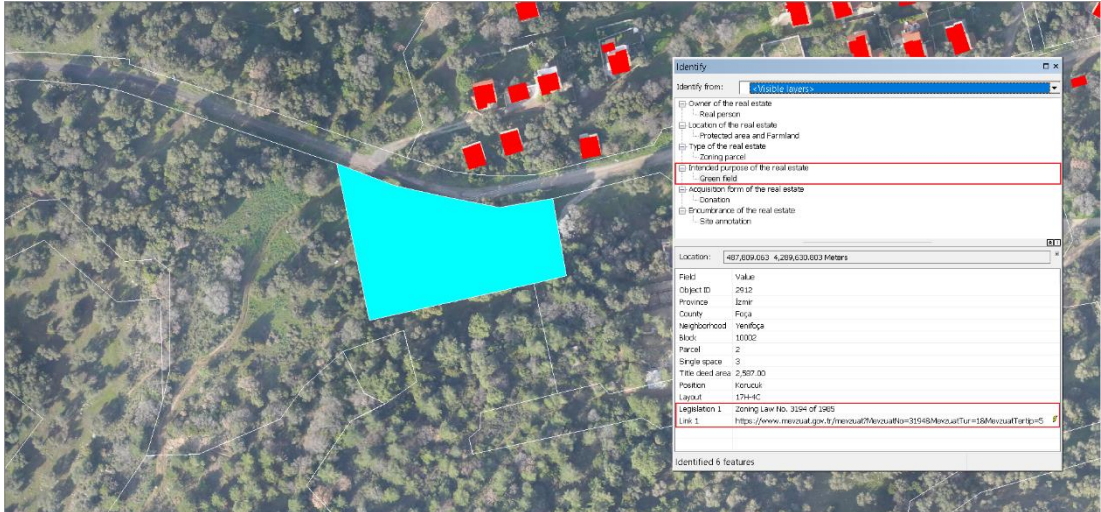


Figure 4.12: Querying the intended purpose of the real estate located on block 10002 parcel 2

Sample query 13,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10002 block, 2 parcel, 3 number single space was queried in terms of the main criterion of “acquisition form”. Since the real estate was acquired through “donation”, “Turkish Civil Code” appears in the marked cell of the attribute table with the guiding link (Figure 4.13).

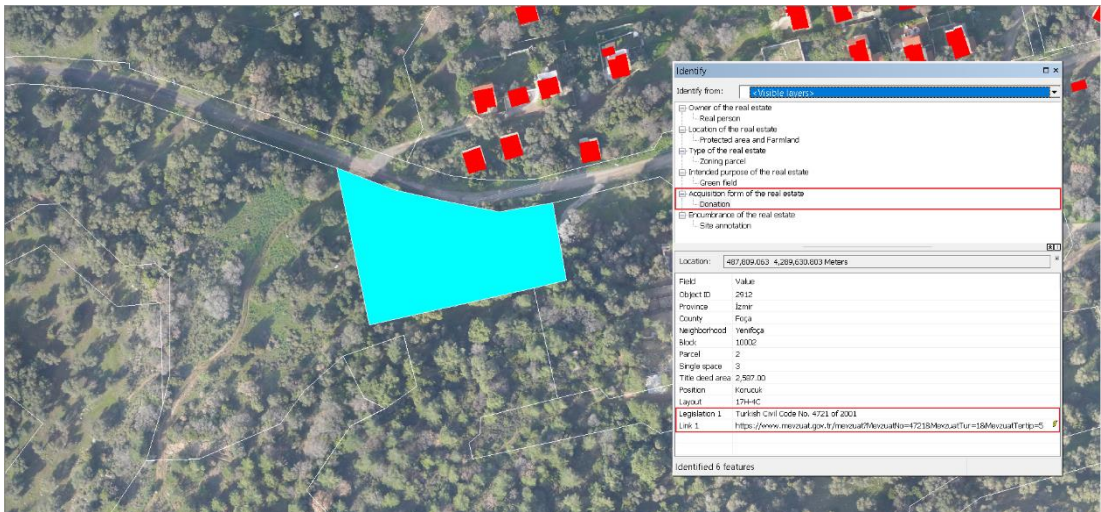


Figure 4.13: Querying the acquisition form of the real estate located on block 10002 parcel 2

Sample query 14,

The real estate located in İzmir Province, Foça County, Yenifoça Neighborhood, 10002 block, 2 parcel, 3 number single space was queried in terms of the main criterion of “encumbrance”. Since the real estate has the “1st degree natural site annotation”, “Protection of Cultural and Natural Properties Law” appears in the marked cell of the attribute table with the guiding link (Figure 4.14).

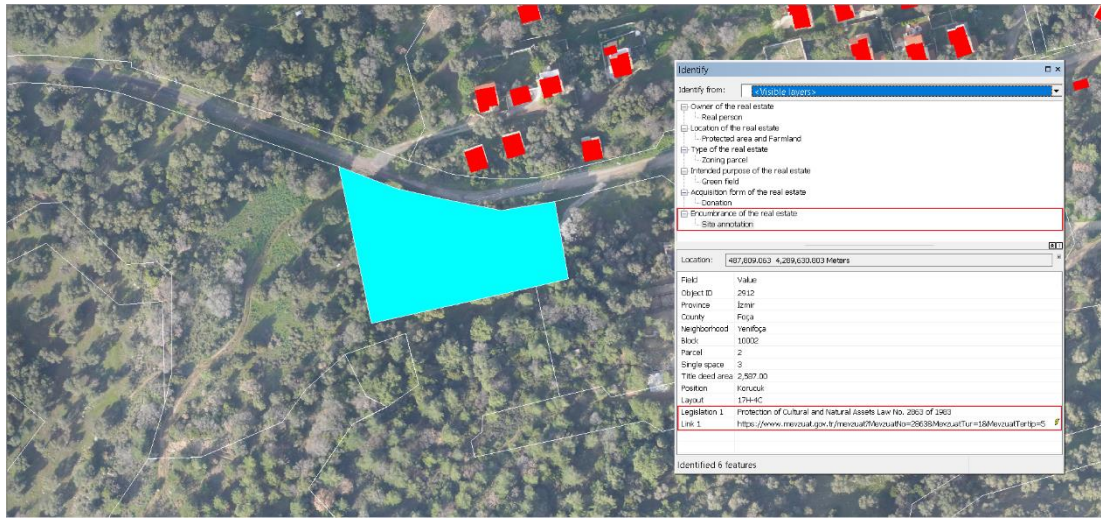


Figure 4.14: Querying the encumbrance of the real estate located on block 10002 parcel 2

4.2.2 Parcel-based HTML Popup query

Sample query 15,

In this sample query, an HTML Popup query was made for the same real estate of different main criteria. The real estate located in İzmir Province, Foça County, Yenifoça-Fevzi Çakmak Neighborhood, 504126 block, 3146 parcel was queried in terms of the main criterion of “owner”. Since the owner of the real estate is a “public legal entity”, “Turkish Civil Code”, “Law on Evaluation of Real Estate Property Owned by the Treasury and Amending the Value Added Tax Law” and “Law on Privatization Implementations” appear in the marked cell of the attribute table with the guiding link (Figure 4.15). The same real estate was also queried in terms of the main criterion of “location”. Since the real estate is located on the “Military area”, “Military

Restricted Zones and Security Zones Law” appears in the marked cell of the attribute table with the guiding link (Figure 4.15).

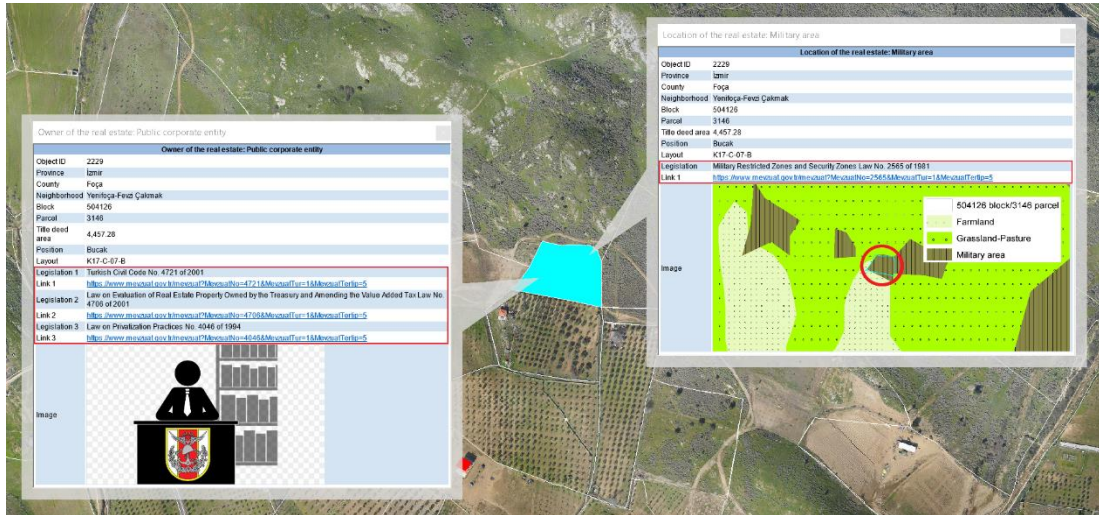


Figure 4.15: Query of the same real estate for different main criteria

Chapter 5

Conclusion and Recommendations

The study, which transfers the legislation that the real estates are responsible for due to different criteria, has generally reached its goals. In this context, real estate owners who do not have technical and legal knowledge will reach the legislation directly or indirectly related to their real estates. Thus, it will be ensured that there are no problems especially after the purchase and sale process. In addition, a more aware society will emerge in protecting and using their legal rights. Professional groups (e.g. public/private sector employees) who have a relationship with the real estate in any respect will be able to learn in a short time what legislation the real estates are subject to. This information will shorten the decision-making processes in real estate cases, valuation report preparation processes and real estate acquisition procedures. In addition, pecuniary loss and intangible damages that may arise in cases carried out according to the incorrect legislation will be reduced. In addition, it has been a guiding study for possible updates to applications such as “Parcel inquiry application”, “Land registry information inquiry application”, “ATLAS application” and “TAKBİS application”. Moreover, it is thought that the national legislation inventory based on real estate will make a relatively important contribution to the literature.

In order to convert the designed information system into a more useful form, some recommendations have been made for the identified weaknesses. The mentioned recommendations are listed as follows,

- In the study, the definition of “main structure consists of single spaces” [110] of the Condominium Law No. 634 of 1965 was ignored. In other words, single spaces were neglected in the study. In the next stage of the study, it is expected that the single space separation will be provided with a new tool and the

attribute information separated according to the single spaces will be presented to the users.

- In order to establish a more comprehensive real estate-legislation relationship, it is expected that Master Court Decisions (e.g. Supreme Court, Council of State, Constitutional Court, European Court of Human Rights, Court of Accounts, Regional Courts) and Regulations, Directives and Circulars will be included in the legislation inventory.
- Instead of GIS-based presentation of real estate attributes, web-based presentation will be more beneficial by using cloud-based mapping services. In this way, the designed information system will become a functional application that provides independent use with open source access, leaving the restrictive GIS / CAD software.

As a result, our expectation is that the designed information system will be supported by public power and put into service for users. This will increase the diversity of services offered to the public. In addition, a more sustainable legislation management will be ensured with the established real estate-legislation relationship.

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Appendices

Appendix A.1

Data Usage Permission Form prepared by Izmir Metropolitan Municipality, Department of Maps and GIS

Evrak Tarih ve Sayısı: 30.04.2022-740665

 T.C.
İZMİR BÜYÜKŞEHİR BELEDİYE BAŞKANLIĞI
Harita ve Cbs Dairesi Başkanlığı 

Sayı : E-27493744-622.01-740665
Konu : YÜKSEK LİSANS TEZİ VE BAŞVURUSU
PLANLANAN TÜBİTAK PROJESİNE İLİŞKİN VERİ
DESTEK TALEBİ

Sayın ARŞ.GÖR.MERT KAYALIK
BALATÇIK MH HAVALANI ŞOSESİ CD NO 33/2 TATÜRK
OSB ÇİĞLİ/İZMİR

İlgi : 19.04.2022 tarihli ve BİLA sayılı yazınız

İlgi yazı ile tez çalışmasında kullanılmak üzere Foça ilçesine ait veriler talep edilmektedir. Müdürlüğümüz sorumluluğunda olan ve Coğrafi Bilgi Sistemi Veri Tabanında (CBSVT) bulunan mahalle sınırı, yol orta hatları ve yapı bilgilerinin temini, 11/01/2010 tarih ve 29 nolu Meclis Kararı gereğince Belediyemiz ile yapmış veri paylaşımı protokolü varsa ücretsiz, yoksa ücreti mukabilinde gerçekleştirilmektedir. Ancak 229 nolu ve 09/03/2020 tarihli Meclis Kararı ile, ödev ya da tezde kullanılmak üzere (Ön lisans, Lisans, Yüksek Lisans, Doktora Tezi vb.) veri talebinde bulunan öğrencilerin resmi yazı ile talep etmeleri durumunda 10 adet mahalle verisi ücret tarifesine tabi değildir.

Bu kapsamda Fatih, Fevzi Çakmak, Mustafa Kemal Atatürk ve Cumhuriyet mahallelerine ait adres verileri yazımız ekinde cd içerisinde shape (.shp) formatında gönderilmiştir. Gereğini bilgilerinize rica ederim.

Abdurrahman Suphi ŞAHİN
Büyükşehir Belediye Başkanı a.
Genel Sekreter Yardımcısı


Ek :1 Adet Cd.

Bu belge güvenli elektronik imza ile imzalanmıştır.

Belge Doğrulama Kodu *BSPR80B6Z3* Pin Kodu 63162 Belge Takip Adresi :
<https://eislem.izmir.bel.tr/tr/EbelgeSorgu/137eD=BSMR86Y9638eS=740665>

İlgili Birim	: Coğrafi Bilgi Sistemleri Sube Müdürlüğü	Bilgi İçin	: Yunus SERBETÇİ
Adres	: 1253 Sokak No 2-4 Oğuzlar Mah. Konak / İZMİR	Unvan	: Büro Personeli
Birim Telefon	: Birim Faks	Telefon	:
Elektronik Ağ	: www.izmir.bel.tr	E-Posta	:



/1



Appendix A.2

Data Usage Permission Form prepared by Izmir Metropolitan Municipality, Department of Zoning and Urban Development

Evrak Tarih ve Sayısı: 05.07.2022-848242

 T.C.
İZMİR BÜYÜKŞEHİR BELEDİYE BAŞKANLIĞI
İmar ve Şehircilik Dairesi Başkanlığı 

Sayı : E-87550252-622.03-848242
Konu : YÜKSEK LİSANS TEZİ VE BAŞVURUSU
PLANLANAN TÜBİTAK PROJESİNE İLİŞKİN VERİ DESTEK TALEBİ HAKKINDA BAŞVURU. 05.07.2022

Sayın MERT KAYALIK
Balatçık mah. Havaalanı Şosesi cd. no:33/2 35620
Atatürk Osb Çiğli/İzmir

İlgi : 09.05.2022 tarihli dilekçeniz

İlgi dilekçeniz ile ; Katip Çelebi Üniversitesi Fen bilimleri Enstitüsü Harita Mühendisliği anabilim dalında tez çalışmasında kullanılmak üzere ; Foça ilçesi , Yenifoça mahallesinde yapılacak çalışmada Cbs destekli taşınmaz mevzuatı bilgi sistemleri kurulmasına yönelik 1/25000 ölçekli Çevre düzeni planında bulunan tüm arazi örtüsü , kullanımı verileri talep edilmiştir.

Söz konusu alana ilişkin Belediye Başkanlığımızca İzmir Büyükşehir Belediye Meclisi'nin 12.09.2012 tarih ve 05.843 sayılı kararıyla uygun görülerek Başkanlık Makamınca 08.10.2012 tarihinde onaylanan İzmir Büyükşehir Bütünü Çevre Düzeni Planı paftaları elden imza karşılığında teslim edilmiştir. Bilgilerinize rica ederim.

Abdurrahman Suphi ŞAHİN
Büyükşehir Belediye Başkanı a.
Genel Sekreter Yardımcısı


Bu belge, güvenli elektronik imza ile imzalanmıştır.

Belge Doğrulama Kodu : *BSC13DNYTZ* Pin Kodu : 24013 Belge Takip Adresi : <https://eislem.izmir.bel.tr/tr/EbelgeSorgu/137eD=BS413LVLK2&eS=848242>

İlgili Birim : Araştırma Planlama Bilgi Sistemleri Şube Müdürüğü Bilgi İçin : Zerrin BAŞTÜRK
Adres : Sair Esref Bulvarı No:50 Kültürpark İçi 1/A No'lu Hol Konak Pk:35250 Unvan : Tekniker
İzmir

Birim Telefon : Birim Faks : Telefon :
Elektronik Ağ : www.izmir.bel.tr E-Posta : Kep :

/ 1



Appendix B

Publications from the Thesis

Conference Papers

1. Kayalık M, Polat ZA. GIS-based real estate legislation information system design: The case of İzmir, Foça. 6th Advanced Engineering Days (AED); 2023 March 5; Mersin, Türkiye. 77–79.

Projects

1. Project numbered 123Y235 supported by TÜBİTAK

Curriculum Vitae

Name Surname : Mert KAYALIK

Education:

2015 – 2020 İzmir Kâtip Çelebi University, Dept. of Geomatics Eng.

Work Experience:

2022 – Present İzmir Kâtip Çelebi University

2021 – 2022 Sahara Engineering Consulting Mining Inc.

2020 – 2021 Caner Pınarbaşı Surveying Office

Publications:

1. Deniz V, Kayalık M, Kırtıloğlu OS, Polat ZA. The public-private partnership (PPP) in the provision of land registry and cadastre services in Türkiye. *Advanced Land Management* 2023; 3(1): 41–53.
2. Pak DNB, Kırtıloğlu OS, Kayalık M, Polat ZA. The transformation from e-Government to e-land administration in Türkiye: A SWOT-based assessment analysis. *International Journal of Engineering and Geosciences (IJEG)* 2023; 8(3): 290–300.
3. Kayalık M, Kırtıloğlu OS, Polat ZA. Evolution and future trends in global research on Geographic Information System (GIS): a bibliometric analysis. *Advanced GIS Journal* 2023; 3(1): 22–30.
4. Kayalık M, Polat ZA. GIS-based real estate legislation information system design: The case of İzmir, Foça. 6th Advanced Engineering Days (AED); 2023 March 5; Mersin, Türkiye. 77–79.
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6. Kayalık M, Polat ZA. CBS tabanlı nominal değerlendirme yönteminin değer haritalarının oluşturulmasında kullanımı: Foça/İzmir örneği. Niğde Ömer Halisdemir

Üniversitesi Mühendislik Bilimleri Dergisi 2023; 12(1): 183–192.
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7. Kayalık M, Çorumluoğlu Ö. SST correlation between chlorophyll and turbidity by Landsat MS image analysis for the Coast of Izmir Province. *International Journal of Environment and Geoinformatics (IJEGEO)* 2022; 9(4): 35–45.
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8. Yalcinkaya S, Uzer S, Kaleli Hİ, Doğan F, Kayalık M. Compost plant site selection for food waste using GIS based multicriteria analysis. *Turkish Journal of Agriculture - Food Science and Technology (TURJAF)* 2021; 9(10): 1908–1914.
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9. Yalçinkaya S, Kaleli Hİ, Doğan F, Kayalık M, Uzer S. A GIS based multi-criteria decision-making analysis for siting potential compost plants to recycle marketplace waste. *Euroasia Summit 4th International Applied Sciences Congress; 2021 September 11–12; Odessa, Ukraine.* 53.