

Analysis of Mega Transportation Projects in Istanbul and Identification of Priority Response Areas and Planning Parameters

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ABSTRACT

Cities are spaces that are constantly changing / transforming and are directly or indirectly affected by every intervention, through iterative cycles. Especially in Turkey, urban regeneration practices are taken into consideration only for issues such as production of residential areas and earthquake resistance, whereas transportation policies in urban regeneration regions are not determined ahead of the implementation. This has negative effects on urban transportation and sustainability. The displacement of segments of the society through urban transformation interventions causes transportation habits to change in turn, along with changes in the space. In this sense, transportation demand and transportation habits constitute the main factors affecting the type and amount of spatial interaction in cities. Especially with the implementation of new transportation projects, the type and amount of spatial interaction is changing and existing plans may become unresponsive to the new needs.

Increased accessibility affects land use demand, and changes in building conditions in the region affect population, transportation and land prices. These changes alter the distribution, type and volume of travels in urban areas, and changing commute habits may cause agglomeration of certain types of transportation, rendering existing transportation networks inadequate. These problems can be seen in many areas such as public transportation, parking, pedestrian and bicycle flows, private vehicle traffic and accessibility. In this context, in order to evaluate the effect of high-scale transportation investments on urban transformation, socio-economic structure, transportation habits and land prices, Istanbul, with its high-scale transportation investments, has been identified as the area of study. Istanbul's population and land use structure were thoroughly affected by Marmaray, the Third Bosphorus Bridge, the Eurasia Tunnel and the Third Istanbul Airport investments, which were implemented without being predetermined by high-scale decisions. Significant changes have been observed in transportation and land prices as a result. Due to the changes created by the mega transportation projects that were implemented, the land use plans that were prepared based on the historical data and the current situation data should be questioned anew.

In this study, the effects of four mega projects on land use were investigated. In order to eliminate the problems caused by the increase in transportation demand and land prices, the districts to be prioritized for intervention were identified. New planning approaches / parameters have been developed to mitigate the negative impacts of mega-projects on the districts selected for priority intervention, taking into account the central planning approaches in effect in the selected districts, and a new methodological proposal that explores the principles and approaches that need to be reconsidered in the context of land use and transportation planning balance is presented.

Keywords: Transportation, Land Use, Marmaray, Third Bosphorus Bridge, Eurasia Tunnel, Third Istanbul Airport

1. INTRODUCTION

Transportation and land use are interrelated concepts. Land use affects the direction of dense traffic and traffic density affects the way the city is used (Keleş, 2016). While land use is a matter of the utilization of a space, transportation helps shape the space by determining accessibility (Osazuwa, 2015). In other words, land use refers to the areas classified to meet needs while transportation is a collection of movements that provide access to the areas where needs can be met.

Transportation plays a major role in the social, economic and physical development of the city. Transportation is an important factor in the use of large areas. In particular, it is observed that settlements tend to be formed in places on the main transportation connections. As large land uses move away from the center, the businesses and population are distributed away from the center as well, resulting in a negative impact on urban economic activities. Evidently, changes in major land uses are also affecting new transportation demands (Fuerstve Wegener, 2004). In this case, every new application in transportation causes the city to reshape as represented in Figure 1. The growth of the space causes insufficient access to the city center (Rodrigue, Comtoisve Slack 2006).

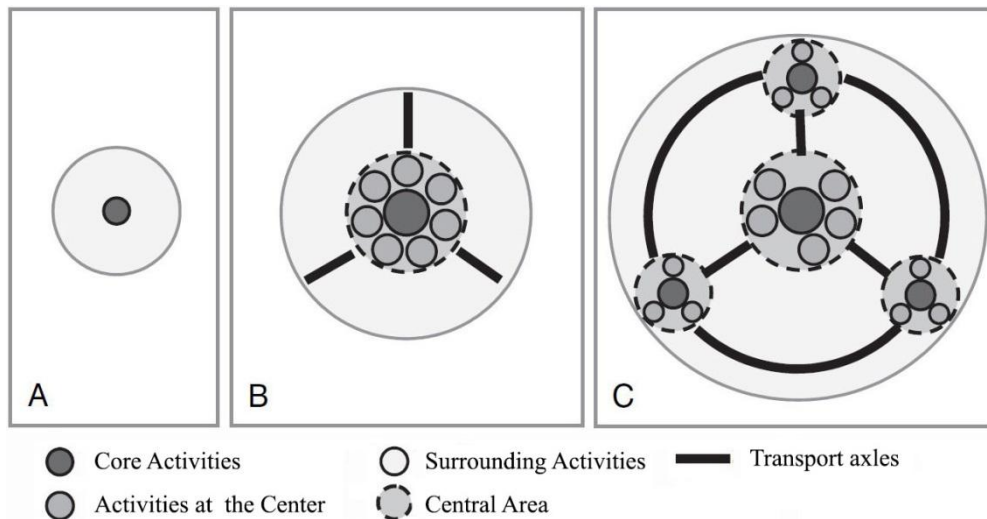


Figure 1. Spatial transformation of the city (Rodrigue, Comtoisve Slack 2006)

Urban activities have been shaped to allow the use of means of transportation. The change that occurs in any part of the city causes changes in the roads of the city that are connected to the area under discussion. Creating new roads or adding new lanes after the change in land use will increase the attractiveness of the land and create new areas or change the functions of existing areas (Elker, 2002; Petersen, 2004; Morimoto, 2015). In this context, transportation investments affect the macro-form of the city by affecting the socio-economic structure of the area and land use, as they increase accessibility in the areas they pass through. Along with the investments in transportation to the city, unstructured areas are also under the pressure of construction.

The socio-economic structure, land prices and land use are impacted along with the transportation investments that are made. When the high-scale transportation investments realized in our country are examined, it is seen that the mega investments especially in Istanbul in the last 10 years have been made without any analysis stage in the field of planning. Whereas an urban planning process ought to consist of research, analysis, determination of targets, preparation of maps and only then the implementation of the plan. With maps having been prepared, a proper planning process is completed by taking into consideration how the city is currently being used, how large land uses are chosen, the public institutions, recreation areas, trade and housing areas, the population and land values distribution, transportation and traffic conditions, the topography of the land and future forecasts (Keleş, 2016). With the present situation and the trends of the

city examined, a more sustainable development can be achieved. Failure to complete any of these stages or the unplanned development of the city will cause traffic problems, lack of infrastructure, distorted urbanization and similar problems. In this context, Istanbul's population and land use structure were thoroughly affected by Marmaray, the Third Bosphorus Bridge, the Eurasia Tunnel and the Istanbul Third Airport investments, which were implemented without any high-scale plans. Significant changes in transportation and land prices have started to be observed. These changes created by the mega transport projects implemented are in need of scrutinizing. Questioning and remaking land use plans prepared with historical data has become a necessity.

In this study, the impacts of the areas affected by Marmaray, the Eurasia Tunnel, the Third Bosphorus Bridge and the Third Istanbul Airport projects in regards to urban transformation, socio-economic structure, transportation habits and land prices were evaluated and superposed. Priority areas and important regions in terms of transformation have been identified for revising or changing development plans. Priority areas were selected from among these areas and planning parameters / approaches were developed for zoning plan modifications or new plans.

2. METHODOLOGY AND FIELD OF STUDY

2.1. Methodology

A 3-stage model has been developed for the reorganization / development of plans rendered partially / completely functionless by mega transport projects, identifying priority intervention areas for revision / modification and changes to the zoning plan and establishing planning parameters. The flow chart of this model is given in Figure 2.

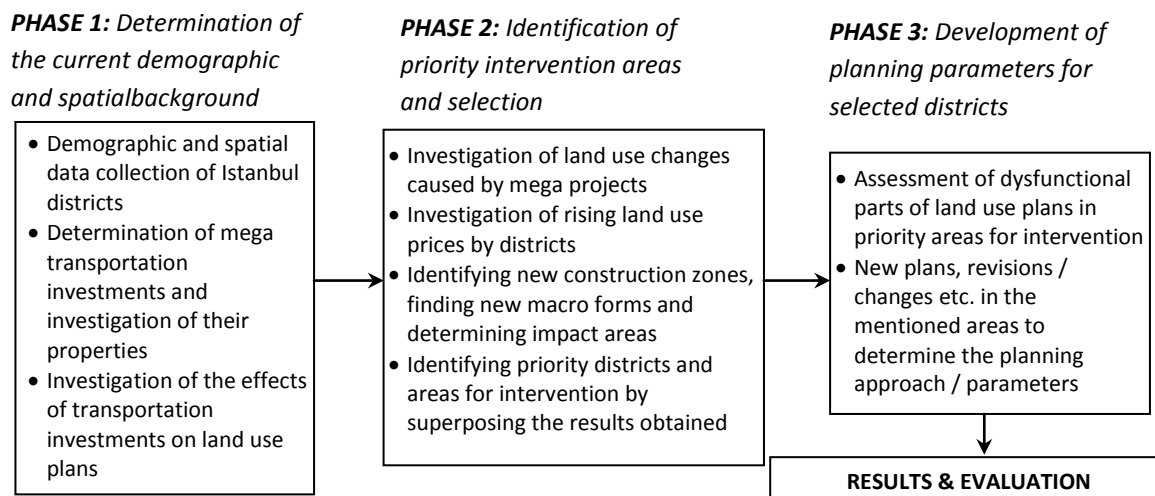


Figure 2. Flow chart

In Stage 1; Demographic data and transportation investments to be used in the model were determined. The impacts and processes of the four transportation projects identified were investigated. The data obtained were analyzed in the next step. **In Stage 2;** land use changes and construction statuses created by transportation projects in Istanbul were evaluated. The variable land values were examined and the districts increasing in value were determined and the impact areas of the investments were found. The impact areas of transportation investments were superposed and priority districts and areas for intervention were identified. **In Stage 3;** the degree to which existing plans regarding district and areas identified in the previous stage were rendered functionless by mega projects was evaluated. In these areas, new plans, revisions / changes, etc. planning approaches / parameters were determined.

3. STUDY AREA

Due to connecting the continents of Asia and Europe and presiding over the Bosphorus sea trade, in other words due to its location, Istanbul has always been of vital importance. This importance has been further reinforced by investments in recent years which have led to significant development and transformations. The rapid growth of the urban area, especially after the transportation decisions, increases the pressure on the surrounding natural areas. The main reason for the transportation problem in the city is the lack of a healthy planning mentality addressing the incoming migration and instead trying to solve the issues by means of temporary solutions. The distorted urbanization continues to grow day by day due to the inability of the city to meet the increasing demand. At the same time, as a result of the investments made in the name of solving traffic problems, large land use changes have occurred. New centers of attraction have thereby been created.



Figure 3.The districts of Istanbul (Istanbul Map 360, 2019)

Figure 3 shows the districts of Istanbul. Since the 1960s, industrial areas have been located in the city center and housing areas have also developed in an unplanned environment. In order to limit this unplanned development and use the area more effectively, the Istanbul Master Plan Office was established in the late 1970s. In 1980, a 1 / 50,000 scale Istanbul Metropolitan Area Master Plan was prepared. However, the plan was insufficient to meet the development of the city due to political and regional decisions. This plan, which was in force at the end of 1980, in large part, does not seem to comply with the anticipated and planned situation. For this reason, the work was restarted in 1990 and in 1995 and the 1 / 50,000 Scale Istanbul Metropolitan Area Sub-Regional Master Plan was prepared. However, this plan was also canceled due to the confusion of authority between the Ministry of Public Works and Settlement and the Istanbul Metropolitan Municipality (IMM) (TMMOB, 2007). Figure 4 shows the development plans prepared in 1980 and 1995.

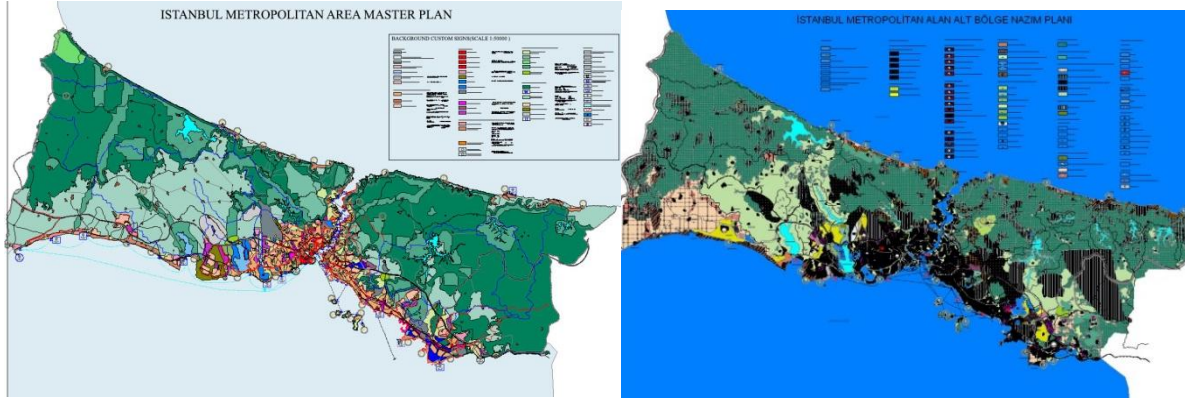


Figure 4. Master Plans of 1 / 50,000 Istanbul Metropolitan Area in 1980 and 1995 (TMMOB, 2007)

For various reasons, despite the high-scale plans, Istanbul has continued to grow unplanned. Together with the changing laws and authorization processes, the Istanbul Metropolitan Planning and Urban Design Center (IMP) presented the 1 / 100,000 Scale Istanbul Provincial Environmental Plan in 2006 given in Figure 5. However, both projects such as Galataport and Haydarpaşa, which are presented together with the plan, and projects such as the third Istanbul Airport offered outside the plan, are far from holistic and are abrupt decisions (TMMOB, 2007). Again, when it comes to transportation, decisions taken that may affect land use and traffic density without the necessary analytical studies having taken place aggravates this situation.

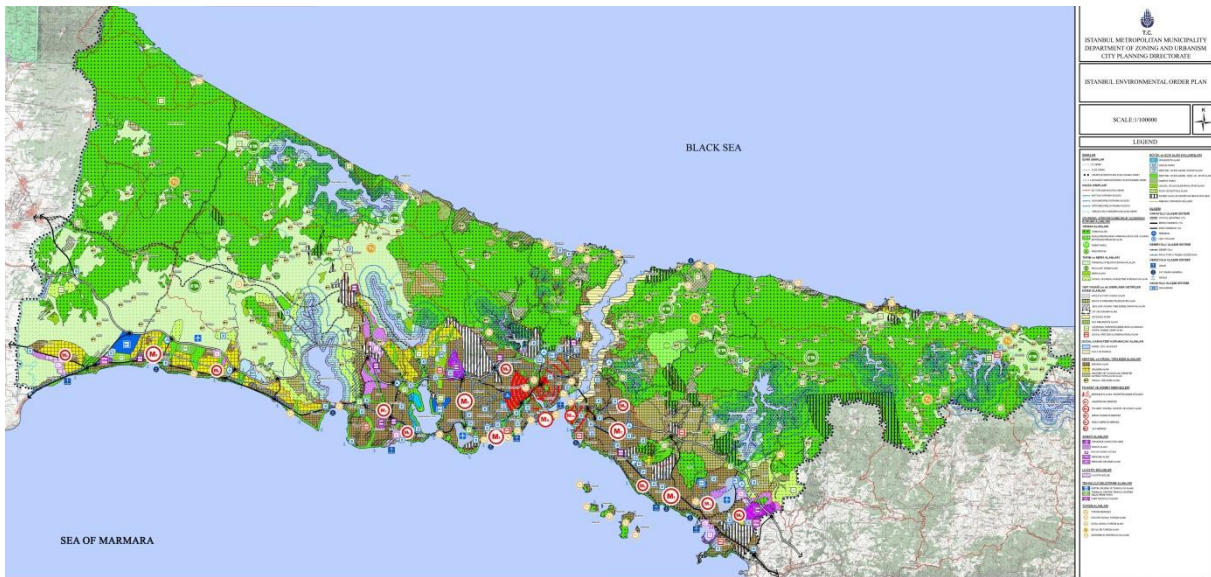


Figure 5. Istanbul 1 / 100,000 scale environmental planning of the year 2006 (IBB, 2009)

In the process, while Istanbul gained access to multi-story financial centers, offices, congress centers and cultural centers that support international standards of living conditions and sports fields, at the same time, car ownership continued to increase in parallel with the proliferation of these functions. As a result of the increase in automobile use, both the user function and the residential areas preferred have started to change. Preferences shifted towards places in prestigious residential areas on the periphery of the city, areas around the business zones in the center and near-center, and areas converted by the evacuation of industries. However, the income disparity between groups in the center and those areas left behind with the disappearance of industry increased (Hamamcioğlu and Zeybekoğlu, 2007).

4. ANALYSIS

4.1. Monitoring Changes in Transport Investments

Transportation projects are effective in changing the socio-economic and formal structure of the city. In this context, 4 mega projects implemented in Istanbul were examined to observe their impact on the city. In 2004, the Marmaray project was presented as a project that uses high capacity electrical energy and does not pollute the environment in order to provide a modern living space and better transportation, to maintain a healthy urban life, and to protect the city's natural and historical values. The project is mainly based on the improvement of the existing railway line and the construction of the Bosphorus sub-sea tunnel (Marmaray, 2019). Kazlıçeşme, Yenikapı, Sirkeci, Üsküdar and Ayrılıkçeşme stations in the Halkalı and Gebze districts which were part of the first phase, were put into service in 2013. The overlap of the central business areas, first-degree centers, trade and service areas in the 1 / 100,000 scale Istanbul environmental plan prepared in 2009 with the Marmaray route constitutes an important element in the urban transformation and the change of the structure of the area going forward (Gökdemir, 2016; Yapı Sektörünün Haber Portalı, 2019). Figure 6 shows the route of the Marmaray Project.



Figure 6.The route of Marmaray Project (Marmaray, 2019)

The Eurasia Tunnel Project was presented in 2006 as a fast, safe, comfortable and environmentally friendly transportation alternative utilizing high technology and advanced engineering techniques (Avrasya Tunnel, 2019). Figure 7 shows the route of the Eurasia Tunnel Project. It starts at Kazlıçeşme and enters the tunnel at Çatladıkapı and ends at Göztepe with the end of the tunnel in Harem. Within the scope of the Eurasia Tunnel Project, new lanes were added to the existing coastal road on the European side and to the E-5 road on the Anatolian side for entering and exiting the tunnel. Although the transportation was initially relaxed due to the added lanes and new roads that were opened, the area became more attractive and the vehicle density started to increase again.

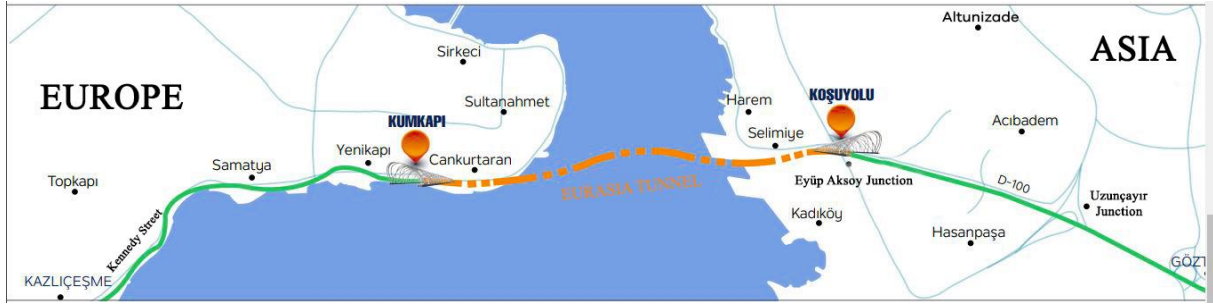


Figure 7.Eurasia Tunnel Project Route (Eurasia Tunnel, 2019)

The Third Bosphorus Bridge project was planned to be built since the 1990s. Its location was announced in 2011 and its foundation was laid in 2013 when construction began. Together with the other two bridges, large land use areas such as industry began to shift towards the city periphery and these large areas which started to remain in the city center became depressions. In this case, this led to the formation of new residential areas. In other words, new settlement areas and new traffic problems have started to emerge with the bridges that were built. However, when the examples of the previous bridges are examined, it is seen that this investment is aimed at transporting vehicles rather than reducing traffic and directing passengers to public transportation (TMMOB ŞPO İstanbul Şubesi, 2010). The fact that it is located in the northern forests of Istanbul in the area chosen for the third bridge also supports the possibility of opening these areas to settlement.

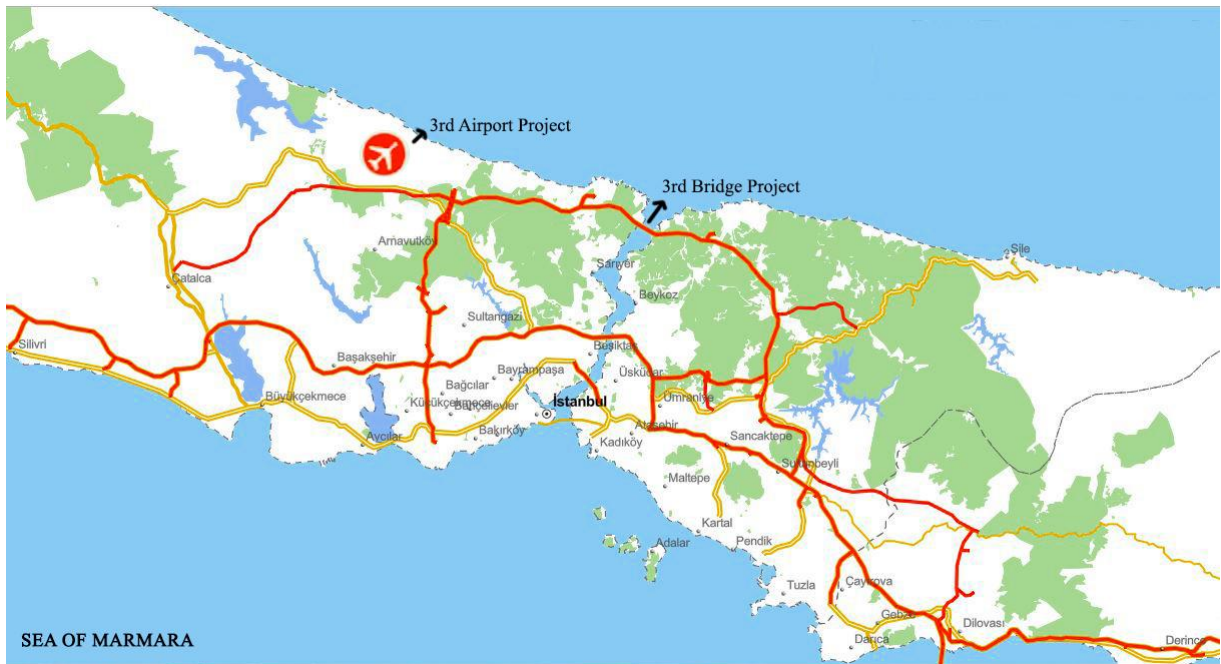


Figure 8.The Third Bosphorus Bridge and the Third Istanbul Airport Project Routes (KGM and Airport Transportation 2019)

The Third Istanbul Airport Project was proposed in 2012 on the grounds that the Sabiha Gökçen and Atatürk Airports were insufficient. The fact that the third airport project is located in the northern forests as is the case of the Third Bosphorus Bridge Project, the urgent expropriation decisions taken and the insufficient housing stock for accommodating the individuals who were to work in the area support the possibility of opening these areas to settlements. Figure 8 shows the routes of the third bridge and the third airport project.

The airport and the bridge's choice of location in an area that has not yet been built up can play an important role in the opening of these areas to construction, as happened in the case of the first and second bridges. This area is more attractive because it covers a larger area than the city center, there is no traffic problem and the land has not been developed yet. It can also be said that these areas affect land uses, as increasing the functionality and route of existing transport axes and the implementation of a new transport system also increases accessibility in areas passed through.

Table Error! Use the Home tab to apply 0 to the text that you want to appear here. **1.**
Population data of the project-affected areas (TÜİK, 2019)

DISTRICTS	2000	2007	2014	2018	DISTRICTS	2000	2007	2014	2018
Arnavutköy			225,670	270,549	Kadıköy	663,299	744,670	482,571	458,638
Ataşehir			408,986	416,318	Kartal	407,865	541,209	450,498	461,155
Bahçelievler	478,623	571,711	599,027	594,053	Küçükçekmece	594,524	785,392	748,398	770,317
Bakırköy	208,398	214,821	221,594	222,668	Maltepe	355,384	415,117	476,806	497,034
Beykoz	210,832	241,833	248,071	246,700	Pendik	389,657	520,486	663,569	693,599
Çatalca		89,158	67,843	72,966	Sancaktepe			329,788	414,143
Çekmeköy			220,656	251,937	Sarıyer	242,543	276,407	337,681	342,503
Eyüp	255,912	325,532	367,824	383,909	Tuzla	123,225	165,239	221,620	255,468
Fatih	403,508	422,941	419,266	436,539	Üsküdar	495,118	582,666	534,970	529,145
Güngören	272,950	318,545	303,371	289,331	Zeytinburnu	247,669	288,743	287,223	284,935

With the projects having been implemented, it is seen that as the attractiveness of the area increases both in terms of transportation and settlement prospects, the population increases as shown in Table 1, and therefore the structure of the area changes as shown in Figure 9.

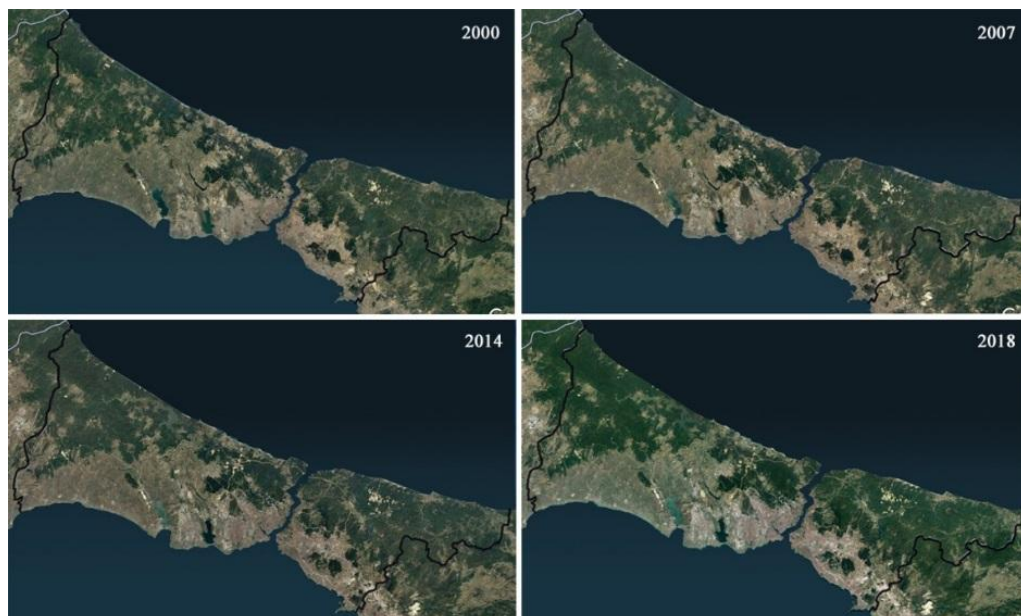


Figure 9. Change of land use in Istanbul over the years (Google earth, 2019)

4.2. Measurement of Effects

With the Marmaray project, it has been observed that there has been an increase in real estate values both along the route and around the route. Figure 10 shows the impact of the Marmaray project on land prices. It is observed that Küçükçekmece, Bakırköy, Zeytinburnu and Fatih are affected on the European side; and Üsküdar, Kadıköy,

MaltepeKartal, Pendik and Tuzla are affected on the Anatolian side. It is seen that urban transformation projects such as Halkalı, Zeytinburnu, Küçükçekmece and Kazlıçeşme square renewal projects initiated by the municipality are also prominent in these areas. In this context, Zeytinburnu has become an important focal point for investors due to both the metro investments and the opening of the coastline to construction.

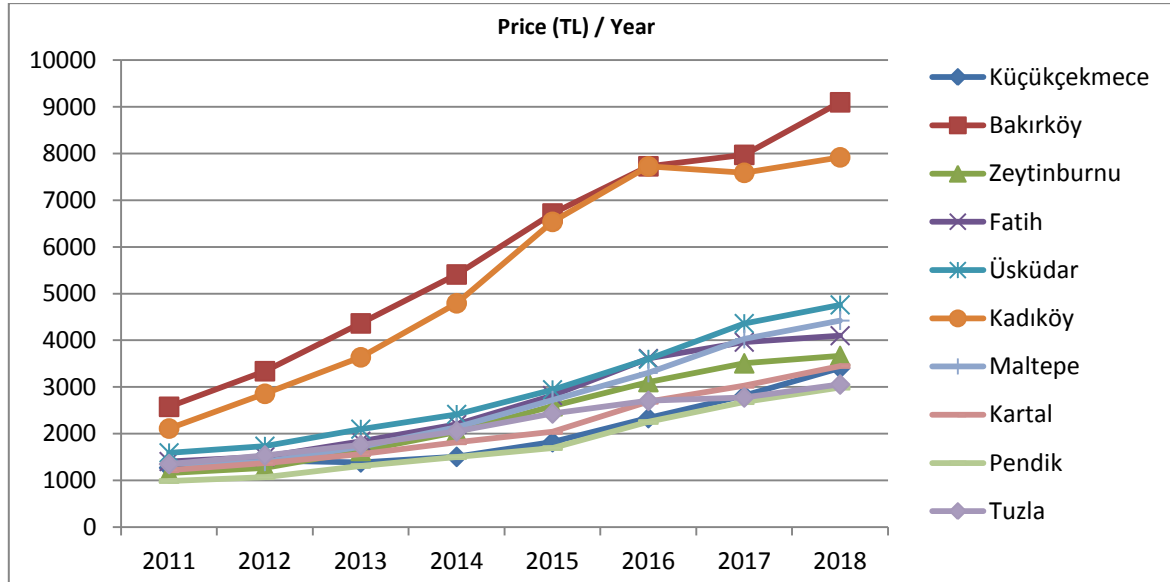


Figure 10.Impact of theMarmaray Project on land prices (Zingat, 2019)

This effect is similar to the effect of the construction of the Eurasia Tunnel and the influence of Marmaray, two projects on the south coast of Istanbul connecting the two sides. Figure 11 shows the impact of the Eurasia Tunnel on land prices. On the European side, Bakırköy, Zeytinburnu and Fatih; on the Anatolian side, Üsküdar, Kadıköy and Ataşehir are affected. The construction of the Yenikapı transfer center has made this point of the city the center of attention. It is seen that the project triggered physical, economic and social changes.

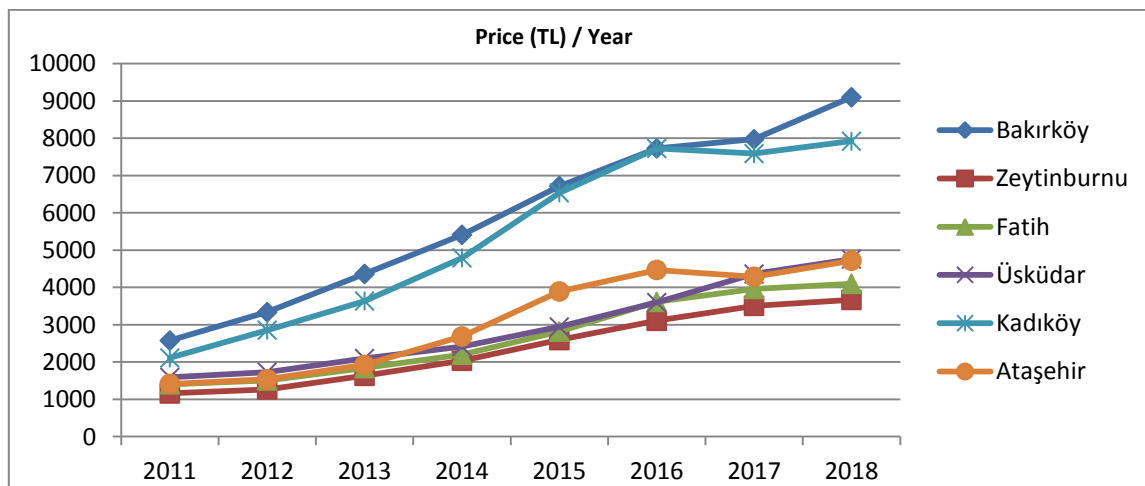


Figure 11.Impact of the Eurasia Tunnel Project on land prices (Zingat, 2019)

Bakirkoy, Zeytinburnu, Fatih, Uskudar and Kadikoy are the areas most affected by the Marmaray and Eurasia Tunnel projects in the south. With the completion of these two projects, Fikirtepe, Sulukule and Süleymaniyewere declared urban transformation areas in the important centers that are Kadıköy and Fatih, reinforcing the trend. With the increase in accessibility, the slum areas in the city center have become attractive to the

upper income groups who wish to return to these areas. Rising land prices is evidence supporting this idea.

With the announcement of the third bridge project and connection roads in 2011, it is observed that the land and field prices in Eyüp, Çatalca, Arnavutköy, Sarıyer, Beykoz, Çekmeköy, Karaburun, Riva and Uskumruköy, which are close to the connection roads of the bridge, have increased (CNN Türk, 2019; YeniŞafak, 2019). Figure 12 shows the impact of the Third Bosphorus Bridge Project on land prices.

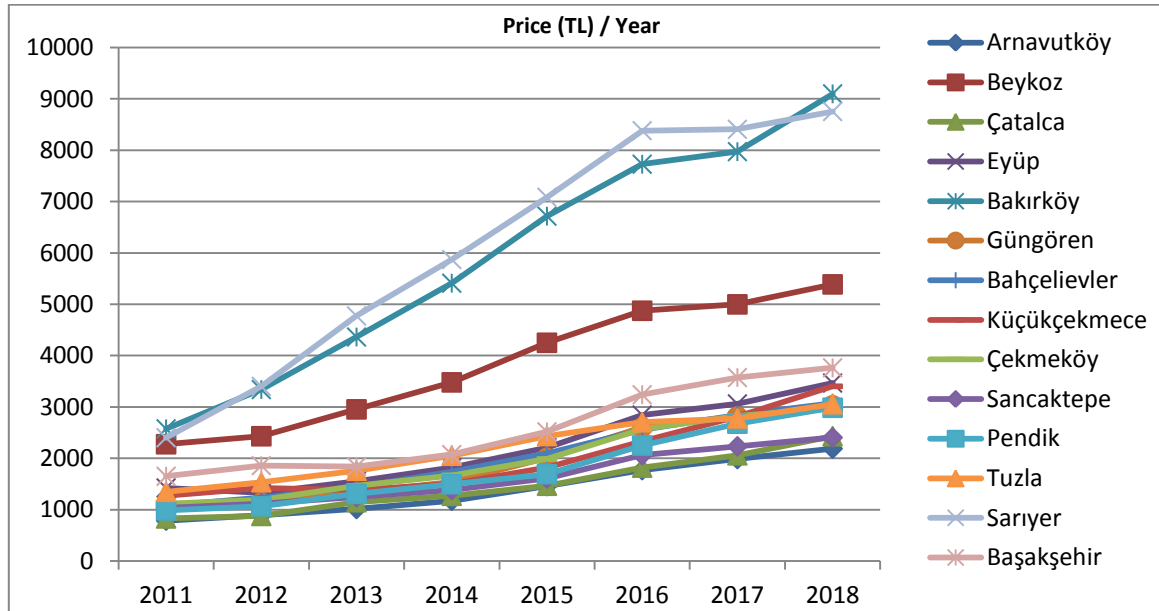


Figure 12.Impact of third bridge project on land prices (Zingat, 2019)

Looking at the impact of the third airport, largeland use changes are observed due to the closing downof the Atatürk airport. It can be said that almost all of the European side as well asthe northern part of the city on the Anatolian side can be affected by the third bridge.

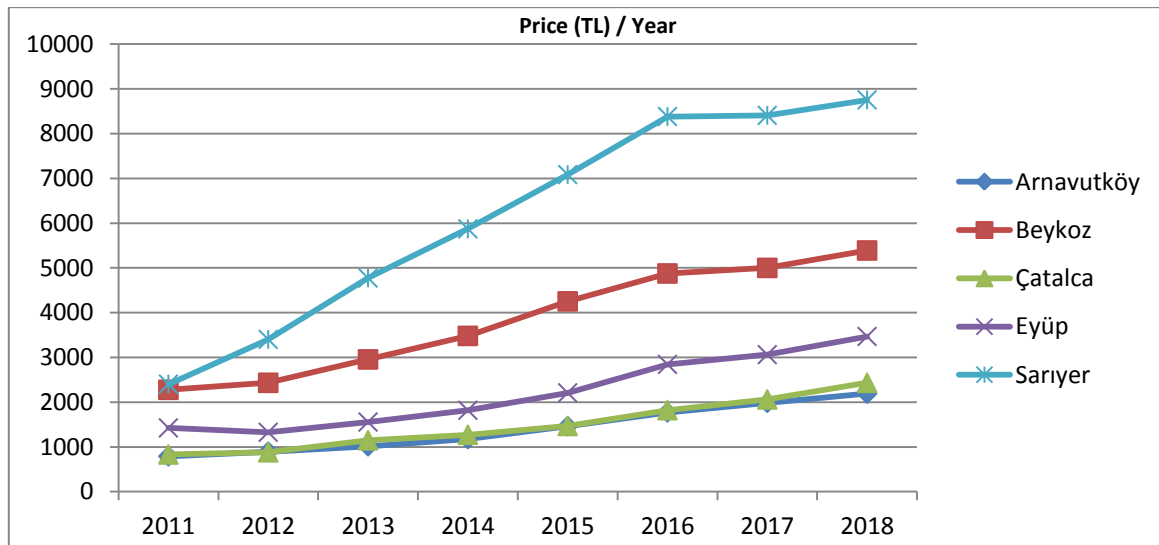


Figure 13.Impact of the third airport project on land prices (Zingat, 2019)

In this context, when the Third Bosphorus Bridge is evaluated along with the third airport, it is seen that the locations chosen in the north of Istanbul for the two major investments have increased the value of the existing areas and have added to the value

of the settlements in the nearby vicinity. Figure 13 shows the impact of the third airport project on land prices. With the announcement of the third bridge project in 2011 and the airport project in 2012, land prices increased in Arnavutköy and Eyüp, and soon no land for sale remained available in Çatalca and Terkos (North Forest Defense, 2015). The land used as an agricultural area was purchased cheaply from the villagers and changed hands, getting transferred to luxury firms (Aydınlık Gazetesi, 2019). In 2012, project to build a new city, which was expected to hold 1 million people was revealed with the tagline "Behold New Istanbul" (Sabah, 2019). With the third bridge and connecting roads, the implementation ground of the New City, which is now envisaged to accommodate and employ 2.5 million people with a focus on high-level service jobs, is being prepared (Candan and Özbay). (2014). Table 2 presents the areas affected by these mega projects.

Table Error! Use the Home tab to apply 0 to the text that you want to appear here. **2. Mega projects and their affected areas (Mega projects İstanbul, 2019)**

	Announ cement	Foundation Date	Opening Date	Affected Areas
Marmaray		2004	2013	Küçükçekmece, Bakırköy, Zeytinburnu, Fatih, Üsküdar, Kadıköy, Maltepe, Kartal, Pendik and Tuzla
The Eurasia Tunnel	2006	2011	2016	Bakırköy, Zeytinburnu, Fatih, Üsküdar, Kadıköy and Ataşehir
The Third Bosphorus Bridge	2011	2013	2016	Arnavutköy, Beykoz, Çatalca, Eyüp, Bakırköy, Güngören, Bahçelievler, Küçükçekmece, Başakşehir, Çekmeköy, Sancaktepe, Pendik, Tuzla and Sarıyer
The Third Istanbul Airport	2012	2014	2018	Arnavutköy, Beykoz, Çatalca, Eyüp and Sarıyer

4.3. Identification of priority areas for intervention

It is seen that mega projects affect the land macroform due to the routes they encompass and their locations. Figure 14 shows the routes and areas affected by mega projects. The mega projects implemented were evaluated in reference to their routes and land prices; Bakırköy and Kadıköy with the Marmaray project, Bakırköy and Kadıköy with the Eurasia Tunnel project, Bakırköy and Sarıyer with the Third Bosphorus Bridge project, and Sarıyer and Beykoz with the Third Istanbul Airport project.

When all the mega projects were examined, the highest increase was observed in Bakırköy, Sarıyer, Beykoz and Kadıköy. However, Zeytinburnu, which started to change in the 2000s and continues to increase in value with high-scale transportation investments even today, is expected to gain further value within ten years with the mega projects now implemented.

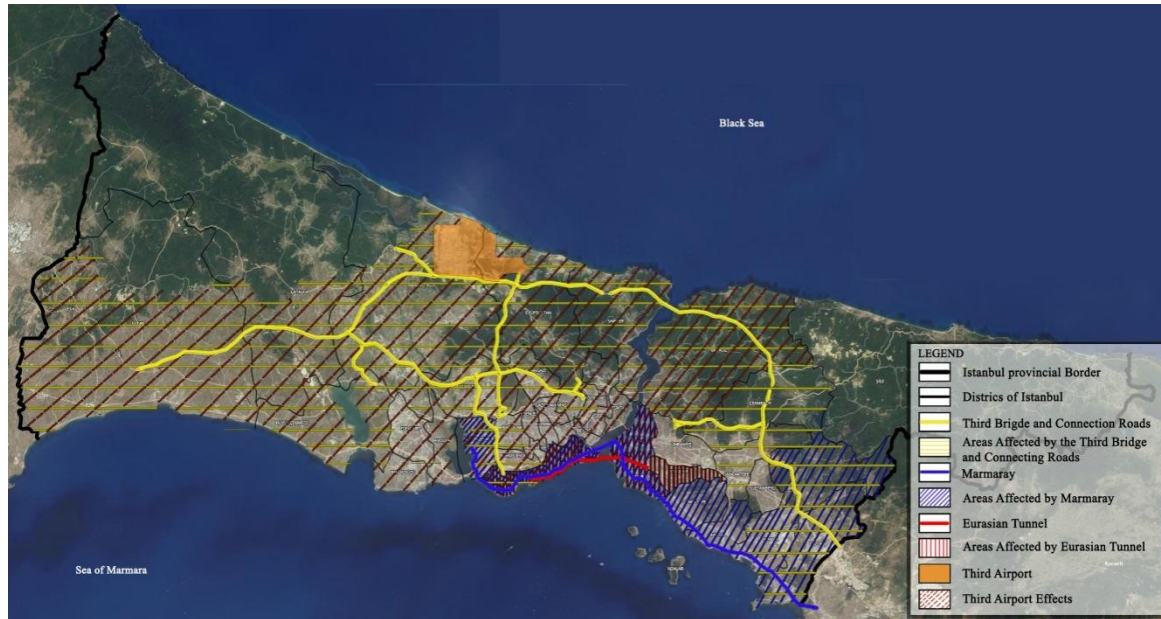


Figure 14.Impacts of mega projects (Mega projects Istanbul, 2019)

It can be said that the districts most affected by the projects will be the most affected by urban transformation and land use due to both the increase in land prices and the location of the projects. In this context, the priority areas for intervention were identified as Bakırköy, Kadıköy, Sarıyer, Beykoz and Zeytinburnu because they have the highest growth potential.

4.4. Generation of Planning Approach / Parameters

Zeytinburnu

As part of the Zeytinburnu district master plan, there are three sub-plans concerning the coast, which includes the tourism center, city wall isolation area and settled area. Furthermore, as a result of the research conducted within the scope of the Zeytinburnu Istanbul Earthquake Master Plan, it was determined that the existing structures are not earthquake resistant. Therefore, a pilot project was launched in cooperation with the Zeytinburnu Municipality and Istanbul Metropolitan Municipality (AKOM, 2019). Figure 15 shows the Zeytinburnu development plan.

The area between the E5 Highway and 30-meter Davutpaşa Street in the north of Zeytinburnu has been designated as a central business area. In this area are offices, culture centers, entertainment and accommodation facilities, luxury residences, business and trade centers, administration buildings, exhibition sales areas, press offices and similar functions. It can be expected that this area will cause traffic problems due to the fact that it remains between the important transportation axes and that there is insufficient parking space. In this area, connecting high-capacity roads to low-capacity roads may also cause traffic density problems.

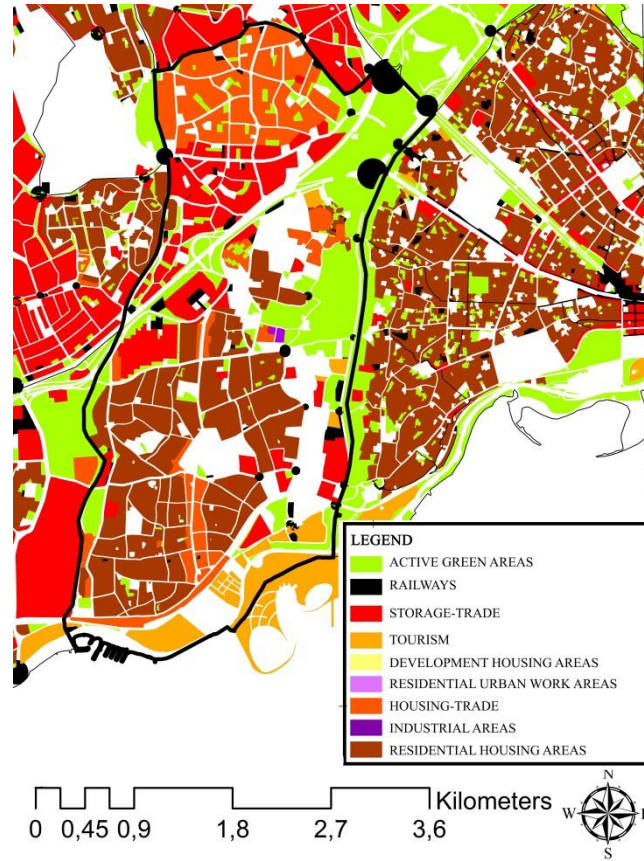


Figure 15.Zeytinburnu 1/5,000 scale master plan

The combination of education areas in the area between the residential zones located to the south of the main transportation axis will increase intensity of this area. Lack of green spaces and lack of continuity between dense housing and commercial areas precludes opportunities for sustainable living. Liberalization of height and block size and shape constraints on urban development and transformation areas risks disrupting the existing urban tissue.

Bakırköy

The Bakırköy district has completed its historical development and since it has been a built region for many years, no development of housing areas is observed. At the same time, it is observed that the green axes are more contiguous and accessible than in the Kadıköy district. The commercial centers / sub-centers located in the west and east ends of the district are integrated with the green areas around them and these green areas are connected both to each other and to the beach contiguously. While these are positive features, the areas that ought to be owned by the public, especially in the coastal areas, are instead found to be concentrated residential areas. Further strengthening of public areas is needed in this context. Accommodation and tourism regions are concentrated on the coast, but the green continuity around the commercial centers is not as strong as those around the coast and tourism areas. Again, the fact that the industrial and storage areas remain within the residential areas poses environmental problems. It can be expected that the intensification of trade activities along the road route, especially in the central areas, will be a problem in terms of traffic. Figure 16 shows the Bakırköy master plan.

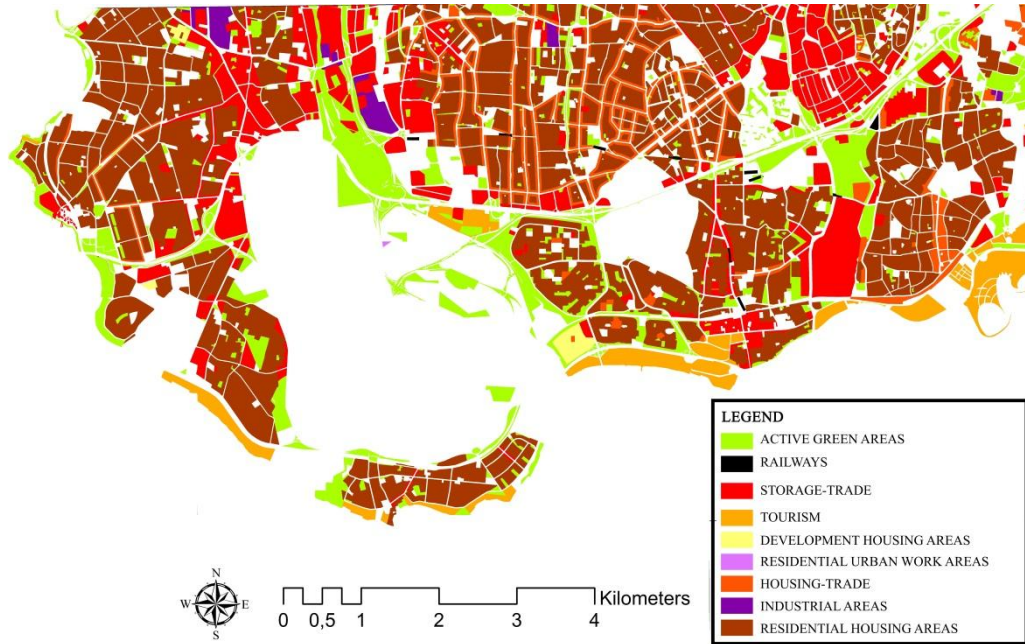


Figure 16.Bakırköy 1/5,000 scale master plan

Kadıköy

Kadıköy has become a center of attraction due to its proximity to the major transportation axes, the coast of the Marmara Sea and the active use of its port. It can also be said that it is an important center because of the housing, trade and cultural centers it contains. When Kadıköy is examined in terms of planning, it is seen that it was settled with a fragmentary mentality, lacking higher-scale plans. Important transportation axes like Marmaray also increase the attractiveness of the area. Figure 17 shows the Kadıköy master plan.

The district contains a homogenous structure. However, it is seen that green areas do not show a thoroughness that can provide contiguity and circulation. The contiguity of the green axis seen in the coastal areas is not observed in the inner regions and it has a structure that does not support pedestrian circulation. It is considered that the lack of green areas in the inner-front parts of the coast reduces the livability in the region. It is necessary to consolidate scattered and separated green areas around certain axes to improve accessibility of each location.

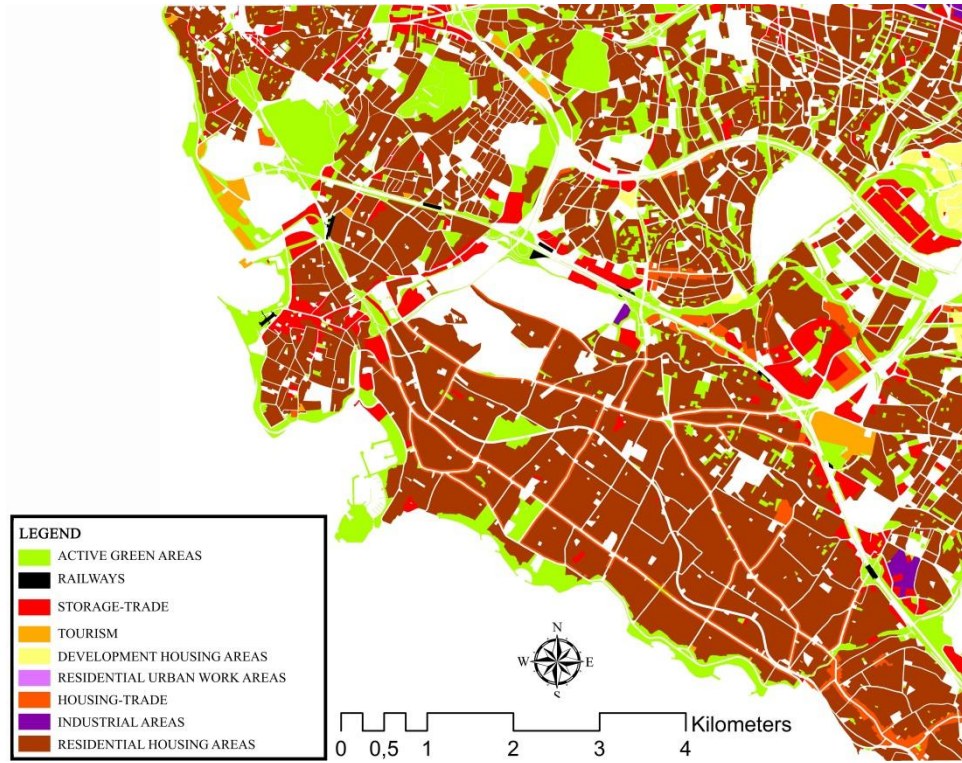


Figure 17.Kadıköy1/5,000 scale master plan

It is observed that trade and tourism areas produce various sub-centers within the district and that these sub-centers do not have a strong relationship with urban green areas. These areas should be gradually evaluated and connected to the main green axes on a pedestrian scale. It can be expected that the concentration of trade and storage areas along the major transportation axes will cause traffic problems. The existence of dead-end streets also hinders the sustainable use of the area. There is also an environmental problem in that industrial and residential areas are intertwined and do not contain any buffer zones between them.

Beykoz

When the Beykoz master plan is examined, it is found that there is significant growth especially in development of housing areas. Construction is spreading in the eastern parts of the forest areas in the western regions of the district. In these areas, there is a homogenous structure and some concentrations are observed. The proposals for development of housing are considered to be at a reasonable level and adequate to meet the current demand. In this region, planning should be made considering the densities of forest and green areas between the residential areas and the tendency of the built areas to unite with each other. Figure 18 shows the master plan of the Beykoz district.

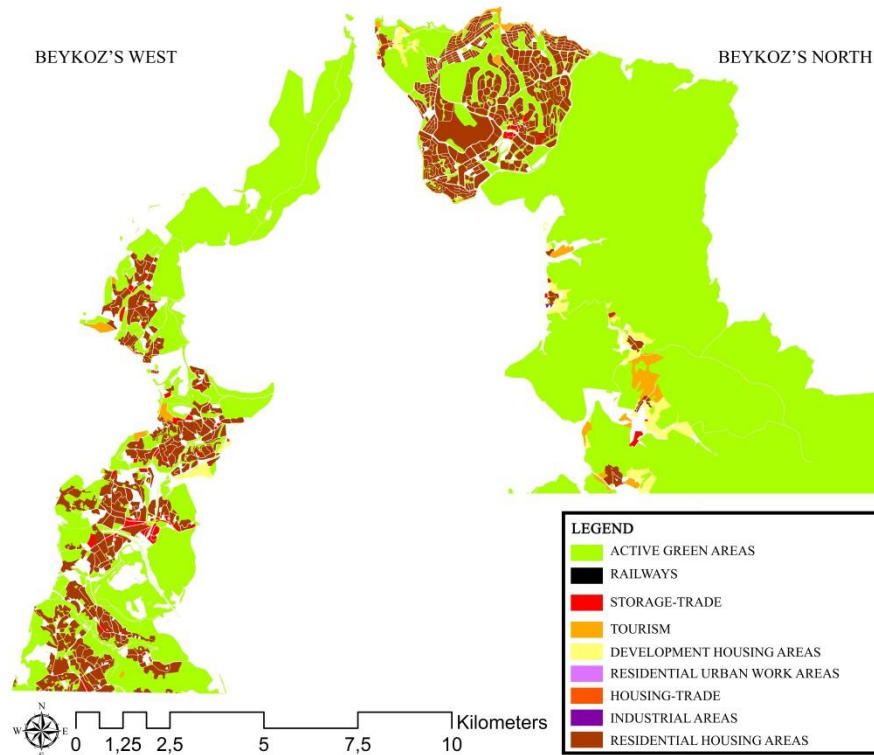


Figure 18.Beykoz 1/5,000 scale master plan

Residential areas are concentrated in the northern part of the district. It is seen that residential areas show less and organic / natural development. With the construction of the Third Bosphorus Bridge and connection roads the green areas will change greatly. As a matter of fact, it can be said that as a result of increasing the residential areas as per the development plan prepared for protection purposes, the reinforcement areas will be insufficient as a result of the opening of the 2D designated areas (expired forest land and farmland owned by the treasury) to housing construction. In the northernmost part of the district, the structure and pattern of building changes and the forest and green areas are coming under pressure. The development located at the northern region border increases the fringing of the residential areas and there is a risk of contraction and confinement of forest areas through merging with this region in the future. It is recommended that the fragmented and mixed construction pattern be transformed into a more planned and expansive pattern around the main axes. On the other hand, given the increasing population and growing demand, it is crucial that the development of residential areas does not create scattered growth. In some places, the green axes that are separated from each other and are scattered are in need of being connected with each other.

It is seen that the increasing demand for housing and construction in almost every district of Istanbul creates the pressure for construction in settlements that have satellite-city characteristics in the south of the area. These development areas will destroy forest and green areas and produce a rapid / aggressive spread / sprawl. Land use and settlement models should be assigned to manage the expansion of these regions and to manage construction more efficiently instead of attempting to meet the demand by producing more houses.

Sarıyer

When the development plan of the Sarıyer district is examined, it is seen that a large area is green, as in the Beykoz district. Again, it can be said that construction pressures will increase with the third bridge and airport projects implemented without complying with any planning decision and without the necessary analysis, as can be understood

from the increase in land prices in these areas. Figure 19 shows the master plan of the Sariyer district. As a matter of fact, most of the area is seen as housing development area in the current plan.

When the morphological situation is taken into consideration in the Sariyer district, a fragmented and growing structure is seen as a result of fringing. Instead of producing spatial grouping / sub-centers, trade and tourism areas are distributed throughout the district. In Sariyer, while housing development areas are seen throughout the district, concentration is observed that is creating a new satellite city just to the north of the district. At the same time, considering that the tourism areas in the northernmost part of the district will increase the demand and attraction to this region, it can be said that the northern part of the district is under threat of construction. To counteract the possible merging and filling of these areas over time, the existing policy of rapid and destructive structuring should be changed and a plan including a land use / transportation balance with pedestrian transportation axes should be produced instead.

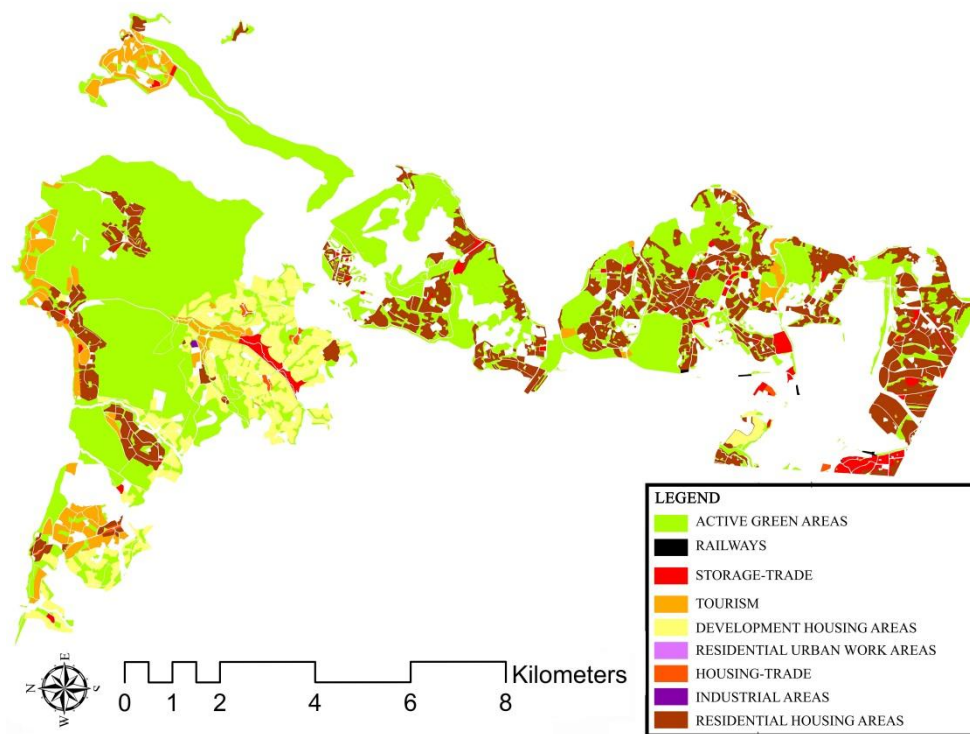


Figure 19.Sariyer 1/5,000 scale master plan

5. CONCLUSIONS AND RECOMMENDATIONS

It is seen that the Istanbul macro form is affected by the mega projects implemented. The mega transportation projects that were implemented without being determined by high-scale decisions was primarily evaluated according to their purpose and to what extent they were used for this purpose. Their effects on land prices were also evaluated. In this framework, the priority areas that need to be intervened due to the high impacts of the four mega projects on land use, increasing transportation demand and land prices are: Bakırköy, Kadıköy and Zeytinburnu; while the districts that require intervention due to the third airport and the third bridge are identified as Sariyer and Beykoz.

The changes that are / will be caused by accessibility through mega projects are examined through the existing plans. It is a necessity to revise these plans with the mega transportation projects that have been implemented independent of the plans, without evaluating / addressing the existing deficiencies / errors in the existing plans.

In this context, new planning approaches / parameters should be developed to mitigate the negative impacts of the existing plans and the mega projects implemented, and the transformed urban areas need to be reconsidered with new approaches in the context of land use and transport planning balance. Therefore, when the plans of Kadıköy, Bakırköy and Zeytinburnu in the south of Istanbul are examined in general, it is seen that the support areas are missing. Industrial areas with large land use, trade and storage centers are progressing along the first-degree route. The lack of sufficient parking spaces will lead to an increase in traffic load in these areas. Again, the fact that the provisions of the development of housing areas determined in these areas are independent of the current plan is contrary to the principles of holistic planning. The lack of green spaces especially in the city center and coastal areas and the lack of interconnection of these areas indicate that they do not comply with requirements for sustainable and contemporary living conditions.

When the Sarıyer and Beykoz plans located in the north of the city are examined, it is seen that most of the areas are forests. However, with the third bridge and connection roads project and the third Istanbul Airport project, land prices have increased significantly. It is possible to say that construction pressure in these areas will continue to increase along with the projects implemented in addition to housing areas.

Therefore, the impact of the projects implemented in these identified areas on the current situation should be evaluated first. As a result of the evaluation, in order to create a more livable and sustainable environment, contemporary and sustainable plans should be established for everyone to enjoy high urban interaction, especially for pedestrians to be able to interact more easily. Green areas must be created that are connected and sustainable, and the balance between land use and transportation must be ensured.

REFERENCES

- AKOM. (2019). İstanbul Büyükşehir Belediyesi Kentsel Dönüşüm Ve Deprem Önleme Çalışmaları [Istanbul Metropolitan Municipality Urban Transformation and Earthquake Prevention Works], Access Date: October 12, 2019, Access Location: http://ibb.gov.tr/sites/akom/documents/haberler_haberdetay_0106.html
- Avrasya Tüneli. (2019). Projenin Kazandırdıkları [The Merits of the Project], Access Date: March 17, 2019, Access Location: <https://www.avrasyatuneli.com/seyahat/projenin-kazandirdiklari>
- Avrasya tüneli. (2019). Avrasya tüneli Güvenlik Broşürü [Eurasia Tunnel Security Brochure], Access Date: September 26, 2019, Access Location: https://www.avrasyatuneli.com/_assets/pdf/avrasya-brosur-tr.pdf
- Aydınlık Gazetesi. 2019, Büyük Vurgun [The Great Heist], Access Date: March 13, 2019, Access Location: <https://alisedarbolat.blogspot.com/2013/07/agac-katili-parti-akp-4-ulkerin.html>
- Candan A. B., Özbay C. (2014). *Yeni İstanbul Çalışmaları: Sınırlar, Mücadeleler, Açılımlar* [New Istanbul Studies: Borders, Struggles, Overtures]. Metis Yayınları.
- CNN Türk.(2019). İstanbul'a 3.Köprü Hangi Semtleri Değerlendirecek? [Which Districts will Increase in Value with the 3rd Bridge in Istanbul?], Access Date: March 13, 2019, Access Location: <https://www.cnntrk.com/video/ekonomi/turkiye/istanbula-3-kopru-hangi-semtleri-degerlendirecek>
- Elker, C. (2002). *Ulaşımda Politika Ve Pratik* [Policy and Practice in Transportation], Ankara: Gölge Ofset Matbaacılık
- Fuerst, F. And Wegener, M. (2004). Land-Use Transport Interaction: State Of The Art. *SSRN Electronic Journal*.
- Gerçek, H. (2007). İstanbul'un Geleceğine Yönelik Ulaşım Politikaları [Transportation Policies Geared Towards the Future of Istanbul]. *PlanlamaDergisi*, 8, 39-41.
- Gökdemir, Ö. 2016. Marmaray Projesi Ulaşım Projesi Değil Kentsel Dönüşüm Projesidir [The Marmaray Project is an Urban Transformation Project, not a Transportation

- Project]. Access Location: <http://docplayer.biz.tr/18235254-marmaray-projesi-ulasim-projesi-degil-kentsel-donusum-projesidir.html>
- Havalimanı Ulaşım. (2019). İstanbul Havalimanına Nereden Gideceksiniz? [How Will You Get to the Istanbul Airport?], Access Date: October 26, 2019, Access Location: <https://havalimaniulasim.com/yeni-istanbul-havalimanina-ulasim/>
- İBB. (2009). İstanbul Büyükşehir Belediyesi İmar Ve Şehircilik Daire Başkanlığı Şehir Planlama Müdürlüğü, ÇevreDüzeniPlanı İstanbul [Istanbul Environment Plan], Access Date: October 12, 2019, Access Location: http://ibb.gov.tr/tr-tr/kurumsal/birimler/sehirplanlamamd/documents/yonetici_ozeti/cdp_yonetici_ozeti_15.06.2009.pdf
- İstanbul Haritası 360, 2018. Access Location: <https://istanbulharitasi360.com/istanbul-ilce-haritasi#.xalnl5zbme>
- KGM. (2019). Karayolları Genel Müdürlüğü Güzergah Analizi [General Directorate of Highways Itinerary Analysis], Access Date: October 26, 2019, Access Location: <https://yol.kgm.gov.tr/guzergahanalizi>
- Keleş, R. (2016). *Kentleşme Politikası [Urbanization Policy]*, Ankara: İmge Kitabevi.
- Marmaray. (2019). Access Date: February 24, 2019, Access Location: <http://www.marmaray.gov.tr/icerik/marmaray/tarih%c3%a7esi/1#prettyphoto>
- Megaprojeler İstanbul. (2019). Mega İstanbul, Access Date: October 26, 2019, Access Location: <http://megaprojeleristanbul.com/#>
- Morimoto, A. (2015). Traffic and Safety Sciences: Interdisciplinary Wisdom Of IATSS, *The Japan Times*.
- Osazuwa, S.O. (2015). The Relationship between Transportation and Development
- Petersen, R. (2004). Module 2a Land Use Planning and Urban Transport, TZ Verlagsgesellschaft.
- Rodrüge, J.P., Comtois, C., Slack, B. (2006). *The Geography of Transport Systems*, New York: Routledge
- TMMOB ŞPO İstanbul Şubesi. (2007). 1/100.000 Ölçekli İstanbul İl Çevre Düzeni Planı'na İlişkin TMMOB Şehir Plancıları Odası İstanbul Şubesi Görüşü [TMMOB Chamber of Urban Planners Opinion Concerning the 1/100,000 Scale Istanbul Province Environmental Plan]. *Planlama Dergisi*, 8, 26-30.
- TMMOB ŞPO İstanbul Şubesi. (2010). 3.Köprü Değerlendirme Raporu [Third Bridge Evaluation Report], Access Date: 24 Mart 2019.
- TÜİK. 2019. Nüfus İstatistikleri [Population Statistics], Access Date: September 15, 2019, Access Location: <https://biruni.tuik.gov.tr/medas/?kn=95&locale=tr>
- Yapı Sektörünün Haber Portalı. (2019). 20 Soruda Marmaray [Marmaray in 20 Questions], Access Date: February 25, 2019, Access Location: http://www.yapi.com.tr/haberler/20-soruda-marmaray_113437.html
- Yeni Şafak. (2019). Üçüncü Köprü Çevresine Değer Kattı [The Third Bridge Added Value to its Surrounding Areas], Access Date: March 13, 2019, Access Location: <https://www.yenisafak.com/ekonomi/ucuncu-kopru-cevresine-deger-katti-2519098>
- Zingat. (2019). Bölge Raporu [Area Report], Access Date: March 24, 2019, Access Location: <https://www.zingat.com/bolge-raporu>