REGULATORY MEASURES TO REDUCE NATURAL HAZARD IMPACTS AND LOCAL SEISMIC ATTRIBUTES IN PLANNING DECISIONS: THE CASE OF FATIH DISTRICT IN ISTANBUL

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submitted by **PINAR ERTAN** in partial fulfillment of the requirements for the degree of **Master of Science in City Planning Department**, **in City and Regional Planing, Middle East Technical University** by,

Prof. Dr. Canan Özgen

Dean, Graduate School of **Natural and Applied Sciences** ______________

Prof. Dr. Melih Ersoy

Head of Department, **City and Regional Planning** ______________

Prof. Dr. Murat Balamir

Supervisor, **City and Regional Planning Dept., METU** ______________

Examining Committee Members

Prof. Dr. Melih Ersoy
City and Regional Planning, Dept., METU ______________

Prof. Dr. Murat Balamir
City and Regional Planning, Dept., METU ______________

Assoc. Prof. Dr. Serap Kayasü
City and Regional Planning, Dept., METU ______________

Assoc. Prof. Dr. Baykan Günay
City and Regional Planning, Dept., METU ______________

Assoc. Prof. Dr .Tarık ŞENGÜL
Public Administration and Political Science Dept., METU ______________

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Lastname : Pınar Ertan

Signature :

ABSTRACT

REGULATORY MEASURES TO REDUCE NATURAL HAZARD IMPACTS AND LOCAL SEISMIC ATTRIBUTES IN PLANNING DECISIONS: THE CASE OF FATIH DISTRICT IN ISTANBUL

Ertan, Pınar
M.S., Department of City and Regional Planning
Supervisor: Prof. Dr. Murat Balamir

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Urban risks have been questioned since the 1999 events in Turkey confirming that local seismic attributes are primary indicators for urban risk management. During the past decade tools and frameworks for global disaster risk management have shifted the priorities from emergency management to pre-disaster risk management and demand new tasks from urban planning. Security and resilience in local, national and global levels becomes a shared accountability which brings in a prominent role to the planning discipline in reducing local seismic vulnerabilities via research, implementation and disseminating methods of mitigation.

In the local context, the so called Disasters Law and the Development Law do not contain the necessary concern for safety in urban planning and have no aspiration to devise appropriate tools for mitigation. The role of city planners', who could mainstream a holistic approach and provide community participation into decision making processes, is hardly apparent in legislation.

Urban mitigation planning methodology thus provides a new area of progression and expansion for the planning profession. This method is investigated in the local context of Fatih, sub-province in Istanbul. It is established that mitigation planning involves an elaborate set of procedures to include hazard identification, determination of vulnerable assets, spatial risk assessment, risk area prioritization, analyses of the emergency state and identification of more effective measures for risk reduction both in spatial and non-spatial terms in line with local development potential. This approach promises a new specialization in the planning theory and practice, and calls for new regulatory tools to facilitate implementation.

Keywords: Local Seismic Attributes, Hazard Identification, Spatial Risk Assessment, Vulnerability Analyses, Emergency State Measures, Urban Mitigation, Decision Making, Community Participation, Policy Implementation

ÖZ

YEREL SİSMİK RİSK ETKİLERİNİ AZALTMAK İÇİN DÜZENLEYİCİ ÖLÇÜTLER: İSTANBUL, FATİH MAHALLESİ ÖRNEĞİ

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Tez Yöneticisi: Prof. Dr. Murat Balamir

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Kentsel riskler, 1999 olaylarından itibaren sorgulanmıştır ki bu da kentsel risklerin belirlenmesi için risk yönetiminde yerel sismik niteliklerin temel gösterge olduğunu bir kez daha doğrulamıştır. Afet risk yönetimi için yerel yönetim araçları ve küresel yapılar, önceliklerini acil durum yönetiminden afet öncesi risk yönetimine doğru kaydırmakta ve kent planlamasından yeni görevler istemektedir. Yerel, ulusal ve küresel düzeyde güvenlik ve dirençlilik ortak sorumluluk haline gelmektedir. Bu da plancıların sakınım yöntemlerinin araştırılması, uygulanması ve yaygınlaştırılması yoluyla yerel sismik özellikleri azaltmadaki rollerini öncelikli hale getirmektedir.

Yerel bağlamda, sözde Afet Yasası ve İmar Yasası kent planlamasında gerekli olan güvenlik kaygılarını kapsamamakta ve sakınım için uygun araçların tasarlanmasına yönelik düzenlemeleri içermemektedir. Bütüncül bir yaklaşımı ana görüş haline getirecek ve topluluğun karar verme süreçlerine katılımını sağlayacak olan şehir plancılarının rolü ise mevzuatta belirsizdir.
Kentsel Sakınım Planlaması metodu bu nedenle planlama disiplini açısından yeni bir ilerleme ve gelişme alanı tanımlamaktadır. Bu metot, yerel bağlamda İstanbul,

Fatih İlçesi'nde incelenmiştir. Sakınım Planlaması; tehlike saptama, zarar görebilir değerlerin belirlenmesi, mekânsal risk belirleme, risk alanı önceliklerini belirleme, acil durum analizi ve risk azaltımı kapsamında mekânsal ve mekânsal olmayan etkili ölçütler geliştirme gibi detaylı süreçleri içermektedir. Bu yaklaşım. Planlama teorisi ve uygulamasında yeni bir uzmanlaşma ve yürütmeyi kolaylaştıran yeni düzenleyici araçlar sunmaktadır.

Anahtar Kelimeler: Yerel Sismik Özellikler, Tehlike Belirleme, Mekânsal Risk Belirlemesi, Zarar Görebilirlik Analizi, Acil Durum Ölçütleri, Kentsel Sakınım, Karar Verme, Topluluk Katılımı, Politika Yerleştirme

To Mom, Dad, Güzi and A.S.

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CHAPTER 1

INTRODUCTION

At the global scale, risk has been questioned theoretically during the two decades particularly 1990s when losses in natural events have been considered as global threats by the UN. *International platforms* have the primary roles in mentoring to affected countries and determine common goals for implementing disaster risk strategy in national development. National and local governments had to develop national policies and local strategies for reducing and mitigating risks. The issue has been attended in Turkey only after the great seismic activities in 1999. Risk reduction became a common interest and requirement for all levels of authority, private sector and community in spite of being a sectoral field.

Today local seismic threats and impacts affect not only localities but national, sub-regional and trans-boundary areas. Today's risks demand more effective tools and associations for adopting a comprehensive approach. Disaster risk management and risk reduction policies shifted to pre-disaster approaches as mitigation planning, these were defined at all levels of authorities from international to local scales.

Unfortunately Turkey is behind many other countries in the implementation of a national comprehensive plan for risk reduction, including changes in legislation and practices. In the global literature, planning specified in disaster risk management is often described for post disaster strategies as "Reconstruction Plan" and for emergency strategies as "Emergency Preparedness Plan and Contingency Plan", pre-disaster strategies as "Mitigation Plan" to reduce risks and long term strategies as “Resilience Plan” to increase societal resilience to disaster. (Balamir, 2009) In fact Turkey’s contribution to local attempts and global frameworks failed as existing legislative and institutional frameworks have proved inefficient. In 1989, in the scope of the action plan of *International Decade for Natural Disaster Reduction, (1990-2000)* Ministry of Public Works and Settlement was designated as the coordinator for disaster risk management activities and the national contact point referred in the Act 7269. The National Committee was formed and an action plan for the decade prepared and transmitted to the *State Planning Organization (DPT)* for execution. In fact, the deficiencies in political support and funding caused the failure in developing a national policy. (Balamir, 2009)

Compulsory *Earthquake Insurance (Zorunlu Deprem Sigortası-ZDS)*, *Building Supervision (Insaat Denetimi), and Professional Competence (Mesleki Yeterlilik)* were adopted with statuary decrees. *Turkey Emergency State Management General Directorate (Turkiye Acil Durum Yonetimi Genel Mudurlugu-TAY)* was established attached to the Prime Ministry and was charged to organize all implementations and coordinate related institutions in an emergency state. In 2000, the *National Earthquake Council (Ulusal Deprem Konseyi-UDK)* was established to include members from different disciplines and academia. The purpose was to determine a national strategy in reducing seismic risks and consult public institutions. In 2007, *UDK* was abolished with the excuse of being ‘functionless.’ The attempts of developing a national strategy failed as there was no legislative basis for the specific purpose of risk reduction and no commensurate institutions and organizations.

The *Disasters Law (7269)* since 1999, primarily focused on post-disaster risk management processes including relief and emergency management. It states that provincial governors are the agents of the central authority and have pro-active role in managing emergency situations. The mayor and municipal organizations remain under the authority of the governor in case of an emergency. On the other hand, according to the *Development Law (3194)*, land-use planning and building activities are monitored by the municipalities. The current compulsory earthquake insurance system, *Turkish Catastrophe Insurance Pool (TCIP)* is running by an insurance administration *(DASK)*, is relatively small but growing. As it can be observed, the existing attempts should be integrated to wider policies and practices rather than assigning individual institutions to involve in risk reduction activities.

The thesis endeavors to highlight the required policies and practices for Turkey to develop a national and local strategy in disaster risk reduction. Through the case of Fatih, local seismic attributes and natural hazard assessments are to be examined for the purposes of mitigation planning, and legislative tools to support spatial policies will be identified. Recent attempts in disaster risk management are examined from international scale to local scale. The methods of implementing pre-disaster strategies of mitigation, preparedness, resilience and complementary local practices sustainable in development are to be clarified.

This study is to focus on problems and possibilities in local mechanism and then searching for regulatory measures through the case of local district Fatih in Istanbul, as an urban risk pool. Local mechanism including authorities, policies, practice is examined through the comparison of international and local cases in disaster risk reduction. Furthermore, the notion of local community in disaster mitigation, risk reduction via mainstreaming pre-disaster approaches is discussed and a way for implementing spatial policies is examined.

In the thesis, the current situation of Turkey in pre-disaster approach is questionified via highlighting problems and possibilities in today's legislative tools and practices. The claim is that Turkey's national policy and local practices particularly in Istanbul, are not in line with the global and international risk reduction policies. As an experiment and a case, risk assessments in the Fatih District in Istanbul and Multi-Hazard Map is used to develop policies and regulatory measures concerning local and national policies for reducing seismic risks.

The thesis is formed in three chapters, apart from the introduction and conclusion sections.

In the 1^{st} Chapter, the nature of global risks and risk society are examined. The difference between traditional industrial society and contemporary society are identified. The concepts defined by Beck to describe contemporary conditions and society are interpreted through distinct social behaviors of risk society and global risks. Finally, eligibility for making decisions regarding risks is discussed questioning the habits and institutions in the risk society. The paths for controlling global risks through different methods of risk regulation regimes are also reviewed in this section.

In scope of the 2^{nd} Chapter, political tools as legislation, the roles and responsibilities of international institutions and the pre-defined activities in disaster risk reduction are examined. In the international scale, Kobe Conference and Hyogo Framework for Action reviewed. International cases of USA, Japan, Canada and local disaster management cases are explained to highlight the advantages and disadvantages in the Turkish legal system and applications in disaster risk reduction.

The 3^{rd} Chapter, regulatory measures for eliminating local seismic threats by means of planning decisions is provided over the case of Fatih Istanbul. Local knowledge is introduced and a risk monitoring procedure is reviewed as explained step by step. Multi-Hazard Map is formed using Geographic Information Systems as an outcome of local knowledge maintained from related institutions. Finally, regulatory measures are developed out of spatial policies as an intermediary phase that would help in forming new paths in legislation and contributing to the national and global frameworks.

CHAPTER 2

GLOCAL RISKS AND RISK SOCIETY

Beck (2000) defines risk as *"a peculiar and intermediary state between security and destruction where the perception of threatening risks determines thought and action."* Risk is not the same as destruction but it implies for destruction. The state of implying destruction is formed a basis for actuarial methods in which risks are calculated through multiplying the degree of loss and the probability of loss. The rationalist tradition is focused on these actuarial methods to calculate consequences of risks, project loss scenarios and minimize the maximum potential loss. (Luhmann, 1993) In fact these methods are inadequate in controlling all dimensions and impacts of risks at social and economic levels as they depend on the acceptability of a possible loss.

The social aspect of risks includes more complex phenomenons through their interaction with society. Risks are both products of modern society and factors altering modern society. In social sciences, risk is defined through the relation with society and perception of risk by an individual. Social and cultural anthropology and psychology disciplines questioned the evolution of risks and "*the willingness to accept risk"* to monitor both the level of perception and ignorance of risk in society which is particularly relative in modern society.

(Luhmann, 1993) This relativity is also created out of ambiguity which impedes to differentiate risks and dangers. There is a thin line between risks and dangers as risks are attributed to decisions and dangers are attributed to externalities. Dangers are uncontrollable and individuals are exposed to dangers. On the other hand, risks are controllable and individuals can eliminate risks through decision making. In traditional society, dangers can be identified while in modern society risks can be identified to take advantage of the opportunities they bring in. (Luhmann, 1993)

The difference between risks and dangers also raises the question of who are responsible to make decision for danger and risk victims. The dilemma lies between two distinct points of views. Risks taken by decision makers could be dangers for the ones who are affected. The decision makers determine consequences for decisions and it's inevitable to ignore future loss. On the contrary, the affected ones find themselves threatening by decisions as none of them have ability to control. The affected ones are forced to see and perceive dangers from decision maker's point of view. This is often named as a social paradox implying that risks change in to dangers and dangers change into risks in relative to how they were perceived and accepted. (Luhmann, 1993)

"*Second order observation"* is utilized to eliminate the social paradox of perceiving risk solely through decision makers' or risk victims' perspectives. First order observation includes the one observing and indicating in a distinct level which is independent from every other thing. First order observers as safety experts and the ones who are critical to experts are to interpret the facts to maintain a certain level of knowledge. The second order observation, regards to the objects indicated in the first order but indicating and distinguishing operations that concur. Second order group observes both safety experts and their critics to show that how different perspectives on the same fact could create different types of information. Quantitative risk calculation models include *"disaster threshold"* which is used to define minimum acceptable disaster risk either taken by decision makers or the ones affected by risks. (Luhmann, 1993)

Risk was initially mentioned in the transition period between the late middle age and early modern era. It was often used in fields of navigation and trade. The prior risk control plan was simply developed as *"maritime insurance"* organized as wager referring to occurrence or non-occurrence of an event under religious measures. The risk control plans became secular, after industrialization and evolved as an integral part of risk calculation. (Luhmann, 1993**)** The term risk was defined in 16thcen and 17thcen as an issue of uncertainty at temporal state. The Industrial Revolution altered dynamics of society and created distinct socio-economic classes. The extended working hours and working with dangerous machines caused individuals to focus on economic development and have practically less time for socialization which are defined as *"disintegration of society"*" and caused a break down in moral system. (Durkheim, caught by Denney, 2005)

All of these externalities created risk community gradually. The recognized risks in society were spread through government, industry, trade unions and public. (McQuaid, 1998, caught by Denney, 2005) Changes in habits and institutions of the society had also changed the nature and number of risks in society and even attributed society as a risk generator.

The evolution of risk society starts from modernity to the latter period. The traditional society before industrial revolution and post-industrial society were compared to define habit and institutions of risk society position of Ulrich Beck. Beck describes modern risks, *"as a systematic way of dealing with hazards and insecurities induced and introduced by modernization itself."* (caught by Denney, 2005) He defines the origins of risks to be hazards induced by industrialism and modern era.

Beck names the era we are living within is *"reflexive modernity"* which is defined as a meso-level in between modernity and late-modernity. The distinction in social values evolved from early modern times to late modernity, is originated from industrialization of nature. In traditional society, nature and culture are totally distinct constituents. In modern society, nature is simulated to culture through transforming it in to its replica.

In modern world, risks are evolved in those ebbs and tides between nature and culture. The contemporary risks are called as *"man-made hybrids."*(Latour, 1993, caught by Beck, 2000) Further more, there is a form of *'hybrid society'* in which risks are combined in terms of politics, ethics, mathematics, mass media, technologies, cultural definitions, perception and it is impossible to differentiate those aspects with realities. *'The Hybrid Society'* also criticizes itself and hybridity as the society perceives itself as a risk society which is named as a "reflexive" behavior and the era in risk society evolves is called as *'reflexive modernity.'* (Beck 2000)

In reflexive modernity, science is also reflexive as it both produces and solves problems. Thus, scientist's rationality acts both as technocrat and citizen. Starting from the industrial era or early modernity, scientists dealing with risk are developed the rational tradition focusing on unknown part and consequences of risk. They take account *'chance, hazard, probability, randomness'* in first hand and concern *'loss and damage'* in the other hand. (Beck captured by Denney 2005) Therefore risk management becomes *'quasi science'* as it solely concerns on loss and damage and screens social and moral judgments which are problems promoted by governments and professional experts. (Beck captured by Denney 2005)

In social definition of risk, there has been change in values and purposes in transition to reflexive life style as risk society and industrial society are compared in Beck's observation:

The place of the value system of the unequal society is taken by the value system of the unsafe society. Whereas the utopia of equality contains a wealth of substantial and positive goals of social change, the utopia of the risk society remains peculiarly negative and defensive. Basically one is no longer concerned with attaining something good but rather preventing the worst. (Beck 1992 captured by Denney 2005)

As the comparison of the traditional society to risk society primarily based on the incremental change in societal norms and habits which are explained by Beck consequently. The social attributes of industrial society as collective life, full employment and exploitation weakened in risk society and stressed by individualization, the gender revolution, globalism, unemployment and global risks. Globalism is inclusive of being both a reason and a consequence for other factors of risk society. In risk society, norms and values of society are de-traditionalized as families and small groups of society started to cease producing culture, social privilege and there happens a decline in transmitting values and norms to next generations. It is defined as a state of floating free from traditions and security as tradition shapes individual in learning and transferring societal norms. Individualization takes place through the replacement of social relations by monetary ones. In traditional society; individuals are in hierarchical order with respect to their utilitarian interests but in risk society, there is disordering and non-institutional pattern. The vanishing of institutions and hierarchy creates ambiguity. Industrial tradition evolved through the gender division of labour in public and private sphere and status grouping in employment-based fields. In risk society, there is no such kind of gender division and status grouping in professions. Finally, all of those factors create more complex risks which are related to global dynamics and change contextually in time. (Beck 1992)

The attributes of global risks are interconnected to the *'time including habits'* and institutions in society that we are living in. Modernity is defined as *'a project of* *social and technological control by the nation state'* and *'conceptualized modern society'* is '*an enterprise for constructing order and control.'* (Talcott Pearson caught by Beck 2000) Contemporary risks are difficult to be localized because globalism came with its *'unintended consequences'* that dominate modernity. In fact it altered the modernity through integrating its *'inherent indeterminacies and uncertainties'* embedded in risk diagnosis. (Beck 2000) Today's method of analyzing risk is ineffective as the utilized tools of industrial modernity are functionless as today; modernity has a distinct character undermined with globalism. Therefore it is claimed that the attempt of construction of security and control which dominated social thought and political action in the first stage of modernity is now becoming fictitious in global risk society.

The method of analyzing risk through categorizing risk is useless as it gets out of control. There is a clear distinction between the old modern world and new global order. In industrial era, beginning from 17th and 18th, and the early 20th centuries risk is examined via calculating unpredictable consequences of industrial decisions or *'making unpredictable predictable.'* (Ewald caught by Beck 2000) Today, risk analysis is still fixed to statistical methods, actuarial calculations, accident probabilities and disaster scenarios describing a concept of risk in which nature and the ways of life are all dominated by traditions. In fact the alterations in global world are reflected as nature is industrialized and traditions became optional rather than being the only choice. There are new coming uncertainties including dangers and internal risks are all named as *'manufactured risks.'* (Giddens caught by Beck 2000) There is a paradox in the field of risk analysis which is sourced from unrecognizable manufactured risks.

Existing approaches on the conceptual definitions of global risks developed as an attempt of explaining the global world with the foundations of old modernity made scientific experts to participate in each risk definition as producers, analysts and profiteers. The attempt of controlling risks brought in broader uncertainties and dangers. A similar paradox is defined in case of *'knowledge synthesis'* and *'unawareness'* referring to manufactured risks in contemporary risk society. It is described as a kind of disinformation created and disseminated in society sourced from knowledge and non-knowledge. The risk assessment constituted in two parts. The first part is formed of empirical knowledge with regard to certainty and the second part is formed of making decisions and acting on risk regarding to uncertainty. The certainty part is constructed by producing more and better knowledge which becomes the source of new risks. The uncertainty part is created by potential knowledge which is described as non-knowledge or inability to know. In both cases risk assessment is exposed to confusion and affects industrial research, action and production. (Beck 2000)

Contemporary risks break the linearity in time. Past, present and future is reversed as the past looses its power to determine present, the advantage is taken by future which is non-existent, but could be happen. Latter, future becomes fictitious and constructed. The breaking in time line brings in the dilemma of evaluating risks as *'factual statement'* or *'value statement.'* (Hobbes captured by Beck 2000) Risks are neither purely factual nor particularly value cases. The reason is risks are *value statements* as the cultural aspects are activated in political dynamics. It is implied that a citizen has a right to abstain from the state if it has a threatening role such as poisoning the air or water resources. In case of the attributed dangers to producers or guarantors of social order, the ones charged in the protection of public interest may be identical with the ones who threaten it.

Another case of global risks is the adversity of localizing them which is related to changing or distinguishing boundaries. In today's world, risks are both local and global. They are named as *'glocal risks.' (*Robertson, 1992, caught by Beck) The environmental dangers have no boundaries and are circulated through common economic and environmental networks between countries which is called as *'time and space compression.'* (Harvey, 1989, captured by Beck) Global threats create a world in which foundations of the established *"risk logic"* in modernity are not validated anymore and it is solely difficult to control dangers but not calculable risks. (Beck 2000) Even though damages of the new breed risks can be attributed to the ones who are responsible for them, it is difficult to compensate them as they are unpredictable. Therefore, risk society is called as a political society. Risk society doesn't call back for *'logic of control'* in modern era. In fact it becomes *'self-critical'* as the contradiction between agencies and actors grow. (Beck 2000) The paradox between technical innovations and their side effects is parallel to the case of polluters and the ones who are responsible of the affected ones. In the example of chemical industry managers and insurance as technicians denies the validity of risk while insurers refuse risk because of that it is too high.

The characteristic of risk society is defined as *'a metamorphosis of danger'* which is difficult to monitor and control as dangers are products of industry and *'consumption habits.'* The nature of dangers is knowledge-dependent and has cultural bounds which are unrecognizable or recognizable by society, creating altruism or paranoia. Furthermore, there is a distinction in between impacts of global risks and risk knowledge. The reason is, *'uncertain global risks'* include impact points not tied to the origin points. The circulation of hazards is hidden and inherent of which the situation named as *'social invisibility'*. Risks are taken into account if they constitute an actual threat on cultural values and symbols. (Beck 2000) The implication perfectly explains point in defining risks as social phenomenon and risks can be both real and constituted by social perception and construction. Therefore, knowledge about risks is tied to culture and social structure.

On the contrary, impacts are formed in ongoing industrial and scientific production. The contradiction explains that the same risk can be perceived and handled distinctly through the world. *'Spatial disjuncture'* between knowledge and impact is rooted in the perception which is always contextual and locally constituted. In fact *'the local contextuality'* is solely extendible via communication tools as mass media and TV. Consequently, if the risks are publicly recognized scarcely then more kinds of risks are produced.

Another factor, triggering the production of risks is the neglect of risk. The situation of neglecting risks is a tendency rooted in the insurance sector. Risk society is explained as the self-transformation of risk from technical to economic risk, market risk, health risk, political risk and so on. Insurer takes the advantage of the time gap between the insurance contract and emergence of the risk through nature and culture. Even though the neglect of risk seems to serve insurers' interest, as they are in *'natural coalition'* with potential victims, the insurers have to take in account every potential hazard, socio-scientific risks and even rumors. (Beck 2000)

The neglect of risk also calls for the neglect of information technologies which promotes growth and spread of risks. In case of technological and scientific progress, mostly products and impacts are denied by manufacturers. By this way, risk industries and insurance business get captured in a dilemma between ignored impact and growing risk including risk knowledge and sensitivity to minimum dangers and rumors. Those *'manufactured uncertainties of hazards'* are digested through industries and are transferred in to potential economic disasters in the insurance system. (Lyold's of London, caught by Beck 2000) The neglect of risk is even rentable for the insurance system.

The attributes of contemporary risks and hazards harbored in risk society are explained briefly. Those hazards and risks change habits and institutions of the society through bringing in new attributes and definitions developed under the structure of risk society. The attributes of risk society identify a *'risk culture'* that lacks institutional dimension and power but also providing a cultural focus on institutional basis. The first attribute, *Organizational irresponsibility* refers to the question of how and why institutions of modern society confess the catastrophe but denying its existence, hiding its origins, impeding its control and compensation. The actual controversy leads to environmental degradation overly but no institution seems to be accountable for any fault.

Secondly, *'Relations of definitions'* regarding to specific institutions, rules and capacities that structure the identification and assessment of risk in a definite cultural context in risk society. It is also described as an *'epistemological and cultural power-matrix'* which dominates risk politics. In risk society including contemporary risks, there is an obvious ambiguity in determining the actors who decide the harmfulness of products, dangers and risks. On the other hand, it is also uncertain who would take the responsibility in participating to growth and spread of risks in between, risk generators, risk profiteers or risk victims. (Beck 2000,)

Another blind point is the knowledge and non-knowledge about causes, dimensions and actors of contemporary risks involved in risk society and according to whose evidences and proof would be submitted. It is well-known that knowledge on contemporary risks is probabilistic, unreliable and conjectural. It is also uncertain as who would compensate the risk victims and make decisions on future damage referring to control, limit and regulate the threatening risks. (Beck 2000)

Consequently, both contemporary risks and *'manufactured uncertainties'* create the paradox of threats and hazards that become more harmful and more apparent in everyday, but also becoming unattainable to activate scientific, legal and political tools for constituting evidence, indication and compensation. The inaccessibility of contemporary risks creates a dead end for attempting and monitoring today's risks.

Another attribute of risk society, *'Social explosiveness of hazard'* is an expression used to emphasize the politicizing role of risks. Contemporary risks are '*quasi-objects'* as the final products of contradicting institutions of risk society. By the metaphor, *explosiveness of hazard*, it is underlined that the probability of potential *manufactured uncertainties*, large-scale hazards and risks could become activated in a sudden and unexpected time and space

Governmental failure in controlling *quasi-objects* is defined in case of the impeding role of *'state bureaucracies'* in cultural and political aspects that *'delegitimate and destabilize'* the institutions of state with responsibilities of '*pollution control'* in particular and safety in general. They also impede institutional elites and experts to use any control mechanism through providing inaccessibility. Therefore, risk assessment bureaucracies take the advantage of utilizing the gap between *latent impact* and knowledge, in which data can be hidden, ignored or modified. The disintegration created in between governmental institutions and social mechanisms to monitor the spread of risk and produce risk knowledge is called as the '*system risk'* (Latour, caught by Beck 2000) In fact, the attempts to eliminate the system risk are functionless as they rooted from 19th century's security frames such as insurance system and today, there is no privileged class of scientists and experts as everyone is involved in recognizing and interested the nature of hazards in risk society.

Finally, *'provident state'* is the corresponding of *'welfare state'* in risk society. (Ewald caught by Beck 2000) *Welfare state* includes class interests, maintenance of social order, health care, national productivity and military power. In *provident state* same mechanisms are handled as safety mechanisms required in risk society, such as provision of services as health care, insurance schemes as pensions and unemployment insurances; the regulation of environment in terms of creating security.

The attempts to control the *glocal risks* are still utilizing the existing methods developed in modern era for risk assessment and risk control. The ambiguity created by *glocal risks* prevents to discover new paths for risk regulation. Risk regulation is defined as a political action which is based on coordination of governmental units, risk experts and society. *Risk regulation regimes* explained as *"Complex of institutional geography rules, practice and animating ideas that are associated with the regulation of a particular risk or hazard"*. (Beck, caught by

Denney 2005) Moreover, in risk society, who is legitimately responsible in making decisions for the affected ones, is the matter of authority providing who is controlling the risk regulation regimes?

The Hierarchical Risk Regulation Regime and *the Egalitarian Risk Regulation Regime* are developed according to the roles and responsibilities of actors in society in controlling the contemporary risks. *Hierarchical Risk Regulation* is based on theories of experts which include both risk forecasting and making anti-risk policies. *Egalitarian Risk Regulation* is focused on the governmental act of supporting community participation. In risk regulation theory, risks are categorized by natural phenomenon as earthquakes, social movements as revolution and state imposition as strike action. There are also corporate risks sourced from insecurities in private sector and the immoral use of technology which contradicts the environment. Risk regulation regime is primarily concerned on organizational systems position in risk as a partial intervention but includes the power to control the whole structure if actors and responsibilities could be determined effectively.

Risk regulation regimes differ in organizational systems of different countries and they are context-dependent to eliminate glocal risks. Risk society has been learned to organize and disseminate risk data to build conscience and cooperate to control and reduce glocal risks. In fact, are the existing methods and approaches of risk regulation, a challenge of controlling risks with modern tools in a global era?, is still the controversy of perspective required to be changed through adopting new theories and practices of risk reduction for the glocal risks .

CHAPTER 3

RISK REDUCTION POLICIES AND PRACTICES

3.1 The International Level

As one of the contemporary risks, natural disaster risk is a problem of priority in many countries, this was experienced tragically in Turkey 1999 events. The major earthquakes occurred across the world and caused millions of life and economic losses in several countries. The common problem observed by experts, is failure in disaster mitigation planning practices.

In order to overcome failures and control the glocality of disaster risks, international institutions and frameworks encourage adoption of specific lines of action across the world. International coordination attempts for disaster risk mitigation was structured in The United Nations Conference on Human Environment (1972, Stockholm), Habitat-I (1978, Vancouver), the following meeting was United Nations Conference on Environment and Development (1991, Rio de Janeiro) and then International Conference on Population and Development (1994, Cairo) took place. In fact 1980's policies which are directed towards relief and post-disaster strategies were criticized and largely considered as ineffective. Objectives in disaster policy are now directed from post-disaster approaches (as emergency management, response and relief activities) to pre-disaster activities by decisions of The United Nations General Assembly. (Balamir 2009)

Table 1. International Initiatives Thru Today

INTERNATIONAL INITIATIVES		
1972	The United Nations Conference on Human Environment	**Stockholm**
1978	United Nations Habitat-I	**Vancouver**
1990-2000	International Decade for Natural Disaster Reduction-IDNDR	**-**
1991	United Nations Conference on Environment and Development	**Rio de Janeiro**
1994	International Conference on Population and Development	**Cairo**
	Yokohoma Strategy and Plan of Action for a Safer World	**Yokohoma**
1995	The World Summit for Social Development	**Copenhagen**
1996	United Nations Habitat	**Istanbul**
2000	Millennium Declaration	**-**
	United Nations International Strategy for Disaster Reduction-UNISDR	**-**
2001	United Nations Habitat	**Istanbul**
2002	The World Summit on Sustainable Development	**Johannesburg**
2005	UNISDR-The First International Conference for Urban Disaster	**Kobe**
2005-2015	Hyogo Framework for Action	**Hyogo**
2007	ISDR-Global Risk Reduction Platform	**-**

A significant step was taken by the declaration of International Decade for Natural Disaster Reduction-IDNDR (1990-2000) and deploying IDNDR as a new body of UN. In scope of the decade; Yokohoma Strategy and Plan of Action for a Safer World (1994) was adopted. It was the primary indicator that claimed a change in the global point of view and a turn towards the strategy on disaster risk reduction. Global platform continued with the same intentions in The World Summit for Social Development (1995, Copenhagen) and UN Habitat-Istanbul in 1996. In scope of the decade, Millennium Declaration (2000) was published, the UNISDR was established, Habitat-Istanbul (2001) and The World Summit on Sustainable Development (2002, Johannesburg) were carried on consequently. Another development in global formations was the formation of International Strategy for Disaster Reduction-UNISDR (2000) which includes The First International

Conference for Urban Disaster (2005, Kobe) and Hyogo Framework for Action .(2005-2015) The recent attempt was the structuring of ISDR-Global Risk Reduction Platform.(2007)

Global disasters are commonly observed as earthquakes, floods, droughts, storms, climate change, pollution and HIV/AIDS in countries. It is reported that earthquake risk form 15% of the geologic disasters which were concluded with 100.000 recorded fatalities in last decade. The earthquakes between 1999 and 2004 caused damage mostly in public facilities and schools as a proof for lack of public safety. The triggering effects increase vulnerability in disasters like caustic landslides, debris and mudflows that may create compound effects as hydro-meteorological, geologic, and environmental hazards. It is recorded that only the compound effects were accounted for another 40.000 deaths during the last decade. In developing countries, it is indicated that 11% of population are exposed to natural hazards and 53% of this population is lost. It is indicated that in accordance with the given statistic and the increasing loss records claim that the existing knowledge and risk reduction performance are inadequate in developing countries. (UNISDR, http://www.unisdr.org, 04.03.2009)

The Yokohoma Strategy Framework for Action is a common platform at the international level established to aid developing countries to reduce the local risks through adopting the common objectives. The main factors increasing the number of losses, the level of vulnerability and compound affects of major disasters such as secondary disasters are explained as rapid urbanization and its intolerable results as concentrated population, social exclusion and poverty. (1994, The Yokohoma Strategy Framework for Action Report, http://www.unisdr.org) In fact it is underlined that the evolution of risk in cities differs as city attracts higher population. Optimal risk distribution is described as a matter of governance, policy making and the related applications as the effects of natural disasters could be revealed not only at particular regions but also in sub-regions or trans-regions. Thus, it is indicated that professional and organizational relationships for the purpose of risk reduction could be modeled far beyond traditional approaches to protection. (UNISDR, http://www.unisdr.org, 04.03.2009)

The main areas of concentrated work are governance, risk identification, knowledge management and emergency management. In governance; governmental media as legislation and policies are manipulated towards the strategy of risk reduction. It is emphasized in *The Yokohoma Strategy Report (1994)* that risk reduction legislation and political framework should be evolved as a part of national development policy for sustainability. Under the national development programme and through mainstreaming public interest; separate risk reduction policies for vulnerable sectors should be developed, vulnerable groups in society should be prioritized and environmental resource management policies should be involved considering changing structure of risks.

In the case of financial measures; it is observed that emergency management programmes are mostly financed by the humanitarian sector and only scarce sources are allocated from development budgets to support risk reduction objectives at the national level, by means of international finance tools. In scope of the integration of risk reduction into national development plan, it is underlined to establish national disaster funds incorporated into development programs deployed by governmental units at all levels. The improvement of local and national capabilities through supporting multi-sectoral and community participation is particularly mentioned. (UNISDR, http://www.unisdr.org, 04.03.2009)

Risk identification and risk assessment are defined as pre-requisite steps providing the accuracy of risk reduction that should encourage public dialogue, community interest and national development principles including *"equity, public participation, good governance and transparency."* It is underlined to carry on risk assessment at local and national levels. In that case, the continuous updating of local and national and local hazard datasets required for decision making on shared natural hazards at sub-regional areas. The free exchange of data in all levels of authority should be provided for the availability of data in a timely manner. The projection of future trends and scenarios specialized for vulnerable sectors in which the scarcity of natural resources and high financial loss potential are valid. More effective tools are demanded for developing countries, in order to reduce vulnerability and emerging risks having political, economic, environmental consequences. (UNISDR, http://www.unisdr.org, 04.03.2009)

As a component of risk monitoring, early warning systems should be coped to technologic capabilities. It is observed that many developing countries lack effective early warning systems as no political and social infrastructures to activate technological capabilities exist. There are also technical problems in risk prediction, such as insufficient knowledge of risks, changing human vulnerability, environmental risks, inadequate communication of warnings, lack of preparedness, and capacity to act on warnings, and which do not promote sustainable development. Thus, it was called for an international early warning programme to assist countries for building their own early warning systems and integrating it with the national development process. (UNISDR, http://www.unisdr.org, 04.03.2009)

Knowledge management is an essential factor in risk reduction as the changing and growing risk data needs to be disseminated and exchanged freely among widespread users, public and private institutions and professional experts concentrated on hazards and human vulnerability. Education is described as the strongest tool to form a collective perception of disaster risk and increase public awareness. Additionally, it is emphasized that a disaster and a destructive event should differ through increased official and public concern to disasters. Public awareness is defined to have a complementary role in risk reduction through actuating national and local authorities to build conscience, capacity and culture for prevention. Thus, educating, training and commemorating are the main activities to raise public awareness and provide public participation. (UNISDR, http://www.unisdr.org, 04.03.2009)

In scope of *Yokohoma Strategy (1994)*, the contemporary risk factors commonly faced in developing countries are identified and preparedness and actions to be taken to provide an effective response and recovery are explained. The critical risk factors are determined by sectors. Social & economic development practices include problems related to financial mechanisms such as international banks lending policies and social security schemes which should support local regulations and policy executions. Secondly, land use planning and other technical measures required to be integrated to risk assessment, environmental management and development activities. In that case, collaboration of experts in mapping of extreme risk areas, strengthening buildings, protecting infrastructure and setting standards of construction are precisely underlined.

As one of the complementary issues, sustaining adequate political and institutional support and wide participation of stakeholders are emphasized. In order to coordinate and support international and inter-sectoral collaboration in risk reduction, *Inter-Agency Task Force for Disaster Reduction (IATF/DR)* is established. *IATF* aims to provide inter-sectoral collaboration in national and global levels prioritizing socio-economic development and humanitarian fields. The collaboration and participation of partnerships, public and local communities are required for creating innovative associations from technical and academic experts, to industrial and commercial sectors and government authorities. It is underlined that through establishing international associations as IATF; more comprehensive role of risk reduction should be promoted by governments via encouraging private sector, NGOs and community-based participation.

Another point is the development of advanced technologies for risk monitoring and assessment such as Remote Sensing, Geographic Information Systems and Communication Technologies to produce accurate risk data; share it with local communities and decision makers and promote open exchange of information. In case of post-disaster strategies; preparedness for effective response and recovery; emergency management and civil protection are the main factors addressed to be developed institutionally and politically in scope of risk reduction objectives.

In scope of *The World Conference on Disaster Reduction* organized in 2005; *Hyogo Framework of Action* was prepared as a counter-active plan of disaster reduction strategy for 21^{st} century and includes implementations and relevant provisions of *Yokohoma Strategy*. In fact, *Hyogo Framework of Action* includes more detailed explanation of disasters and counter-active risk reduction policies and practices. Contemporary risks and hazards are explained more specifically as changing demographic, technologic, socio-economic factors, unplanned urbanization, and development in high risk zones, under development, environmental degradation, climate variability, climate change, geological hazards, epidemics and competition for scarce resources. The disaster risk is defined as a kind of formation which emerges when hazards interact with physical, social and ecologic vulnerabilities having hydrometeorological origin at most. *Hyogo Framework for Action* aims to develop holistic and multi-hazard approach to disaster mitigation through reducing vulnerabilities and creating resilient nations.

In the content of *HFA*, the main concerns are given to governance, risk identification, knowledge management and emergency management as parallel to *Yokohoma Strategy*. The primary considerations are the integration of risk reduction in to development policies and provide poverty reduction. The assessment of human resources, national and local capacities should be examined initially. Latter; as a matter of governance, it is emphasized that risk reduction should be constructed both as national and local priority through specific institutions. The formation of multi-sectoral platforms providing sectoral coordination in local and national levels of authority is mentioned as a requirement. The adoption and modification of legislation through the consensus-based regulations specified in risk reduction and mitigation is also underlined. The prioritization of local risk attributes the allocation of resources and the decentralization of responsibilities from national to local levels of governance and promoting community participation and volunteerism are determined as key activities in risk reduction objectives.

In case of risk assessment and monitoring disaster risks; enhancing early warning system is described as a component of an effective disaster risk reduction. Providing the periodic dissemination of risks maps to decision makers and community at risk, monitoring the indicators of disaster risk and vulnerability both at local and national scale, providing the assessment of sub-national and local disaster impacts are described as essential activities in risk monitoring and assessment. Despite the applications of actuarial methods; the activities of recording, analyzing, summarizing and disseminating statistical information of disaster occurrence, impacts and losses should be achieved through international, regional and local coordination. The coordination of early warning systems with informational systems and integration to government policy is emphasized to implement effective risk reduction policies. (UNISDR, http://www.unisdr.org, 04.03.2009)

The knowledge management and exchange, education, training, research and public awareness are other essential factors to provide public participation. The vulnerable urban realms should be examined in case of demographic, gender, culture and livelihood features. The determined risk groups should be educated in how to act upon warnings and support decision makers and disaster managers in risk reduction activities. The observation, analysis and dissemination of data should be maintained through open exchange databases to contribute in to decision making process and risk reduction practices.

In *HFA*, the underlying risk factors and activities to reduce risks and vulnerabilities in public are explained precisely. Changing social, economic and environmental conditions, inconvenient landuse, compound impacts of hazards caused by geologic events are identified as significant risk factors. Environmental and resource management is a field should be involved in risk reduction practices which provide proper allocation of natural resources and contribute to national development planning. Changing social and economic conditions should be controlled through social and economic development practices including the protection and strengthening of critical public facilities as schools, hospitals, water and power plants, communication and transportation lifelines, disaster warning and management centers, retrofitting and rebuilding of cultural lands. It is also emphasized that are emphasized in scope of post-disaster applications such as recovery and rehabilitation processes; the sharing of expertise and providing income options for populations in high risk areas should be provided. In order to decrease the social and economic vulnerability, the income and financial assets of public should be secured through adopting developing policies and risks sharing mechanisms as insurance and re-insurance. It is indicated to establish public and private partnerships to foster a culture of disaster prevention. The allocation of resources and activating pre-disaster techniques as risk assessment and early warning systems are determined as obligatory steps for decreasing social and economic vulnerability.

In landuse planning and other technical measures, the requirement of incorporating disaster risk assessment measures in to urban planning and providing disaster-prone human settlements in concentrated areas are indicated. The urban problems such as temporary housing in high risk areas should be examined under urban poverty reduction and slum-upgrading programme. The mainstreaming of disaster risk concerns in to infrastructure and design projects and legislative processes such as approval and implementation operations considering social, environmental and economical impact assessments should be provided. Furthermore, it is emphasized that rural development planning and disaster risk management in rural areas should be considered in scope of planning flood areas, determination of safe zones for settlements, providing the revision of existing building codes, developing standards, rehabilitation projects and reconstruction practices for marginal human settlements both at national and local levels through the consensus based approach. (UNISDR, http://www.unisdr.org, 04.03.2009)

At international scale, in both frameworks; it is emphasized to provide disaster preparedness both at local and national levels. Strengthening political, technical and institutional capacities of disaster management at local and national levels, encouraging coordination and dialogue in pre-disaster and post-disaster approaches including political and legislative frameworks, risk assessment and early warning systems, knowledge management and education networks and emergency management are identified to develop a holistic approach. Additionally, the contemporary risks should be controlled and reduced through developing regional approaches and operational mechanisms for an effective disaster response, preparedness and contingency plan considering national, sub-regional and local levels. Promoting national and local funds to support response, recovery preparedness and providing multi-sectoral participation to risk reduction are described as the significant step to be taken.

3.2 *The National Scale*

USA, Japan and Canada are few of the countries that are well-equipped and practiced policies in disaster risk reduction. On the contrary Turkey is lacked of national strategy including policies and practices in risk reduction. The comparative analysis of countries in case of legislative and governmental, technical, financial and educational regulations of risk reduction and risk reduction samples at district level would be examined.

When the local seismic attributes of the countries are observed separately, it is found that the seismic events are at the top of the classification of natural disasters. The contextual hazards of USA are earthquakes, floods, hurricanes, landslides, tsunamis, volcanoes, and wildfires. In fact, USA is located at the Pacific Belt which passes from the Pacific Ocean and the area is named as the Ring of fire as it is seismically active. Mostly, the major earthquakes occur in Texas, California, Alaska and Nevada as there are active faults located. It is estimated that each year averagely 700 seismic shocks are determined. (Wikipedia, http://en.wikipedia.org/, 09.03.2009)

Japan is one of the countries which are most prone to natural disasters, especially earthquakes. The contextual hazards of Japan are floods, typhoons and earthquakes. There are several active faults monitored and presented in 2005 Kobe Report, located in parallel to the coastal area causing the earthquakes such as Great Kanto Earthquake in 1923, the Fukui Earthquake in 1959, Hokkaido Nasei- oki in 1993 and Great Hashin Awaii Earthquake or Kobe Earthquake in and Niigata Earthquake in 2004. Canada is also opened to various natural hazards such as blizzards, earthquakes, tornadoes, hail, landslides and avalanches, icebergs, tsunamis and volcanic eruptions. The most hazardous natural events are also recorded as earthquakes in Canada as it is located at the tectonic plates of Pacific Coast and affected continuously. (Wikipedia, http://en.wikipedia.org/, 09.03.2009)

Turkey is exposed to natural hazards such as landslides floods and earthquakes. As Turkey is located on Eurasian Geological Plate which is seismically active and includes North Anatolian Fault (NAF) laying from east to the west, East Anatolian Fault (EAF) laying from Antakya to Bingol and Western Graben Complex located at the Aegean Sea. The recent major earthquakes were happened in 1999, in Adapazari, Golcuk, Yalova and Bolu. There have been 58 major earthquakes in between 1903 and 1999, causing more than 100.000 life losses, injured 420.000 buildings and injured 150.000 people. (Ministry of Public Works and Settlement, http://www.deprem.gov.tr, 09.03.2009)

3.2.1 The Legislative and Governmental Measures

In case of legislative measures, USA's national policy on disaster risk reduction mainstreams mitigation. *Disaster Mitigation Act in 2000* includes a national hazard mitigation programme and national fund for mitigation to assist states and local governments in reducing disaster risks. *Federal Emergency Management Agency (FEMA)* is established to apply the national disaster mitigation goals and provide coordination with the president, state and local authorities. *Natural Disaster Hazard Mitigation Programme* is defined under the title *Pre-disaster Hazard Mitigation* and established by the President for providing technical and financial assistance to federal states and local governments. In scope of the technical and financial assistance; reducing injuries, loss of lives, damages and destruction of properties, damages to critical services, facilities and provide public and private partnerships are involved. At least five local governments should recommend financial assistance from the governor of each state to receive approval by *FEMA* for the assistance. The national development goals are decentralized in to responsibilities shared at all levels of authorities to provide mitigation from national to local units of governance. (FEMA, www.fema.gov, 06.03.2009)

In the content of programme, *Hazard Mitigation Measures* are developed to improve assessment of community vulnerability to natural hazards and establish hazard mitigation priorities plan for community through supporting public and private partnerships. There is also a special emphasis on vulnerable groups of 3000 people or fewer individuals called as *Small Impoverished Communities.* In order to impede community vulnerability, post-disaster preventative measures as the continuation of the critical services as hospitals, energy centrals and schools and implementing risk reduction approach in to technical design and emergency preparedness are underlined precisely. The coordination between financial, governmental, technical and educational measures should be provided to manage an effective mitigation plan.

Under the title *Disaster Preparedness and Mitigation Assistance, Interagency Task Force-IATF* is established for coordinating the implementation of *Pre-Disaster Hazard Mitigation Programmes* under the directory of *Federal Emergency Management Agency-FEMA*, including members of relevant federal agencies, states, local governments and *American Red Cross*. In scope of the section of *Mitigation Planning*, it is defined in the purpose of the identification of natural hazards, risks and vulnerabilities in state and local scales. *Local Mitigation Plans* describe action to mitigate local natural hazards risks and vulnerabilities and establishes strategies to implement those actions. *State Mitigation Plans* are also deployed for the same purposes but also to support development of local mitigation plans and provide technical assistance to local governments.

Japan's legislative and governmental framework is concentrated on disaster risk management and constituted of *Disaster Countermeasures Basic Act 1961* and sectoral plans prepared for vulnerable sectors in scope of national development goals are involved. (EMI, www.emi.pdc.org, 06.03.2009) Lessons learned from great Japan earthquakes as *Kobe Earthquake (1995)* are used in setting out comprehensive and long-term risk management plans. Under the Disaster Countermeasures Basic Act, it is aimed to develope multi-sectoral disaster risk mitigation. In that scope, the participation of the Prime Minister, the Bank of Japan, local communities, private sector, public bodies, legal bodies carrying on public business to volunteer activities are ensured by the act.

There are three plans to execute disaster countermeasures at national, prefectural and local levels, under the mentoring of the *Central Disaster Management Council* which is constituted under Prime Minister and Minister of State for Disaster Management. The council members include members; Minister of State for Disaster Management and all the cabinet ministers which also involves in the Organization for Technical Investigation. Other members including Chief of Designated Public Corporations Governor of the Bank of Japan, President of

Japan Red Cross Society, President of Japan Broadcasting Corporation (Nippon-Hoso Kyokal) and President of Telegraph and Telephone Corporation (Nippon) and people of experienced or academic standing form the Secretary Organization. The Council provides for coordination of the information flow, decision making in disaster management policies and the declaration of disasters under jurisdiction of Prime Minister and the Minister of State for Disaster Management.

The first plan is *Disaster Management Plan* developed in 1963 and then it was upgraded step by step, through implementing new counter measures such as Earthquake, Petrochemical Complex, Accident Disaster Nuclear Disaster, Storm and Flood and Nuclear Disaster Countermeasures, up to 2002. After the *Kobe Earthquake (1995)*, the entire plan is revised according to the new lessons learned. It is developed to coordinate sub-plans assigned to the Government, public corporations and local governments and the implementation of national disaster management measures. Besides, disaster countermeasures refer to emergency state and post-disaster techniques as response, recovery, reconstruction were developed according to each type of disaster. The second plan is *Disaster Management Operation Plan* developed by the designated administrative organizations and designated public corporations according to *Disaster Management Plan*. The third plan is *Local Disaster Management Plan,* developed by prefectural and municipal disaster management councils. Separate plans are developed for each type of disaster, according to local circumstances and *Disaster Management Plan.*

Under the body of state and ministry of state for disaster management, there are organizations specialized in different sectors of risk and legislation on disaster risk reduction, emergency response, post-disaster recovery, reconstruction fields and there are long-term plans including social, economic and environmental plans. *Comprehensive National Plan* is based on the Comprehensive National Development Act adopted in 1998. It is aimed to improve Japan’s safety to prevent from large-scale earthquakes and other natural disasters through mainstreaming pre-disaster risk management. *Disaster Mitigation Counterrisk Reduction Measures* are adopted to provide disaster-resilient transport, communications and infrastructure, introducing public works design standards, promoting assurance of earthquake resistance capacity in buildings, establishing an earthquake watch network and other disaster watch systems, promote research in to disasters and their prevention, assessing and publishing degree of risk of local disasters and reflecting all the information to local development, landuse, educative manual specialized for certain disaster types and scales for local, corporate and administrative bodies and community based information sharing systems.

Other sectoral plans are developed to implement disaster management countermeasures in to vulnerable sectors that should be protected from disaster impacts and harms under national development goals. *Social Infrastructure Development Priority Plan* provides coordination and communication in between related departments of social infrastructure considering flood damage, traffic safety, energy and water lifelines, steep slopes, coastal cliffs, preventing the disaster impacts on infrastructural networks and determining the evacuation routes and sites. *Long Term Plan for Land Improvement* is developed to mitigate disasters and impacts, prioritizing the reduction of flood areas and increase safety in agricultural areas and provincial communities. *Forestry Maintenance and Conservation Projects Plan* aims to provide forest maintenance and afforestation applications such as the regeneration of damaged forests and increase the number of communities located at periphery of forestall areas for preventing landslide disaster. *Ministerial Ordinance Governing Technical Standards for Water Supply Facilities* is a disaster management plan tailored for water lifelines to impede negative impacts of disasters considering topography, geology and other natural conditions including bearing of the loads regard to their weight as water pressure, earth pressure, uplift pressure, seismic force, accumulated snow and so on.

Canada's national strategy is based on emergency preparedness and carried through intermediary legislations and organizations to provide coordination in federal, provincial and territorial levels of authorities. The role of the government of Canada is described through *Levers and Lenses Approach for Sectoral Coordination* as a coordinator to build connections in between social, economic, environmental factors to reduce risks and vulnerability through the mitigative strategies shared in all levels of authorities. All kinds of collaboration and partnership between government and public and private stakeholders is defined to provide the sustainability of hazard mitigation under a holistic approach is considered. *The National Support Plan* is an emergency plan at national scale includes functions of each federal government which is responsible for developing contingency and civil emergency plans. *National Security Policy (NSP)* is not developed specially for disaster mitigation but includes the issues as emergency management, public health, transportation, border security and international security *The Emergency Preparedness Act (EPA)* is developed to coordinate emergency management policy in the fields of education, research, development and financial assistance assigned to federal ministries. *EPA* also focuses on roles and responsibilities of provincial and local governments at emergency state. (Prevention Web, www.preventionweb.net, 06.03.2009)

Emergency Management Legislation is specialized for each province and territory in Canada to coordinate the emergency management in civil society. The prevention of life losses, protecting public health and welfare through minimizing damages to community, hazard identification, vulnerability assessment and disaster mitigation are explained as the key responsibilities under comprehensive emergency management. *The Federal Policy on Emergencies (FPE)* is developed to provide the coordination and collaboration mechanisms among federal departments of Government, territories and provinces.

Public Safety and Emergency Preparedness Canada (PSEPC) is an official agency working as a keystone in coordination of information, policy approval, transmitting the declaration by State and other critical issues among federal government departments. *National Disaster Mitigation Capacity (NDMS)* is also an official agency established by PSEPC in 1990 and aims to develope long term measures to reduce disaster impacts in environmental, economic and social fields through coordinating the levels of authorities from federal to territorial. .

National Critical Infrastructure Programme (NCIAP) is developed to protect and recover the critical infrastructure including physical facilities, information networks which are damaged after a natural event occurs. The infrastructure sector is operated by the private sector and NCIP provides for partnership between private and public sector stakeholders at national scale and ensure coordination among them for the continuity of services after a major disaster happens. The vulnerable sectors are secured by funds and organizations such as *Infrastructure Canada* including *Canada Strategic Infrastructure Fund (CSIF)* and *Municipal and Rural Infrastructure Fund (MRIF); Natural Sources Canada (NRcan)* including *Canadian Forest Service* and *Climate Changes and Adaptation*; and *Industry Canada (IC)* including *Emergency and Telecommunication Programmes.* In Turkey, it is not possible to mention a national strategy secured by legislative, political frameworks and responsibilities shared by all levels of governmental units. When the legislative and governmental structure is examined, it is observed that there is a temporary assignment of emergency management to governmental units. The main legislative tools related to disaster risk reduction are included inadequately in Disaster's Law and Development Law. Disaster's Law (7269) is focused primarily on post disaster applications as emergency management and relief. There are also decisions related to disaster risk reduction and development such as 'Regulations on Construction in Natural Disaster-prone Areas' which creates confusion as it should be integrated to Development Law. Disaster management activities organized through Disaster Works established under the Earthquake Board and the Prime Ministry. Disaster Works is constituted of three sub-units as Earthquake Engineering Unit to organize engineering works to develope disaster-resistant buildings, Seismology Unit to form earthquake record network and Laboratory Unit to monitor earthquake and participate to international disaster reduction studies. In fact Disaster Works is focused on post-disaster activities.

The roles given to local authorities in disaster management are not clear and integrated into Disasters Law (7269). In, Metropolitan Municipality Law (5216, 7th article) disaster planning is mentioned and the requirement for eliminating inconvenient land uses from the metropolitan area is underlined but no strategy and financial resources are defined. Municipality Law (5393) includes defined responsibilities solely for emergency management.

Development Law (3194) is not established for reducing and eliminating disaster risks. The juridical efficiency of the law is damaged by development amnesty laws. After 1999, policy implementations based on disaster risk reduction are provided. Compulsory Earthquake Insurance (ZDS), Building Supervision, and Professional Competence laws are adopted with statuary decree.

In 1989, in the scope of the action plan of International Decade for Natural Disaster Reduction (1990-2000), Ministry of Public Works and Settlement is assigned to coordinate disaster risk management activities and became a national contact point referred to the act 7269. *"National Committee"* is established and an action plan for the decade is prepared and assigned to State Planning Organization (DPT). National plan is executed only partially as it is not supported politically.

Turkey Emergency State Management Chairmanship (Turkiye Acil Durum onetimi Genel Mudurlugu-TAY) is established under the body of Prime Ministry and charged to organize applications and coordinate related institutions in emergency state. In 2000, National Earthquake Council *(Ulusal Deprem Konseyi-UDK)* is established including members from different disciplines and academia. The purpose of the institution is determining a national strategy on reducing seismic risks and consulting public institutions. In 2007, it is abolished with the excuse of being "functionless".

The problems and inadequacies are reported in Turkey's national report on risk World Conference on Risk Reduction, national strategy disaster management is based on post-disaster policies and practices. Legislative framework on national and local are based solely on emergency concerns. Turkey Emergency Management Agency Directory (Turkiye Acil Durum Yonetim Merkezi-TEMAD) charged to establish emergency management centers under Prime Ministry, coordinate all modes of transportation according to relief-based applications and other minimalist works as protection of relief supplies. (Prevention Web, www.preventionweb.net, 06.03.2009)

3.2.2 The Financial Measures

In USA, *Natural Disaster Hazard Mitigation Programme* and *Measures* are supported both by the *Federal Share* and *National Pre-disaster Mitigation Fund* which is established under treasury of USA. 75% of total cost of mitigation actions of states and local governments and 90% of total cost of *Small Impoverished Communities* supplied from the *Federal Share.* The president has right to increase federal share form 15% to 20%, depending on eligibility criteria for property acquisition and other measures under title *Increased Federal Share for Hazard Mitigation Measures*, if it is approved in the Mitigation Plan when the major disaster is declared by State. The expenses for Mitigation Plans and Measures are supplied from *National Pre-disaster Mitigation Fund* which is constituted from gifts, bequests or donations and services or property. The financial resources are transferred from treasury of USA to the President and then from the President to states and local governments. (FEMA, www.fema.gov, 06.03.2009)

In order to minimize economic vulnerability there are disaster loans and grant programmes to finance repair and construction costs for individuals affected by major disaster. In fact it is obligatory to apply safe standards and building codes if disaster loan or grant is received by an individual. Besides, safe landuse and construction practices could be applied under the mentoring of state and local governments.

Financial Assistance to Repair, Restore, Reconstruct or Replace Damaged Facilities given by state and local governments includes responsibilities as financing the costs of reconstruction, repairment and replacement of a public facility damaged by a major disaster. In case of Private and Non-Profit Facilities, the same expenses are supplied by the individual. Special case is defined for *Large in Lieu Contributions* which includes the supplement of construction costs that would be carried on unstable soil as 90% for Public Facilities and 75% for Private Non-Profit Facilities from the Federal Share. The confirmation of the costs of repairing and reconstruction estimations would be also supervised by an Expert Panel. (FEMA, www.fema.gov, 06.03.2009)

In the scope of *Federal Assistance to Individuals and Households, Housing Assistance* is given to affected communities whose properties are damaged or lost after the major disasters. State offers four options of assistance. In the options of financial assistance or direct assistance of *Temporary Housing;* individuals and households could rent existing rental units, manufactured housing, recreational vehicles and other readily fabricated dwelling either could purchase or lease temporary housing units directly. *Repairs Assistance* is given to the owner occupied private residences, utilities, residential infrastructure such as private access routes and the repairment activities should be eligible to hazard mitigation measures. *Replacement Assistance* is given to finance the cost of replacement of owner-occupied private residences. *Permanent Housing Construction* is given by the financial assistance or direct assistance to construct permanent housing in provincial areas outside USA or in other remote locations as the last option to execute if there are no other housing resources available or temporary housing assistance is not feasible. (FEMA, www.fema.gov, 06.03.2009)

Japan's disaster risk management countermeasures are covered from the state budget. Approximately, 5% of the total general-account budget is separated from disaster reduction expenses. (www.emi.pdc.org) Disaster assistance loans are given by municipal authorities, grants for disaster countermeasures are given by prefectural governments and disaster insurances are given by the state. Disaster loans and Local loans are also given to local and public bodies and small and medium enterprises. There are also loans for reconstruction given by the state. Those governmental aids are given to the affected communities who lost their property and live in municipality building belonging to a prefecture.
In the content of financial measures of Canada, there are no national funds for National Disaster Mitigation Strategy. Canada's financial measures in emergency preparedness are decentralized in to governmental and non-governmental programmes and initiatives at provincial and municipal levels of authorities. *Municipal Rural Infrastructure Fund (MRIF)* provides partnership among federal, provincial, territorial and municipal governments to internalize disaster resilience via adopting risk reduction measures into design, building and rehabilitation of major infrastructure. *Disaster Financial Assistance Arrangements (DFAA)* is a kind of financial assistance defined under the national strategy and given by the state to affected individuals at provincial and territorial levels to reduce financial impacts of disasters. *Canada Infrastructure Fund (CSIF)* is managed by the government to supply investments provided for infrastructure projects promoting economic growth and appropriate life standards. CSIF works in coordinated with Municipal and Rural Infrastructure Fund (MRIF). (Prevention Web, www.preventionweb.net, 06.03.2009)

The insurance system includes personal and commercial insurance available for fires, tornadoes, windstorms, hailstorms and earthquakes. Earthquake insurance demands for some incentives and criteria of construction standards for major infrastructure projects.

In scope of Turkey's financial measures, there is no separate budget for risk reduction but transferred shares form the state's budget for the purpose of emergency management. Emergency Management and relief-based activities partially supplied by Turkey Red Crescent. Other activities and projects for educating officers, administrators and community are supplied by international organizations as EU and World Bank.

The insurance system in Turkey is recently developed. Natural Disaster Insurances Organization (DASK) is established after Marmara Earthquake in 1999 for the purpose of reducing the financial post-disaster losses and providing capital accumulation in a common pool through the international insurance, reassurance agencies capital markets. During a major disaster, common pool resources are transferred to governmental units as Ministry of Public Works and Settlements to be used in emergency management activities. Compulsory Earthquake Insurance is given by DASK to manufactured housing units or commercial buildings. (Prevention Web, www.preventionweb.net, 06.03.2009)

3.2.3 The Technical Measures

Technical measures include risk monitoring and risk assessment practices which are based on developing technologies to determine disaster risks, hazards; early warning systems to inform public and provide collaboration at international level; and information networks for using disaster data in informing institutions and raising public awareness.

In USA, risk identification and assessment in national, federal and local levels through the Multi-Hazard Maps and high impact natural disaster scenarios which are used in estimation of future loss and scenarios developed to make natural hazards more real to decision makers and public. Under *Hazard Mitigation Measures, FEMA* develops *Multi-Hazard Advisory Maps (HAZUS-MH)*, in which each type of hazard is overlapped and identified simultaneously. Multi hazard

Maps are developed through states, local governments and federal agencies under responsibility of reducing the impacts of natural disasters such as flooding, hurricanes and seismic events. In fact they are advisory maps and not refer to new policy or regulation but used to inform general public and support hazard mitigation measures. (FEMA, www.fema.gov, 06.03.2009)

Early warning systems are essential components of risk monitoring process. USA has separate early warning systems for all kinds of major hazards such as floods, volcanoes and tsunamis and publicly accessible. In fact, global space-based observation, generated by contributions of each country as a part of Global Earth Observatory System, is used to monitor seismic events and fully accessible to all Nations.

Technical measures to ensure the critical infrastructure and building codes are ensured by organizations. *The National Science and Technology Council*'s *Interagency Subcommittee on Disaster Reduction-SDR* works as a mentoring institution determining the *National Grand Challenges* to develop new technologies tailored to mitigate each type of natural hazard as Coastal Inundation, Drought and Earthquakes in damages of infrastructural systems including communication, electricity, financial, gas, sewage, transportation, water lines, after a major disaster is happened. *American Society of Civil Engineers* and *International Code Council (ICC)* work as supervising organizations to develope building codes specialized for each type of hazard and updating the existing codes to the current scientific and engineering techniques as seismic shaking, intensity, wind loads and fire characteristic through the consensus-based process. (FEMA, www.fema.gov, 06.03.2009)

Japan's technical measures in risk monitoring and risk assessment includes hazard mapping system which is publicly accessible and specified to natural hazards and disasters as tsunamis, floods and volcanic attributes. It is carried through different agencies of disaster management under the Cabinet Office and the Ministry of relevant departments as Agriculture and Forestry, The Ministry of Land Infrastructure and Transport and so on. The vulnerability assessments carried through *The Central Disaster Management Council* and local governments for the estimation of the potential damage that would be caused after a major earthquake through evaluating the earthquake resistance of buildings and infrastructure. The capacity assessments to test the efficiency of disaster management activities are carried through *The Fire and Disaster Management Agency* and *The Cabinet Office* providing a self evaluation system including questions and tests for local bodies. As a complementary system to risk assessment; early warning systems tailored to specific kinds of natural hazards.

In building codes, Japan has *Building Standard Law* enacted in 1950 and *The Act for Promotion of the Earthquake Proof Retrofitting of Buildings* enacted in 1955. After in 1981, *Building Standard Law* is revised according to *New Seismic Design Method* including adequate standards for earthquake resistance. It is reported that 1/3 of the total buildings were developed before 1981 having lack of those standards. There are projects of reconstruction and retrofitting providing earthquake resistance for aged buildings. (EMI, www.emi.pdc.org, 06.03.2009)

Canada's technical measures are based on Natural Hazard Assessment Project (CNHAP), published in 2003 by contributions of Public Safety and Emergency Preparedness (PSEPC) and Meteorological Service of Canada and Institute for Catastrophic Loss Reduction (ICLR). The project includes two components. The initial component is formed of the technical papers suitable for publication, created by academics, researchers, emergency management practitioners and the second component is formed of the synthesis of technical documents suitable for the general public and transmitting the experience and information to the international community. It is aimed to use the project in providing risk assessment for each type of hazard and developing mitigation measures consequently. Another risk assessment medium is *Natural Hazards and Emergency Response Program* established by the Federal Government's initiative, *Strong and Safe Communities Natural Resources Canada-Earth Science Sector.* Under the programme, it is aimed to provide geo-scientific and geo-spatial information expertise to assist in disaster mitigation. The programme includes communities and critical infrastructure at risk to provide national risks assessments and integration with national monitoring and observation systems. (Prevention Web, www.preventionweb.net, 06.03.2009)

Canadian risk monitoring system includes early warning systems for all types of natural disasters. In case of earthquakes and seismic attributes, *The Geological Survey of Canada (GSC)* operates a wide network of seismographs to give real time alerts including real time data from other institutes. The system also informs about the safety of transport facilities as railway track and energy plants as nuclear power plants and dams.

Canada's national building codes are updated by *The National Research Council* including the assessment of seismic risk impacts with latest innovations and techniques. An application template is prepared for provinces and reviewed in every five years. *The institute for Research in Construction (IRC)* and *The National Research Council* are charged to develop new techniques for modernizing building codes and construction quality. (Prevention Web, www.preventionweb.net, 06.03.2009)

In Turkey, risk assessment is not systematized and institutionalized yet. There is no institution specially assigned for risk assessment and hazard mapping. The hazard map developed for monitoring seismic risks are also developed as Earthquake Zoning Map by *Ministry of Public Works and Settlement* and Active Fault Map developed by *Mineral Research Institute* up to 1990s. After 1999 *The General Directorate of Disaster Affairs* prepared a multi-hazard map and it became an assigned responsibility for municipalities afterwards. Also there is no institution responsible for risk monitoring and risk mapping. The institutions with related responsibilities are defined as *Earthquake Research Center, Department of*

Ministry of Public Works and Settlement and *The Kandilli Observatory of Bogazici University* for earthquake observation. There is no institution or governmental body carries on vulnerability assessment. *Earthquake Disaster Research Project* developed by association of Turkish Government and *Japan International Cooperation Agency (JICA)* to identify seismic risks at regional level but it is not evaluated effectively by governmental and local units. There are early warning systems for floods, earthquakes and meteorological extremes distinctly and have no relation to international early warning and information systems. (Prevention Web, www.preventionweb.net, 06.03.2009)

Turkey's building codes are revised in 1998 and Earthquake Design Code is adopted in 2007 under Earthquake Specification. (Prevention Web, www.preventionweb.net, 06.03.2009)

3.2.4 Educational Measures

Educational measures are activated to raise public awareness, train technical and governmental risk reduction practitioners and forming collective perception of disasters and disaster risks.

In USA, public education on local government level is carried on through *National Science Foundation* which provides research tools and methods for multi- risk assessments and cost and benefit analysis. Country-wide public awareness strategy is developed to disseminate culture of disaster resilience with outreach to urban and rural communities. In local level, commemorations of major disasters are organized. *National Multi-Sectoral Platform for Disaster Risk Reduction* provides coordination and policy guidance on disaster risk reduction. It is aimed to support multi-sectoral and inter-disciplinary risk reduction with public, private and civil society participation.

In case of implementing disaster risk mitigation measures in to professional education, *American Planners Association (APA)* established *Hazards Planning Research Center* which is contracted with FEMA to prepare a *Planning Advisory Service Report (2007)* on effective practices of integrating hazard mitigation in to all types of local planning. The study examines community activities and goals, developing comprehensive, master and general plans, making sub plans as neighborhood and downtown plans, landuse management tools such as zoning, subdivision, development and form based codes, improving financial resources for public investments such as infrastructure, building and facilities. (FEMA, www.fema.gov, 06.03.2009)

In Japan, *The Central Management Council* includes study groups share information with *The Headquarters for Earthquake Research Promotion* to discuss policy on earthquake research. In *Science and Technology Basic Plan*, the areas of the earthquake disaster prevention science and technology, emergency and disaster reduction present various researches in safe construction and infrastructure to provide effective risk reduction. There are education and training programmes for children, teachers and administrators to involve in risk reduction applications in accordance to the legislative plans. Academic institutions carry out scientific and technical researches for specific natural hazards and share the research data with government, *the Central Disaster Management Council* and its sub-bureaus of investigation to apply disaster management countermeasures. *Japan Planning Association* attains a training programme given by UNISDR to apply disaster management measures in planning discipline. (EMI, www.emi.pdc.org, 06.03.2009)

The educational measures are developed weighly by universities, governmental and private organizations in Canada. *PSEPC-Research and Development Division* works as an advisory institution in order to increase capacity in the fields of scientific research, risk assessment, disaster prediction, mitigation and emergency response. *PSEPC also* arranges a training programme via *the Canadian Emergency Preparedness College (CEPC)* focused on multi-service response to emergency through organizing workshops, seminars and courses. *Canadian Red Cross* is interacting with provincial and territorial emergency organizations and partners to provide public awareness and educating communities according to the type of emergencies. *The federal Department of Public Safety and Emergency Preparedness* develops visual material and manuals to increase public awareness for individual and communities and provide emergency preparedness. Academic Institutions such as *Brandon University* in collaboration with the *Manitoba Emergency Services College* established *the Applied Disaster and Emergency Studies Program (A-DES)* in 2000 and focused on to train students in emergency management from an inter-disciplinary approach. There are other academic institutions contributing to emergency management preparedness through annual researches, online forums and workshops. (Prevention Web, www.preventionweb.net, 06.03.2009)

In Turkey, universities and earthquake research institutes are not supplied by government or any other private organization. They supply the scientific researches from university's budget and international projects. There are no projects, social and educational programmes systematically developed for public awareness and capacity building. (Prevention Web, www.preventionweb.net, 06.03.2009)

3.2.5 International Experiences in Local Disaster Management

In this section, community-based disaster mitigation practices in localities from international samples of USA and Japan would be examined in case of mitigation practices and community participation.

In USA, Hurricane Katrina formed over the Bahamas in 2005 and crossed southern Florida. As one of the Atlanta Hurricanes examined in six category according to their impacts and parameters as sustained winds, storm surges and central pressure, Katrina Hurricane was started as the least damaging hurricane in Category 1 but after it strengthened to Category 3 in the Gulf of Mexico. Category 3 storms can cause some structural damage to small residences and buildings with wood frame, manufactured materials with minor curtain wall and mobile houses lack of solid foundation, gable-end roof and cause floods. In the disaster, the loss of life and property damage mostly occurred in New Orleans, Louisiana which is caused by the failure of the levee system. 80% of the city became flooded and 1.836.000 people lost their lives in the actual hurricane and in the floods.

The recovery plan is given to Concordia Planning Firm and supported by the private organizations, Rockefeller Foundation and The Greater New Orleans Foundation for the citizen-led recovery planning. The Unified New Orleans Plan is a citizen developed recovery plan. Urban design firms are called to involve in the process. More than 10.000 people who are located around the country and dislocated New Orleans dwellers are joined to extensive meetings organized for decision making process of the recovery plan. The Unified Plan was approved by the local authorities as mayor, the City Council and the Louisiana Recovery Authority which is state's federal funding agency. (APA, www.planning.org, 10.03.2009)

The main problem observed after the disaster was that lower areas are left by local community to be waste areas because of another disaster expectation and experienced disfunctional levees of flood prevention system. Higher areas are mostly preferred to be settled in. Thus, lower areas are required to be redeveloped in New Orleans. The Unified Plan points out the redevelopment of the lower areas initially and clustering critical services around the city center. It is explained that in place of assigning schools as community centers, clustering of critical facilities is a broader concept for affective disaster mitigation. The schools are also working as community centers and health care and social services are located on to school site.

The New Orleans recovery authority is formed to coordinate multi-sectoral partnerships to involve in the recovery process. The New Orleans School Facilities Master Plan is developed and examined by federal governing agencies. The first phase of the plan proposes the primary to middle school facilities to be distributed throughout the city mostly at a distance of 1.6 km to each other to provide equity and less dependency to automobile transportation. Around the school facilities, there are neighborhood centers which the community could use transportation facilities if they would prefer to go to another district school. The first phase was completed by $700 million. The second phase of the plan includes high schools are projected to be located beside the significant learning centers such as NASA facility where space shuttles are designed and built, Contemporary Art Center. Another risky site on the Mississippi River is proposed to become Maritime Military Academy which would cooperate to Audobon Center for Research of Endangered Species located on the same area during a major disaster. It is underlined to use community assets for learning and planning the whole city as an integrated learning center as the main strategy. (APA, www.planning.org, 10.03.2009)

The failure of *Federal Emergency Management Agency (FEMA)* and state government is interpreted as externalizing the local community besides disfunctional operation of the state government, local units and practices. It is also emphasized that while California is spending $100 billion on school facilities, Louisiana State spends only $20 billion from the local funds. It is observed that there is no collaboration with parks, libraries, health care and adult education before the disaster happened. Through *the Unified Plan*, community facilities are placed at the center and civil society become integrated and coordinated to mitigate disasters and recover Katrina Hurricane. The city planning department coordinated to education facilities that collaborated with transportational planning department. During the community meetings organized in New Orleans, the community pointed out the lack of coordination among federal government and local units in post-disaster practices and it is indicated that the community would approve the plan if the school system, the city government, the housing authority and city institutions are collaborated to develop a holistic recovery plan.

In Japan, after 1999 earthquakes there are several community development projects carried through different authorities. *Kyojima District Community Development Plan* is based on *the Community Development Plan* mentioned in *the Community Development Conference (1981, Tokyo)*. It is a significant model developed under *The Constructed Area Development Incentive Project* which includes rebuilding of the aged buildings, rehabilitation and developing of traffic roads, constructing neighborhood dwellings and developing green areas. It is not based on any city planning methods as it was experienced in the New Orleans case and it was not applied by financial contribution of private sector and citizens. The project is financed by 50% central government, 25% Tokyo Metropolitan Government and 25% local municipality. In the project, it is aimed to rehabilitate the neighborhood for disaster preparedness and increasing the quality of life. The project application is ensured by metropolitan disaster mitigation acts and legislations, developed by The Metropolitan Government and Land, Infrastructure and Transportation Ministry. The municipalities under the Metropolitan Government are free to identify project site and develop autonomous projects but charged to use macro level financial mediums. (Urban Research Initiative, www.kentli.org, 10.03.2009)

There are several urban problems in site observed as challenges for disaster preparedness. The aged buildings are located on soft ground and close to each other. Unplanned construction created narrow streets and cul de sacs. The residential lots are formed by cut and fills which attributes hazardous grounds. The field roads and irrigation lines are regenerated in to streets, 56% of the roads are the narrow streets. There are 3365 residences in the area and 74.7% of them are aged buildings and according to the Earthquake Hazard Regional Risk Report, Kyojima District is located at most risky area. The population of district is decreased in 40% from 1975 but the elderly population is determined as 26% which is over the average population of elderly people in the city. The amount of small business entrepreneurs and manufacturing industries are decreased. It is not possible to provide reconstruction in parcel scale as the housing parcels are small and do not have any facades looking to the street, are jointly owned properties and housing credits are quite low.

The Community Development Project is carried through the chairpersons of seven civil organizations from the locality and the directors of three shopping centers. The groups in the organization are; The Community Development Conference which is responsible for decision making and application of the plan on Kyojima District; The Executive Committee which manages the application of the plan and programmes the schedule; The Specialists' Council formed of the Planning Group, the Commercial Group, the Industry Group and the Woman Group which carry on planning works in related fields; The Organization Information Council that is formed of the chairpersons for seven civil organizations from the locality.

In scope of the Community Development Plan for Kyojima District, the positioning of residential units and commercial units proximally, developing resilient and safe settlements to major disasters, creating a living city for the permanent dwellers and genders are purposed precisely. The project is formed of three phases which include, the planning of the service roads, the rehabilitation of residential units and other units and the planning of the public uses. In the service roads plan; the test of efficiency of street roads, the determination of new roads that would be developed, the determination of the road priorities, the development and construction of service roads and the construction of the main service roads in a distance of 100m from each other, developing roads specially concerned for fire department vehicles and roads considered for pedestrian and cyclers are included. (Urban Research Initiative, www.kentli.org, 10.03.2009).

In the rehabilitation of residential units plan; the demolition of the aged buildings, the rehabilitation of shops and storages, the construction of disaster resilient and fire resilient buildings, supporting the reconstruction including unification of parcels and planning multi-story buildings and identification of roles and responsibilities given to Sumida municipality and citizens, financing the citizens who prefer reconstruction of their dwellings are the activities mentioned. This part of the project started in 1983 and 43% of the buildings were determined as risky. The risky buildings were expropriated and new dwellings and lands were given to the house owners for reducing their vulnerability. In the planning process of public uses; planning efficient public uses for the district and changing public structure considering two existing conference halls, planning pocket parks and open spaces which could be activated in emergency state are determined as main activities. Additionally, water tanks are proposed to be constructed under district dwellings and pocket parks for disaster mitigation.

The project started in 1970 and still continues. It is financed by the public sector but carried through communicating the local incentives. It has been waited for the approval of dwellers to reconstruct their residences and temporary public houses are provided for each to settle in during reconstruction period. (Urban Research Initiative, www.kentli.org, 10.03.2009)

Both cases in USA and Japan, even the local projects are carried through public or private sector, community participation is concerned primarily. The democratic application of planning decisions concluded as shorter recovery period and public awareness to disasters created through the negative experience but converted in to community resilience.

3.3 Lessons Learned

The seismic activities has been intensified from 1990s to 2000s are required for a new perspective to determine and counteract contemporary disasters and disaster risks. The great amount of life losses and economic loss showed that post-disaster policies and practices are disfunctional and became old for new breed disaster risks. The global initiative started to shape in 1980s is a positive step to develop a collective perception of disaster risk and risk literature to provide communication at global scale.

Yokohoma Strategy and Hyogo Framework for Action are the main indicators to point out the threshold of changing global perspective from post-disaster to pre-disaster approaches including disaster risk management, disaster risk reduction, preparedness and resilience. In both of the global frameworks; common objectives for countries are identified in the scope of pre-disaster strategies.

- The risk reduction strategy of each country should be implemented in to national development goals to provide sustainability of related policies and practices.

- The long-term risk reduction plans should be developed for socially and economically vulnerable sectors.

- In order to provide risk reduction finance, central and local capacities should be improved through supporting multi-sectoral collaboration and public participation.

- Developing technologies and informational networks for risk monitoring, early warning and risk assessment systems as the risk assessment is the primary component of risk reduction.

- The expanding risk data should be managed through governmental units and exchanged publicly.

- The education and training in risk reduction should be supported by the government and generalized at schools, universities and local units to raise public awareness.

- The coordination at all levels of governance, public and private sectors, professional and academic disciplines as risk assessment and landuse planning should be provided precisely.

In fact Hyogo Framework for Action includes more specific activities for risk reduction besides the mentioned global objectives. The prioritization of local attributes, the allocation of resources and the decentralization of risk reduction responsibilities from national to local governments are underlined. The determination of vulnerable community, preparing risk maps and provide information exchange freely, activating rural development planning as a risk reduction mechanism are also mentioned. The adoption of poverty reduction activities as slum upgrading programmes, concerning critical services infrastructure and energy centers in scope of risk reduction, developing financial policies and complementary mechanisms as re-insurance to decrease financial vulnerability under governmental measures are emphasized.

After 1999, common goals determined for constructing the disaster management principles in a common platforms is continued but governmental failures and greater number of deaths are observed repeatedly. Even disaster management goals and strategies are determined at global level; the legislative infrastructure and operational capacity of local governments differ and could include technical and legislative problems. At first, local capacities should be improved in order to cope with international risk reduction network; otherwise global frameworks are only used as written documents in risk reduction.

The activities are also defined in scope of Yokohoma Strategy and Hyogo Framework for Action under governmental and legislative, technical, financial and educational measures but adopted distinctly in national cases. The disaster management activities depend on operational capacity of state and local governments. Unless the institutionalization of the critical subjects of disaster management calling social and economic aspects of disaster risks are provided both at governmental and non-governmental organizations, an efficient disaster management could not be carried on. When the national cases are observed it is found that different countries developed distinct strategies from same global objectives pointing out the governmental, political, cultural dimensions of disaster management. It is possible to assemble all the dimensions under the concept of locality. Thus, both global frameworks proposed to strengthen local capacities to provide effective disaster management.

USA strategy is focused on disaster mitigation and central governance of mitigative measures and practices. Even local governments have roles and responsibilities in mitigation, the federal governments assembled under *Federal Emergency Management Agency (FEMA)*, is the main body to manage mitigation activities. The approval of state should be required for mitigation activities at local level. In fact financing of the mitigation activities are ensured by the federal government as it is responsible to charge 90% of disaster mitigation activities. In Mitigation Act, it is concerned to reduce economic vulnerability primarily. Housing Assistance is given to individuals lost their properties, in forms of financial aids concerning Temporary Housing, Repair, Replacement and Permanent Housing Construction. It is a well developed financial system protecting the property right of the local community. Another regulation of proposing 90% financial aid to public buildings and 75% of financial aid is given for non-governmental buildings to be constructed on unstable soil, is more effective solution than disaster insurance system for mitigating building-centered risks and providing authority on risky sites.

On the other hand, Japan concerned on disaster management is a well-organized model mainstreaming the implementation of disaster risk reduction in to national development through providing the participation of all ministries, academic and financial mechanisms in to disaster mitigation. The governmental structure is ensured by accompanying multi scale plans at provincial, municipal and local levels and Disaster Management Countermeasures. The direct participation of academia and disaster management experts in to decision making process and providing efficiency through the collaboration with political organization brings out a multi-sectoral and multi-disciplinary approach. The disaster management activities are supported by 5% share from the overall state budget. Japan disaster Management system could be a prototype for other countries in the way of overlapping disaster management in to governmental organization.

In Canadian system, emergency preparedness is the core strategy. All legislative, financial, technical and educational measures are decentralized in to provincial authorities and managed by Preparedness Safety and Emergency Preparedness Canada (PSEPC). National Disaster Mitigation Strategy (NDMS) is established under PSEPC and developed to build national capacity to prevent disasters risks. In fact the conservation of the critical infrastructure is a prioritized subject in case of legislative and financial measures. In emergency preparedness, the coordination in between provincial governments is provided through governmental and non-governmental organizations concerned on distinct vulnerable sectors such as land improvement, forestry and so on. There is a special fund to prevent hazard mitigation in rural infrastructure which is developed as result of wild fire disasters mostly seen in rural areas. In order to coordinate all levels, educational and informational networks are well developed. There are master degrees, training programmes and research fields almost in all universities. Canadian system is not an ideal case, though it is educating in case of searching a way of developing a holistic approach of disaster mitigation in federal governance system.

It is unlikely to compare any national cases to Turkey, as a developing country Turkey is young in the field of disaster management. There is no national strategy determined and legislation specified for pre-disaster approach as mitigation. In

Development Law and Disasters Law the existing technical measures and responsibilities of authorities are not determined precisely. Only observable disaster management activity is the emergency management which is structured under the temporary crisis management center in the body of the Prime Ministry. The temporary crisis management center also includes Disaster Works, the Ministry of Public Works and Settlement, the General Directorate of Disaster Works and the General Directorate of Civil Protection. The pre-disaster approach is ignored in case of legislative and governmental measures. The contemporary organizations in legislative framework as Building Inspection and Compulsory Earthquake Insurance (ZDS) are focused on post-disaster approach. Only instrument ensuring financial safety of public is DASK which should be integrated to wider financial system secured by governmental measures. The existing insurance-based system is not confidential for public as it provides minimum acceptable loss certainly.

There are vulnerable sectors as forests, energy centers, coasts, critical infrastructure, agricultural areas, historical conservation areas and nature conservation areas which should be ensured by special legislations and organizations of disaster risk. The technical measures including risk assessment and early warning systems are not institutionalized but defined under the sub-units of Disaster Works.

The educational measures should be developed for training the risk reduction practitioners and raise public awareness which are inadequate and not supporting by the government effectively. As it is mentioned in Hyogo Framework for Action, in order to raise public awareness and provide distinction in between a disaster and a minor emergency, the collective memory should be vitalized through organizing community meetings and commensurations.

In national cases of USA, Japan and Canada cases, the community participation is emphasized severely. In scope of multi-sectoral and multi-stakeholder disaster mitigation, local community is the main element activated for learning and spreading the culture of disaster prevention. It is mentioned in national cases that disaster management measures and practices should prioritize public interest to become applicable with a consensus-based approach.

When the local disaster management cases of USA and Japan are examined, the requirement of community participation is underlined. Even the contemporary hazards are defined as both local and global, initially the local community faced with disaster impacts. The losses and damages in the urban environment primarily affect the local community. Thus, strengthening the local capacities and financial mediums are a priori factors in disaster mitigation.

In both cases of New Orleans and Kyojima Neighborhood, it is learned that the legislation in Turkey is not focused on local-centered problem solving. The existing institutional and governmental structure does not provide possible mediums to develop strategically and problem-solving disaster management organizations. In order to develop such organizations, the local community is the key actor in disaster management to form flexible organization models with governmental and civil organizations. Another point is the effective use of financial instruments. Turkey requires for adopting a financial system including the coordination of state and local governments. The existing financial instruments have not been used effectively. The more comprehensive and secure financial instruments should be developed and ensured by governmental measures. The disaster management activities and projects should be carried on in spite of changing governments. It is only possible to activate disaster mitigation above politics that local recovery and mitigation projects should be adopted by the local community primarily. Thereby, the local community providing the sustainability of the local disaster mitigation projects could be eliminated the disturbance of the sustainability of disaster management projects.

Table 2. International Cases for Disaster Reduction

Regulations	International Cases of Disaster Risk Reduction			
	USA	JAPAN	CANADA	TURKEY
Governmental	Mitigation	Disaster Risk Management	Emergency Preparedness	Does not have National Policy
Technical	HAZUS Maps	Multi-Hazard Maps	Sectoral Maps for Risk Assessment	Risk Assessment is not legitimated
Financial	15% of Federal Budget	5% of overall state budget	Sectoral Funds from Federal and Local Budget	Does not have national or sectoral budget
Educational	Community programs and academic research progrmmes	From kindergarden to university, including all genders and levels of society	Academic Institutions	Partial contributions of some academic instiutions

CHAPTER 4

THE MITIGATION PLANNING FOR THE CASE OF FATIH DISTRICT IN ISTANBUL

4.1 *The Geographic And Historical Attributes of Fatih District*

The contextual priority of Fatih District includes various challenging attributes for planners. Istanbul is an urban risk pool containing geographical, historical, structural, transportational, infrastructural and social constraints which were evolved through the historical development of Istanbul. The Historical Peninsula located in between Silivri-Gebze, at the center of the Metropolitan Area and harboring the all the problems originated from its central location and functional relations. Thus, Fatih District is an inclusive prototype for including all the general problems and constraints that Istanbul is still facing with.

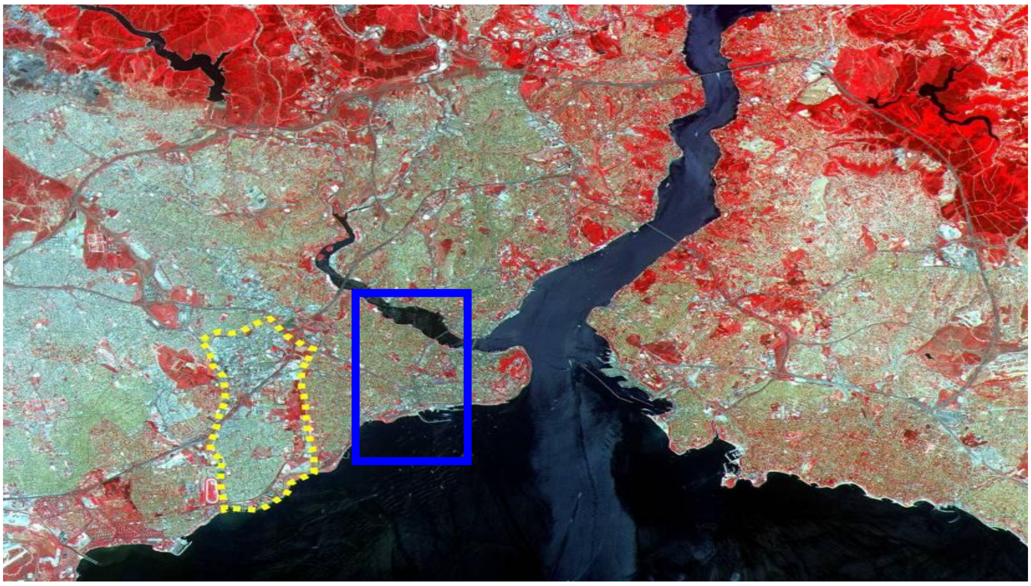


Figure 1.The Historical Peninsula and Fatih District

Istanbul is located at Catalca-Kocaeli Section which lays from the east of Adapazarı plain to Silivri, including the north-east of Marmara Region and divided in to two by the Bosphorus. The east part is called as Kocaeli Peninsula and the west part is named as Catalca Peninsula. The Historical Peninsula (Old City) is separated by city walls located at the southeast part of the Catalca Peninsula which includes the entire area laying to the west boundary with Bulgaria. At the North coast of the Historical Peninsula, Halic and Beyoglu, at the east, the Bosphorus, at the west part, The Marmara Sea and at west Zeytinburnu, Bayrampaşa and Eyup districts are positioned. The Historical Peninsula is an area about 1562 ha including the Eminonu Province of 511 ha and 33 districts. The Eminonu Province is limited with Halic, Bosphorus, Marmara Sea and Fatih District from the east. Fatih Province is an area about 1051 ha including 69 districts and surrounded by is Eyup, Zeytinburnu, Eminonu Provinces, The Marmara Sea and Halic.

4.1.1 The Historical and Cultural Attributes

The historical Peninsula is hosted to many civilizations including Greek, Roman, and Ottoman Empires which formed the structure of city overlapping different historical periods and blended cultural sensitivities that are assembled under unique and surprising setting.

4.1.1.1 The Hellenistic Era

The first settlements in Istanbul and the periphery were based on the first and mid Paleolithic Era in Kucukcekmece and Chalcolithic Era in Anatolian part in Fikirtepe and Kadikoy which includes the traces of Thracians, Phrygians and Britons lived together in B.C 1000.

Later, in the Antique Era, Megara Colonies lived together and integrated with other civilizations as Spartans, Athens civilizations and countered to Persian Empire in B.C 400s. Each city was under the dominance of one civilization and god. Byzantion includes many Greek civilizations and the name is based on Bizas who was the Trachian leader of the first Megara Colony. Byzantion was established in B.C 7. The settlement was laid from eastern edge of Thrace to the entry to the Bosphorus, over a high plateau and including a safe seaport in hillside. The location was preferred as it was safe, easy to defend and close to the international trade route which lays from Pontus to Euksinus (Black Sea) and Eurasia in the south-east. The geographical location and durable city walls provided the empire to last long period independently.

In the Antique Era the main functions of the city includes, memorialize deads in Necropolis, discuss philosophy and politics in Agora which was surrounded by arcades from four sides, position and train soldiers in Strategion, organizing horse races in Hippodrom which are located at a high plateau around Acropolis. As the significant point of the city for worshipping gods it was surrounded by city walls, including a diameter of 35 Stadion and 27 citadels watching over the city. The city has a seaport at north between Sirkeci and Sarayburnu to build strong trade relations with other Greek cities.

4.1.1.2 The Roman Period

The Roman Period in Constantinople was started with the invasion of the roman emperor Septimius Severus who demolished the city walls and took back the title of the city from the site to village. The latter, he rebuilt the city with monumental scale. The seaport was untouched but forum was built to the place of agora and topography was transformed for the function of Hippodrom. A theatre and a stadion were constructed and the cemetery of the city was developed to the west. The city was developed out of the city walls, dominating the Balkans, Eastern Europe and one of the wealthiest provinces of the Roman Empire, the Anatolia.

The city was named as Constantinople in the period of Constantinus I which was a transition period from Paganism to Christianity. He constructed an oval forum surrounded by arcades and raised his monument in to the mid of the forum which was preserved up to today and named as Cemberlitas. The constructions of the Great Palace, Hagia Sophia, Hagia Irene, Church of the Holy Apostles were completed during the emperor of Constantinus I. Some of the roman senators migrated to Byzantion had contributed to development of city such as the construction of the special palace which has a cistern called Binbirdirek Cistern, was located in between Mese street and Hippodrom and could be seen today. The axe of the city, Mese was one of the urban components to connect two forums and other core functions from Augusteion, the emperor square, to Lycos Stream Valley (Aksaray).

In the period of Theodosius II (B.C 408-450), the city was extended through constructing new city walls to the west of the Historical Peninsula and the Blahernai District which was located outside the old city walls. The Great Palace and Blahernai Palace were the significant buildings of Byzantine Empire symbolizing the power and wealth of empire. The strategically important city gate Golden Gate was located at the highest plateau of the city, Yeditepe. It is the gate of emperors to welcome their return from wars and connects the main ax of the city Mese to the Via Egnata, the land route coming from the west. The gate was designed as a marble triumphal arch and named as Theodosius City Walls. The greater cistern is the one in Basilica which was constructed in 6th century and called as Yerebatan Cistern.

In the period of the emperor Iustinianos (A.C 527-565), Constantinople had its last golden age in case of political authority, juristic power and urban regeneration. The two side of Halic was expressed by new and spectacular buildings and the whole city was regenerated. Hagia Sophia, Hagia Irene and 33 other churches were also constructed. In the middle age, the city had gained its complete Christian-orthodox identity through the domination of Macedonian emperors. (A.C 867-1081)

In the second period of mid Byzantine Era, in the domination of Kommenos Empire, several monasteries were constructed. The plan of monasteries was constructed in Greek Cross plan. Christ Pantocrator Monastery located on a hill over Halic and constructed in 13th century was formed of three adjacent buildings and named as Zeyrek Kilise Camii in today.

In 12th century, crusades were started and after the 4th crusade the Byzantine was captured by Latin Monarchy and Byzantine was lost it significance in political arena. The Catholic character of city appeared but monasteries and was become more interacted to outer world. In 14th century, the population of the city was decreased and trade was dominated by Italian cities mostly. A hundred year before the invasion Ottomans were settled in Uskudar and constructed Anatolia Castle to control the Bosphorus. After the Rumeli Castle was constructed, the city was captured in 1453.

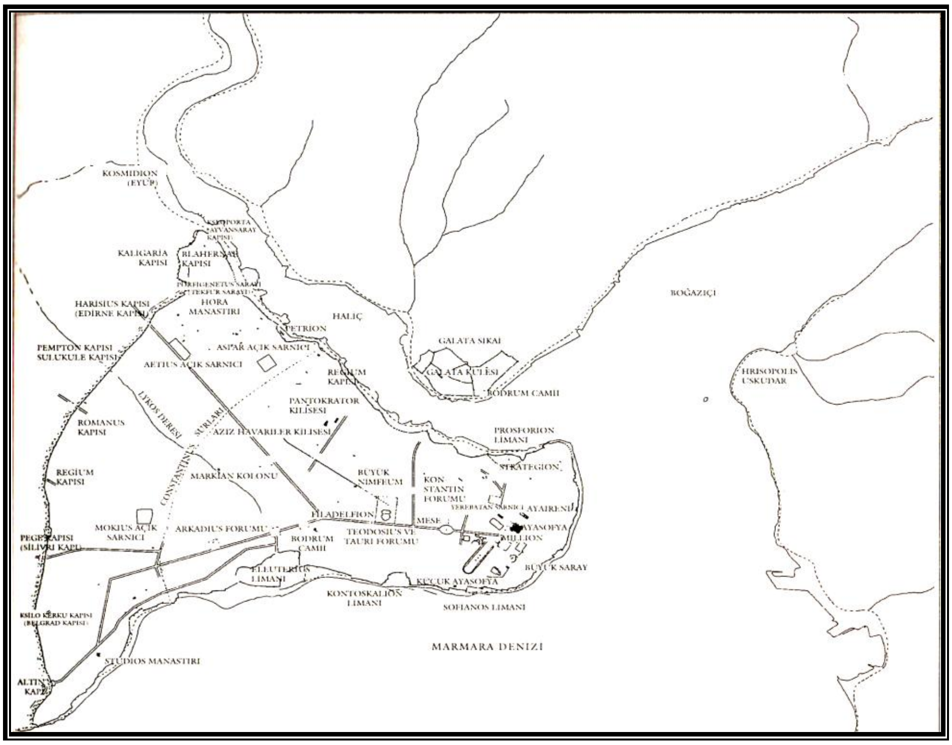


Figure 2. The Plan The Plan of Constantinople in late Byzantine Period (A.C 450-1453), KUBAN D.

4.1.1.3 The Ottoman Period

In Ottoman Period, the Christian identity of city was transformed in to Muslum character through regenerating churches in to mosques and empire buildings. Hagia Sophia was changed in to mosque called Fatih Sultan Mehmet Vakfi. Monasteries were used as residence to sustain initial residence requirement. The Church of Holy Apostles was demolished to construct Fatih Kulliyesi in 1463. The city walls were rehabilitated through adding extra wall with towers to the inner part of the Golden Gate; an Acropolis was formed and named as Yedikule Castle. Differing from Byzantine, The Ottoman Empire determined two strategic locations for constructing new palaces. Saray-i Atik or the old palace, was constructed near ancient Theodosius Forum, watching Halic and taking north winds. Saray-i Cedid, the new palace, was constructed to the edge of the Historical Peninsula and separated by a wall called Sur-u Sultani.

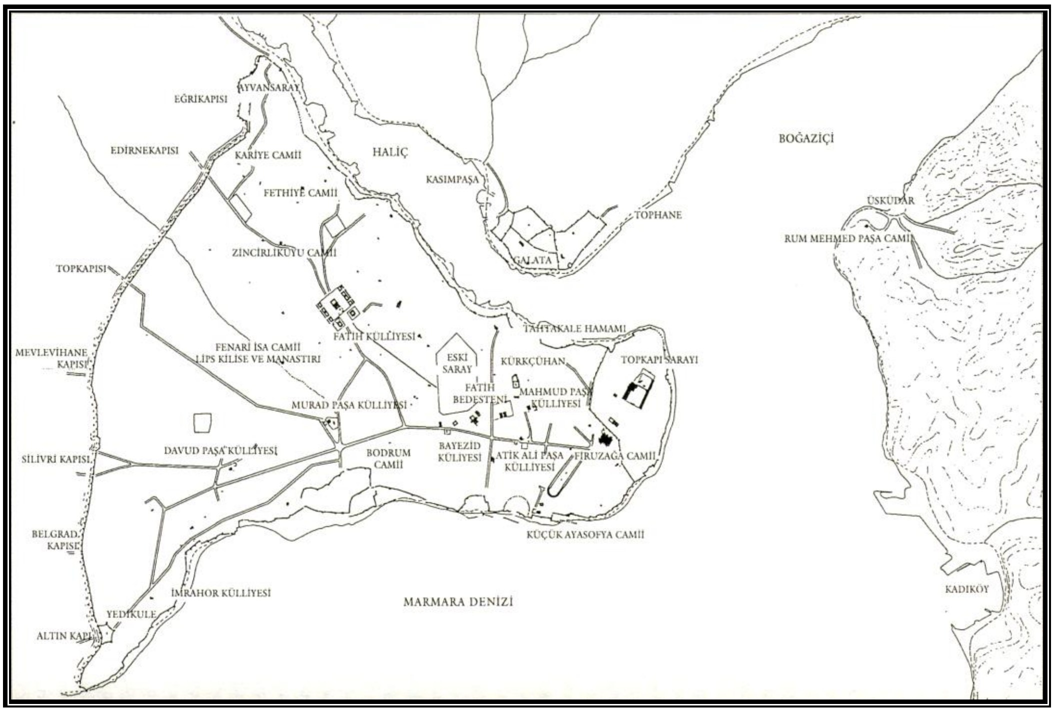


Figure 3. The Plan of Constantinople in the Ottomans Period (1453-1520), KUBAN D.

Istanbul was becoming city of Turks through the spread of Ottoman foundation system. In scope of the system; mosques, madrasahs, schools for children, masjids and for supplying the trade; Turkish baths, bazaars, khans and a bedesten called Kapalıcarsi including 15 big and 8 small domes had constructed through the support of the prominent people. Kapalicarsi includes the archive of documents of guilds, tradesman and became the center of trade. The street system of Byzantine was preserved and new mansions were constructed on ancient terraces. A cadastral survey was carried on for supplying the water requirement of public and Kirkcesme Facilities were constructed to provide water supply.

In the period of Bayezid II (1481-1512), Kıyamet-i Sugra which was an earthquake lasted for 45 days was happened and the structure of the city was destroyed. In fact the harms had been covered up in a short period but the construction material was changed from brick to wood which was endurable to the climate of Istanbul. Also the topography and the winds of Istanbul triggered fire disasters and caused to have greater number of losses. Mimar Sinan constructed Suleymaniye Camii and Kulliyesi in between 1550 and 1557, in the period of Bayezid II. The building includes social and cultural facilities as mosque, madrasahs, Turkish baths and became a social center for the capital city of Ottomans.

In 19th century, the old city was still surrounded by waters and a picturesque composition of Yedikule towers located at the joint of Marmara and the city walls. There was no settlement in front of the city walls standing along Sarayburnu. The Topkapı Palace was descending to the coast with sets and pavilions. The homogeneous and non-dimensional structure of districts can be seen in city silhouette viewed from Marmara in between large scale mosques dominating the rest of the city. In Haliç, there was a coastal area including stone and brick buildings following Khans Area. In 1800s, there were many fire disasters which were triggered by the narrow street system.

In 19th century, city was growing to the north as it could be observed from the locations of palaces, military buildings and pavilions. The inner migration, changes in transportation system and increasing population were accelerated the spatial development in city. Beyoglu was became a living space for Levantines and non Muslims who were settled from the Historical Peninsula, Fener and Balat. Along the railway line, new housing areas and secondary houses were developed. Istanbul had connection with other countries through sea lane and railway systems. In scope of Administrative Reforms (1839), rights given to minorities were increased under westernization movements and new governmental units for bureaucratic organization were established. New sea ports such as Galata, Haydarpasa and Sirkeci, stations, banks, hotels, financial institutions and offices were established. The Historical Peninsula was preserved as a center for trade.

Tradesmen and craftsmen dealing retail sales were placed to old center of trade in Bahcekapi, Tahatakale, Unkapanı, jewelry dealers were moved to Buyukcarsi, watchmaker and cooks were placed to Beyazit. In 19th century, increasing fire disasters destroyed the traditional street structure and wooden architecture. The wooden buildings were changed to stone or brick constructions. The narrow street structure in Aksaray, Kumkapi, Unkapani, Fener, Balat and Samatya were changed with wider streets including steep junctions, grid road system, increasing residential density and decreasing urban green space. New education, administration facilities and squares were developed in Sutanahmet and Bayezit.

4.1.1.4 The Republic Period and Today

The capitalization of Ankara in 1923 caused the population of Istanbul to be decreased from 1,213000 to 690000. The administrative functions in the Historical Peninsula decreased. Formerly, both Fatih and Eminönü districts constituted the central district; in 1928 they became separate districts.

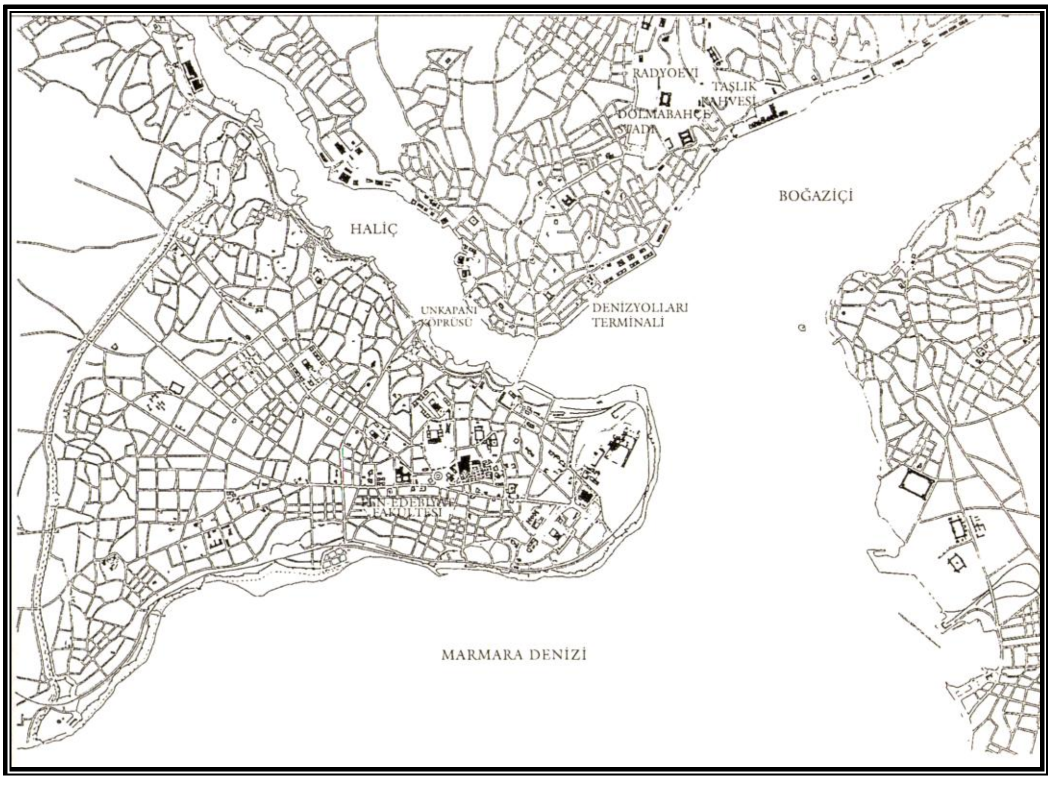


Figure 4. The Plan of Constantinople in the Republic Period (1923 –1950), KUBAN D.

The planning movements of the Republic Period had started in 1933. Henry Prost, the French architect and urban designer developed a master plan and application plans in 1936. Some of his critical planning decisions were affected Istanbul up to today. The zoning decision of Istanbul and the agglomeration of industrial facilities in to Halic were reflected as unfortunate planning actions latter when Halic is faced heavy pollution and destruction of old city. The conservation areas were decided to include Hagia Sophia, The Great Palace and Hippodrom area as the first degree and city wall area as the second degree conservation area. In fact the main contribution of Prost was in conservation field. The Historical Peninsula was preserved as city center. The population limit to growth was determined as 800.000. The regeneration of Galata Bridge through shifting it to inner Halic and constitute organized areas in both edges of the bridge were proposed. Sarayburnu was indicated to be cleaned off storage and load station functions. In the Historical Peninsula, it was not allowed constructions higher than 9.5m in areas 40m from the sea level to protect horizontal silhouette and residential landuse was determined in Halic and Marmara. The conservation of old districts were provided through designing squares around historical monuments such as Eminönü Square around Yeni Camii and Beyazid Square around Beyazid Camii. Beyazid was proposed to be the center of culture as Istanbul University. Bayrampasa valley was thought to be organized as Zoology and Botanic Garden. Prost had also proposed the stadium located behind The Dolmabahce Palace and the Bosphorus Bridge which was constructed in 1970s. In fact the most of the proposals of Prost were remained undone because of political and economic conflicts. After 1930s, in the mayoralalty of Lutfi Kirdar, the application of Prost Plan was continued partially in case of constructing new public buildings and spaces.

It is also essential to mention Adnan Menderes as starting from 1950s Istanbul was rebuilt under the mayoralalty of him and triggered rapid urbanization and unplanned development movements. The development period was deviated from the conservation-centered planning understanding to superficial and aesthetical prerequisite style with wider boulevards, higher buildings and motorway weighted transportation without rehabilitating the existing infrastructure. The new development movements attracted people from Anatolia and historical buildings in Fatih, Suleymaniye and Cerrahpasa were became the first settlements for new migrants. The political rent, internal migration, destruction of historical districts, buildings, squattering were born and developed incrementally from that period to today. (Kuban 1996)

Figure 5. The Plan of Constantinople in the Republic Period (1950–1960), KUBAN D.

In between 1970-80 period, Central Business Districts were developed in Eminönü and Aksaray, in Vatan and Millet streets. In 1970s, the narrow street structure and insufficient auto parks impeded the land route traffic, accessibility of new companies and old Central Business District. In between 1963-83 period, as the development of center continued in the Historical Peninsula, the requirement of new residential areas were became apparent. The location of wholesales trade and small factories were in the Historical Peninsula, the population living in the area preferred to move away from the center and migrants coming from Anatolia preferred the center to find job and settle in. By the way, residential districts as Suleymaniye, and Cankurtaran were dilapidated as the residential user profile was changed. Before the World War I, Fatih was planned in orthogonal road structure and wooden buildings were changed to two or three floored apartments and houses. In 1960s, as a result of increasing building density and multi-story concrete buildings, the wooden buildings became less in amount and the old owners of Fatih were left the district under new population movements. Consequently, the historical structure, civil architecture and social structure were totally destroyed.

Today, the Historical Peninsula is the center of history, culture, business, transportation, and tourism. Through the history, financial and administrative functions were moved out but still Fatih preserves the functions of retail and wholesales trade. Even traditional trade is disappeared; residential, business and service accommodation functions are spread. Small industry also exists in the area and forms an inconvenience in case of endangering the historical features and the population in the Historical Peninsula. The location of Istanbul University and vocational schools also point out the function of education in the Historical Peninsula. The industrial and wholesales functions located in the Historical Peninsula form disparity with conservation and touristic functions.

4.1.2 Geographic and Seismic Attributes

According to the earthquake zones of Turkey determined by the General Directorate of Disaster Affairs; Fatih District is examined as a 2nd Degree

Earthquake Zone in the Map of 1997. Today, Turkey Earthquake Zones has been updated and the Historical Peninsula is examined under the 1st Degree Earthquake Zone. Fatih District is of the first ten districts which are determined as one of the most risky settlement besides Zeytinburnu, Bakirkoy, Beyoglu, Eminonu, Avcilar, Adalar, Bahcelievler, Bayrampasa and Kucukcekmece.

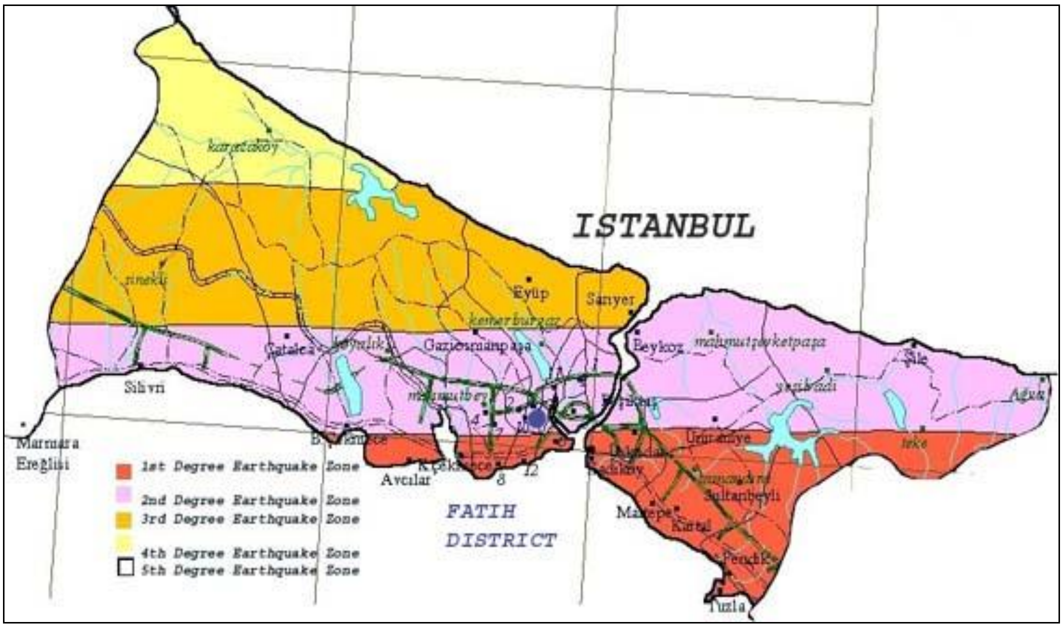


Figure 6. Seismic Zones In Marmara Region (General Directorate of Disasters Affairs Earthquake Research Center http://www.deprem.gov.tr)

In Fatih District, there are natural hazards originated from the terrain shape, hazardous grounds and the interaction of these hazards with urban environment.

Fatih District is divided by slopes. The altitude changing from 10m to 90m creates sharp slows in between 20%-38% at coastal parts. In the mid part of the district, altitude decreases to 10 m and the land form of the area resembling to a great calix which brings in the attribute of water basin collecting the wasted water and rain water.

There are 8 fault lines in the area distributed to the coastal parts.

There are seismically active areas including high PGA values. PGA is a measure of earthquake acceleration on the ground and an important input parameter for earthquake engineering. It is not a measure of the total size of the earthquake, but rather how hard the earth shakes in a given geographic area. (Wikipedia, http://en.wikipedia.org, 09.03.2009)

There are three groups of geologic formations in Fatih District. 1st group is formed of fine grained ground which conducts the Peak Ground Acceleration (PGA) at high level, 2nd group is the coarse grained ground conducting the Peak Ground Acceleration (PGA) at lower level and 3rd group is rocks which conducts the Peak Ground Acceleration (PGA) at minimum level. Kusdili Formation is attributed to fine grained ground type containing high seismic conductivity and it is the most hazardous ground type in the district. Latter, Gungoren Formation, Cukurcesme Formation and Trakya Formation are classified from weakest to the hardest ground type. As Trakya Formation is formed of rocks, it is a substantial ground type and the safest for the construction.

There are landslide areas, especially located on sharp slopes. Landslide is a geological phenomenon which includes a wide range of ground movement, such as rock falls, deep failure of slopes and shallow debris flows, which can occur in offshore, coastal and onshore environments. Although the action of gravity is the primary driving force for a landslide to occur, there are other contributing factors affecting the original slope stability. Typically, pre-conditional factors build up specific sub-surface conditions that make the area prone to failure, whereas the actual landslide often requires a trigger before being released. (Wikipedia, http://en.wikipedia.org, 09.03.2009)

There are liquefaction areas. Liquefaction is a phenomenon occurring in saturated soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. When it is compared to an earthquake, the water pressure is relatively low but together with earthquake shaking cause the water pressure to increase to the point where the soil particles can readily move with respect to each other. (Washington University, http://www.ce.washington.edu/, 09.06.2009)

There are alluvial grounds in the coastal parts. Alluvial grounds are type of soils or sediments deposited by a river or other running water. Alluvial ground is typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel.

There are artificial fills which are derived from the filling the coastal areas or areas including high altitude values to stabilize ground for construction. In fact, it is the weakest ground type for settlements and not resistant to any seismic activity.

There construction areas including the old watercourses are determined as hazardous grounds. The Bayrampasa Valley located in the middle of the district, in the ax of Vatan street which also includes water resource basin harboring infrastructure problems and floods.

Tsunami is a seismic sea wave caused by the occurrence of a major earthquake under the sea. According to the worst earthquake scenario of Japan International Cooperation Agency, JICA, 2000, a tsunami will be occurred in the Marmara coast if an earthquake happens in the magnitude of 7.5.

The local seismic attributes of Fatih District refer to various fields of science as geology and hydrology. The aim of the study is to evaluate the natural hazards in case of planner’s view and develop spatial policies in order to eliminate hazards and impacts.

4.2 The Stages of Determining a Mitigation Strategy

In this study; spatial risk determination in Fatih District is targeted. Natural hazards are determined, categorized according to their relation to seismicity and evaluated in accordance with socio-economic input to monitor evolution of natural hazards to risks in the locality.

In the section of *Hazard Identification,* the available data and digital base maps achieved from the BIMTAS Project Group are examined to identify local natural hazards in the territory and monitor their interaction with each other. In *Spatial Categorization of Hazard Areas,* natural hazards in the locality are categorized according to their dependence of seismicity in terrain character and the location of the territory, are examined under titles *Terrain Hazards*, *Local Geological Attributes*, *Hydrologic Hazards* are analyzed and hazard maps are created by ARCGIS 9.0 programme.

In *Synthesis of Natural Hazard Data* section, natural hazards are assessed according to their interactions with each other and the environment. Multi-hazard zoning is processed to monitor the natural hazards forming 2, 3, 4 and 5 combinations and create a map Multi-hazard Map to determine locations of hazard combinations in the locality. The level of allowance to physical intervention is also determined by superimposing the hazard areas with Conservation Areas. 36 distinct natural hazard areas are identified consequently.

In *Vulnerabilities Analyses* section, natural hazard zones monitored in the Multi-Hazard Map are analyzed in case of socio-economic base information input achieved from BIMTAS Project Group. The socio-economic input includes available data on building stock, landuse and population including district-based quality of life survey data. 24 natural hazard areas are determined according to the criteria of age of structures, listed buildings and local multi-hazard attributes.

In *Spatial Risk Assessment*, spatial analyses of building stock and infrastructure are carried on. Building stock is examined by comparison of age, material and number of storey. Infrastructure is examined by different types of life lines as natural gas, water and communication. Population is examined in case of relevant social surveys to risk assessment. In addition to the criteria, property values of residential and commercial based on average market price of property unit are examined. Prioritized risk areas are identified regarding to three criteria. They are categorized according to the superposition multiple hazard attributes and ground hazards, the building age per hazard zone and the density of the registered historical buildings criteria. It is also used as a base map for other analyses such as building stock, infrastructure, population, property value and emergency scenario.

Consequently, the calculation of financial vulnerability of socio-economic components provided the determination of 12 risk areas in the locality.

Risk area prioritization is provided by examining the emergency measures taken by local administrative. Emergency scenario is created according to JICA earthquake scenarios. 7 risk areas are prioritized according to the emergency measures.

In last section of Mitigation Strategy, findings and possibilities synthesized as a product of the analytical study are interpreted to determine local capacity for identifying a mitigation strategy.

4.2.1 Hazard Identification

Natural hazards are the principal dynamics of urban environment which are formed of various risk factors. Natural hazards are inherited and inevitable. Technical aspects of natural hazards and their relations with the building stock are examined by different professions. In case of the planning discipline the primary issue is to explore that how natural hazards would affect the urban context

In this section, it is purposed to determine the spatial areas and conditions which are based on the location of Fatih district and natural hazards that the site is exposed to. The hazards sourced from the natural attributes of the site are determined as factors increasing the vulnerability of values, community and investments at inclusion field. Those factors are examined under titles, *Terrain Hazards, Local Geological Attributes*, and *Hydrologic Hazards.* (Appendix-A, Figure.35)

In scope of *Terrain Hazards*; Slope Data and Terrain Model are mapped and overlapped to form Synthesis I which is an intermediary map summarizing the hazards derived from the land character. In *Local Geological Attributes;* geologic formations as Kusdili and Gungoren which conduct and increase seismic shakes are monitored. Types of ground inconvenient for construction such as landslide and liquefaction areas, artificial fills and alluvial grounds are examined overlapped to develop the map of Synthesis II which visualizes the hazardous ground types conducting seismic movements.

In *Hydrologic Hazards*; Water Courses, Natural Water Basin and Tsunami Impact Region are mapped and overlapped to form Synthesis-III which shows Natural Water Basin Model.

Synthesis Maps are formed of overlapping of the main maps *Terrain Hazards, Local Geological Attributes* and *Hydrologic Hazards* Analysis to highlight the areas in which natural hazards are clustered. The prior stages of constituting the Multi-hazard Map are monitored basically.

4.2.1.1 Spatial Categorization of Natural Hazard Areas

Terrain Hazards

Slope is the primary indicator for identifying terrain character and hazardous areas. In the map, by the help of the contour lines, it is observed that altitude values change in 10m-90m. The terrain shapes, brows, ridges and lower parts constituting the natural water basin are monitored in the relief terrain model to identify the existing terrain character.

In terrain model formed according to slope data, the changing slope values in between 10%-35% are shown through using the contour lines. The areas including slope values over 20% are highlighted exclusively because of containing landslide hazard.

In Fatih District, brows closer to the Halic coast, contain geologic formations named as Gungoren and Trakya. These areas including slope values change in between 20%-38%, generate potentials of landslide hazard and reservoir at mid parts. At the periphery of reservoir basin, the slope values are 10% and 15%. At the brows near the Marmara coast; slope values are 10%-20%. Besides, the areas having slope values higher than 20% are formed by filling the coastline which increases the seismic risk exposure of the area through generating landslide hazard and tsunami.

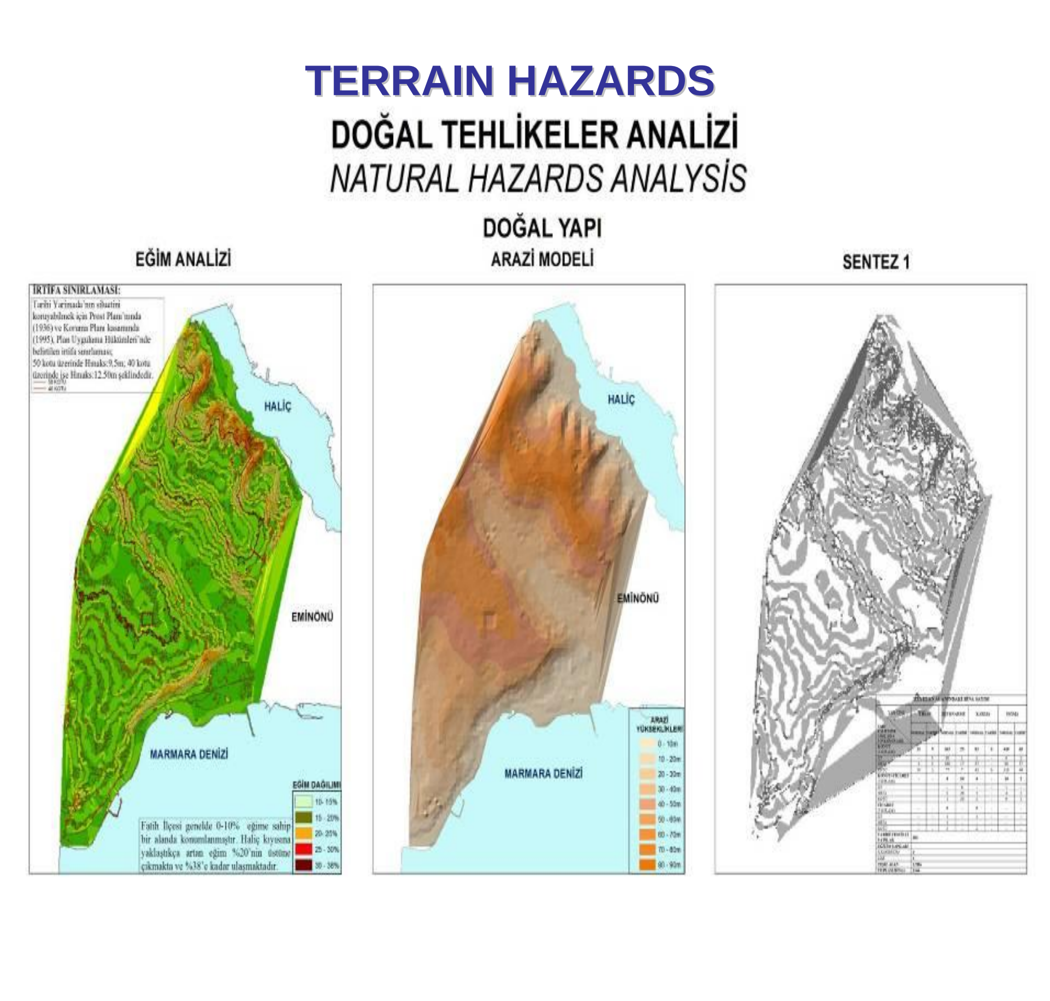


Figure 7. Terrain Hazards

Local Geological Attributes

In scope of *Local Geological Attributes*, geological formations are classified according to determined in report of The Historical Peninsula Conservation Plan 1/5000. According to that, geologic formations are examined in to three groups. 1^{st} group is formed of fine grained ground which conducts the Peak Ground Acceleration (PGA) at high level, 2^{nd} group is the coarse grained ground conducting the Peak Ground Acceleration (PGA) at lower level and 3^{rd} group is rocks which conducts the Peak Ground Acceleration (PGA) at minimum level.

Kusdili Formation is attributed to fine grained ground type containing high seismic conductivity and it is the most hazardous ground type in the locality. Latter, Gungoren Formation, Cukurcesme Formation and Trakya Formation are classified from weakest to the hardest ground type. As Trakya Formation is formed of rocks, it is a substantial ground type and the safest for the construction.

Gungoren Formation and Kusdili Formation generate landslide hazard potential in the areas including a slope value of %20 and greater. The landslide potential is observed at Halic coast, including slope values change in %20- %38 on Gungoren and Kusdili Formations.

It is critical to examine overlapping formations. Bakirkoy Formation which is determined in 1/1000 Conservation Development Plan Report to be convenient for settlement but also conducts Peak Ground Acceleration. (PGA) In fact it covers the Gungoren Formation which conducts Peak Ground Acceleration (PGA) at high level and eliminates the safety of Bakirkoy Formation. This observation is examined in the process of the Multi-hazard Zoning.

Despite geological formations, fault lines, landslide and liquefaction hazards are the factors affecting the seismicity

Fault Lines: One of the factors increasing the seismic activity of the district is the recent fault lines. The fault lines and their impact area of 50m which is a parameter taken from the project of Japan International Cooperation Agency (JICA), the study of Loss Estimation 2000, are examined in scope of the hazard analyses.

Landslide Areas: In Fatih District; the brows closer to Halic coast, including slope values of 20% and greater are under landslide hazard. The existing landslide areas are located on Gungoren and Trakya Formation which locate beside water reservoir basin. These areas are prioritized as they contain the potential to generate secondary disasters during seismic activity.

Liquefaction Areas: Liquefaction areas in Fatih district are positioned at the coastal region of Marmara and Halic in northeast-northwest and southeast-southwest directions. The most hazardous ground types such as artificial filling, liquefaction areas and areas having high Peak Ground Acceleration (PGA) are overlapped at these coastal areas which create high exposure to seismic risks.

Artificial fills, grounds with high ground peak acceleration (PGA) and alluvial soils are examined under hazardous grounds.

Alluvial Grounds: Alluvial levels are positioned along the Halic coast and partially overlap to Kusdili Formation and liquefaction areas and areas having high PGA and increase the seismic activity of the area.

High Peak Ground Acceleration (PGA): There are three kinds of high PGA areas in Fatih District. In Marmara Coastal Area, on Bakirkoy Formation, there is an area of 401 hectares including the most of the historical registered buildings, hospitals and wooden buildings. Second high PGA area of 14.5 hectares is located in Halic Coastal Area and overlaps with a liquefaction area. The third area of 1ha is located at the old city.

Artificial Fills: In Fatih District, most of the artificial fills are located in coastal areas. In Marmara Coast, there are artificial fills overlapping the weakest ground type, Kusdili Formation and Gungoren Formation which generates landslide hazard in areas including slope values greater than 20%.

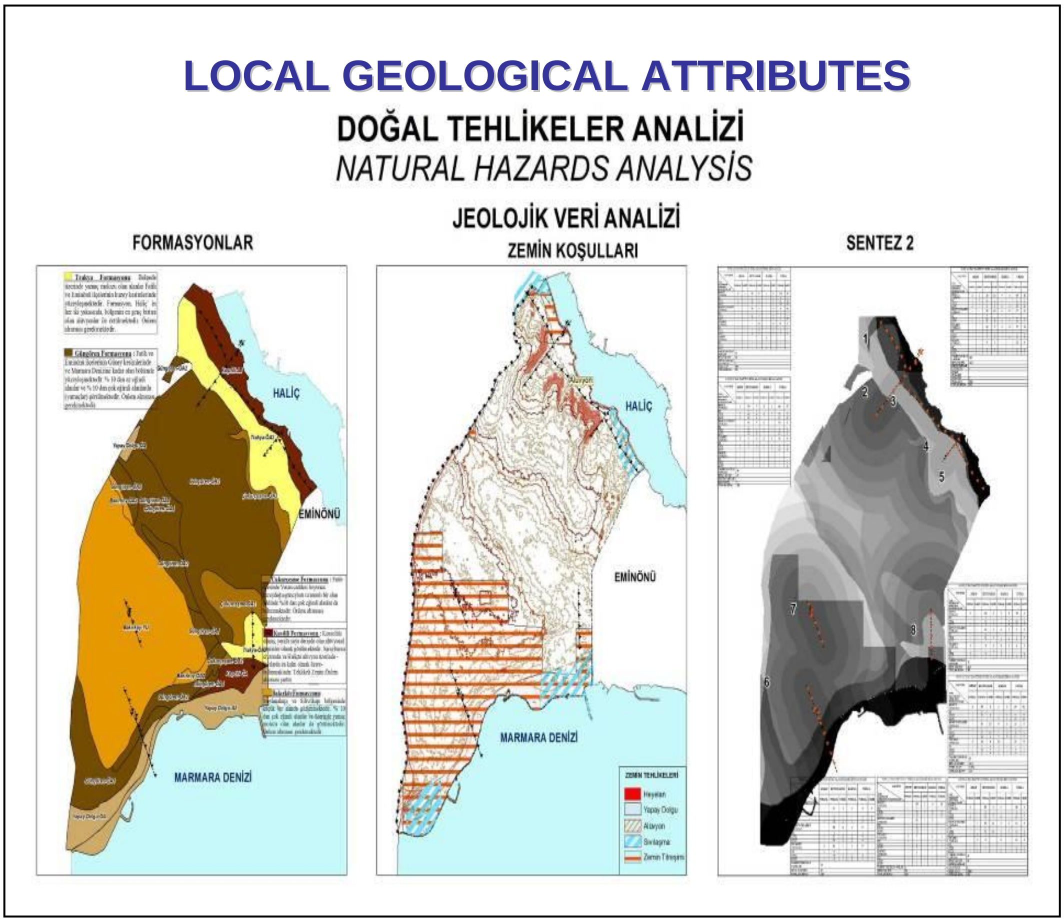


Figure 8. Local Geological Attributes

Hydrologic Hazards

The slope and the location of water courses are the factors that increase the reservoir potential of the area. The valley laying from the west to the mid part of the area divides the district in north-west direction and attributes as reservoir basin. The slope of the area increases to 30% in the mid part and then decreases to the coastal area create infrastructural problems, flood potential and increases the hazard potential of the area.

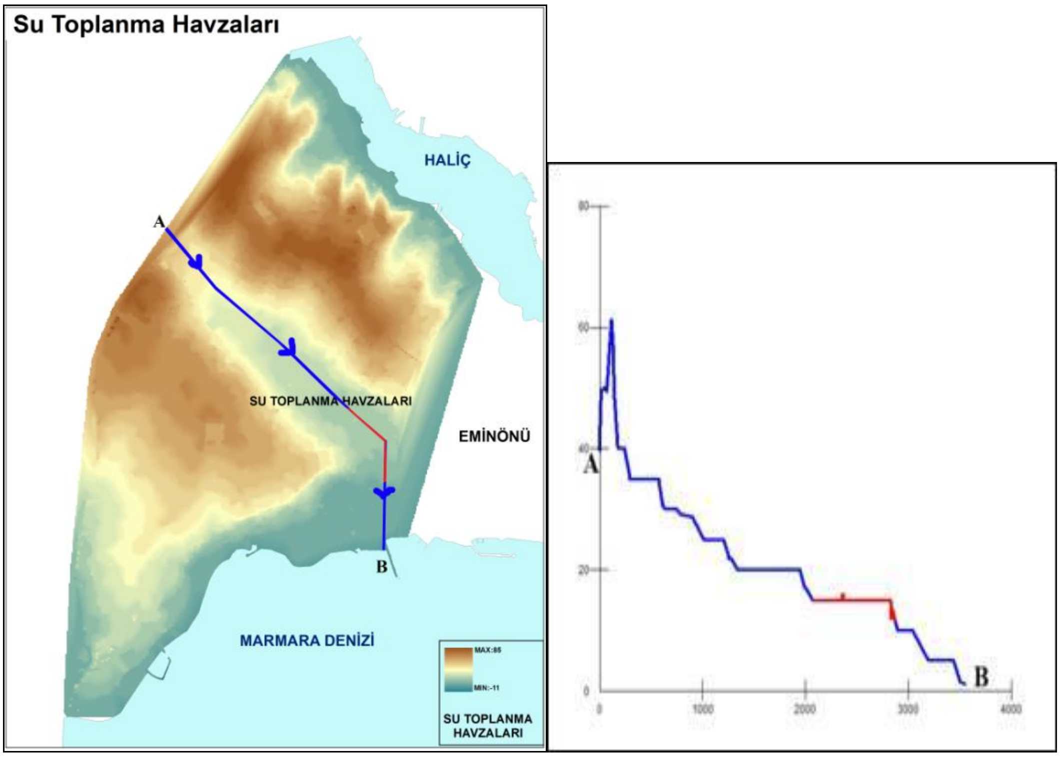


Figure 9. Water Resource Basin and The Profile of Water Flow

According to the earthquake scenario of JICA; if the magnitude of an expected earthquake would be 7.5, it is quite possible to form a tsunami at Marmara Coast. The artificial fills, liquefaction areas, high PGA areas and Kuşdili Formation located at Marmara Coast are overlapping to hazardous grounds, Tsunami Impact Area and create high vulnerability. (Appendix-A, Figure.35)

4.2.2 The Synthesis of Natural Hazard Data and Multi-Hazard Zoning

In Fatih District, the available data on natural hazard potential is examined under three main titles and consequently twelve hazard types are identified.

Table 3. Natural Hazards In Fatih District

NATURAL HAZARDS		
Terrain Hazards	**Local Geologic Attributes**	**Hydrologic Hazards**
Slope	Kusdili F.	Water Courses
	Gungoren F.	Water Resource Basin(Main Streets Junction)
	Fault Lines	
	High PGA	
	Landslide	
	Liquefaction	
	Artifical Fills	
	Alluvial Soil	Tsunamı

As a result of analyzing *Terrain Hazards*, *Local Geological Attributes* and *Hydrologic Data (Attachment-1)*, the overlapping hazard areas are determined and mapped via GIS medium. The hazard groups forming the natural hazard combinations are not prioritized but evaluated equally. *In Multiple Hazard Zoning*, it is purposed to determine the location of grouped hazards in the locality.

In Fatih District, natural hazards such as high slope, landslide areas, fault lines, liquefaction, tsunami, alluvial ground, artificial fill and hazard areas formed of overlapping natural hazards are weighly clustered in coastal parts of Halic and Marmara.

When the distribution of hazards is examined, it is observed that in some parts of the district; hazards such as Kusdili Formation and landslide are located distinctly. In other parts, 6 distinct hazards overlap and form 2, 3, 4 and 5 hazard combinations. As the combination number increases, the density of hazards increases.

2 Hazard Areas

1→ [Kusdili F. x Water Resource Basin]

2→ [Bakirkoy F. x High PGA]

3→ [Gungoren F. x Landslide]

4→ [Landslide x Water Resource Basin]

It is observed that the above mentioned hazards are overlapped and those areas are named as Two Hazard Areas.

3 Hazard Areas

Kusdili F. ,Gungoren F. , Fault Lines, Artificial Fills, Alluvial Ground, Landslide, Liquefaction, High PGA, Tsunami and Water Resource Basin are formed 3 Hazard Combinations out of 10 natural hazards.

1→ [Gungoren F. x Landslide x Water Resource Basin]

2→ [Gungoren F. x Artificial Fill x High PGA]

3→ [Kusdili F. x Tsunami x Water Resource Basin]

4→ [Kusdili F. x Landslide x Water Resource Basin]

5→ [High PGA x Tsunami x Water Resource Basin]

4 Hazard Areas

Kuşdili F. , Alluvial Ground, Artificial Fills, Fault Lines, Landslide, Liquefaction, High PGA, Tsunami, Water Resource Basin formed 4 hazard combinations out of 9.

1→ [Artificial Fill x High PGA x Tsunami x Water Resource Basin]

2→ [Kusdili F. x High PGA x Liquefaction x Water Resource Basin]

3→ [Kusdili F. x High PGA x Alluvial Ground x Water Resource Basin]

4→ [Kusdili F. x Fault Line x Liquefaction x Water Resource Basin]

5→ [Kusdili F. x High PGA x Landslide x Water Resource Basin]

6→ [Kusdili F. x Alluvial Ground x Liquefaction x Water Resource Basin]

7→ [Kusdili F. x Fault Line x Landslide x Water Resource Basin]

8→ [Kusdili F. x High PGA x Fault Line x Water Resource Basin]

9→ [Kusdili F. x Alluvial Ground x Fault Line x Water Resource Basin]

5 Hazard Areas

5 hazard combinations are formed out of 9 natural hazards.

1→ [Artificial Fill x High PGA x Liquefaction x Tsunami x Water Resource Basin]

2→ [Kusdili F. x High PGA x Liquefaction x Tsunami x Water Resource Basin]

3→ [Kusdili F. x High PGA x Fault Line x Alluvial Ground x Water Resource Basin]

4→ [Kusdili F. x High PGA x Fault Line x Tsunami x Water Resource Basin]

Consequently, each hazard including two hazard overlapping variants to five hazard overlapping in Multiple Hazard Map are achieved as 24 distinct hazard combinations and 36 distinct natural hazard locations. (Appendix-A, Figure.36)

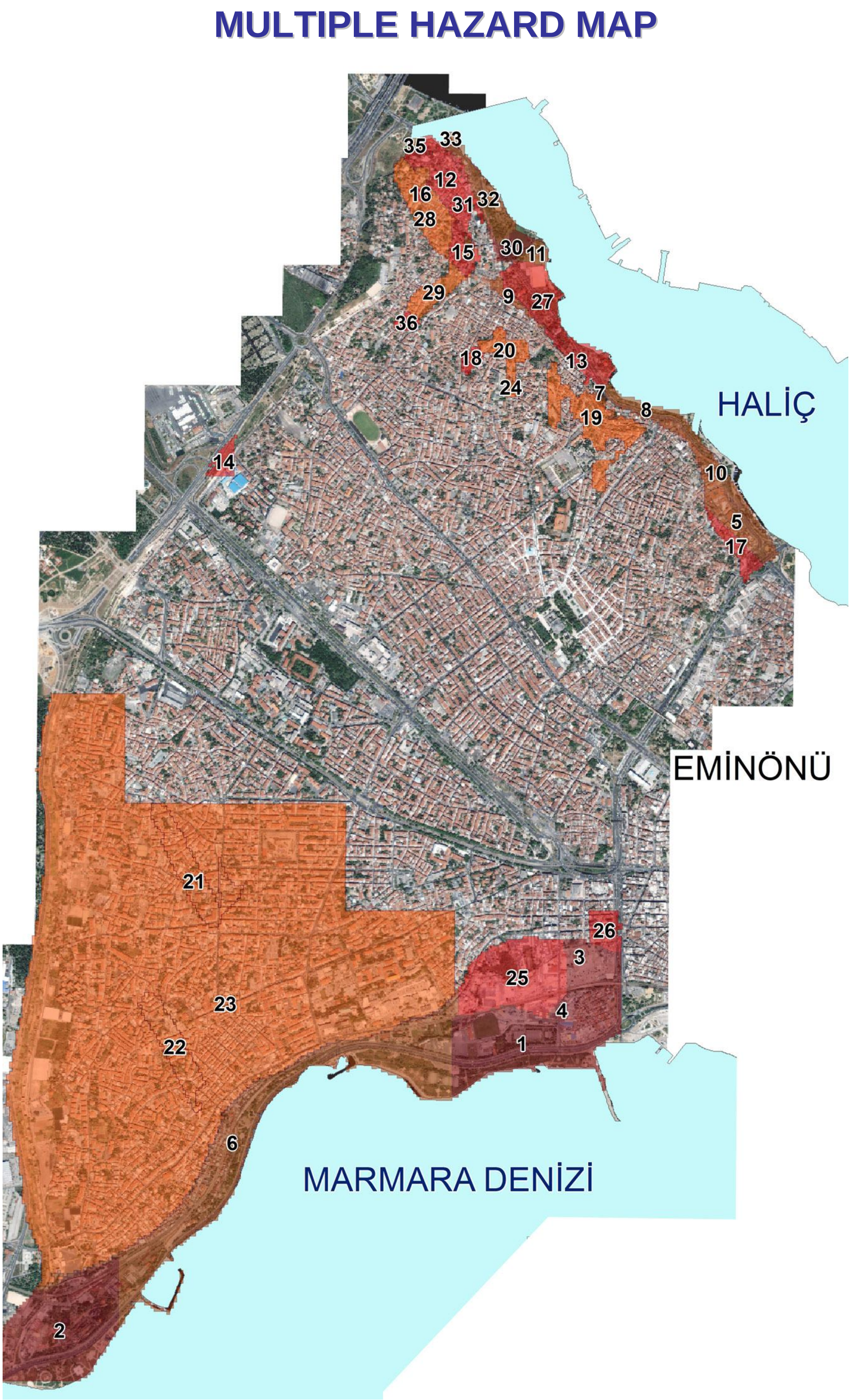


Figure 10. Multiple Hazard Zoning

Table 4. 36 Distinct Natural Hazard Areas

NO.	HAZARD AREAS	HAZARD COMBINATIONS
1	5A	Artificial Fill+High PGA+Liquefaction+ Tsunami+Water Resource Basin
2	5A	Artificial Fill+High PGA+Liquefaction+ Tsunami+Water Resource Basin
3	5D	Kusdili F.+Fay Fault Line+High PGA+Tsunami+Water Resource Basin
4	5B	Kusdili F.+Liquefaction+High PGA+Tsunami+Water Resource Basin
5	4D	Kusdili F.+Fault Line+ Liquefaction+ Water Resource Basin
6	4C	Artificial Fill + High PGA + Tsunami+ Water Resource Basin
7	4G	Kusdili F.+Fault Line+Landslide+ Water Resource Basin
8	4I	Kusdili F.+ Fault Line + Alluvium + Water Resource Basin
9	4I	Kusdili F.+ Fault Line + Alluvium + Water Resource Basin
10	4F	Kusdili F.+ Liquefaction + Alluvium + Water Resource Basin
11	4B	Kusdili F.+ High PGA + Alluvium + Water Resource Basin
12	3H	Kusdili F.+ Fault Line + Water Resource Basin
13	3H	Kusdili F.+ Fault Line + Water Resource Basin
14	3D	Gungoren F.+Artifical Fill+ High PGA
15	3C	Kusdili F.+ Landslide + Water Resource Basin
16	3C	Kusdili F.+ Landslide + Water Resource Basin
17	3G	Kusdili F.+ Liquefaction + Water Resource Basin
18	3A	Gungoren F.+ Landslide + Water Resource Basin
19	2E	Landslide + Water Resource Basin
20	2E	Landslide + Water Resource Basin
21	2D	Fault Line + High PGA
22	2D	Fault Line + High PGA
23	2B	Bakirkoy F.+ High PGA
24	2C	Gungoren F.+ Landslide
25	2A	Kusdili F.+ Water Resource Basin
26	2E	Landslide + Water Resource Basin
27	3A	Gungoren F.+ Landslide + Water Resource Basin
28	3B	Kusdili F.+Tsunami+ Water Resource Basin
29	3E	High PGA + Tsunami+ Water Resource Basin
30	3F	Kusdili F.+ Alluvium + Water Resource Basin
31	3I	Kusdili F.+ High PGA + Water Resource Basin
32	4A	Kusdili F.+ High PGA + Liquefaction + Water Resource Basin
33	4B	Kusdili F.+ High PGA + Alluvium+ Water Resource Basin
34	4E	Kusdili F.+ Landslide +High PGA+ Water Resource Basin
35	4H	Kusdili F.+Fault Line+ High PGA + Water Resource Basin
36	5C	Kusdili F.+Fault Line+ High PGA + Alluvium+Water Resource Basin

4.2.2.1 Conservation Plan Decisions

In determination of natural hazard areas, the seismic activity of the area and high potential of vulnerability in accordance with Conservation Plan Decisions are also considered.

According to the Conservation Plan Decisions of the Historical Peninsula, there are three types of conservation areas.

Table 5. The Planing Decisions in the 1st Degree Conservation Areas

1st Degree Conservation Areas	
Historical Heritages and Spaces	Conservation Plan Decisions Affecting the Hazard Areas
-Topkapı Palace and periphery -Archeological Areas -The preserved Historical Urban Areas, Squares and Main Routes -Khans -Cisterns -Historical Kale yards -City Walls -Haliç and Marmara coastal areas and areas greater than +40m	-In the streets including monumental heritages and civil architecture clusters, the road codes are taken to its original position as its possible. -The pedestrian routes are formed to connect the conservation areas. -The building blocks including the registered civil architecture clusters, it is not allowed to increase floor height of the old heritage. -The physical interventions and technical infrastructure applications destroying social-cultural-traditional attributes of the site are not allowed. -In those areas, unification and allotment operations for the purpose of gaining and increasing construction right is not allowed. In fact it is only allowed for the purpose of increasing social and physical quality of the site in accordance with decisions of the Historical Peninsula Culture and Historical Assets Conservation Assembly.

Table 6. The Planing Decisions in the 2nd Degree Conservation Areas

2nd Degree Conservation Areas	
Historical Heritages and Spaces	Conservation Plan Decisions Affecting the Hazard Areas
-The preserved Historical Urban Areas and Routes -The preserved historical kale yard located at City Walls Inner Conservation Area -Important Monumental Heritages and periphery -Historical Squares -1st Degree Conservation Areas and Periphery	-The road widths are allowed to be changed only in obligatory circumstances. -In historical squares, pedestrian-based transportation solutions are allowed to be applied. -In the streets including monumental heritages and civil architecture clusters, the road codes are taken to its original position as its possible. -In the parcels not having a historical value but located beside monumental heritages, the given altitude is H-max 12.50m, with the condition of not greater than the original valance height. -The building blocks including the registered civil architecture clusters, it is not allowed to increase floor height of the old heritage.

Table 7. The Planing Decisions in the 3rd Degree Conservation Areas

3rd Degree Conservation Areas	
Historical Heritages and Spaces	Conservation Plan Decisions Affecting the Hazard Areas
-The areas in which civil architecture samples and monumental heritages are found quite rare. -The areas which lost its natural value but located in City Walls Inner Conservation Area and could be preserved with an arrangement -The areas located in between 1st Degree and 2nd Degree Conservation Areas and affecting the Historical Peninsula silhouette negatively -Haliç and Marmara coastal areas and areas greater than +50m	-3A Conservation Areas are defined as Short-term Regeneration Areas. -3B Conservation Areas are defined as Long-term Regeneration Areas. -In the parcels not having a historical value but located beside monumental heritages, the given altitude is Hmax 12.50m, with the condition of not greater than the original valance height. (excluding 50m) -The preservation of green areas through regeneration projects and vitalizing the existing traditional architectural, cultural and natural texture of the city.

Conservation areas are superimposed with Multiple Hazard Map to determine the level of physical intervention allowed in natural hazards located in the locality is identified. (Table.8) (Appendix-A, Figure 36)

Table 8. The Superimposition of Natural Hazar Areas and Conservation Areas

		Natural Hazard Areas (ha) In The Territory of Conservation Areas			
Total Natural Hazard Areas (ha)		**1 Physical Intervention Not Allowed**	**2 Only Road Widening Allowed Excluding Buildings**	**3A Short-Term Urban Regeneration Area**	**3B Long-Term Urban Regeneration Area**
2C	**0,4**	0,3	-	-	-
4G	**0,2**	0,2	-	-	-
3G	**2,17**	0,1	1,7	-	-
3H	**5**	1,3	3,4	0,2	-
4D	**4,6**	0,9	2,5	0,3	-
4F	**3**	0,5	1,3	1,3	-
3C	**2**	0,01	1,7	0,5	-
4I	**2,6**	0,2	0,1	2	-
4B	**0,9**	0,4	0,07	3	-
4I	**0,8**	0,7	0,00046	0,03	-
3C	**0,3**	0,05	0,00047	0,3	-
3H	**1,6**	0,6	-	0,9	-
3D	**1,3**	0,3	-	0,9	-
2E	**2,3**	1,2	1,1	-	0,01
2D	**5**	0,3	0,01	1,3	2,3
5A	**22,2**	0,04	7	0,5	3
4C	**35**	0,04	4	9	0,2
2B	**287**	22,3	32	2,5	168
2E	**7,5**	2,2	2,4	2,6	0,3
2D	**7**	0,1	-	0,7	6,2
5D	**1,5**	-	-	1,5	-
3A	**0,8**	-	0,2	-	0,6
5B	**5**	-	-	4	-
5A	**22,5**	-	-	14	0,05

It is found that the degree of Conservation Areas and level of physical intervention allowed increase with increasing hazard combinations. In 1st Degree Conservation Areas and 2nd Degree Conservation Areas in which physical intervention is not allowed and allowed at minimum level as road widening excluding buildings, 2 hazard combinations and 3 hazard combinations are observed. In 3A and 3B Conservation Areas allowing to short-term and long-term regenerations include 5 hazard and 6 hazard combinations which is positive to provide physical intervention for reducing natural hazards and their impacts. (Appendix-A, Figure.36)

4.2.3 Vulnerability Analyses

In this stage, natural hazard areas are examined by socio-economic base input achieved from BIMTAS Project Group. In scope of the socio-economic data, building stock, land use, population and conservation areas are examined in case of vulnerabilities. The vulnerabilities in building stock are determined by age, material, use and number of storey. Conservation Areas are also examined in case of building stock and land use to identify hazardous uses in hazard areas. Population is observed according to the social survey on Quality of Life Analysis includes factors identifying the social structure.

4.2.3.1 Building Stock

High percentage of built up areas located in natural hazards are essential indicators of vulnerabilities. Initially, natural hazard areas are examined by total built-up areas. The ratio of total hazard area in distinct combinations to total built-up areas in reciprocal hazard area is shown. (Table 9, Figure.11)

Table 9. Total Built-Up Areas in Natural Hazard Areas

Hazard Areas	Built-up Area %
2 Hazard Area	%42,3
3 Hazard Area	%33,4
4 Hazard Area	%17,5
5 Hazard Area	%12

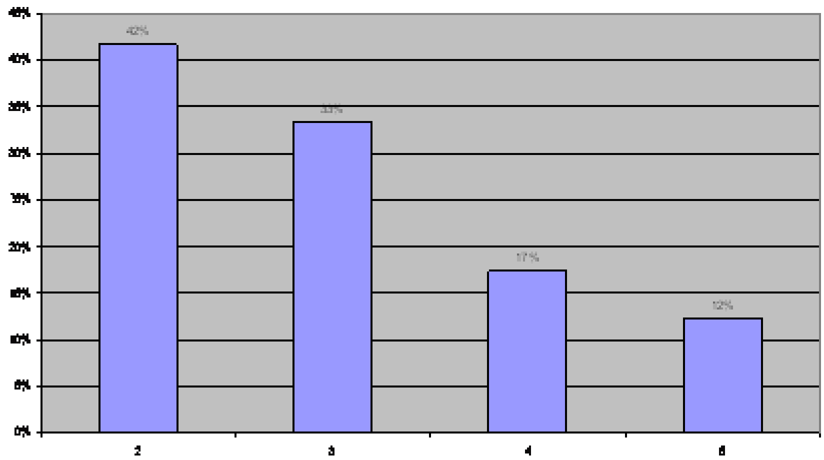


Figure 11. Total Built Up Areas Per Natural Hazard Combinations

In Hazard Areas, as the hazard combination increases, the percentage of built-up area decreases. It is positive to find that weighly built-up areas including high population contain less natural hazards.

Building stock is formed of 26.162 buildings. It is examined according to the criteria including material, age, use and number of storey defined in building codes for the buildings to be constructed in disaster areas. (06.03.2006, official journal, Prime Ministry, http://rega.basbakanlik.gov.tr, 06.03.2009)

Type of Building

There are 63% concrete, 31% masonry, 5% concrete-masonry and 1% wooden building located in Fatih District. The masonry buildings are clustered in Yalı District, Fener-Balat and Yedikule-Samatya. The wooden buildings are clustered in Zeyrek and Fener-Balat Area.

Table 10. Type of Building

Building Material	No. of Buildings	%
Wooden	184	1
Concrete-Masonry	1355	5
Masonry	8102	31
Concrete	16521	63
Total	26162	100

Building Uses

The building uses are classified as residential, commercial, industrial and both residential and commercial. 65% of the buildings are in residential use. 27% of buildings are in commercial-residential use and clustered in Yali, Kirkcesme, Husambey and Sofular neighborhoods. 8% of the buildings are in commercial use and clustered in Aksaray, in Inebey, Cakiraga and Yali neighborhoods. The commerce function is also located at the periphery of the main axes Vatan -Millet streets, through Fevzipasa Street, old city and the coast road. The industry functions are scattered in the district through the functions of storing and manufacturing.

Table 11. Building Uses

Building Uses	No. Of Buildings	%
Residential	16835	65
Residentialt+Commercial	7189	27
Commericial	2059	8
Industrial	79	0
Total	26162	100

Number of Storey

In contrary to Prost Plan, the building height is increased from 9.50m to 12.50m in +50m altitude and 12.50m to 15.50m in +40m altitude, at the periphery of Fevzipasa Street in Fatih District. In general, the building height increases from 1 to 7 stories at maximum. 47% of the building stock is 5-6 story and 31% of the building are 1-2-3 story which are located along the city walls, in Fener-Balat, Zeyrek and Cibali areas. 6-7 story buildings are scattered at the periphery of Vatan-Millet Streets.

Table 12. Number of Storey

No. of Storey	No. of Buildings	%
1 storey	2713	10
2 storey	2749	11
3 storey	2896	11
4 storey	4254	16
5 storey	7172	28
6 storey	5084	19
7 storey	1294	5
Total	26162	100

Age of Buildings

The building age is more affective factor in case of seismicity as Fatih District is located at an old neighborhood. In general the building ages are observed at intervals 0-15, 16-35, 36-45, 46-65 and 66-98. 76% of the building stock is formed of the buildings are less than 45 years, 24% of the buildings are greater than 45 years.

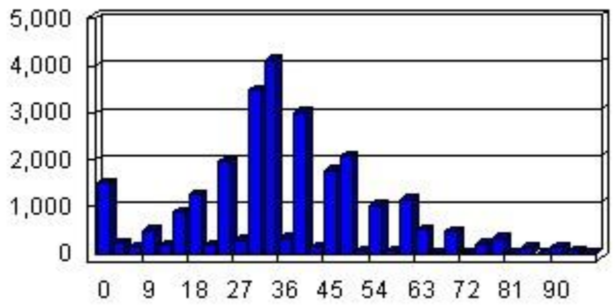


Figure 12. Age of Buildings and No. of Buildings

Table 13. Age of Buildings

Age of Buildings	No. of Buildings	%
0-15 Years	3307	13
16-35 Years	11371	43
36-45 Years	5200	20
46-65 Years	4921	19
66-98 Years	1363	5
Total	26162	100

(Yesil Berna, 2007,The Mitigation of Fatih District Report, The Analysis of the Building Stock)

4.2.3.2 Conservation Areas

Conservation Areas are examined to identify vulnerabilities in case of building density.

Table 14. Building Densities According to Hazard Combinations and Conservation Areas

	1st Degree Conservation Area	**2nd Degree Conservation Area**	**3A Conservation Area**	**3B Conservation Area**	**TOTAL**
	No. of Buildings	Building Density (ha)	No. of Buildings	Building Density (ha)	No. of Buildings
2 Hazard Combination Area	634	42,43	1134	68,88	2582
3 Hazard Combination Area	97	4,13	375	16,12	267
4 Hazard Combination Area	103	3,32	273	13,23	80
5 Hazard Combination Area	1	0,15	4	0,67	180
TOTAL	835	50,03	1786	98,90	3109

It is observed that building density and number of buildings decrease with increasing hazard combinations. It is positive to observe that less number of buildings and building density are seen in vulnerable areas including 5 and 6 hazard combinations. (Figure.13, Appendix-A, Figure.40)

Table 15. No. of Listed Buildings According To Conservation Areas

	1st Degree Conservation Area	2nd Degree Conservation Area	3A Conservation Area	3B Conservation Area
Total No. of Buildings	1403	1977	9587	10516
No. of Listed Buildings	1397	829	786	427
Listed Buildings Approximate to 50m Impact Area of Fault Lines	335	179	57	27

It is observed that number buildings decrease and number of listed buildings increase at 1st degree Conservation Areas located at 50m impact area of the seismic faults. 3A Conservation Areas include the greatest number of buildings available for short-term regeneration under planning decisions.

4.2.3.3 Land Use

Land use is examined according to Conservation Areas. Natural hazard areas are examined to monitor vulnerabilities by highlighting hazardous land use. (Appendix-A, Figure.39)

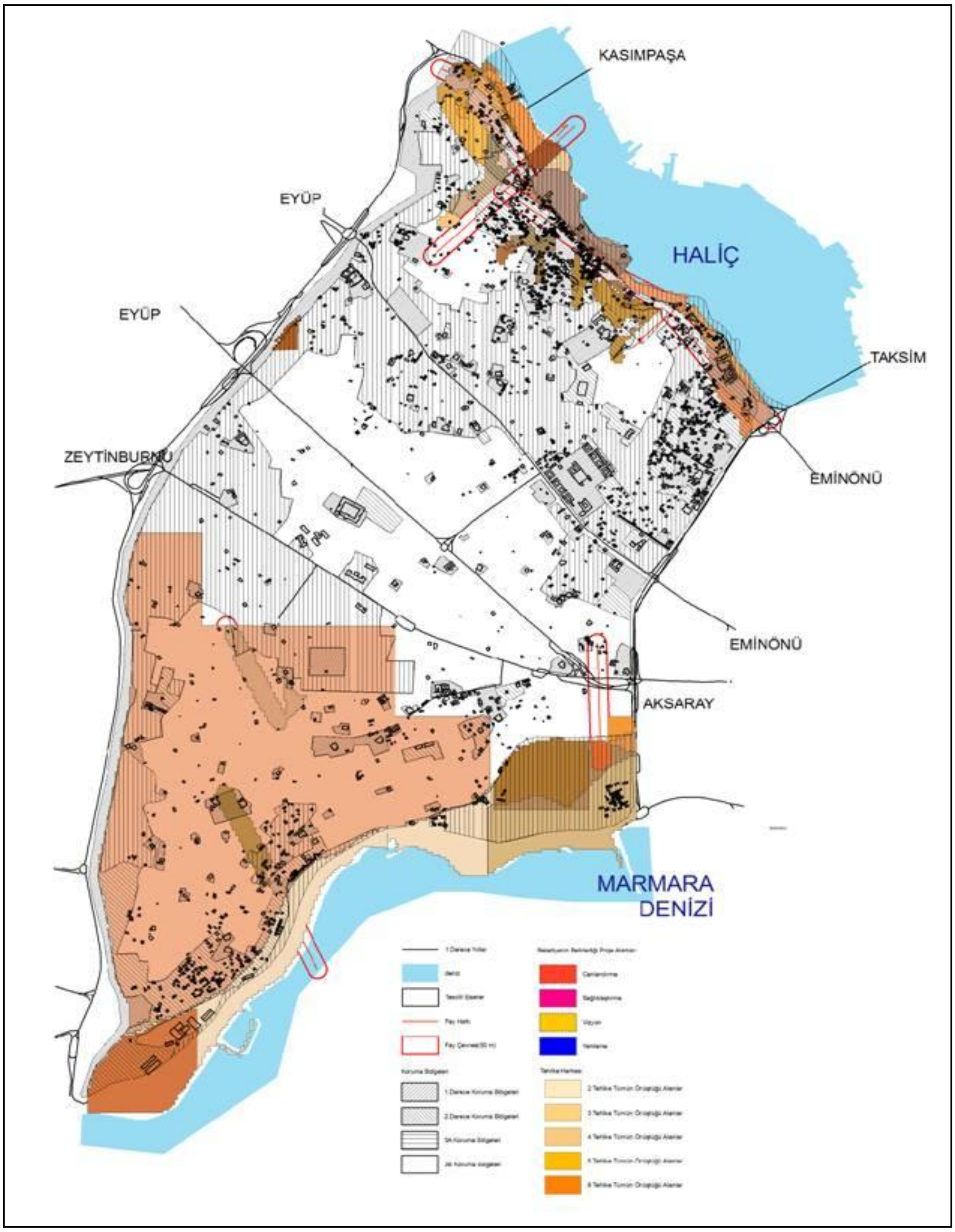


Figure 13. Natural Hazard Areas and Listed Buildings According To Conservation Areas

Table 16. Land Use According to Conservation Areas

LAND USE	1st Degree Conservation Area	2nd Degree Conservation Area	3A Conservation Area	3B Conservation Area
Auto Park	5,6	2,9	5	3,2
Fuel Oil Station	-	-	0,08	0,2
Manufacturing	1,9	1,5	0.8	0,3
Residential	46,3	75,5	65.6	65
Residential+Commerical	4,8	5,1	7,5	12,2
Commerical+ Manufacturing	-	4,1	0,2	0.03
Commerical	8,8	1,5	6.3	8,2
Tourism Facilities	-	-	1	-
Mosques	16,5	6	1,8	2
Education Facilities	5	1,8	5,2	3,2
Dormitory	-	-	0,2	0,3
Health Services	2,3	0,1	0,1	1,85
Public Use	0,4	0,2	0,1	-
Park/Green Areas	8,4	1,3	6,12	3,52

The location of high percentage of health services, education facilities, auto parks, commercial use, manufacturing use and public use are allocated in 1^{st} degree Conservation Area. Residential use is weighly distributed in 2^{nd} Degree Conservation Area. Each function increases the vulnerability of the area by attracting population and creating sectoral hazards in commercial and manufacturing uses. It is positive that fuel oil stations are not located in 1^{st} and 2^{nd} degree Conservation Areas.

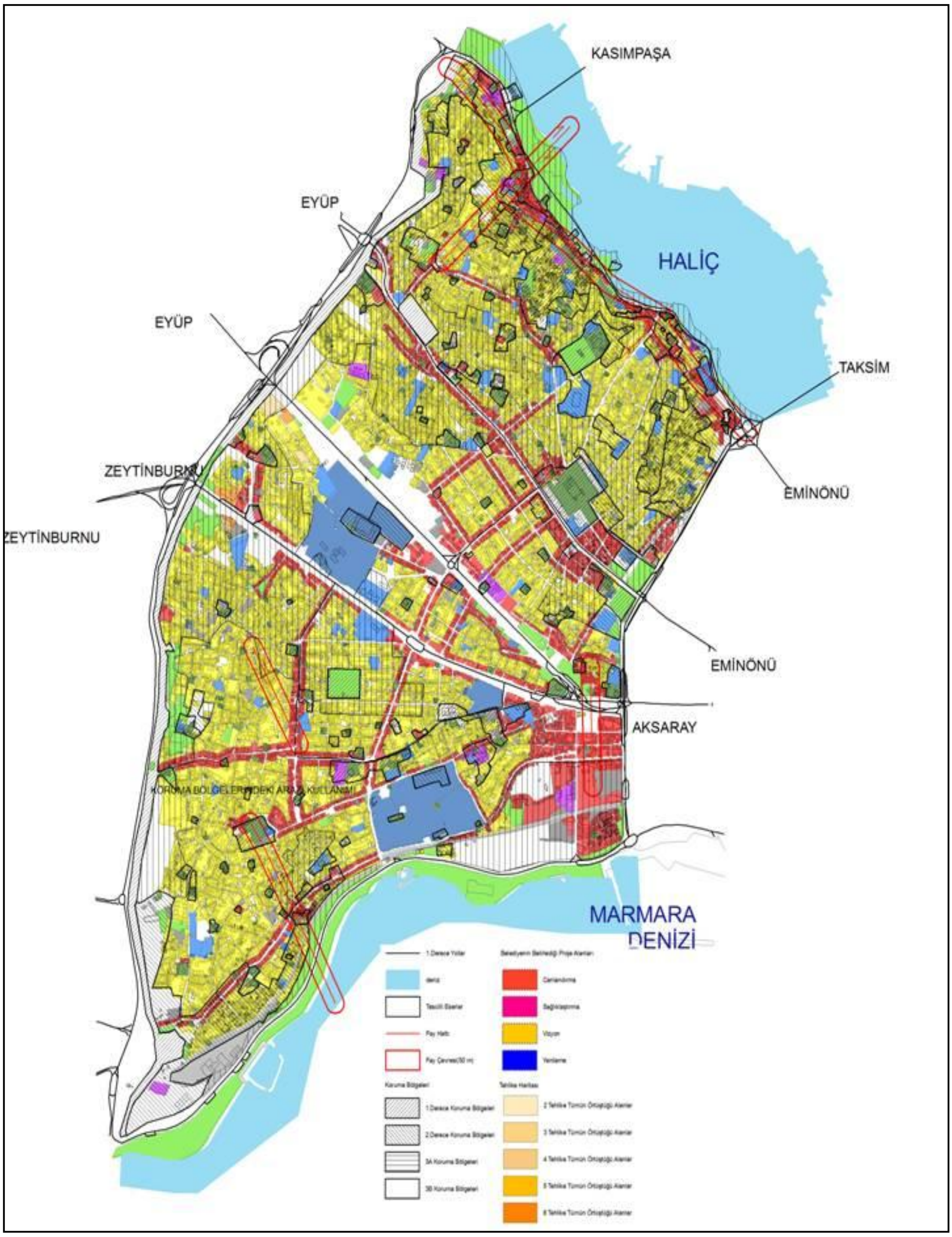


Figure 14. Conservation Areas According to Project Areas of Istanbul Metropolitan Municipality

In *Figure.14*, the project areas defined by Istanbul Metropolitan Municipality are superimposed with natural hazard areas and Conservation Areas. It is found that Vision (orange in legend) areas include as city wall area, Vitalization (red in legend) areas include streets in which commercial use is common, Rehabilitation (magenta in legend) Areas and Regeneration (blue in legend) Areas include historical neighborhoods. The terms Vision and Regeneration imply for comprehensive physical intervention; Rehabilitation and Vitalization imply for minor physical intervention. It is observed that the project areas are determined without considering natural hazards and Conservation Areas. City wall area determined as Vision Project Area is defined under 1st degree Conservation Area and includes most of the listed buildings.

4.2.3.4 Population

Quality of Life Survey carried by BIMTAS is used in the section to examine socio-economic structure. The criteria is identified according to the social surveys on Participation to Local Meetings, Neighbor Relations, Opinion on Local Safety, House and Vehicle Ownership, Energy Consumption Level, Opinion on Health Services, Spare Time Activities, Frequency of Travelling, Use of Recreational Areas, Allocation Facilities, Shopping Conveniences, The Impact Areas and Accessibility of Socio-Cultural Facilities and The Level of Contentment in the Locality. The data relevant to the mitigation plan is examined in the next section.

4.2.3.5 Determination of 24 Natural Hazard Areas

After socio-economic base information is examined to determine vulnerabilities, physical priorities are determined such as local multiple hazard attributes, age of buildings and listed buildings. The criteria are used to evaluate natural hazard areas and reach 24 Natural Hazard Areas. (Appendix-A, Figure.37)

Local Multi-Hazard Attributes

The first step of hazard identification is to categorize natural hazard areas according to local seismicity based on *Terrain Hazards*, *Local Geological Attributes* and *Hydrologic Hazards*. Multi-hazard zoning is maintained to monitor location of hazard clusters. Hazard clusters formed of *Local Geological Attributes* include high vulnerability as it contains the overlapping natural hazards; liquefaction, landslide, alluvium, Kusdili F., Gungoren F. with fault lines and high PGA. The hazardous ground and seismicity create high vulnerability and defined as a criterion.

Age of Buildings

It is the second criterion to determine 24 Natural Hazard Areas. Despite the seismic risks, building stock is also considered in determining the prior hazard areas. In some areas, the average building age is more than 45 years which increases the sensitivity of the site to natural hazards, vulnerability and the percentage of total loss.

Listed Buildings

It is the third criterion to identify 24 Natural Hazard Areas. Historical registered building density points out the priority of the culture and historical heritages that are included in hazard areas.

The hazard areas, in which ground hazards and local seismic attributes overlap intensively, face off triggering secondary disasters and high potential of vulnerability during the major disaster. The old buildings in the site increase the vulnerability degree of the urban realm and the historical registered buildings necessitate taking extra precautions under the Mitigation Plan. As a result of those factors and findings 24 prior hazard areas are determined out of 36 hazard areas and classified at below. (Appendix-A, Figure.38)

Table 17. 24 Natural Hazard Areas

No. of Hazard Areas	Hazard Combinations	Natural Hazards	Hazard Areas (ha)	Age of Buildings	Listed Buildings
1	5A	Artifical Fill +High PGA+Liquefaction+ Tsunami+Water Resource Basin	22,5	51	78
2	5A		22,2	46	10
3	5D	Kusdili F.+Fault Line+High PGA+Tsunami+ Water Resource Basin	53	41	-
4	5B	Kusdili F.+Liquefaction+High PGA+Tsunami+ Water Resource Basin	5	36	-
5	4D	Kusdili F.+Fault Line+Liquefaction+ Water Resource Basin	4,6	47	26
6	4C	Artifical Fill +High PGA+ Tsunami+Water Resource Basin	35	41	63
7	4G	Kusdili F.+Fault Line+Landslide+ Water Resource Basin	0,2	42	4
8	4I	Kusdili F.+Fault Line+Alluvium+ Water Resource Basin	2,6	46	66
9	4I		0,8	43	56
10	4F	Kusdili F.+Alluvium+Liquefaction+ Water Resource Basin	3	42,5	37
11	4B	Kusdili F.+High PGA+ Alluvium+STH.	1	35,5	7
12	3H	Kusdili F.+Fault Line+ Water Resource Basin	5	44	59
13	3H		1,6	41	51
14	3D	Gungoren F.+Artifical Fill+ High PGA	1,3	60	1
15	3C	Kusdili F.+Landslide+ Water Resource Basin	2	36	7
16	3C		0,3	33	17
17	3G	Kusdili F +S.+ Water Resource Basin	2,17	48	11
18	3A	Gungoren F.+H.+ Water Resource Basin	0,8	43	-
19	2E	Landslide+ Water Resource Basin	7,5	41	74
20	2E		2,3	42	56
21	2D	Fault Line.+ High PGA	7	30	25
22	2D		5	31	5
23	2B	Bakirkoy F+ High PGA	287	33,4	555
24	2C	Gungoren F.+Landslide	0,4	41	18

4.2.4 Spatial Risk Assessment

In the section of *Spatial Risk Assessment*, specific analyses for multi-hazard zones are proceed to determine evolution of natural hazards in to risks. Risk assessment includes Building Stock, Infrastructure Population and Property Values to evaluate financial dimensions of natural hazards and determine risks.

4.2.4.1 Building Stock

In this section, available building data is examined by comparing 2 groups as:

- Type of Building-Building Use
- Type of Building -No. of Storey
- Type of Building -Age of Buildings
- Building Use-No. of Storey
- Building Use-Age of Buildings
- Age of Buildings-No. of Storey

More specifically risks in case of building material, age, use and no. of storey are determined as:

- Wooden Buildings
- High Storey and Aged Buildings
- Commercial and Industrial uses are also examined to be

Type of Building- Use

Wooden buildings constituting 1% of total building stock include risk of fire. Specially, commercial and industrial uses in wooden buildings should be examined including locations and the periphery building uses.

Concrete buildings constituting 63% of total building stock which is the most common material used in the locality. 56% of total residential use, 83% of the residential and commercial use, 51% of the commercial use and 49% of the industrial use include concrete buildings. (Figure 14)

Table 18. Type of Building and Building Use

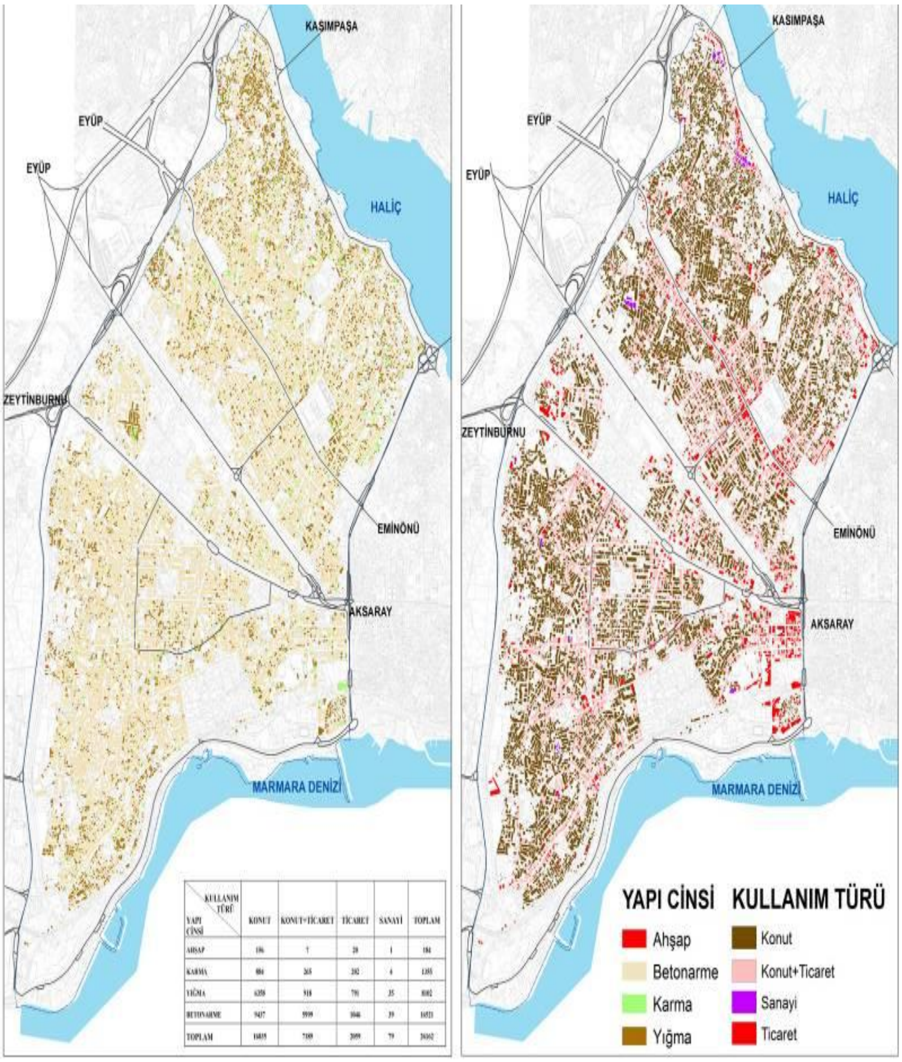
TYPE OF BUILDING/ USE	RESIDENTIAL	RESIDENTIAL + COMMERCIAL	COMMERCIAL	INDUSTRIAL	TOTAL
WOODEN	156	7	20	1	184
CONCRETE-MASONRY	884	265	202	4	1355
MASONRY	6358	918	791	35	8102
CONCRETE	9437	5999	1046	39	16521
TOTAL	16835	7189	2059	79	26162

Type of Building and No. of Storey

It is observed that 3and 5 storey buildings imply for hazard and their locations are examined. According to the Building Codes, masonry buildings should not be over 2 storeys in hazard areas. In fact, 3, 4 and 5 storey buildings could be seen in the locality. It is determined that 39% of total concrete building stock is 5 storeys and 31% of it includes 6 storey buildings. Most of the buildings are 5-6 storeys excluding the wooden building stock. (Figure 15)

Analyses in the Building Stock

Type of Building Use



KULLANIM TÜRÜ / YAPI CİNSİ	KONUT	KONUT+TİCARET	TİCARET	SANAYİ	TOPLAM
AHŞAP	156	7	20	1	184
KARMA	884	265	282	4	1335
YIĞMA	6358	918	791	35	8102
BETONARME	9437	5999	1046	39	16521
TOPLAM	16835	7189	2099	79	26162

Figure 15. Type of Building and Building Use

Table 19. Type of Building and No. of Storey

TYPE OF BUILDING / NO. OF STOREY	1	2	3	4	5	6	7	TOTAL
WOODEN	43	94	41	5	1	-	-	184
CONCRETE - MASONRY	182	301	338	305	229	-	-	1355
MASONRY	2264	2033	1854	1371	580	-	-	8102
CONCRETE	224	321	663	2573	6362	5084	1294	16521
TOTAL	2713	2749	2896	4254	7172	5084	1294	26162

Type and Age of Building

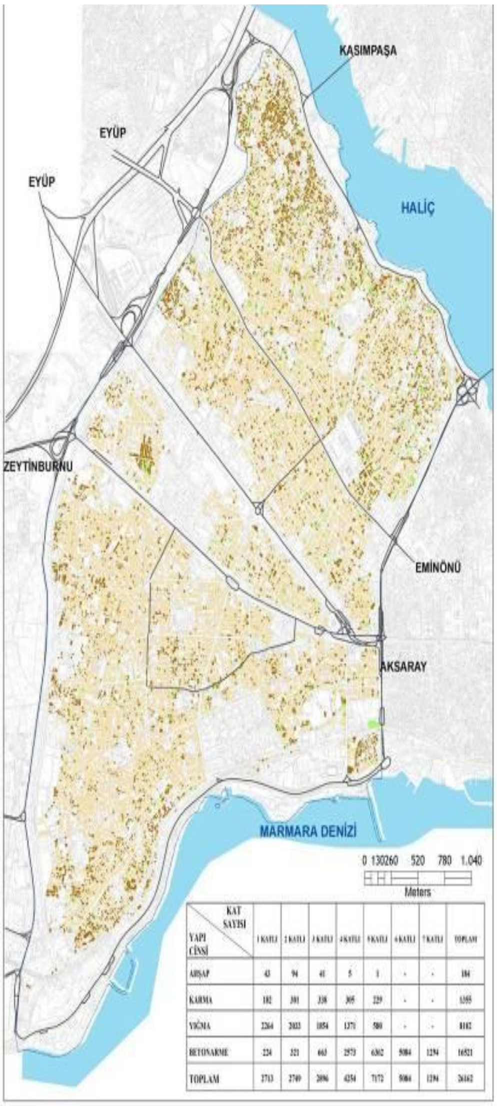
The location of wooden building stock should be examined to determine if they locate in Conservation Areas. Concrete, masonry and concrete-masonry buildings over 45 years should be also examined to identify the natural hazards they are exposed. (Figure .16)

Table 20. Type of Buiding and Age of Building

TYPE OF BUILDING/ AGE OF BUILDING	0-15	16-35	36-45	46-65	66-98	TOTAL
WOODEN	50	8	16	46	64	184
CONCRETE-MASONRY	139	243	346	472	155	1355
MASONRY	832	1147	1533	3510	1080	8102
CONCRETE	2286	9973	3305	893	64	16521
TOTAL	3307	11371	5200	4921	1363	26162

Analyses in the Building Stock

Type of Building / Number of Storeys



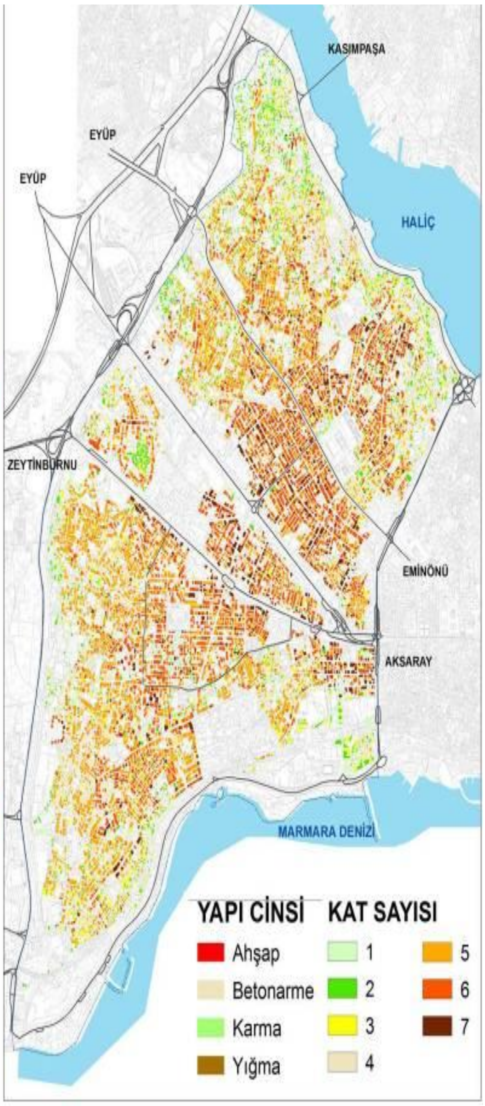


Figure 16. Type of Building and No. of Storey

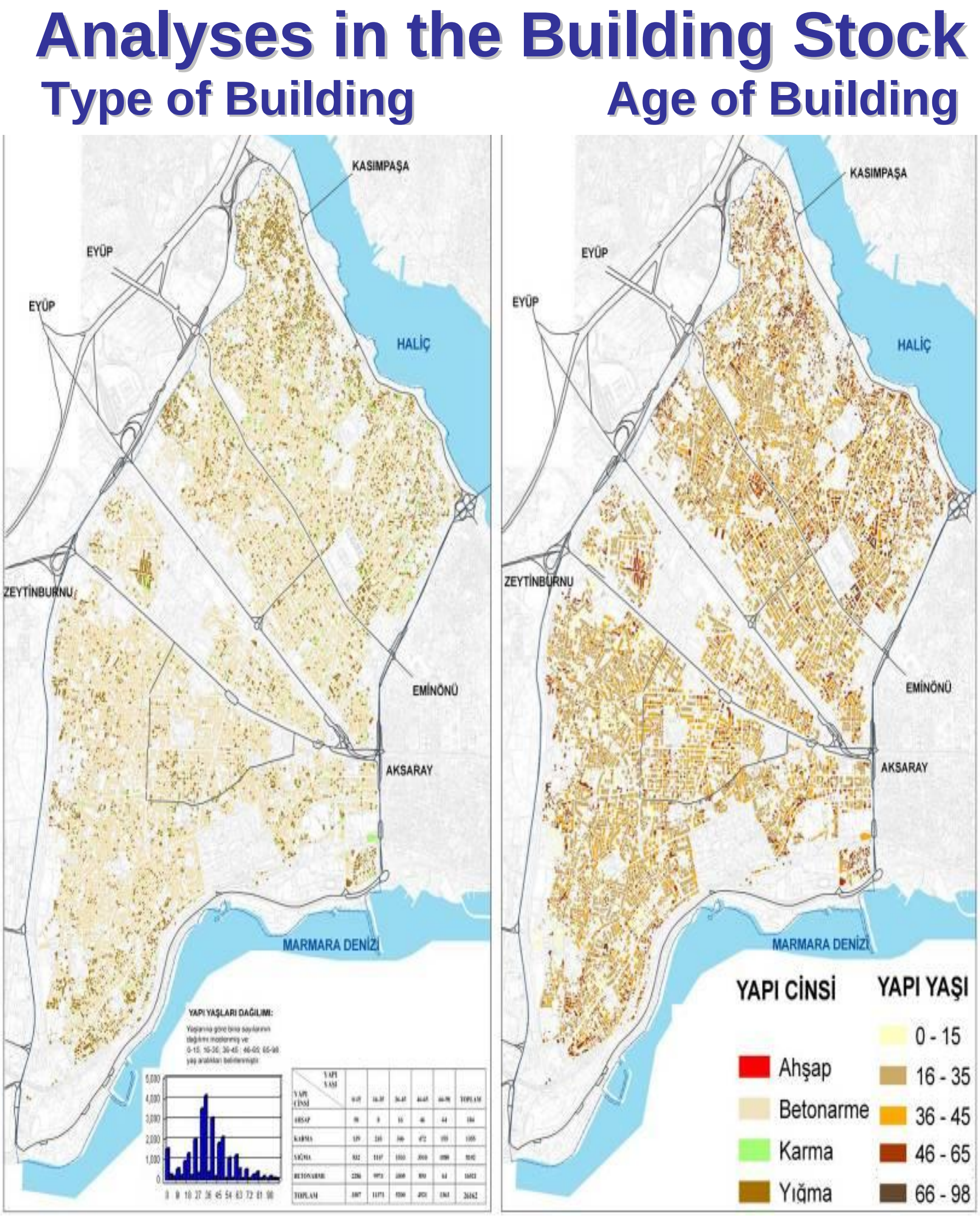


Figure 17. Type of Building and Age of Building

Building Use and No. of Storey

It is observed that residential use in 5 story buildings is common in the locality. (Figure.17)

Table 21. Building Use and No. of Storey

USE/ No. of Storey	1	2	3	4	5	6	7	TOTAL
Residential	1974	2056	2101	2687	4459	3033	525	16835
Residential+Commercial	23	245	556	1374	2522	1838	631	7189
Commerical	684	422	230	184	190	211	138	2059
Industrial	32	26	9	9	1	2	-	79
TOTAL	2713	2749	2896	4254	7172	5084	1294	26162

Building Use and Age of Buildings

All uses over 45 years imply for high risk but especially industrial buildings over 45 years are determined to be vulnerable. (Figure.18)

Table 22. Building Use and Age of Buildings

BUILDING USE/ AGE OF BUILDINGS	0-15	16-35	36-45	46-65	66-98	TOTAL
Residential	1958	6868	3390	3607	1012	16835
Residential+Commercial	887	3746	1480	886	190	7189
Commerical	452	740	316	396	155	2059
Industrial	10	17	14	32	6	79
TOTAL	3307	11371	5200	4921	1363	26162

Analyses in the Building Stock

Use Number of Storeys

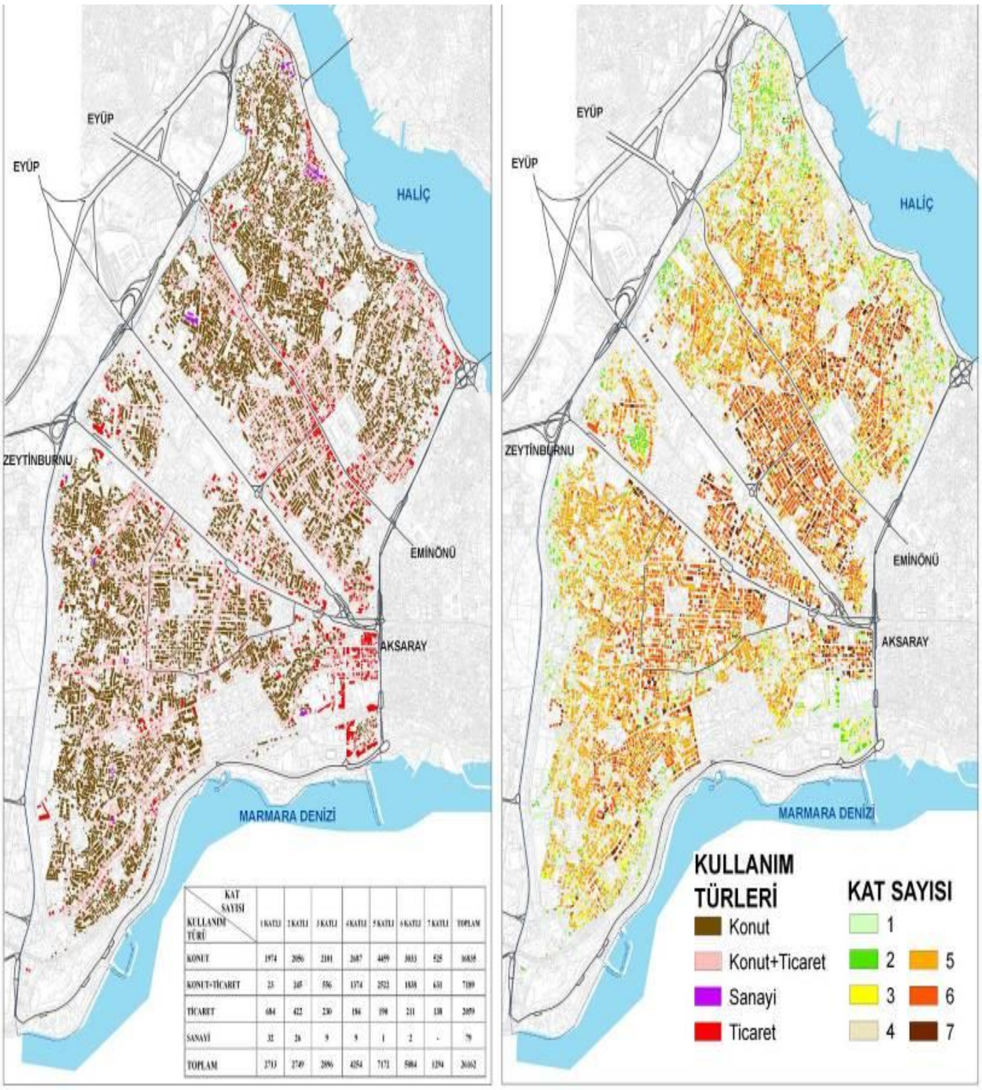
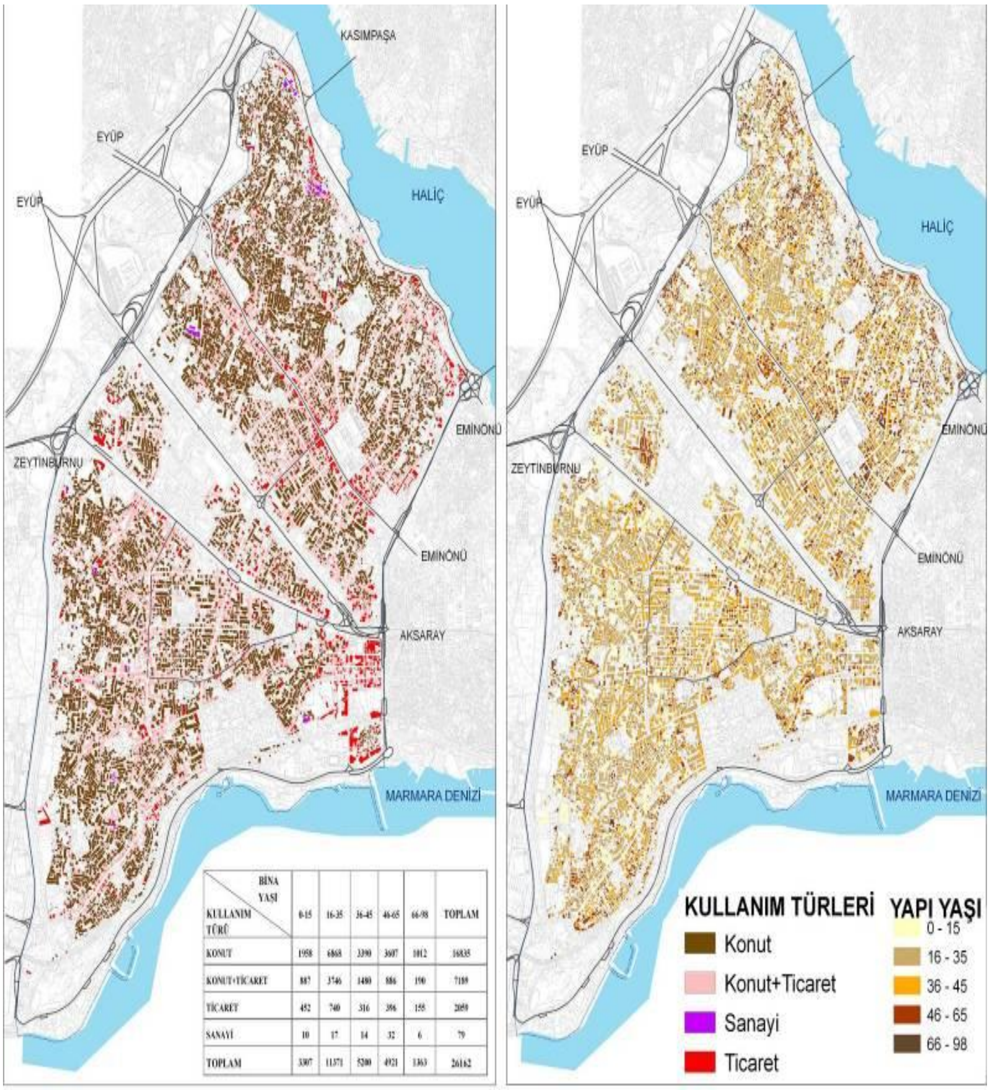


Figure 18. Building Use and No. of Storey

Analyses in the Building Stock

Use **Age**



KULLANIM TÜRÜ \ BİNA YAŞI	0-15	16-35	36-45	46-65	66-98	TOPLAM
KONUT	1958	6868	3390	3607	1012	16835
KONUT+TİCARET	887	3746	1480	886	190	7189
TİCARET	452	740	316	396	155	2059
SANAYİ	10	17	14	32	6	79
TOPLAM	3307	11371	5200	4921	1363	26162

Figure 19. Building Use and Age of Buildings

Age of Buildings and No. of Storey

It is determined that aged buildings that are over 45 years are 5 story buildings. (Figure.19)

Table 23. Age of Buildings and No. of Storey

AGE/NO. OF STOREYS	1	2	3	4	5	6	7	TOTAL
0-15	424	383	313	429	795	699	264	3307
16-35	669	419	570	1803	4127	3057	726	11371
36-45	459	478	606	835	1479	1100	243	5200
46-65	896	1079	1061	942	675	210	58	4921
66-98	265	390	346	245	96	18	3	1363
TOTAL	2713	2749	2896	4254	7172	5084	1294	26162

Wooden Buildings

Although the number of wooden buildings is 184 and forms 1% of total building stock, they include risk of fire. Their location and periphery uses should be examined primarily. Most of the wooden buildings are located at historical neighborhoods including narrow streets which increases the risk of fire and requires for physical intervention. Therefore, wooden building stock is examined according to Conservation Areas to determine spatial risks of wooden buildings.

Wooden Buildings Located At 1st Degree Conservation Area

There are 52 wooden buildings including 18 listed buildings.

The age distribution is 49 in average. 40% of total wooden building stock is under 45 years. 60% of total wooden building stock is over 45 years.

The average no. of storey in the area is 2. 65% of the total stock includes 1-2 storeys and 35% of it includes 3-4 storeys.The use in wooden building stock is allocated as 85% residential, 4% commercial and residential and 11% commercial. (Figure .20)

Table 24. Wooden Building Stock in 1st Degree Conservation Area

AGE		**NO. OF STOREY**	
AGE	**No. of Buildings**	**No. of Storey**	**No. of Buildings**
0	9	1	10
2	1	2	24
3	1	3	13
15	1	4	5
20	1	**Average No. of Storey**	**2**
30	1		
35	1		
40	5		
45	1		
50	5	**BUILDING USE**	
55	2	Residential	44
60	4	Residential+Commerical	2
70	4	Commercial	6
80	10		
85	1	**TOTAL NO. OF WOODEN BUILDINGS 52**	**TOTAL NO. OF LISTED WOODEN BUILDINGS 18**
90	4		
95	1		
Average Age	**49**		

Wooden Buildings Located At 2nd Degree Conservation Area

There are 37 wooden buildings including 8 listed buildings.

Wooden buildings are located at historical neighborhoods including narrow street network and hazardous uses as small manufacturing ateliers which contain explosive materials.

29% of total wooden building stock is under 45 years and 71% of it is over 45 years.

The average building age in the area is 58. In general distribution, 80 years of buildings are commonly observed.

The average no. of storey is 2 in the area. 57% of total wooden building stock is 1-2 storeys and 43% of it is 3 storeys. (Figure .20)

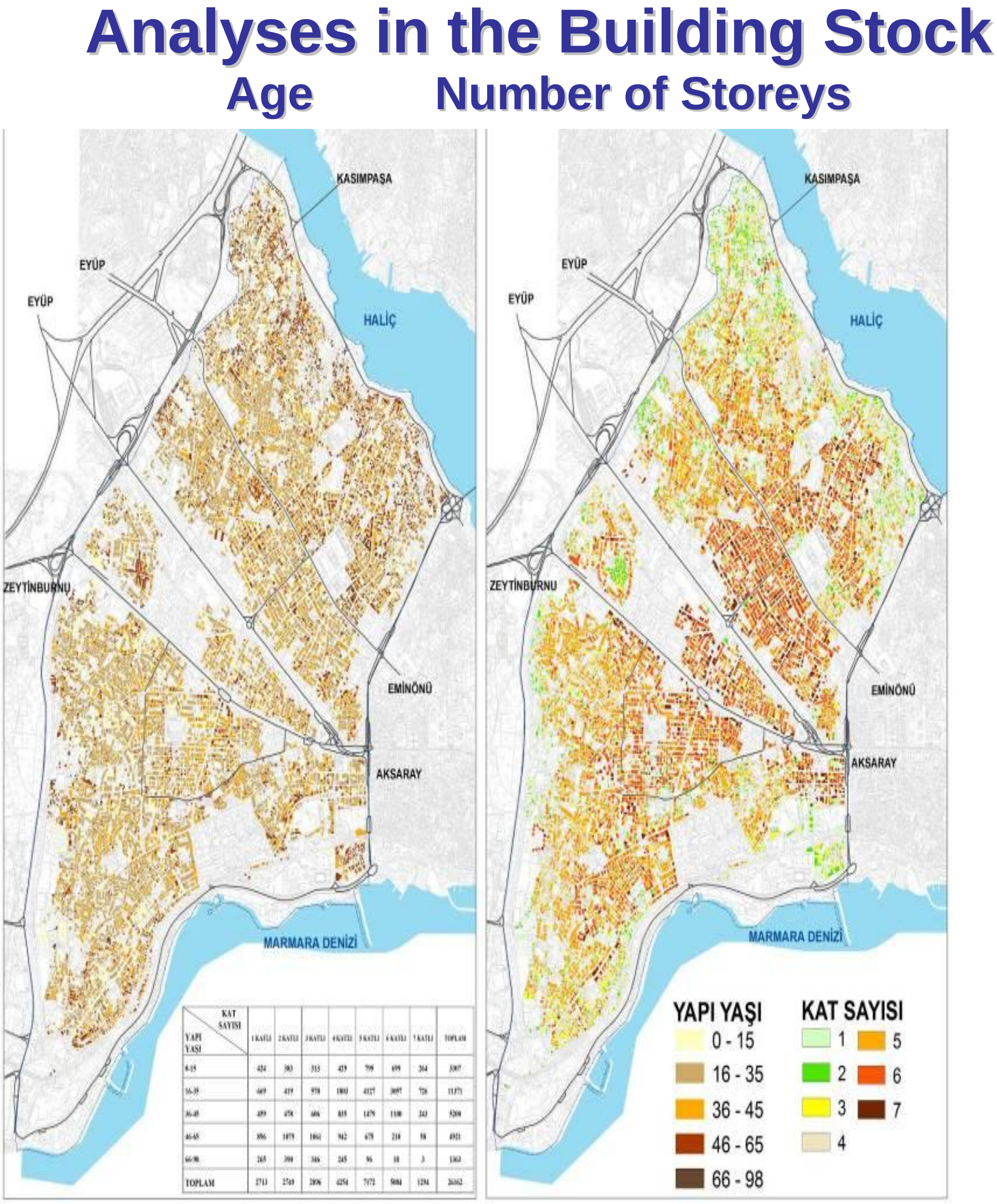


Figure 20. Age of Building and No. of Storeys

The building use includes 86% residential, 6% residential and commercial, 6% commercial and 3% industrial.

Table 25. Wooden Building Stock in 2nd Degree Conservation Area

AGE		NO. OF STOREY	
AGE	**No. of Buildings**	**No. of Storey**	**No. of Buildings**
0	5	1	4
30	1	2	17
35	1	3	16
38	1	**Average No. of Storey**	**2**
40	1		
45	2		
50	3	**Building Uses**	
55	2		
60	2		
65	2	Residential	32
70	1	Residential+Commerical	2
75	3	Commercial	1
80	7	Residential	2
85	1		
90	2	**TOTAL NO. OF WOODEN BUILDINGS 37**	**TOTAL NO. OF LISTED WOODEN BUILDINGS 8**
95	3		
Average Age	**58**		

Wooden Buildings Located At 3A Conservation Area

There are 54 wooden buildings including 2 listed buildings.

The age distribution is 46 in average. 39% of total wooden building stock is under 45 years. 61% of total wooden building stock is over 45 years.

2. 83% of the total stock includes 1-2 storeys and 17% of it includes 3-5 storeys.

The use in wooden building stock is allocated as 89% residential, 4% commercial and residential and 7% commercial. (Figure .21)

Table 26. Wooden Building Stock in 3A Conservation Area

AGE		NO. OF STOREY	
AGE	**No. of Buildings**	**No. of Storey**	**No. of Buildings**
0	12	1	17
5	1	2	28
15	4	3	8
25	1	5	1
40	2	**Average No. of Storey**	**2**
45	1		
50	4		
55	1		
60	5		
65	7	**Building Use**	
70	4	Residential	48
75	4	Residential+Commerical	2
80	5	Commercial	4
85	1		
90	2	**TOTAL NO. OF WOODEN BUILDINGS 54**	**TOTAL NO. OF LISTED WOODEN BUILDINGS 2**
Average Age	**46**		

Wooden Buildings Located At 3B Conservation Area

There are 41 wooden buildings including 4 listed buildings.

51% of total wooden building stock is under 45 years and 49% of it is over 45 years. The average building age in the area is 40. The average no. of storey is 2 in the area. 90% of total wooden building stock is 1-2 storeys and 10% of it is 3 storeys.

The building use includes 78% residential, 2% residential and commercial and 20% commercial. (Figure .21)

Table 27. Wooden Building Stock in 3B Conservation Area

AGE		NO. OF STOREY	
AGE	**No. of Buildings**	**AGE**	**No. of Buildings**
0	9	1	12
1	1	2	25
3	1	3	4
5	2	**Average No. of Storey**	**2**
7	1		
10	1		
15	1		
25	1		
30	1	**Building Use**	
40	2	Residential	32
45	1	Residential+Commerical	1
50	1	Commercial	8
55	4		
60	1		
65	3		
70	2		
75	2	**TOTAL NO. OF WOODEN BUILDINGS 41**	**TOTAL NO. OF LISTED WOODEN BUILDINGS 4**
80	2		
85	4		
90	1		
Average Age	**40**		

Consequently, it is determined that the distribution of wooden building stock is commonly observed in Zeyrek and Fener-Balat areas, Mimar Sinan, Kececi, Karabas and Haci Huseyin Aga neighborhoods. In general, listed wooden buildings are located at 1st and 2nd degree Conservation Areas. The wooden building stock is constituted of 84% (156 buildings) in residential use. Commercial (20 buildings) and Industrial (1 building) wooden buildings include risks in building uses which are located in residential area. In the analysis, wooden buildings over 45 years and 3-5 storey buildings are exposed to seismic risks.The building uses located at periphery of wooden building stock is also examined to determine spatial risks.

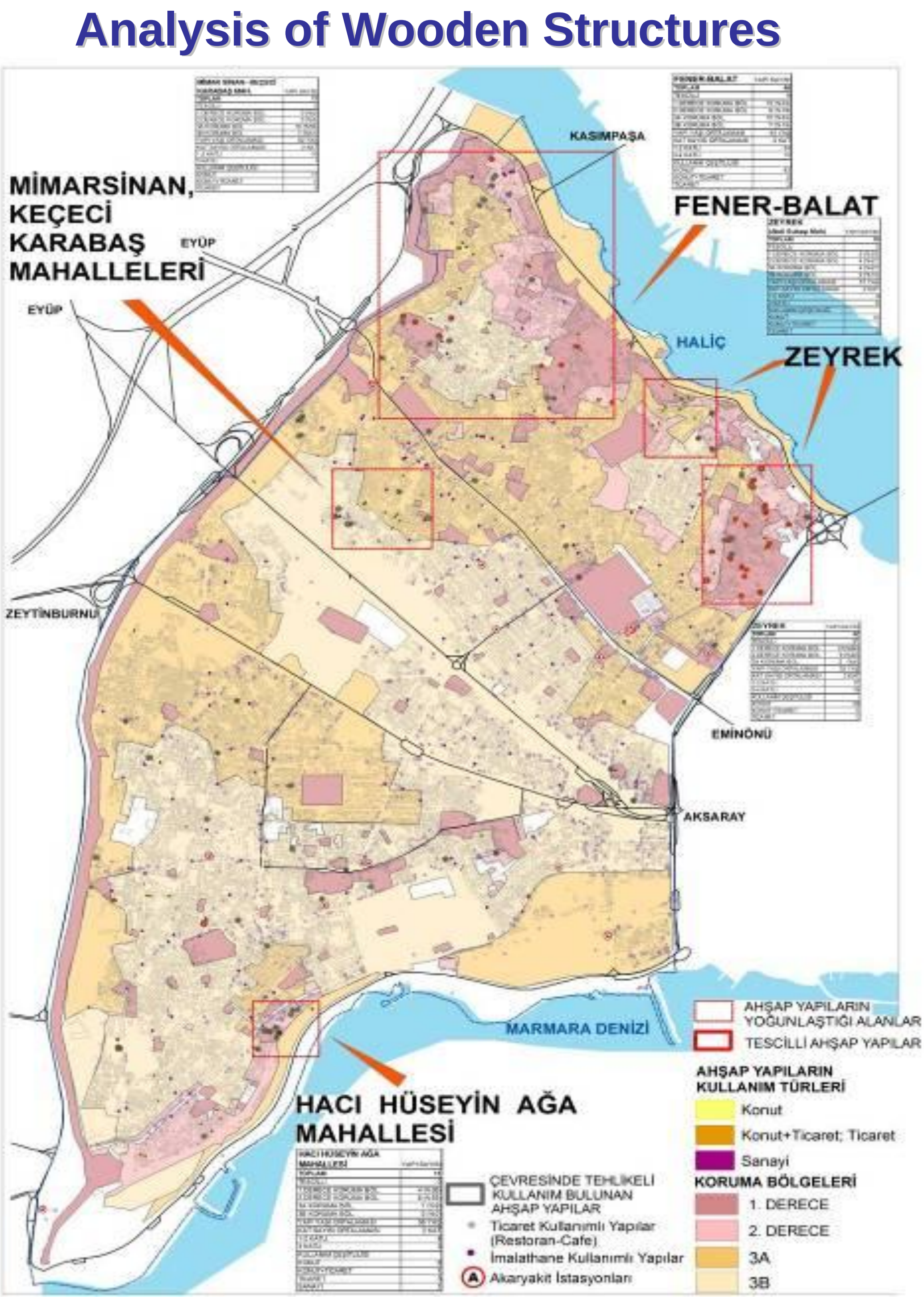


Figure 21. Analysis of the Wooden Structures

There are hazardous uses at 50m of impact areas at the periphery of wooden building stock, including chemistry industry and manufacturing, fuel oil stations, LPG stations, restaurants and related facilities using LPG.

Aged (Over 45 years) and High (5-6-7 Storey) Buildings

It is determined that totally 1060 aged and high storey buildings in which 8% of it is located at 1st Degree Conservation Areas, 11% of it is located in 2nd Degree, 42% of it is positioned at 3A and 40% of it is located in 3B Conservation Areas. (Figure.22)

The buildings over 45 years and include 5, 6, 7 storey buildings include 57% concrete, 43% masonry-concrete and masonry buildings.

60% (632 buildings) of total building stock (1060) is residential use. Commercial and residential and commercial uses are also valid. There is no industrial use in aged and high storey buildings.

The only-adjacent buildings in aged and high storey buildings are analyzed especially as it is exposed to seismic risks. 32% (334 buildings) of total building stock (1060) are determined to be in only-adjacent at corner.

Aged and high storey buildings positioned at 40m and 50m is also examined as it is indicated in Prost Plan.

Aged and high storey buildings are examined according to material, age, use, no. of storey and building arrangement at below.

Table 28. Aged and High Storey Buildings

	1st Degree Conservation Area		**2nd Degree Conservation Area**		**3A Conservation Area**		**3B Conservation Area**	
Total Buildings 1060	**84 (%8)**		**116 (%11)**		**436 (%41)**		**424 (%40)**	
Av.Age	63 years		58 years		55 years		54 years	
No. of Storey	**5**	%95	**5**	%84	**5**	%66	**5**	%73
	6	%5	**6**	%13	**6**	%27	**6**	%21
	7	-	**7**	%3	**7**	%7	**7**	%6
Uses	**Residential**	%79	**5**	%74	**Residential**	%57	**Residential**	%55
	Mixed Use	%18	**Residential**	%26	**Mixed Use**	%39	**Mixed Use**	%40
	Commercial	%3	**Mixed Use**	-	**Commercial**	%4	**Commercial**	%5
	Industrial	-	**Commercial**	-	**Industrial**	-	**Industrial**	-
Type of Building	**Concrete**	%28	**Industrial**	%38	**Concrete**	%67	**Concrete**	%58
	Masonry	%63	**Concrete**	%45	**Masonry**	%27	**Masonry**	%34
	Concrete -Masonry	%9	**Masonry**	%17	**Concrete -Masonry**	%6	**Concrete -Masonry**	%8
Building Arrangement	%48 Only-adjacent at corner		%46 Only-adjacent at corner		%28 Only-adjacent at corner		%28 Only-adjacent at corner	

Analysis of Aged & High Buildings

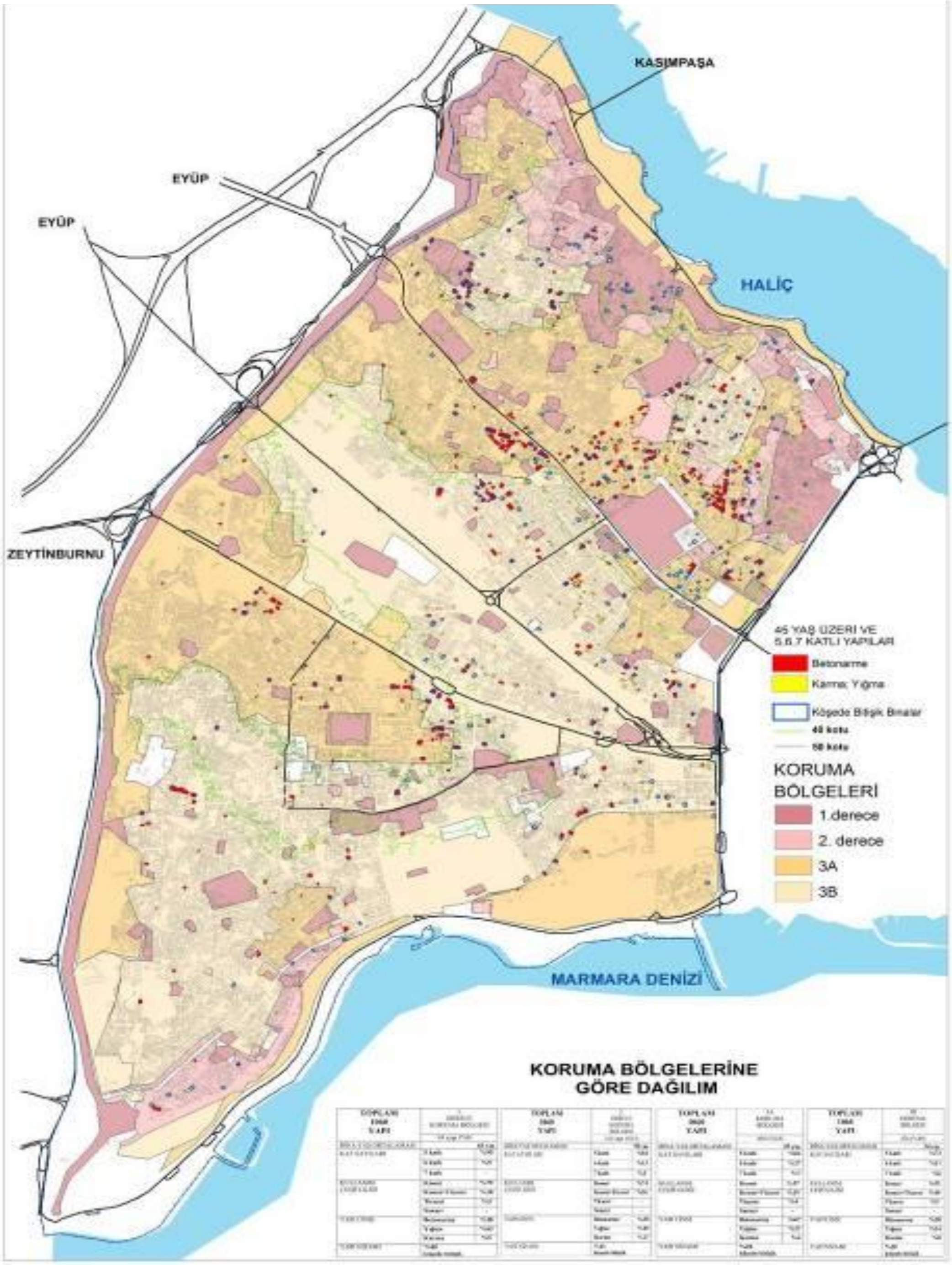


Figure 22. Analysis of Aged and High Buildings

Commercial and Industrial Buildings

Commercial Buildings

In Fatih District, 2138 buildings of total 26.162 buildings are commercial and industrial uses. The spatial distribution, building material, age and number of storey of commercial and industrial buildings are analyzed. (Figure.23)

There are 2059 buildings in commercial use and 7189 buildings in commercial and residential use. Commercial use is commonly observed on main axes as Fevzipasa, Vatan, Millet streets, coast road and Balat-Karabas neighborhood at Halic coast. It is found that floor area ratios increase in buildings and axes of commercial uses. Floor area ratios of commercial buildings located at periphery of Fevzipasa streets are over 3.5.

Commercial and residential use is observed in the north of the main ax Fevzipasa stree, in tneighborhoods; Seyh Resmi, Kirmasti, Husambey and neighborhoods located in the south of Fevzipasa street, including Hatice Sultan, Muhtesip Iskender, Hoca Uveyz, Hasan Halife, Sofular and Iskender Pasa. Around Eminonu District, Yali, Inebey and Cakiraga neighborhoods and Arabaci Beyazit, Koca Mustafa Pasa and Sancaktar Hayrettin neighborhoods located at periphery of Social Security Authority (Sosyal Sigortalar Kurumu-SSK) hospitals.

Commercial buildings are examined according to material, age, use, no. of storey and building arrangement at below.

Table 29. Commercial and Residential+Commercial Uses

COMMERCIAL BUILDINGS	**Total 2059 Buildings**	
Average No. of Storey	34 Years	
Building Material	Wooden	20
	Concrete	1046
	Concrete-Masonry	202
	Masonry	791
No. of Storey	1	684
	2	422
	3	230
	4	184
	5	190
	6	211
	7	138
Residential+Commerial Uses	**Total 7189 Buildings**	
Average Age	33 Years	
Building Material	Wooden	7
	Concrete	5999
	Concrete-Masonry	265
	Masonry	918
No. of Storey	1	23
	2	245
	3	556
	4	1374
	5	2522
	6	1838
	7	631

Analysis of Industry & Commerce

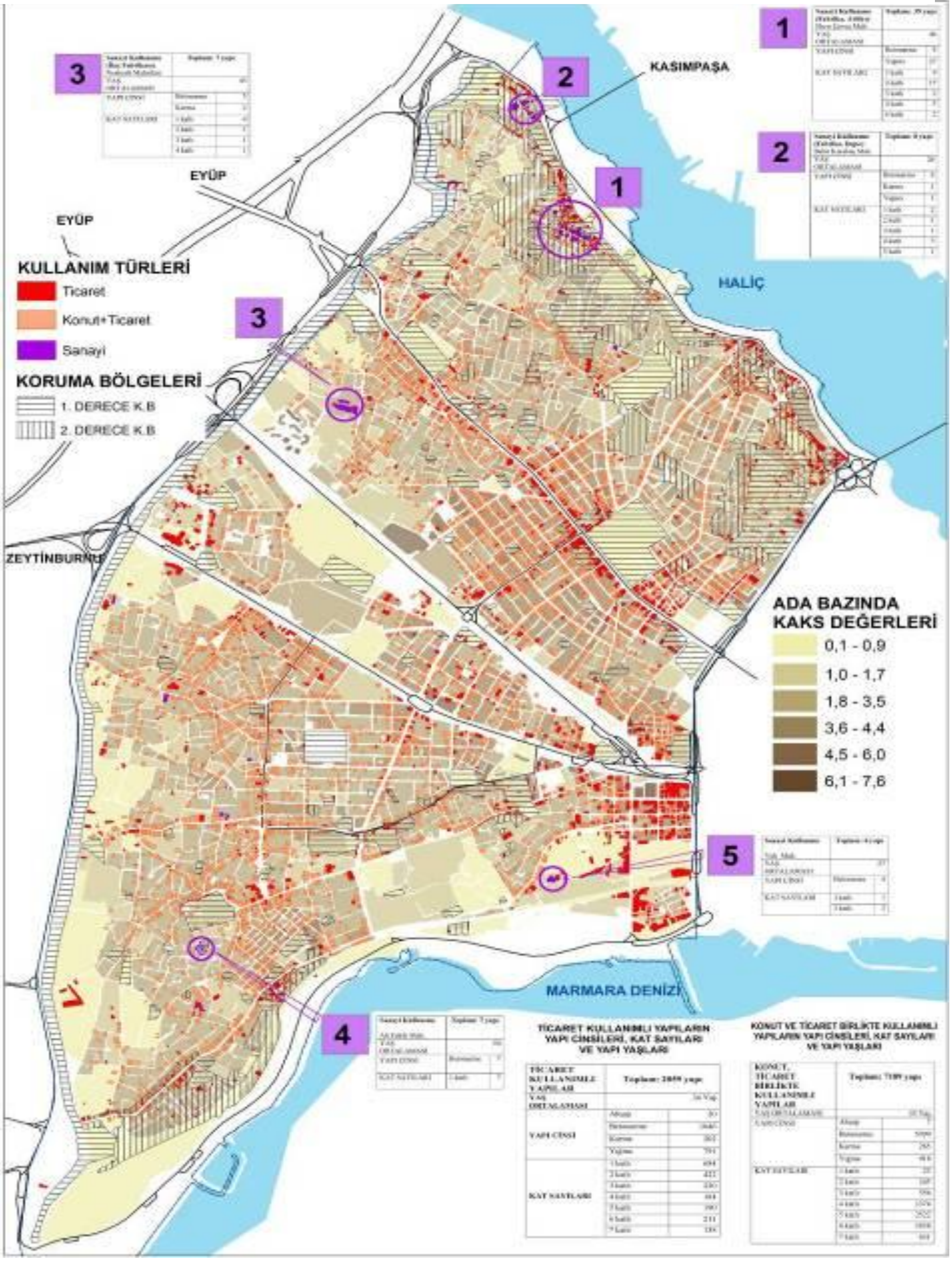


Figure 23. Commercial and Industrial Uses

There are 79 industrial buildings in Fatih District. They are scattered to Hizir Cavus, Balat-Karabas, Neslisah, Ali Fakih and Yali neighborhoods. Hizir Cavus neighborhood includes small factories and ateliers. Balat-Karabas neighborhood includes small factories and storages. Neslisah neighborhood includes chemistry and pharmacy factories. (Figure.23)

Consequently, 660 buildings are determined under risk as below.

Table 30. Buildings At Risk

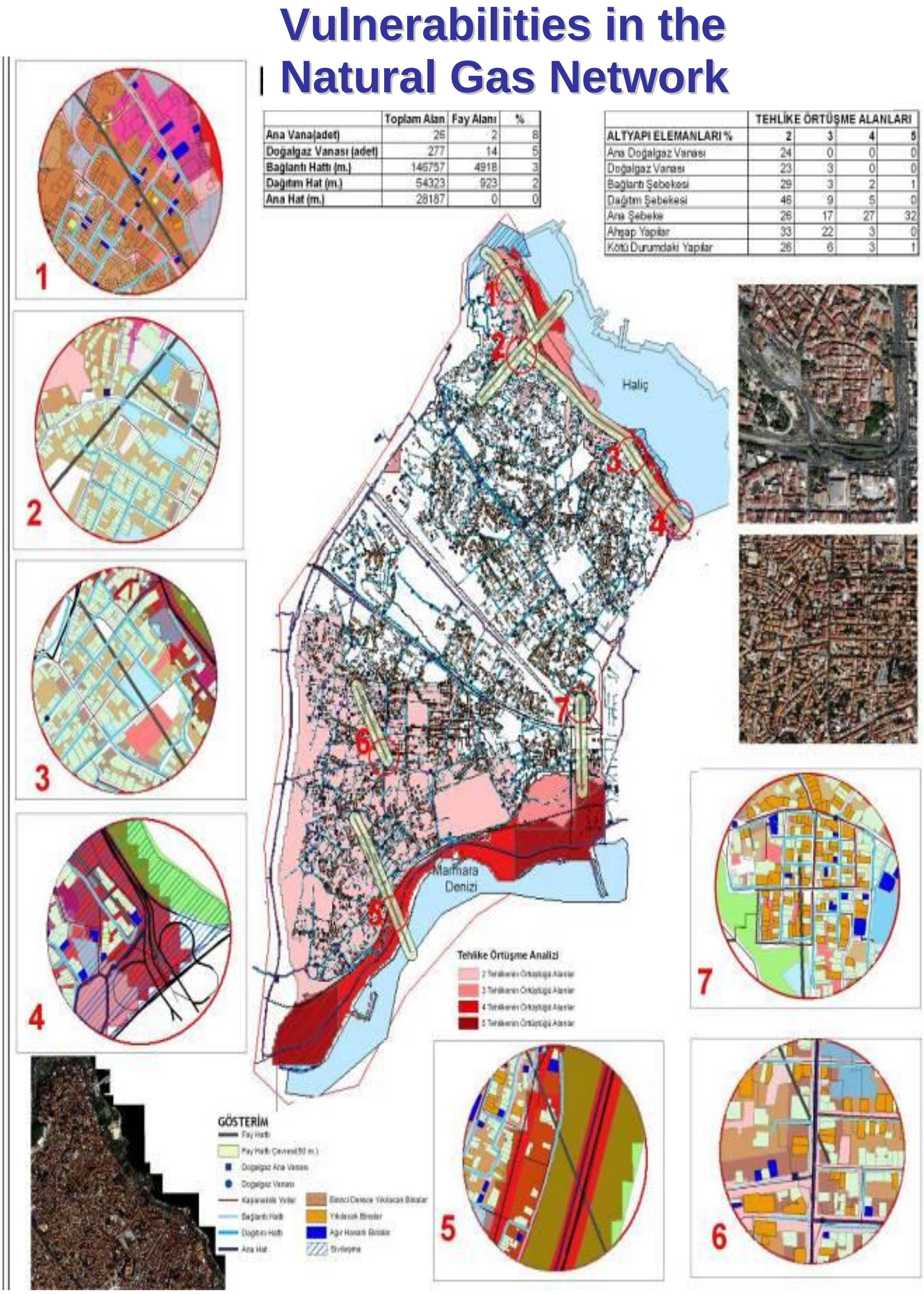
Buildings At Risk	No. of Buildings
Buildings Over 45 Years, 5-6-7 Storey Buildings (Concrete, Concrete-Masonry, Masonry)	324
Buildings Over 45 Years, 3-5 Storeys, Wooden Buildings	34
Wooden Commerical and Industrial Uses	21
Wooden Buildings With Hazardous Uses At Periphery	87
Buildings Located On Artifical Fills	228

4.2.4.2 Infrastructure

In Fatih District, the infrastructural systems include natural gas, electric, telecommunication, potable water and sewage systems. Infrastructure is the subject to secondary disaster as fires and explosions during the major disaster, the loss of water and energy and epidemic diseases.

The Natural Gas Network

The natural gas system includes main line valves, line valves, connection nets and distribution nets. According to JICA report it is indicated that the harm would be at minimum as the natural gas lines are produced from a flexible material of polyurethane and include automatic shut off valves. This analysis is maintained according to the main valve study of Bogazici University and Red Cross and structural information achieved from IGDAS. (Figure.24)



	Toplam Alan	Fay Alanı	%
Ana Vana(adet)	26	2	8
Doğalgaz Vanası (adet)	277	14	5
Bağlantı Hattı (m.)	146757	4918	3
Dağıtım Hat (m.)	54323	923	2
Ana Hat (m.)	28187	0	0

	TEHLİKE ÖRTÜŞME ALANLARI			
ALTYAPI ELEMANLARI %	2	3	4	5
Ana Doğalgaz Vanası	24	0	0	0
Doğalgaz Vanası	23	3	0	0
Bağlantı Şebekesi	29	3	2	1
Dağıtım Şebekesi	46	9	5	0
Ana Şebeke	26	17	27	32
Ahşap Yapılar	33	22	3	0
Kötü Durumdaki Yapılar	26	6	3	1

Figure 24. Vulnerabilities in the Natural Gas Network

The natural hazard areas are examined according to the elements of natural gas infrastructure. It is observed that 34% of the steel main line is located at 5 hazard combination areas which create high risk and vulnerability.

The connection and distribution networks are located commonly in 2 hazard combination areas which include 6 main valves and 47 wooden buildings. There is high risk of fire in this area. Also there are 2209 vulnerable buildings and if they are estimated to be demolished, mitigation measures for infrastructure should be taken immediately. (Figure.24)

Table 31. Natural Gas Infrastructure Elements According to Hazard Combinations

	Hazard Combinations			
Infrastructure Elements %	**2**	**3**	**4**	**5**
Main Natural Gas Valve	24	0	0	0
Natural Gas Valve	23	3	0	0
Connection Network	29	3	2	1
Distribution Network	46	9	5	0
Main Network	26	17	27	32
No. of Wooden Buildings	47	6	4	0
No. of Vulnerable Buildings	2209	472	236	96

It is determined that 11,54% of the main valves, 4.80% of the valves, 1.50% of the main line, 6% of the distribution line and 6.20% of the connection line are located in the impact area of 50m of fault lines.

Table 32. Natural Gas Infrastructure Elements At Impact Areas of Fault Lines

	Total Area	Fault Area	%
No. of Main Natural Gas Valve	26	3	11,54
No. of Natural Gas Valve	251	12	4,78
No. of Connection Network	28204	407	1,44
No. of Distribution Network	54360	3239	5,96
No. of Main Network	146870	9097	6,19

The Energy and Communications Network

In electric systems, JICA reports that minimum damage was determined at energy production centrals, aboveground transport lines and towers in past experiences. The most of the damage is formed at underground cables. According to the master plan, it is also estimated that Fatih would be damaged heavily in underground cables which include an average voltage of 34.5-10kV transmitted to transformers. It is determined that there is no risk of damage for the transformers.

According to natural hazard combinations, there is no hazard in case of 5 hazard combination area. It is observed that 33% of electrical transformers and 29% of the connection points are located at 2 hazard combination areas. (Figure.25)

Table 33. Electrical Infrastructure Elements According to Hazard Combinations

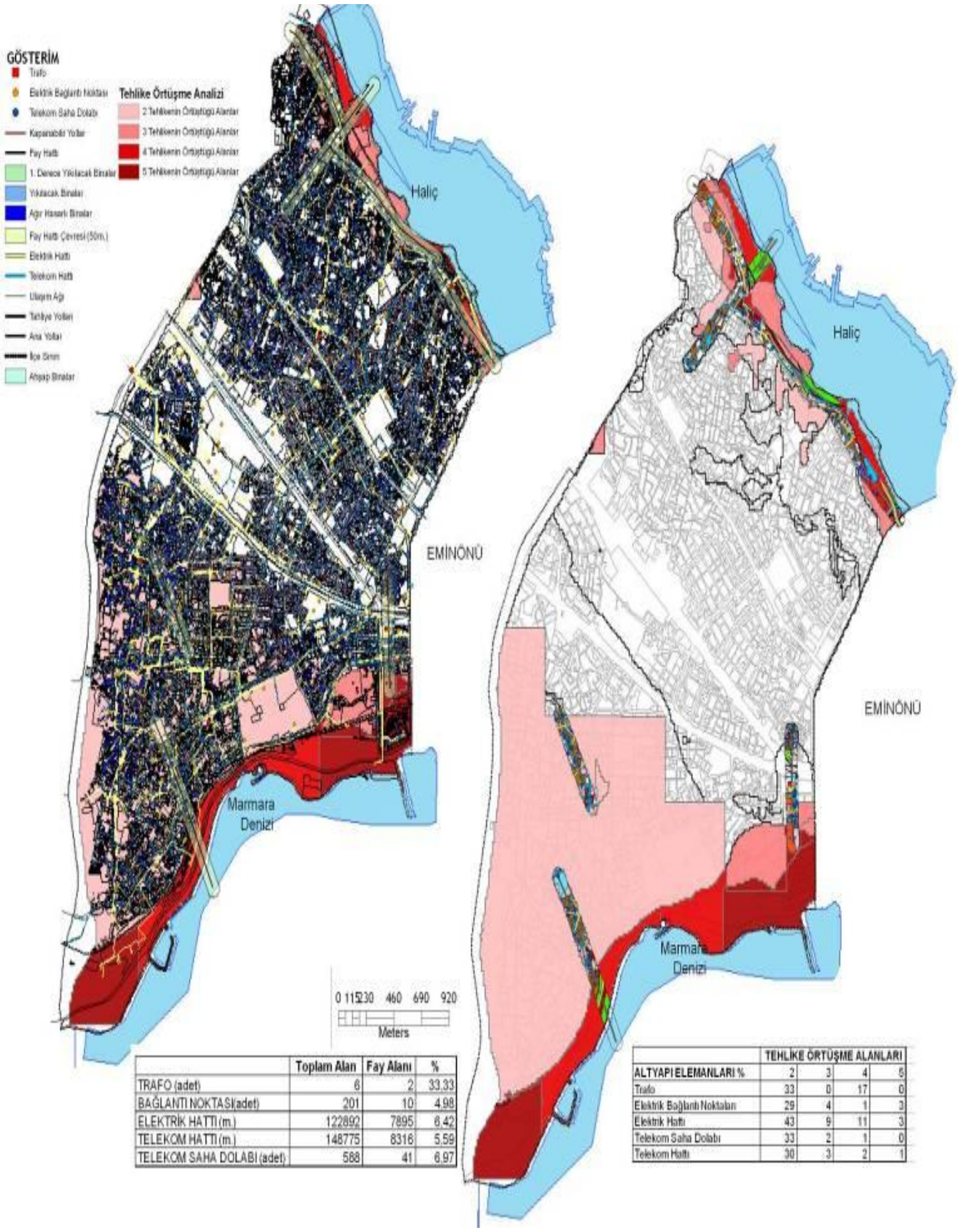
	Hazard Combinations			
Infrastructure Elements %	**2**	**3**	**4**	**5**
Transformers	33	0	17	0
Electrical Connection Point	29	4	1	3
Electricl Lines	43	9	11	3
Telecom Site Cabinet	33	2	1	0
Telecom Line	30	3	2	1

In the fault line impact area of 50m, there are 5 transformers and 201 electric connection points. 33.33% of transformers, 5% of electric connection points, 6.5% of electric lines and 7% of telecommunication lines are located in the impact area of the fault lines.

Table 34. Electrical Infrastructure Elements At Impact Areas of Fault Lines

Infrastructure Elements	Total Area	Fault Area	%
Transformers	5	2	33,33
Electrical Connection Point	201	10	4,98
Electricl Lines (m)	122892	7895	6,42
No. of Telecom Site Cabinet	148775	8316	5,59
Telecom Line (m)	588	41	6,97

Vulnerabilities in the Energy & Communications Network



	Toplam Alan	Fay Alanı	%
TRAFO (adet)	6	2	33,33
BAĞLANTI NOKTASI(adet)	201	10	4,98
ELEKTRİK HATTI (m.)	122892	7895	6,42
TELEKOM HATTI (m.)	148775	8316	5,59
TELEKOM SAHA DOLABI (adet)	588	41	6,97

	TEHLİKE ÖRTÜŞME ALANLARI			
ALTYAPI ELEMANLARI %	2	3	4	5
Trafo	33	0	17	0
Elektrik Bağlantı Noktaları	29	4	1	3
Elektrik Hattı	43	9	11	3
Telekom Saha Dolabı	33	2	1	0
Telekom Hattı	30	3	2	1

Figure 25. Vulnerabilities in the Energy and Communication Network

The Waste Water Network

According to natural hazard areas, the main collector line is located at 2 hazard combination areas. 11% of the main collector line is located at 5 hazard combination area. (Figure.26)

Table 35. Waste Water Infrastructure Elements According To Hazard Areas

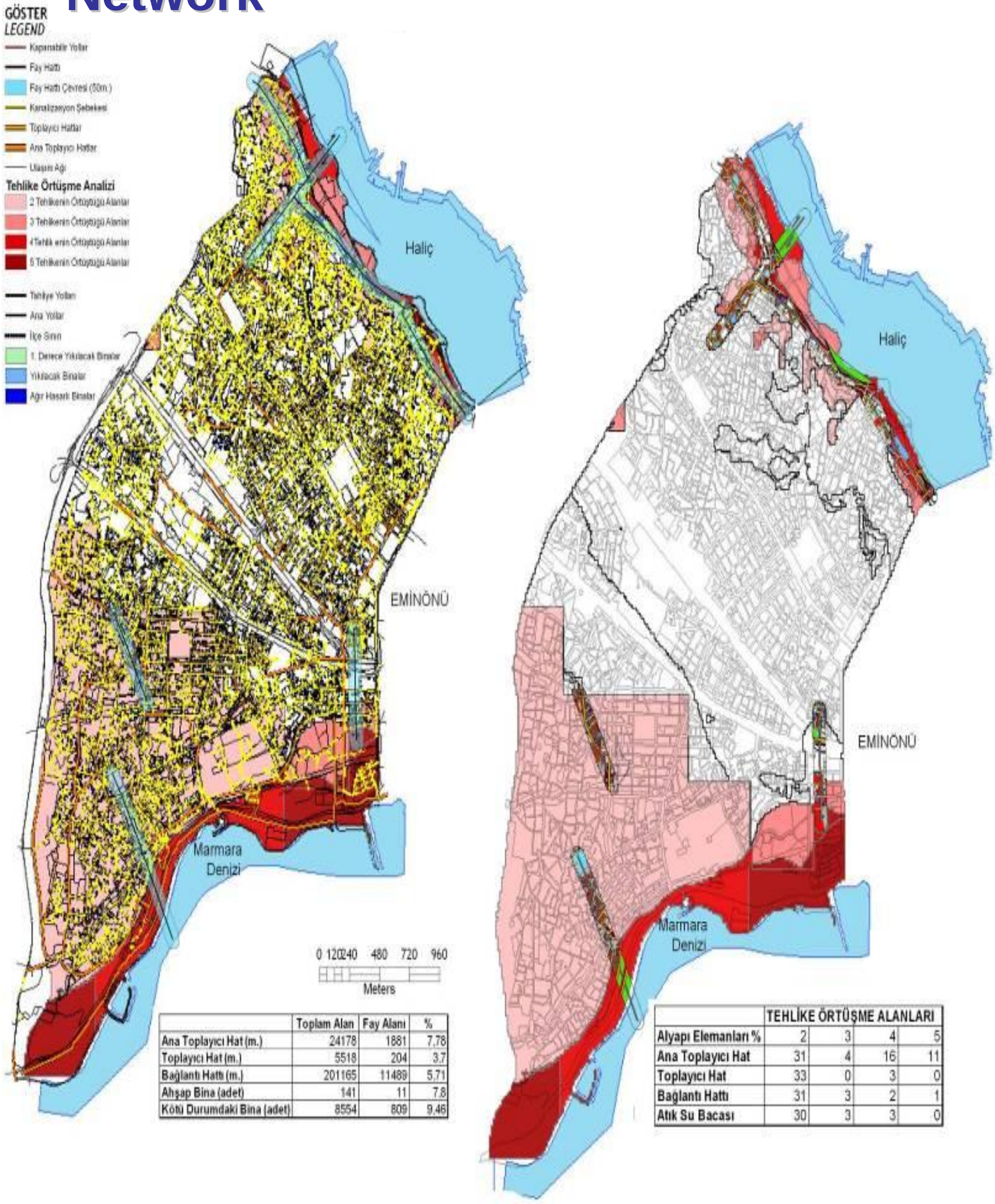
	Hazard Areas			
Infrastructure Elements %	**2**	**3**	**4**	**5**
Main Collector Line	31	4	16	11
Collector Line	33	0	3	0
Connection Line	31	3	2	1
Waste Water Funnel	30	3	3	0

In scope of the waste water lines, 7.8% of the main collector line, 3.7% of the collector line and 5.7% of the connection line are located in the impact area of the fault lines.

Table 36. Waste Water Infrastructure Elements At Impact Areas of Fault Lines

	Total Area	**Fault Area**	**%**
Main Collector Line (m.)	24178	1881	7,78
Collector Line (m.)	5518	204	3,70
Connecting Line (m.)	201165	11489	5,71
No. of Wooden Buildings	141	11	7,80
No. of Vulnerable Buildings	8554	809	9,46

Vulnerability Analysis of the Waste Water Network

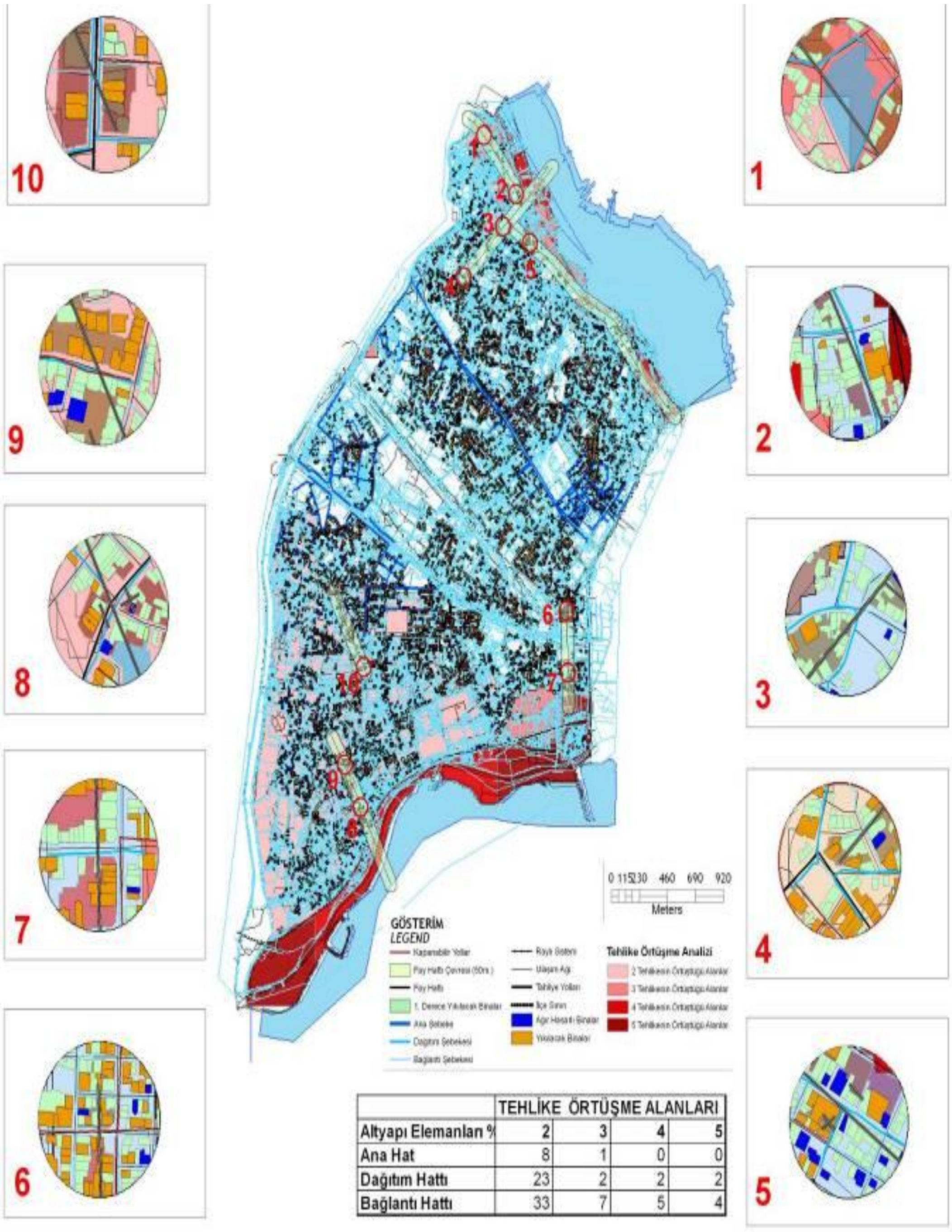


	Toplam Alan	Fay Alanı	%
Ana Toplayıcı Hat (m.)	24178	1881	7,78
Toplayıcı Hat (m.)	5518	204	3,7
Bağlantı Hattı (m.)	201165	11489	5,71
Ahşap Bina (adet)	141	11	7,8
Kötü Durumdaki Bina (adet)	8554	809	9,46

	TEHLİKE ÖRTÜŞME ALANLARI			
Alyapı Elemanları %	2	3	4	5
Ana Toplayıcı Hat	31	4	16	11
Toplayıcı Hat	33	0	3	0
Bağlantı Hattı	31	3	2	1
Atık Su Bacası	30	3	3	0

Figure 26. Vulnerabilities in the Waste Water Network

Vulnerabilities in the Potable Water Network



	TEHLİKE ÖRTÜŞME ALANLARI			
Altyapı Elemanları %	2	3	4	5
Ana Hat	8	1	0	0
Dağıtım Hattı	23	2	2	2
Bağlantı Hattı	33	7	5	4

Figure 27. Vulnerabilities in the Potable Network

The Potable Water Network

It is determined that 8% of the main potable water line is located at the area of clustering wooden buildings and weak buildings in 2 hazard combination area. (Figure.27)

Table 37. Potable Water Infrastructure According To Hazard Areas

	Hazard Combinations			
Infrastructure Elements %	**2**	**3**	**4**	**5**
Main Line	8	1	0	0
Distribution Line	23	2	2	2
Connection Line	33	7	5	4

(Bulut, Zeynep, The Mitigation of Fatih District Report-2007, The Technical Infrastructure Hazards)

4.2.4.3 Population

Fatih District has a population of 455.498. The social structure of the area is defined through social analyses based on 'Quality of Living Survey' applied by BIMTAS. According to the results, statistical analyses were carried on for summarizing the data to explain the features of social structure. In this study, solely the factors significant in order to identify the level of sensitivity to earthquake disaster and capacity to build earthquake conscious are explained. In this scope, contribution to local meetings, neighborhood, safety, house-vehicle ownership, the impact areas and accessibility of socio-cultural facilities and the level of contentment of the urban space are examined.

In results of the social survey, it is determined that the people are not contributing to the local government and other local administration meetings and apartment meetings in 85%. The number of associations in the district is a few and 88.5% are not member of any community. Only 2.8% of existing members contribute to the association meetings rare than one in a month. The social contribution to the local administration and civil initiative is quite low.

59% of the local people are not bounded to the neighborhood and only 17% of the people are bounded to the district they live in. 73% of the people are not content from neighborhood relations. It is observed that the number of dwellers decrease when the living span in the neighborhood increases. It is determined that number of new dwellers living in Fatih district for 20 years is greater than the ones who live in the district for 50 years and there is a cumulation in 10 years interval. In Fatih District, there are %71 owners and 29% tenants in propriety use. The average rents are determined as 200-400 TL. It is found out that most of the dwellers are from Istanbul, a small entity is migrated from the Black Sea Region and there are also other people migrated from other regions. The real estate values change from 450-3270 TL. and in 450-1000 TL. value interval; 61% are tenants and 45% are home owners. It is concluded that the reason for preferring Fatih District as a living space is only the cheap building stock. When the living span is compared to the building age, it is determined that local people lived in buildings constructed before 1975, in longer period.

In case of safety, it is concluded that; 78% of the local people were not exposed to robbery but 66.7% of them are afraid of going out after the dark. The robbery cases are specially observed in Carsamba, Fatih and Findikzade areas. The most of the people are not content of the neighborhood safety.

When the vehicle ownership is examined, it is observed that 78% of the people do not own any vehicle. The vehicle owners mostly have cars and weighly they are settled in IETT Garage area. 76% of the people use bus a primary transportation vehicle. 90% of the people do not travel for any reason.

Most of the people do not know left primary school and there is a significant entity who does not know reading and writing.

The contentment of quality of the social environment is cumulated in the old city. The student population is cumulated in Fatih and Mollaski areas. The contentment of parks and children playgrounds is maximum 9% and the discontentment is maximum 20%. The reason of the contentment is determined as neighborhood relations primarily. It is reasoned in the location of dwellers which came from the same region of Turkey are possibly settled in same neighborhood. The reasons of the discontentment are determined as inadequacy of parking areas, socio-cultural facilities and noise.

(Aydın, Nazlı; The Mitigation of Fatih District Report-2007, The Analysis of Quality of Life)

Consequently, Fatih District is an urban space which is preferred for its cheap building stock. Low income groups are the dwellers which are clustered in same neighborhood according to the city they are migrated have low economic conditions. The building stock is old and urban area is inadequate in case of social facilities and green spaces. The dwellers in Fatih District are under high risk in case of the quality of urban environment and economic conditions.

4.2.5 Property Values

In this section, real property values are examined in case of residential and commercial uses per hazard area. The latter, residence and commercial values are summed up and divided by total land and building square measure to find total real property values per hazard area. Hazard areas are classified according to property values which prioritize high investment values.

4.2.5.1 Hazard Areas According to Residential Real Estate Values

Real Property Values are calculated from the land values which are derived as a result of the surveys of BIMTAS including the interviews with 300 real estate agencies in Fatih. The distribution of real property costs are carried out according to the unit price intervals per parcel, determined by BIMTAS.

In scope of the 5^{th} classification of Evaluation stage, Hazard Areas According to Real Estate and Commercial Estate Values in hazard areas are examined. In the study, the averages of house unit price intervals determined by BIMTAS are used to calculate property values per building. (Figure.28)

Table 38. Residential Real Estate Unit Price

Real Estate Unit Price Intervals-YTL	**Average Unit Prices-TL**
450-800	**625**
801-1000	**901**
1001-1250	**1126**
1251-1500	**1376**
1501-2,000	**1751**
2001-2,500	**2251**
2501-3270	**2886**

The averages of house price unit intervals are taken and multiplied by total building square measure and total residential real estate value is found for each hazard area. According to that hazard areas are classified from the highest residential value to the lowest and the distribution of residential investment is examined.

Hazard Areas from the highest to the lowest residential real estate investments are determined as below:

The highest residential real estate value is 2B hazard area which is 287 ha and includes 1 quadrillion Turkish liras investment value. 2B area is located on Gungoren F. which is covered by Bakirkoy F. and high PGA area. Two 2D areas located on 2B area and exposed to fault lines and high PGA, includes 57 billion TL and 41 billion TL investments. 2E-a area exposed to landslide and water resource basin hazards, includes 38 billion TL residential investments. Artificial fill, high PGA, liquefaction, tsunami, water resource basin hazards valid in 5A-a area includes 21 billion TL residential real estate value.

3D area includes 20.6 billion TL residence investments and exposed to hazards as Gungoren F., Artificial Fill and high PGA. .Artificial fill, high PGA, tsunami, water resource basin hazards are located in 4C area which includes 18.5 billion TL residential real estate value. 2E-b area is exposed to landslide and water resource basin hazards and includes 11.5 billion TL housing investment. The most hazardous ground for settlements Kusdili F., Liquefaction, alluvium and water resource basin hazards are the local seismic attributes of 4D area including 10 billion TL housing value. In 3C-a area is exposed to hazards such as Kusdili F. landslide and water resource basin and includes 9.6 billion TL investment value of residence.

In 4I-b area, Kusdili F., alluvium and water resource basin area hazards are located and includes the housing investment about 7.5 billion TL. Artificial fill, high PGA, Kusdili F., liquefaction, tsunami and water resource basin hazards are contained in 5A-b area that includes residential investment value of 7.3 billion TL. Kusdili F., liquefaction, high PGA, tsunami and water resource basin hazards are clustered in 5B area and includes 7 billion TL. housing investment. 5D area is exposed to hazards as Kusdili F., fault line, high PGA, tsunami and water resource basin and includes 6.36 billion TL. Real estate value. 3A-b area contains Gungoren F. which creates landslide in areas including 20% slope value and greater, landslide and water resource basin hazards are found and the area includes 6.3 billion TL. housing investment.

3G area is exposed to hazards; Kusdili F., liquefaction and water resource basin and includes 6.2 billion TL. residential real estate value. The hazards such as Kusdili F., fault line, liquefaction and water resource basin are contained by 3H-a area which includes 5.5 billion TL. housing investment. 4D area includes the same hazards and 2.7 billion TL. housing value. 3H-b area is exposed to Kuşdili F., fault line and water resource basin and includes 2.5 billon residential investment. 2.2 billion investment value is valid in residential area 4B-a which includes hazards; Kusdili F., high PGA, alluvium and water resource basin.

4I-a area included 2 million TL. residential investment and exposed to Kusdili F., fault line, alluvium and water resource basin hazards. A Gungoren F. and landslide hazard are contained by 2C area and includes 1 billion housing value. 812 milliard TL. housing investment is valid in 3C-b area that includes Kusdili F. landslide and water resource basin hazards. The least residential real estate value among 24 hazard areas is 4G area which contains Kusdili F., fault line, landslide and water resource basin and includes 584 milliard TL.

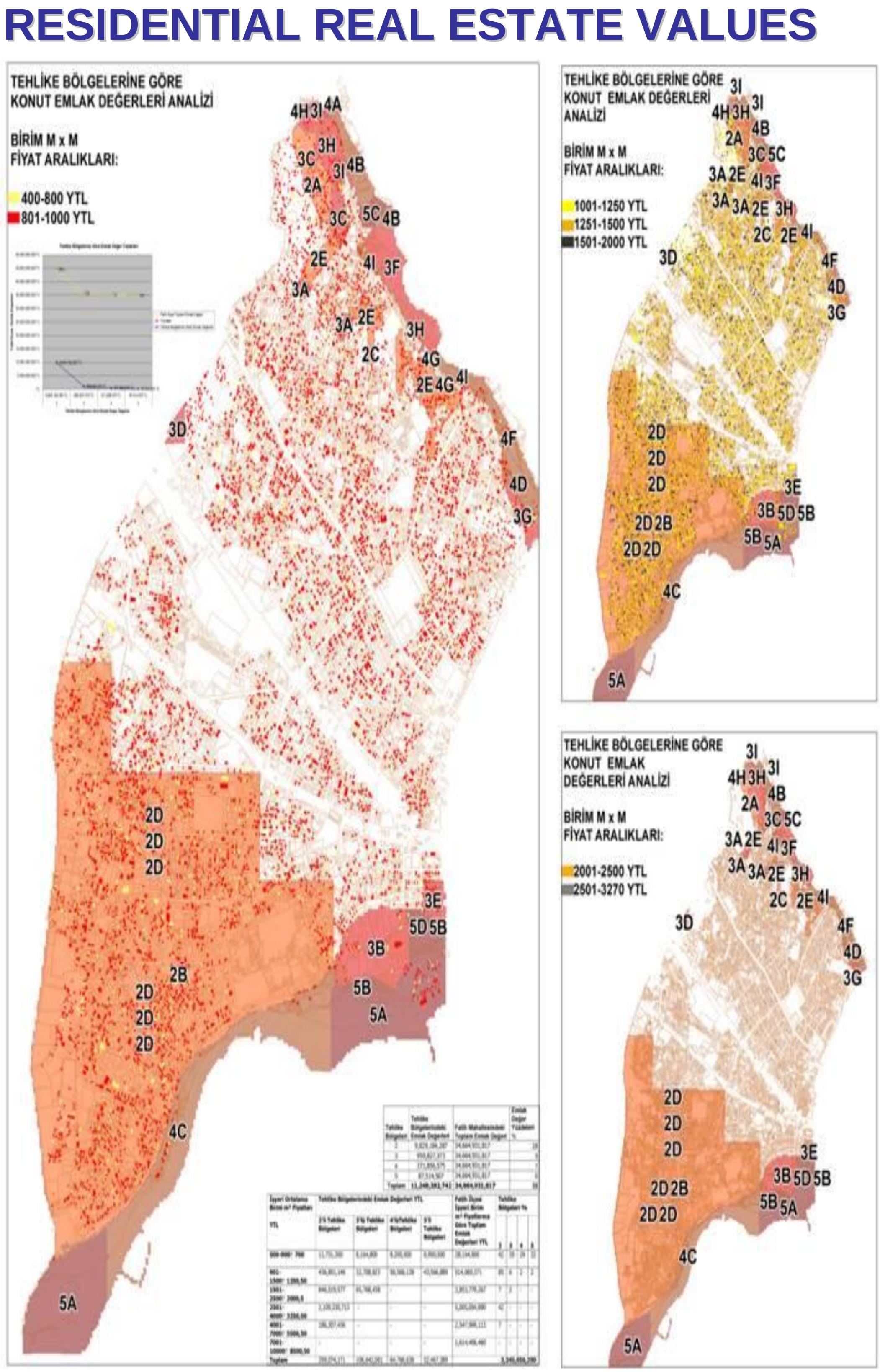


Figure 28. Residential Real Estate Values

4.2.5.2 Hazard Areas According To Commercial Real Estate Values

The averages of the Commercial Real Estate unite price intervals determined by BIMTAS are used to calculate real property values per commercial buildings. (Figure.29)

Table 39. Commercial Real Estate Unit Prices

CRE Unit Price Intervals	Average Unit Prices TL
500-900	**700**
901-1500	**1.201**
1501-2500	**2.001**
2501-4000	**3.251**
4000-7000	**5.500**
7000-10000	**8.500**

At the table below, as the 5th step of the Evaluation stage and the 2nd step of Hazard Areas According to Real Property Values, Hazard Areas According to Commercial Real Estate Values; includes total commercial real estate value for each hazard area and they are classified from the least commercial investment value to the most as below.

The highest commercial investment value is 1.96 quadrillion TL., located in 2B area of 287 ha including the most advantageous ground type Bakirkoy F. covering the most hazardous ground type Gungoren F. which creates landslide areas in areas of minimum 20% slope and includes high PGA. Fault line and high PGA hazards contained in 2D-a area which includes 103 billion TL. commercial real estate value. 4F area is exposed to Kuşdili F., high PGA, alluvium and water resource basin hazards and includes 60.billion TL. investment value. Landslide and water resource basin hazards located at 2E-a area includes 58 billion TL. commercial investment. 51 billion TL. is included in 4D area which contains Kuşdili F., fault line, liquefaction and water resource basin hazards.

47.5 billion TL. commercial real estate is located in 2D-b area including fault line and high PGA threats. 4C area is exposed to hazards; artificial fill, high PGA, tsunami and water resource basin, including 39.5 billion commercial real estate investment. The hazards, artificial fill, high PGA, liquefaction, tsunami and water resource basin are clustered in 5A-a area which includes 22 billion TL. commercial investment. 3H-a area contains Kusdili F., fault line and water resource basin and includes 21.4 billion TL. investment.

Landslide and water resource basin are located in 2E-b area which includes 14.5 billion TL. commercial investment. 4I-b is exposed to hazards; Kuşdili F., fault line, alluvium and water resource basin and included an investment of 4.7 billion TL. in commercial real estate. In 3G area, Kuşdili F., liquefaction and water resource basin hazards are clustered and includes 9 billion TL. investment. 4G area contains Kuşdili F., fault line, landslide and water resource basin and includes 8 billion TL. commercial investment. 7 billion TL commercial real estate value is located in 3A-b area including hazards as Kusdili F., landslide and water resource basin.

3H-b area is exposed to Kusdili F., fault line and water resource basin hazards and includes 5.8 billion TL. investment in commercial real estate. Gungoren F. And landslide hazards are located in 2C area, including 5.4 billion TL. commercial investment. 3C area contains hazards; Kuşdili F., landslide and water resource basin and includes a commercial investment of 5.3 billion TL. Kusdili F., fault line, high PGA, tsunami and water resource basin are clustered in 5D area which includes 3.1 billion TL. commercial real estate value. 2 billion TL. commercial real estate investment is valid in 5A-b area which includes artificial fill, high

PGA, liquefaction, tsunami and water resource basin hazards. In 5B area, the hazards; Kuşdili F., high PGA, liquefaction, tsunami and water resource basin are valid including 1 billion TL. commercial investment value.

4B-a area contains Kusdili F., high PGA, alluvium and water resource basin hazards and includes 889 billion TL. commercial investment. 4I-a area is exposed to the hazards; Kusdili F., fault line, alluvium and water resource basin and includes 808 trillion TL. commercial real estate investment. 704 billion TL. commercial value is valid in 3C-b area which includes Kusdili F., landslide and water resource basin hazards. In 3D area the least commercial real estate value of 450 billion TL. is found, including the hazards; Gungoren F., artificial fill and high PGA.

The classifications of natural hazards according to building square measures, landuse and conservation areas are used to determine prior hazard areas in case of the Mitigation Plan. In fact urban risks are phenomenons including financial dimensions of the hazards. Therefore, real estate values of hazard areas are essential indicators to evaluate the financial potential in scope of the Mitigation Plan. (Figure.29)

COMMERCIAL REAL ESTATE VALUES

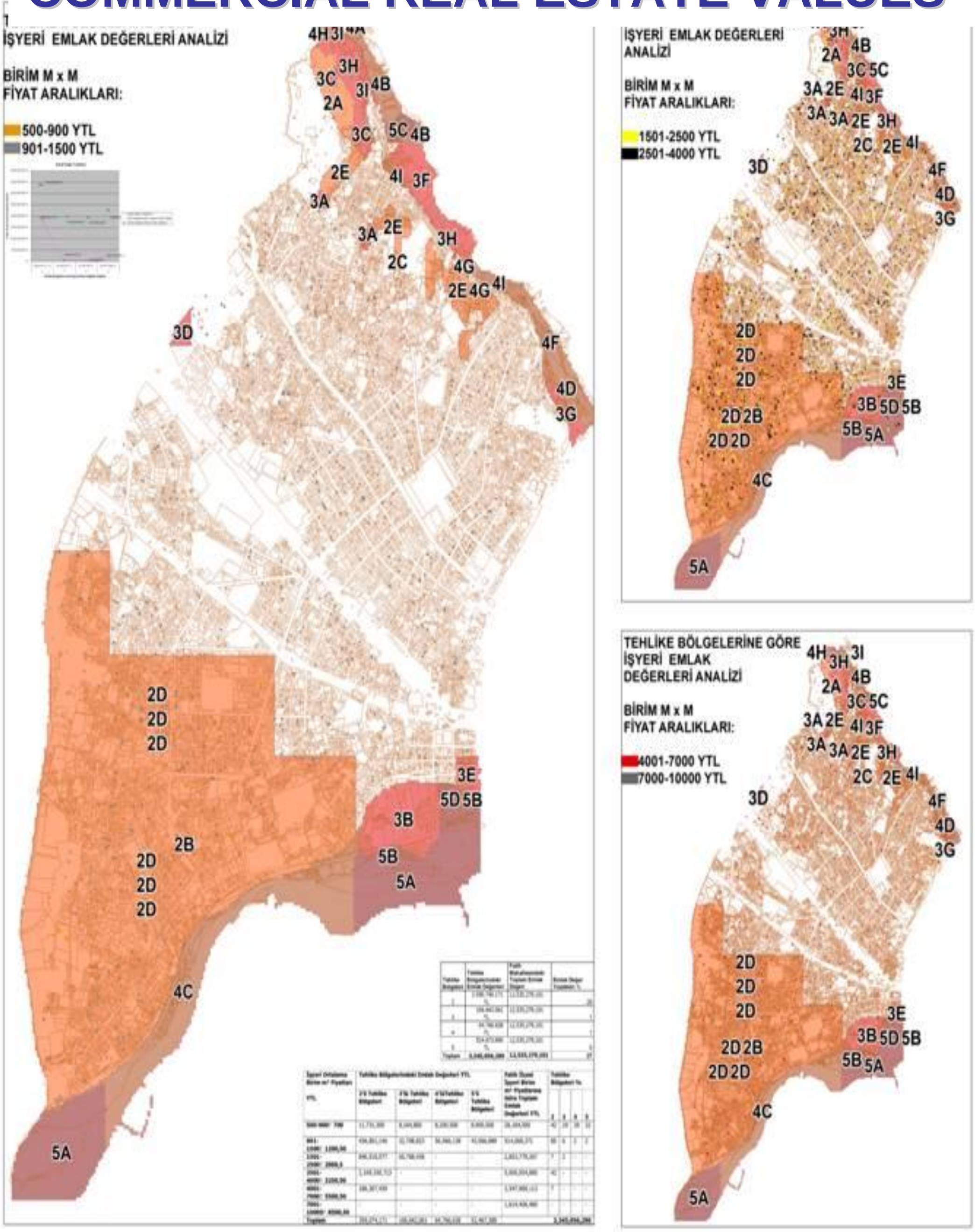


Figure 29. Commercial Real Estate Values

Table 40. Total Real Estate Values in Multiple Hazard Areas

PROPERTY VALUES IN MULTOPLE HAZARD AREAS						
Hazard Areas	Hazard Combinations	Total Property Values	Total Built Up Area	Land Area	Total Value/Building	Total Value/Land
23	**2B**	**2.000.000.000,000**	**4628378**	2870000	424,534	684,636
3	**5D**	**1.505.614.000,000**	**14232**	15000	105.790,770	100.374,282
10	**4F**	**98.584.000,000**	**70115**	30000	1.406,033	3.286,133
1	**5A**	**79.262.104,044**	**74289**	225000	1.066,943	352,276
19	**2E**	**64.000.000,000**	**135404**	75000	472,287	852,660
7	**4G**	**15.436.000,000**	**4557**	2000	3.387,324	7.718,019
2	**5A**	**43.000.000,000**	**16371**	222000	2.626,989	193,723
11	**4B**	**12.417.000,000**	**5113**	9000	2.428,529	1.379,674
5	**4D**	**53.284.000,000**	**28235**	46000	1.887,152	1.158,342
6	**4C**	**60.451.000,000**	**60773**	350000	994,708	172,718
22	**2D**	**57.166.000,000**	**119559**	50000	478,138	1.143,315
12	**3H**	**28.000.000,000**	**47724**	50000	581,361	554,898
14	**3D**	**18.900.000,000**	**24114**	13000	784,548	1.455,276
9	**4I**	**18.800.000,000**	**21143**	8000	889,311	2.350,338
18	**3A**	**17.446.000,000**	**19320**	8000	903,015	2.180,781
20	**2E**	**17.000.000,000**	**64236**	23000	265,842	742,461
17	**3G**	**16.835.000,000**	**26607**	21700	632,721	775,797
21	**2D**	**14.000.000,000**	**205845**	70000	602,327	1.771,228
24	**2C**	**11.694.000,000**	**8577**	4000	1.363,311	2.923,279
13	**3H**	**8.514.000,000**	**10615**	16000	802,127	532,161
8	**4I**	**7.176.000,000**	**8884**	26000	807,760	276,005
15	**3C**	**5.890.000,000**	**26862**	20000	219,281	294,516
16	**3C**	**2.835.000,000**	**94626**	3000	29,967	945,226
4	**5B**	**2.291.000,000**	**15819**	50000	144,814	45,816

In *Table.40*, total residential and commercial real estate values in each hazard area are summed and divided to total square measure of each hazard area. The average real estate value is found for each hazard area and they are classified from the least value to the highest value of real estate. (Appendix-A Figure.41)

4.2.6 Determination of 12 Risk Areas

Spatial risk assessment section is completed with the calculation of financial dimensions of vulnerabilities and natural hazard impacts. Hazard areas are analyzed according to the qualitative and quantitative attributes determined in the previous section and 12 risk areas are identified out of 24 hazard areas. (Appendix-A Figure.41)

3G Area

The prior risk area is located at Kasap Demirhun Street. 312 people live in the area. Tekel Building, The Central Bank of Turkey and Katip Celebi Primary School are the significant uses positioned at periphery and it is located at the junction of Ataturk Boulevard.

The hazardous formation for settlements, Kuşdili F., water resource basin and liquefaction which increases the vulnerability of the urban environment, are found. Average building age in the area is 48. 41% of the area included residential and commercial use. 3G area is 2 ha and total building square measure is 3 ha. The total real estate value is 16 billion TL. 78% of the area is 2^{nd} degree Conservation Area and limited physical application is allowed. Therefore, the required legislative framework should be prepared to make spatial decisions.

4D Area

4D area is located at the city wall band at Halic Coast, including a green area and historical buildings. 540 people live in the area.

The area is exposed to fault line and liquefaction hazard which increases the hazard dimensions and the possibility of a secondary disaster during an earthquake. The average building age is 47 and the area is settled on the hazardous ground of Kusdili F. which increases the level of vulnerability. There are 26 historical registered buildings. The area is 4.6 ha and the building square measure is 0.6 ha. The landuse is weighly commercial. 54% of the area is 2nd Degree Conservation Area. All the factors limiting the appliance of spatial decisions to be taken and the area should be classified in prior risk areas.

4I Area

4I area is located at historical Molla Aski neighborhood. 440 people live in the area.

Kuşdili Formation, fault line and alluvial ground are the local seismic attributes increasing the vulnerability of the site. The average building age is 43 and the number of historical registered buildings is 56. The area is 0.8 ha and the building square measure is 0.9 ha. 50% of the landuse is weighly the historical registered buildings. 4I-b includes 18.8 billion TL. of real property value. 88% of the area is under 1st Degree Conservation Area which increases the vulnerability potential of the site and demands for some add-in regulations in legislation to take spatial decisions for historical assets.

3D Area

3D area is located at Fatma Sultan neighborhood, including Istanbul Electric Tramway and Tunnel (IETT) garage which is the node of overall transit traffic in the Historical Peninsula. 68 people live in the area.

It is known that Güngören F. generates landslide in the areas including slope values minimum at 20%-30%. 3D area contains Gungoren F., Artificial Fill and high PGA which is a hazard combination increasing the vulnerability of the site.

The average building age is 60 which demands for retrofitting and reconstruction applications. The area is 1.3 ha and the building square measure is 2.2 ha. 82% of the area is in residential use. 18.9 billion TL. of real estate value is valid. 69% of the area is under 3A Conservation Area. The validity of hazardous grounds, high PGA and average building age of 60 increases the vulnerability of the site but it is positive that 3A Conservation Area allows for the short-term regeneration projects.

2E Area

2E are is located at Hamami Muhittin neighborhood. 680 people live in the area.

As a landslide area, 2E could generate secondary disasters during an earthquake but also has the potential for hazard formation in normal conditions. The average building age in the area is 42 and there are 56 historical registered buildings which increase the vulnerability of the site. The area is 2.3 ha and total building square measure is 5 ha. 65% of the area is in residential use. 52% of the area is formed of 1st Degree Conservation Area and the physical intervention is limited. Thus, it should be examined under the prior risk areas.

4F Area

4F area is located at Yedikule-Yenikapi ax, on the city wall band. Approximately 680 people live in the area.

The area includes the hazards; Artificial Fill and high PGA point out the active seismicity of the area. The average building age is 41 and there are 63 historical registered buildings. There is an Emergency State Center in the area. The area is 35 ha and the building square measure is 2.6 ha. 50% of the area is in residential use. Total real estate value is 60 billion TL. 26% of the area is under 3B Conservation Area. It is a critical area because of the square measure, the building age, the historical assets and the real estate value. Also it is positive that 3B areas are opened to long-term regeneration projects. Thus, the area is defined as the prior risk area.

5A Area

5A area is located at Yali neighborhood beside the city wall band. The area includes significant buildings of critical infrastructure as Water Network Management System, Water Purification facilities and Fatih Municipality Technical Works Directory. 968 people live in the area.

The area contains natural hazards as liquefaction, high PGA and Artificial Fill which could generate secondary disasters during a major earthquake. On the other hand, there are 78 historical registered buildings and the average building age of the area is 51. The hazardous ground types, high PGA, high building age and the validity of historical assets increase the vulnerability of the site. The area is 22.5 ha and the building square measure of 5A is 7 ha. The landuse is weighly formed of residential use and total real estate value is 43 million TL. % 31 of the area is formed of 2nd Degree Conservation Area. The area should be considered under the prior risk areas because of the challenges such as the square measure, the building square measure, the building age, the historical assets, real estate value, the management of critical services and the allowance for the limited physical application.

2B Area

2B area is located on the widest area with respect to other prior risk areas. It includes the historical neighborhoods Davutpasa and Bulgur Palas which are determined as Urban Regeneration Areas and Silivrikapi, determined as Urban Regeneration Area by Istanbul Metropolitan Municipality. 33,052 people live in the area.

2D areas including 2 fault lines and high PGA attributes are located in the area 2B which is 287 ha. The seismicity of the area is active and 19% of the area is built area. 19% of the wooden, 36% of the concrete, 13% of the mixed, 26% of the masonry and 2% of the historical registered buildings are located in high PGA 2B area. 19% of the industrial buildings, 9% of the health facilities (SSK and Cerrahpasa Hospitals) and 16% of the education facilities are located in the area.

At first the area which is covered with Bakırköy F. is defined as safe for settlement as it is has a coarse-grained structure and conducts seismic movements at minimum level. In fact, 2B area is located on Bakırköy F. which covers the Güngören F. at the deep. Güngören F. has a fine-grained texture, conducts the seismic movements at high level and generates landslide in 20% or greater slopes. Therefore, 2B area is settled on a hazardous ground increases the vulnerability of the site.

The building square measure of the area is 435 ha and the landuse is 64% in residential use. The total real estate value is 1.9 quadrillion TL. 59% of the area is under 3B Conservation Area. 2B area is considered as the prior risk area, because off the high vulnerability potential in the density of historical registered buildings and wooden buildings, health and education facilities, the square measure of the area and the building square measure of the area. In fact the area could be regenerated partially in the long-term in accordance with conservation plan decisions.

2D Area

2D area is located at periphery of IETT garage Silivrikapi, which has high density of commercial use, motorway, tramway traffic and it is determined as Urban Rehabilitation Area by Istanbul Metropolitan Municipality. 884 people live in the area.

The area is exposed to fault line and high PGA hazards showing that the area is active in case of seismicity. There are 25 historical registered buildings. The area is 5 ha and the building square measure is 11.5 ha. 43% of the area is in residential use. The total real estate value is 57 billion TL. 46% of 2D-b is under 3B Conservation Area. The required physical applications are allowed as long-term regeneration projects.

4.2.7 Risk Area Prioritization

The risk areas determined in the previous section are prioritized according to the emergency measures taken by local administrative. In the first part of this section; emergency measures would be analyzed according to damage and loss estimations maintained in earthquake scenario of 7.5 magnitude in JICA Report. Building stock, building quality and engineering survey data is used in evaluations.

According to the harm and loss scenario of JICA, there are four models. Model A includes minimum loss and Model C includes the maximum loss. According to the Model A, a fault line of 120km located at west, Izmit Bay part of 17th August crack to Silivri and causes an earthquake in 7.5 magnitude. The number of buildings containing a severe damage is 51.000 which is 7.1% of the buildings located in the locality and 114.000 buildings damage in medium. 73.000 of the population would be lost and 6.000 people would be lost in Fatih.

According to the Model C in JICA Report, considering risk areas and vulnerabilities synthesized from previous section, the possible findings are determined as 1447 buildings which are 5.5% of the buildings at the study site, would be demolished with a highest possibility and 4617 building would be demolished possibly which forms 17% of the buildings at the study site. The number of buildings that would be harmed heavily and averagely is 2139 which forms 8% of the buildings at the study site. The number of the historical registered buildings that would be harmed is 588. The total loss of lives in Fatih District would be 11.000 which are 2% of the population.

The Distribution of Emergency Centers

In the second part of this section the distribution of Emergency State Centers are examined to develope emergency scenario for the locality.

There are 16 health facilities and 58 education facilities. There are 730 Emergency State Centers designated from pubic and private buildings. The functions of Emergency State Centers are determined by AKOM. (Disaster Coordination Center) According to that, education units located at a 200m distance to the hospitals are designated to health service units. The educational facilities located at dense building blocks which are not closer to hospitals and student dormitories are designated to temporary housing units. The cultural facilities, shopping centers and markets are designated to storage and the distribution centers of aids. The local units of the district under local governments are designated to disaster district candidates (Mahalle Afet Gonulluleri-MAG) and civil defense personnel bureaus. (Sivil Savunma Gorevlisi-SSG)

Health Facilities

The determination of service areas and capacity, deficiencies and risks in service are maintained. The distribution of other health facilities, pharmacies and ambulance service points are also determined. In an emergency case, injured people are transferred from unavailable hospitals to schools and dormitories in 200 m distance according to Disaster Manual and AKOM data. The locations of education facilities in 200m distance to hospitals are determined. (Figure.30, Figure.31)

Distribution of Emergency Facilities

Figure 30. Distribution of Emergency Facilities

Education Facilities

The locations and total floor areas of education facilities are determined according to AKOM database and Disasters Manual. Education facilities located in 200m distance to hospitals are designated as first aid and health facilities. Other education facilities are determined as temporary housing and aid storage units. (Figure.30, Figure.31)

Public Buildings

Cultural Facilities, shopping centers and markets are designated as aid, storage and distribution unit; hotels and dormitories are designated as temporary housing and local authority buildings as municipality are designated as disaster district candidates (Mahalle Afet Gonulluleri-MAG and civil defense personnel (Sivil Savunma Gorevlisi-SSG) bureus. (Figure.30)

The Narrow Roads to Be Closed According to JICA Scenario

Fatih District includes a traditional street structure in some parts which include roads in 2m width. It is known that Fatih District was faced off fire disasters because of the narrow street structure. According to the adaptation of JICA (Japan International Cooperation Agency, The Harm and Loss Estimation 2000) scenario in to Fatih District, considering an earthquake happens in the magnitude of 7.5, some of the roads would be closed. The roads that would be closed in a possibility greater than 50% are in width of 2-6m located at the south part of the Europe side and the Anatolia side; and in idth of 7-15m located partially at Europe side in the Historical Peninsula. In Fatih District, it is determined that the roads in 2-8 width would be closed with a high possibility. The total area is 285768 m^2 and total length is 40824m. The roads that would be closed with an average possibility are in the width of 8-15m, in an area of 612080m^2 and in a length of 164803m. (Figure.32)

The Capacity of Emergency Facilities & Proximate Schools

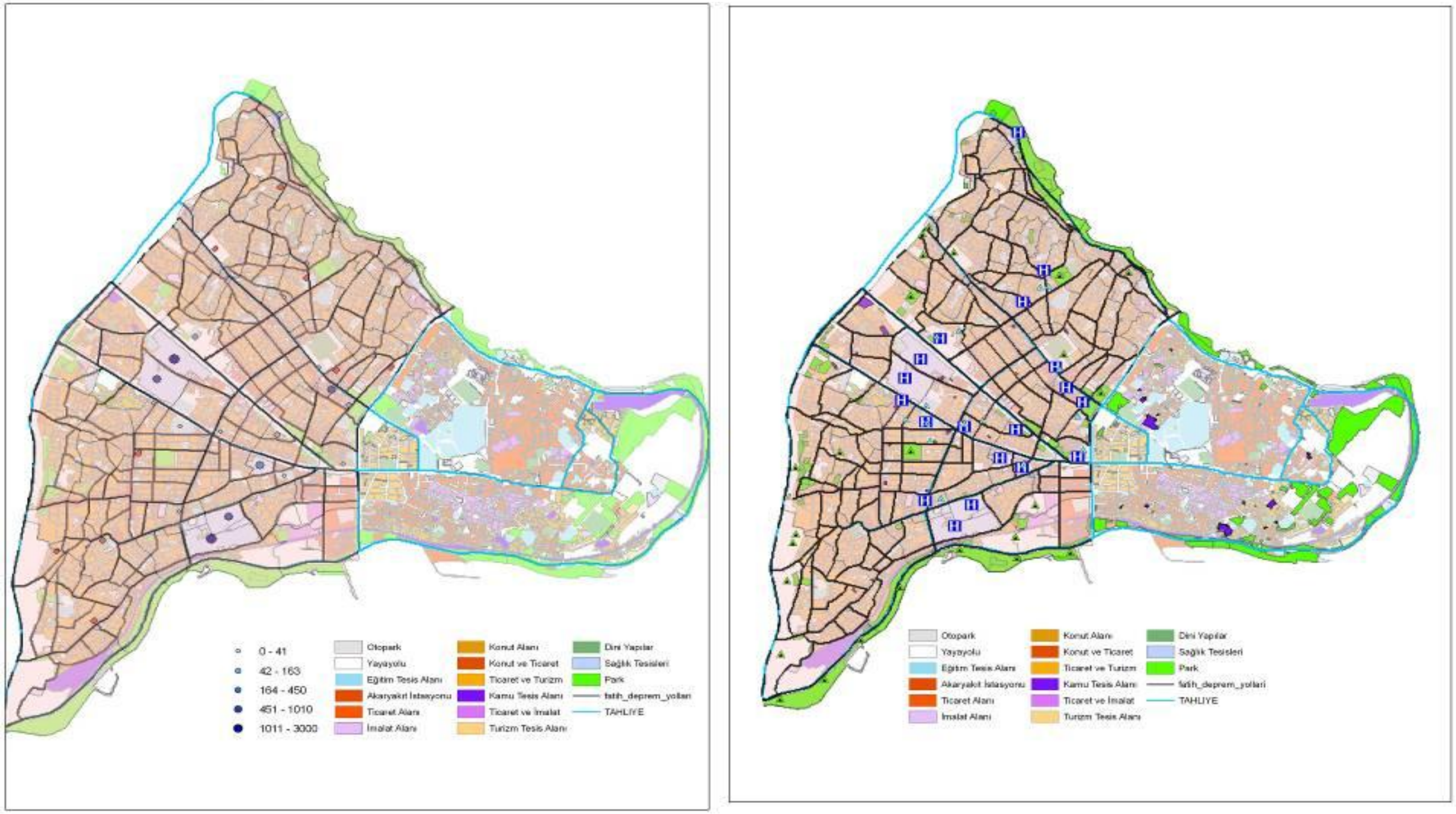


Figure 31. The Capacity of Emergency Facilities and Proximate Schools

Vulnerable Road Networks

Figure 32. Vulnerable Road Network

(Yusufoglu Ayca, The Mitigation of Fatih District Report-2007, The Earthquake Harm and Loss Analysis and The Evaluation of Mitigation Decisions)

4.2.7.1 Determination of Prioritized Risk Areas

7 risk areas are prioritized considering emergency measures and vulnerability of the locality determined in the previous section.

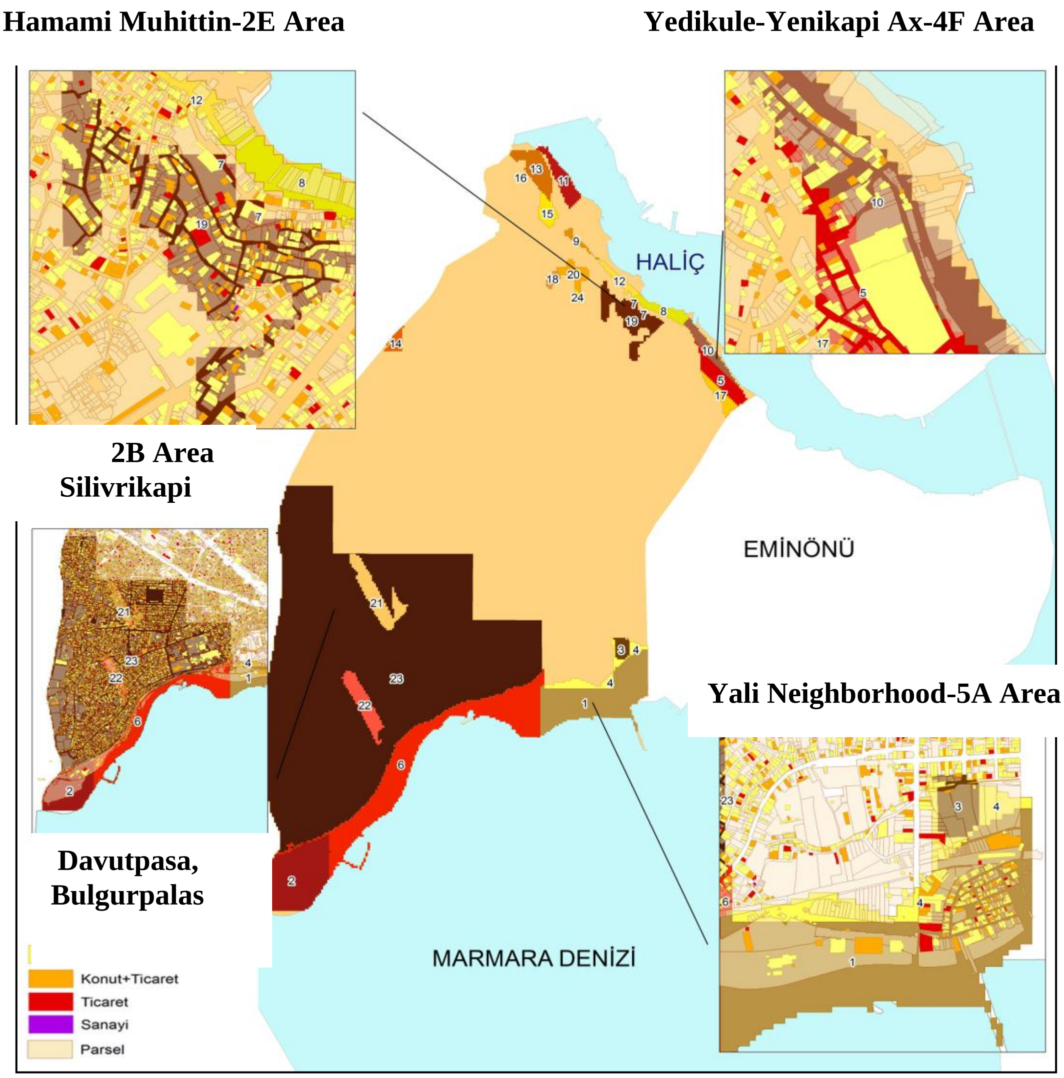


Figure 33. Prioritized Risk Areas

2E Area

2E are is located at Hamami Muhittin neighborhood. 680 people live in the area.

As a landslide area, 2E could generate secondary disasters during an earthquake but also has the potential for hazard formation in normal conditions. The average building age in the area is 42 and there are 56 historical registered buildings which increase the vulnerability of the site. The area is 2.3 ha and total building square measure is 5 ha. 65% of the area is in residential use. 52% of the area is formed of 1st Degree Conservation Area and the physical intervention is limited. Thus, it should be examined under the prioritized risk areas. (Figure.33)

4F Area

4F area is located at Yedikule-Yenikapi ax, on the city wall band. Approximately 680 people live in the area.

The area includes the hazards; Artificial Fill and high PGA point out the active seismicity of the area. The average building age is 41 and there are 63 historical registered buildings. There is an Emergency State Center in the area. The area is 35 ha and the building square measure is 2.6 ha. 50% of the area is in residential use. Total real estate value is 60 billion TL. 26% of the area is under 3B Conservation Area. It is a critical area because of the square measure, the building age, the historical assets and the real estate value. Also it is positive that 3B areas are opened to long-term regeneration projects. Thus, the area is defined as the prior risk area. (Figure.33)

5A Area

5A area is located at Yali neighborhood beside the city wall band. The area includes significant buildings of critical infrastructure as Water Network

Management System, Water Purification facilities and Fatih Municipality Technical Works Directory. 968 people live in the area.

The area contains natural hazards as liquefaction, high PGA and Artificial Fill which could generate secondary disasters during a major earthquake. On the other hand, there are 78 historical registered buildings and the average building age of the area is 51. The hazardous ground types, high PGA, high building age and the validity of historical assets increase the vulnerability of the site. The area is 22.5 ha and the building square measure of 5A is 7 ha. The landuse is weighly formed of residential use and total real estate value is 43 million TL. % 31 of the area is formed of 2nd Degree Conservation Area. The area should be considered under the prior risk areas because of the challenges such as the square measure, the building square measure, the building age, the historical assets, real estate value, the management of critical services and the allowance for the limited physical application. (Figure.33)

2B Area

2B area is located on the widest area with respect to other prior risk areas. It includes the historical neighborhoods Davutpasa and Bulgur Palas which are determined as Urban Regeneration Areas and Silivrikapi, determined as Urban Regeneration Area by Istanbul Metropolitan Municipality. 33,052 people live in the area.

2D areas including 2 fault lines and high PGA attributes are located in the area 2B which is 287 ha. The seismicity of the area is active and 19% of the area is built area. 19% of the wooden, 36% of the concrete, 13% of the mixed, 26% of the masonry and 2% of the historical registered buildings are located in high PGA 2B area. 19% of the industrial buildings, 9% of the health facilities (SSK and Cerrahpasa Hospitals) and 16% of the education facilities are located in the area.

At first the area which is covered with Bakirköy F. is defined as safe for settlement as it is has a coarse-grained structure and conducts seismic movements at minimum level. In fact, 2B area is located on Bakirköy F. which covers the Gungoren F. at the deep. Gungoren F. has a fine-grained texture, conducts the seismic movements at high level and generates landslide in 20% or greater slopes. Therefore, 2B area is settled on a hazardous ground increases the vulnerability of the site. (Figure.33)

The building square measure of the area is 435 ha and the landuse is 64% in residential use. The total real estate value is 1.9 quadrillion TL. 59% of the area is under 3B Conservation Area. 2B area is considered as the prior risk area, because off the high vulnerability potential in the density of historical registered buildings and wooden buildings, health and education facilities, the square measure of the area and the building square measure of the area. In fact the area could be regenerated partially in the long-term in accordance with conservation plan decisions.

3H Area

It is located at Molla Aski neighborhood including historical Esnaf Loncasi Street. At the periphery historical Anemas Dungeons are valid which was developed as a part of Blahernai Palace in Roman Period. 1,016 people living in the area. It is determined as Urban Rehabilitation Area by Istanbul Metropolitan Municipality.

Kuşdili F., fault line and water resource basin hazards are located in the area. The average building age per hazard area is 44, there are 59 listed buildings. The area is 3,6 ha and total built-up area is 6 ha. 67% of the area is in residential use. The total real estate value is 27.7 million TL. 68% of the area is under 2nd Degree Conservation Area. The physical intervention is limited with road widening excluding buildings. (Figure 34)

2E Area

2E area is located at Hatip Muslihittin neighborhood. Fener Rum Boys High School and Metrology Church are valid and 368 people live in the area.

As a landslide area 2E has the potential of generating disaster both as secondary disaster and under normal conditions. The average building age is 41 and there are 74 listed buildings. The area is 7.5 ha and built up area is 13 ha. 80% of the area is historical registered buildings. Total real estate value is 63,6 billion TL. 35% of the area is under 3A Conservation Area. The area is defined as prioritized risk area as it includes high values of the square measure, the building square measure, the historical assets and the real estate investment. 3A areas are opened to short-term regeneration projects. (Figure 34)

2D Area

2D area is located at Ibrahim Cavus neighborhood, includes Kucuksaray Square. 368 1,060 people live in the area. The area is exposed to fault line and high PGA which points out the active seismicity. The area is 7 ha and built up area is 11.5 ha. 53% of the area is in residential use. Total real estate value is 13,9 billion TL. 46% of the area is under 3B Conservation Area. In scope of the prior risk area, 2D includes weighly the residential use and hazardous local seismic attributes. The area could be regenerated in the long-term as it is defined under the conservation plan decisions. (Figure 34)

Finally, *Prioritized Risk Areas* are determined according to spatial risk assessment including property values and emergency scenario including proximity to hospitals, narrow streets required for physical intervention and distribution of Emergency State ADG as their approximityrelevance to local seismic attributes and the constraints which are produced of their interaction with the environment. The local seismic attributes are determined as ground hazards, disasters as landslide, liquefaction and tsunami which are clustered in the site. Urban risks have complex systems and formed out of their interactions to urban environment. (Figure 34)

Molla Aski-3H Area **Ibrahim Cavus-2E Area**

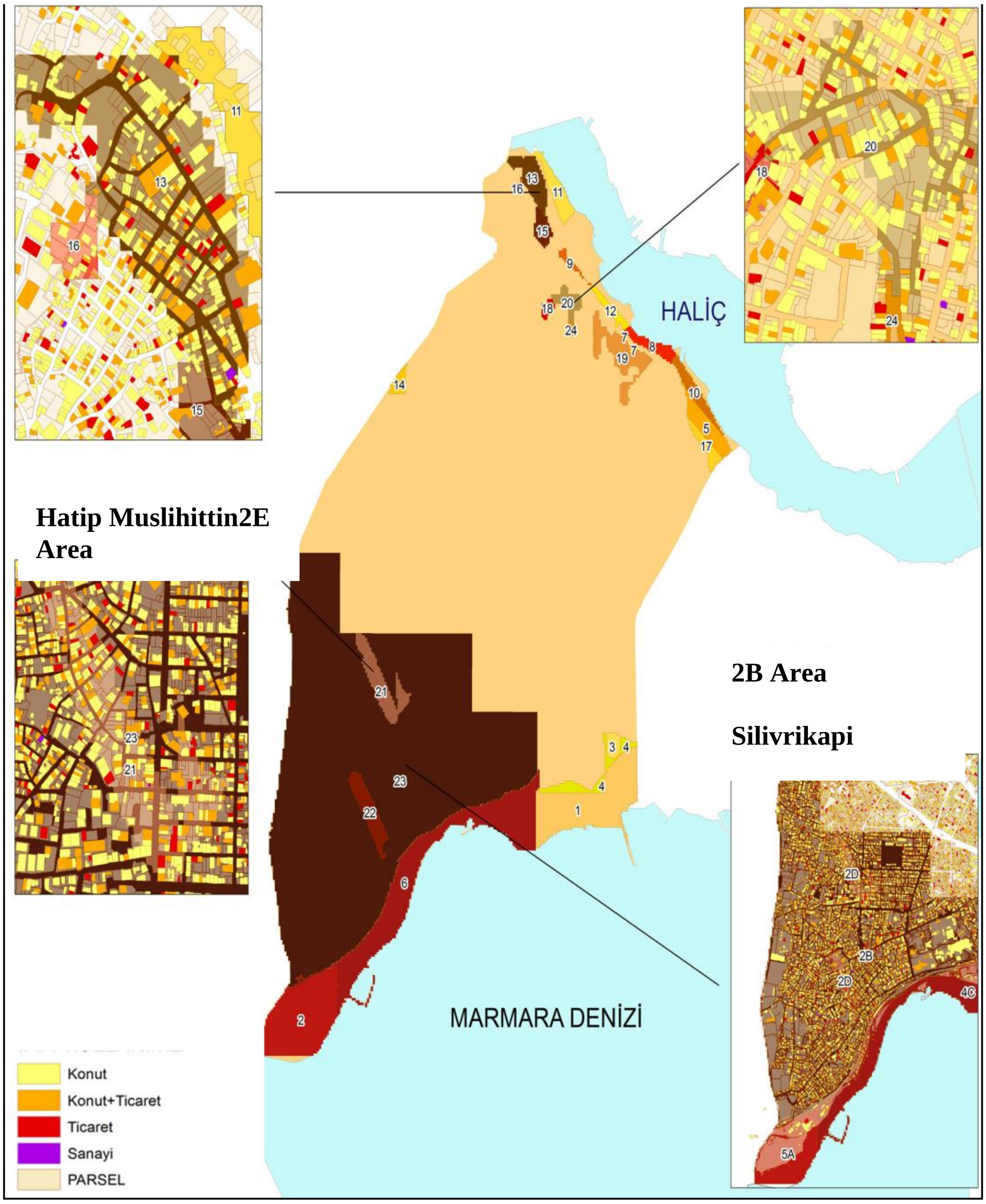


Figure 34. Prioritized Risk Areas

CHAPTER 5

CONCLUSION

5.1 Summary of Survey Findings

For many years, risk analyses have been fixed to actuarial methods, statistical analyses and high-tech innovations in civil engineering supported by global and local economic programs. Risks and their impacts have been evaluated through harm and loss analyses which led to oversimplification of the potential of hazards. Social aspects of risks are generally ignored not in theoretical field but in implementation and practices of risk management techniques. In fact, the nature of contemporary risk is much complicated and multi-surfaced to manage with single-referential methods and approaches. A diverse point of view, utilized to recognize and intervene to today's risks is still the matter of time and space briefly but not in a linear time and not in a pre-defined space. As a matter of governance, glocal risks are required for powerful and multi-disciplinary political tools of network. In fact the main factor including all the externalities, origins, impacts and atmosphere of risk for it to sprout is the society.

International perspective defines a sustainable disaster mitigation implemented in to national development. Apart from human induced risks pooled in urban realms natural disasters bring the opportunity of creating common platforms to respond and struggle with impacts of disasters as an obligatory rather than an optional choice. Global frameworks for disaster risk management and reduction as Yokohoma Strategy and Hyogo Framework for Action determined some core fields and strategies to form “global and national platform” to share information and experience but also systematize the methods and approaches of risk reduction to provide security at global level.

When the country cases are observed, as an integral part of national development goals, USA is focused on disaster mitigation, Japan is concerned on Disaster Management and Canada mainstreams emergency preparedness. The common disaster management activities observed in three countries are, organizing meetings purposed for information sharing, organizing disaster instruction and simulations, developing technologies for education and information transfer, formulization of mutual agreement and assistance papers, educating citizens and other groups involved in disaster risk reduction process, achieving and preserving the appropriate financial resources, assigning informal bounds in between groups involved in disaster risk reduction, data collection on future hazards, risks and transferring to the related institutions, developing institutional disaster plans and integrated it in to mass emergency plans and providing the systematic update of all materials and strategies.

Literally, the interaction of risks as factual statements to cultural ones is connected to political issues, are often miss-interpreted in traditional risk evaluation methods. In fact countries’ disaster management programmes and local disaster mitigation cases claim that risks as cultural statements are purely feed from the local attributes. Both of the local disaster mitigation cases a Kyojima District of Japan and the city of New Orleans in USA claimed the requirement of the notion of Egalitarian Risk Regulation which is based on governmental act mainstreaming community participation. It responds to the paradoxes of risk victims which become eligible to make decisions for them through coordinating with the state government. In scope of the Community

Development Project of Kyojima District, the required space for the rehabilitation of the built-up area is maintained via the expropriation and demolishing of weak constructions. In the rehabilitation process, developing the existing roads and evacuation roads, creating open spaces and public facilities are included. In New Orleans case, the unified plan of recovery is based on to position community centers implemented in to the built up area and waste area locating around schools and other learning facilities including governmental and public buildings. Both cases are supporting community participation, multi-sectoral collaborations at all levels of governance and affective use of local funds.

In Turkey, *'organizational irresponsibility'* is the type of behavior which explains that why actors and institutions ignore risks and impacts to take entire responsibility and action. Firstly, there is no national act, fund and national risk assessment system. There are no specified institutions in disaster risk management but temporary assigned governmental units for emergency management. The existing acts as Development Law and Disasters Law do not include roles and responsibilities of authorities. The recent legislations as Building Inspection and Compulsory Earthquake Insurance (ZDS) are only concentrated on post-disaster practices. There are no sub-plans for vulnerable sectors as forestry, energy centers, coasts, critical infrastructure, agricultural areas, historical conservation areas and nature conservation areas. There is no comprehensive financial system integrated to the insurance system Natural Disasters Insurance Agency (DASK). Disaster Works established under the Ministry of Public Works and Settlement is assigned as the only responsible governmental unit in pre-disaster and post-disaster activities.

In order to become a *'provident state'*, Turkey should build up its *relations of definitions* including all social, financial, legislative and organizational networks should be defined and supplied by the government prominently through providing the participation of community. Who is eligible to make decision for the affected community and who are legitimate to identify risks are still the main concerns. The sharing of roles and responsibilities should be structured from local to national in order to provide democratic and action-oriented risk regulation method. Second observer's view which also observes and criticizes safety experts and risk reduction practitioners should be adopted to provide transparent and self-monitoring understanding of disaster risk reduction. The affected individual and communities should also participate into decision making process for preserving public interest and democracy.

There is a requirement of revitalizing National Earthquake Council (UDK) with more effective administrative tool, without pressure of politics but with mentoring and collaborating to political community. National Disaster Council should be established by collaboration of all ministries, academia and private sector. Under the council, distinct investigation commissions should be established for each type of disaster with collaboration of local authorities and academic institutions and trade associations. The case of Japan is a successful model for the implementation of legislation and building governmental organization correspondingly.

Sectoral plans and policies should be implemented for risk reduction. Water resource and forestry management, energy and critical infrastructure should be concerned in aspect of disaster risk reduction and separate plans should be developed as complementary legislative tools for national strategy.

Risk Assessment is a pre-requisite step for effective risk reduction. Turkey doesn't have an institution and legislative tool identifying the requirement of risk assessment. Multi-hazard Maps as in USA case and micro-zoning maps should be developed for each type of disaster and relevant legislative procedures and time table should be determined under the act. The multi-hazard maps could be developed by Disaster Affairs but a secondary unit related to process and report scientific research should be established. The map data should be publicly accessible.

Development Law (3194) should also be structured for reducing risks. Building codes building codes and density control measures tailored for different disaster types and structured as technical institutions developing technologies and monitoring construction standards and license. According to the act on Building Supervision (4708), the authority of supervising construction and provide construction license is determined as municipalities. The institution of building codes is also required to impede political exploitation of construction license. Members from trade associations and academic institutions should be included under the institution for building codes.

'Regulations on Construction in Natural Disaster-prone Areas' should be included in Development Plan as it is integrated to Disaster Law and create confusion. Moreover, there is a requirement for special title under Development Law, defining urban areas under disaster risk and regulations related to physical planning and density control, property rights, eminent domain and land development (Development Law 3194) should be activated or limited under certain conditions in urban areas under the disaster risk.

Financial resources and ways of collaborating private sector should be examined. National Disaster Fund should be established apart from the state budget. Disaster Mitigation plans, related practices and scientific researches carried on by academia should be supported from the budget. Local funds under municipalities should be also provided for district-based rehabilitation and reconstruction projects in collaboration by private sector

Education and capacity building is required to provide preparedness and resilience. Separate education programmes for different levels of education and age groups should be developed. Earthquake Simulation Centers should be opened and supported by the government. The training of administrators, personnel of institutions as Disaster Affairs is required for practicing accurate risk reduction measures and could be provided by trade associations. It is also required to educate urban planners in disaster planning to develope specific plans such as neighborhood plans and educate also other sectors in risk reduction strategies via unions and trade associations.

Turkey is becoming risk society through facing off the consequences of ‘organizational irresponsibility’ in society and even in governmental organizations which ignore risks and still accept “It won’t happen to me” phenomenon. Some other part of the society becomes self-critical and reflexive, having great concerns about risks and impacts of risks. Other countries such as USA, Japan and Canada are becoming ‘knowledge societies’, analyzing synthesizing risks and adopting self-critical policies. By developing information networks, effective risk assessment technologies, specialization in legislation, organization and professions with mitigative approach, societies became isolated from disinformation and ‘non-knowledge’ that create illusory risks.

‘Provident states’ searching for the secure are still practicing Hierarchical Risk Regulation Regimes. The participation of local communities, scientific communities and professions with multi-disciplinary point of view should be included via adopting Egalitarian Risk Regulation Regime which would respond to the paradoxes of risk victims of becoming eligible make decisions in risk regulation processes in collaboration with the authority. By this way self-monitoring risk society would be eligible to object to unequal applications of state. Egalitarian Risk Regulation should be organized in terms policies and practices of provident state which does not provide for just distribution in per capita but just distribution of risks.

Moreover, the local capacities should be activated emergently. As Quarantelli explains that, disaster risk management should be developed through activities not written documents. (Balamir, 2009) Therefore, capacity building from local to national and international scales is a well-defined path to provide disaster mitigation in the long-term. As it is observed in Fatih District, natural hazard combinations and urban risks determine different levels of vulnerabilities which should be reduced through multi-disciplinary evaluation method. Mitigation Plan should propose regulatory measures to build community resilience. Therefore, the main concerns involved in the measure are to develop comprehensive approach in between geophysical built, socio economic and the degree of different vulnerabilities in locality.

5.2 Viability Of Method Followed And Its Mainstreaming

Mitigation planning is the new area in city planning discipline highlights the requirement of local risk knowledge to involve in urban planning and develop regulatory measures in a consensus based approach with the local community. The case of Fatih District, is a prototype to monitor local hazards and seismic attributes guiding for implementing mitigative measures.

The first step of *Hazard Identification* is based on collecting data including natural hazards and seismic attributes of locality which are determined as *Terrain Hazards* of slope data; *Local Geological Attributes* of inconvenient geological formations, liquefaction and landslide areas, high peak ground acceleration areas, artificial fills and alluvial soil; *Hydrologic Hazards* of water courses, water resource basin and Tsunami areas. The natural hazard data input is categorized according to seismic relevance and used to develop a *Multiple Hazard Map* in ARC GIS 9.0 and monitor the superimposition of natural hazards in accordance with Conservation Areas. As a result of the stage 36 Distinct Hazard Areas including hazard combinations of 2 to 5, are achieved and used in further analyses.

The second stage is formed of *Vulnerability Analyses* based on the analyses of socio-economic data input according to natural hazard areas. The data input includes building stock, historical building stock, population and landuse. The vulnerabilities in each area are analyzed according to the aged buildings, listed buildings and natural hazard areas to determine *24 Natural Hazard Areas* at the final of this stage.

In the following stages of *Spatial Risk Assessment* and *Risk Prioritization*, the financial dimensions of vulnerabilities are calculated to define risk area and determine prioritizing areas of risks. In the risk assessment, building stock risks are determined in case of type of building, use, age, number of storey and comparing type of building with uses, age, no. of storey; use with no. of storey and age; and age with no. of storey. Specifically, observed risks in wooden building stock and commercial and industrial buildings are analyzed. Infrastructure risks in energy and communication networks, waste and potable networks and natural gas networks are analyzed distinctly. Population risks describing the social structure are determined in accordance with Social Survey on Quality of Life Analysis.

As a following step, residential real estate and commercial real estate values achieved from average unit market prices are analyzed distinctly to maintain property values. The financial aspects of natural hazards and vulnerabilities are calculated in the building stock to determine risk areas. Consequently, the final data is compared to engineering survey data and 12 risk areas are maintained.

In the following stage, risk areas are prioritized in accordance with emergency measures determined by local administrative and JICA scenario. The distribution of Emergency State Facilities designated by Disaster Coordination Center *(Afet Koordinasyon Merkezi-AKOM)* and their capacities are identified. In an emergency state, vulnerable roads network, hazardous uses located at the periphery of the critical facilities as schools and hospitals are determined to prioritize 12 risk areas in case of emergency. Finally 7 areas are prioritized as a final assessment of spatial risks.

In the local context, mitigation strategy includes proposals and projects to build local capacity and develope Faith District both economically and culturally. In order to build local communication network on risk data, local administrative should organize and integrate their archive in electronic medium and integrate to wider Networks at international level. Local project areas determined by Istanbul Metropolitan Municipality should be based on Multiple Hazard and risk micro zoning works which are compatible to Conservation Plan Decisions.

Emergency Plan for the locality should be developed after the spatial feasibility of emergency facilities is done. Designated governmental and public buildings to serve as emergency management centers during the emergency should have adequate capacities. The existing capacity of designated emergency management centers should be increased.

Vulnerable road network should be analyzed to develop an emergency state transportation plan based on accessibility of the critical uses as schools and hospitals. Fire risk and hazardous uses as LPG station located at periphery of residential areas, hospitals and wooden buildings should be eliminated through spot projects.

In order to promote designation of emergency management centers, tax exemptions could be given to private establishment and facilities. The multi-stakeholder collaboration in financing mitigation should be supported by government and local administrative.

The legislative measures to ensure convenient urban regeneration of historical neighborhoods in risk areas should be defined exclusively in the legislation. *Development Law (3194)* should be integrated to physical regulations and building codes not only in disaster areas but also risk areas in scope of the mitigation. *Disasters Law (7269)* should include roles and responsibilities of local administrative, regulations in public and private sector disaster risk management plans and each should be tailed for distinct disasters.

Socio-cultural programmes increasing the sense of belonging to the neighborhood, common cultural facilities to develope neighbor relations and professional education should be organized by local administrative to educate the local community primarily. Secondly, increasing the collective perception of an earthquake risk, the knowledge and sensibility to earthquake and building capacity also for emergency state but initially for mitigation should be provided through training programmes and conferences. The association in governmental and local entities and non-governmental organizations should be modeled in scope of the mitigation plan. (Appendix-A, Flowchart p.186)

Tourism potential of the district is significantly underdeveloped and should be developed to provide financial investments and raise socio-economic level of the locality. Spot projects to eliminate spatial risks and maintain touristic facilities supported by the government, should be proposed in scope of urban regeneration. The contribution of the local community to the production of assets through training programmes in tourism, traditional hand crafts and restoration works should be provided. Pedestrian networks to see historical structures and vista points should be arranged to connect socio-cultural functions.

The governmental, financial and socio-cultural measures relevant to the local-context are defined in mitigation strategy. In order to provide their implementation, urban policies and national policies should include mitigative measures and be consistent with legislative and institutional frameworks. The local mitigative measures are the primary indicators for developing national strategy is risk reduction.

This study could be used as a prototype for local risk reduction in localities and municipal practices. Moreover, the project could be used in developing urban design projects and sectoral plans as School and Hospital Master Plans for Fatih District. It could be used to plan Fatih District as a prototype for disaster risk reduction and emergency center of the Historical Peninsula, for latter work as doctorate thesis. It could be used as an advisory map in governmental units to process planning measures, identify project areas and emergency plans. It could be also presented as a model of implementing mitigation-oriented planning approach in learning planning discipline.

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APPENDIX A

THE NATURAL HAZARD MAPS

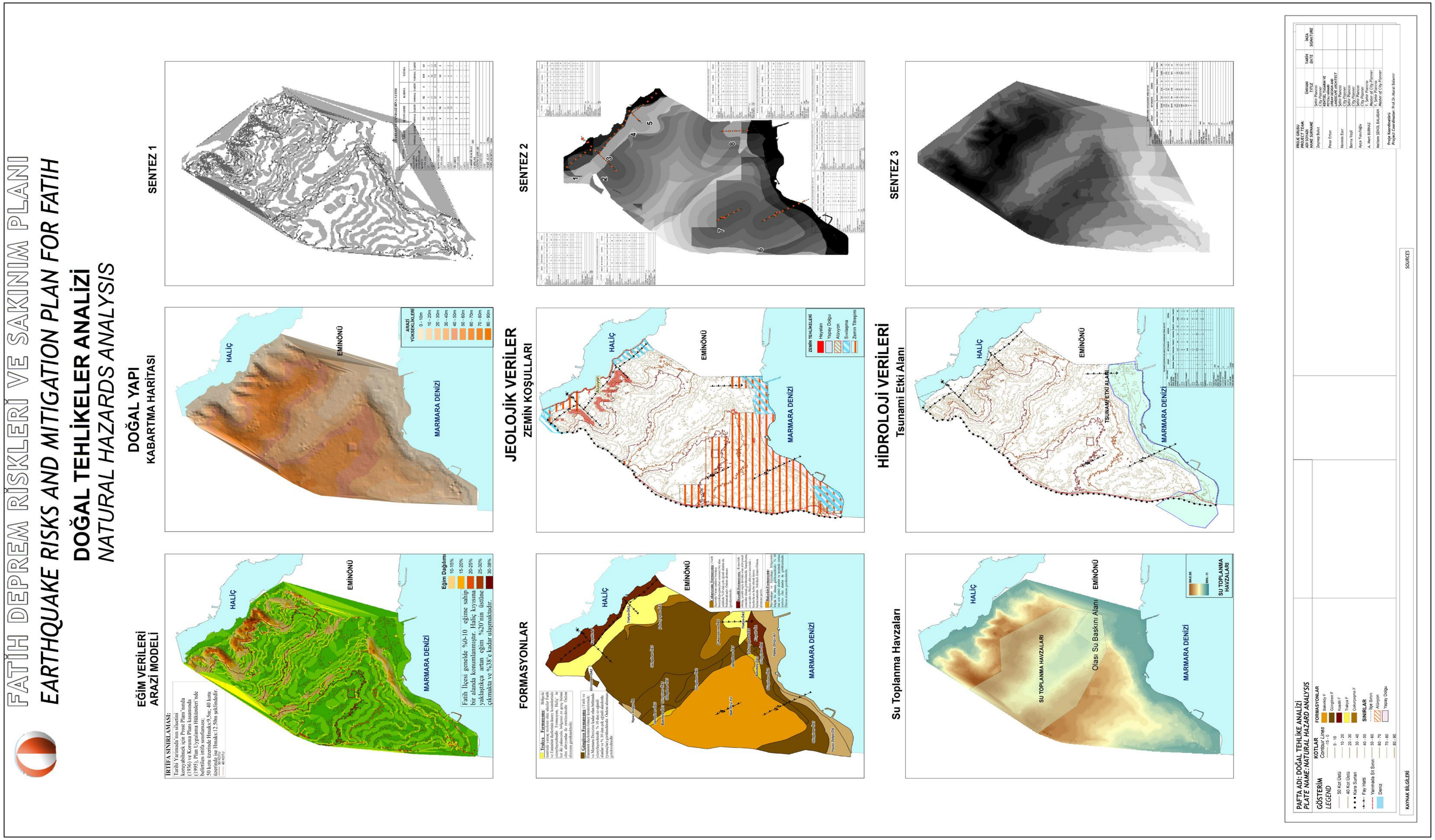

Figure 35 The Categorization of Natural Hazards

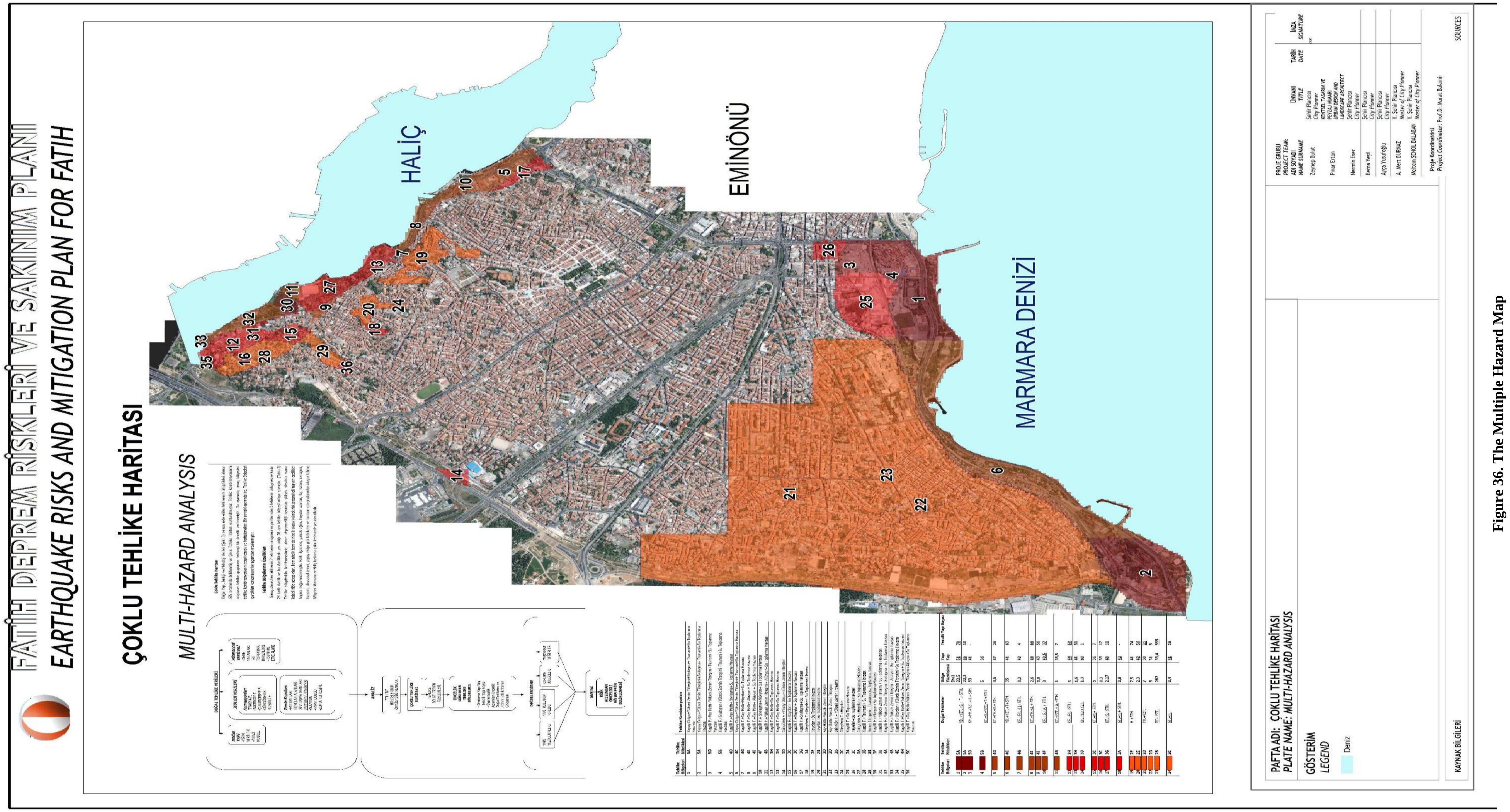

Figure 36. The Multiple Hazard Map

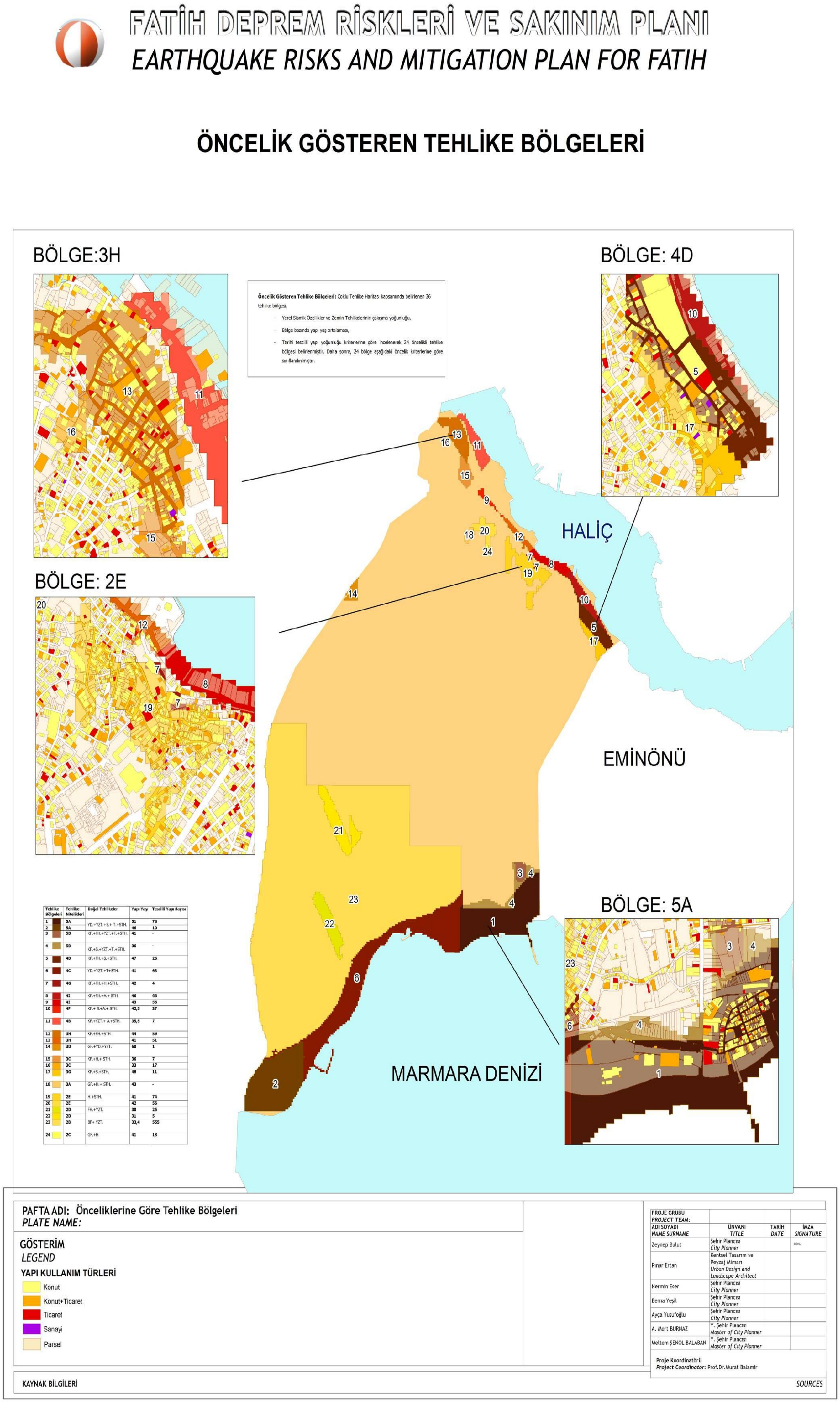

Figure 37. Prioritized Natural Hazard Areas

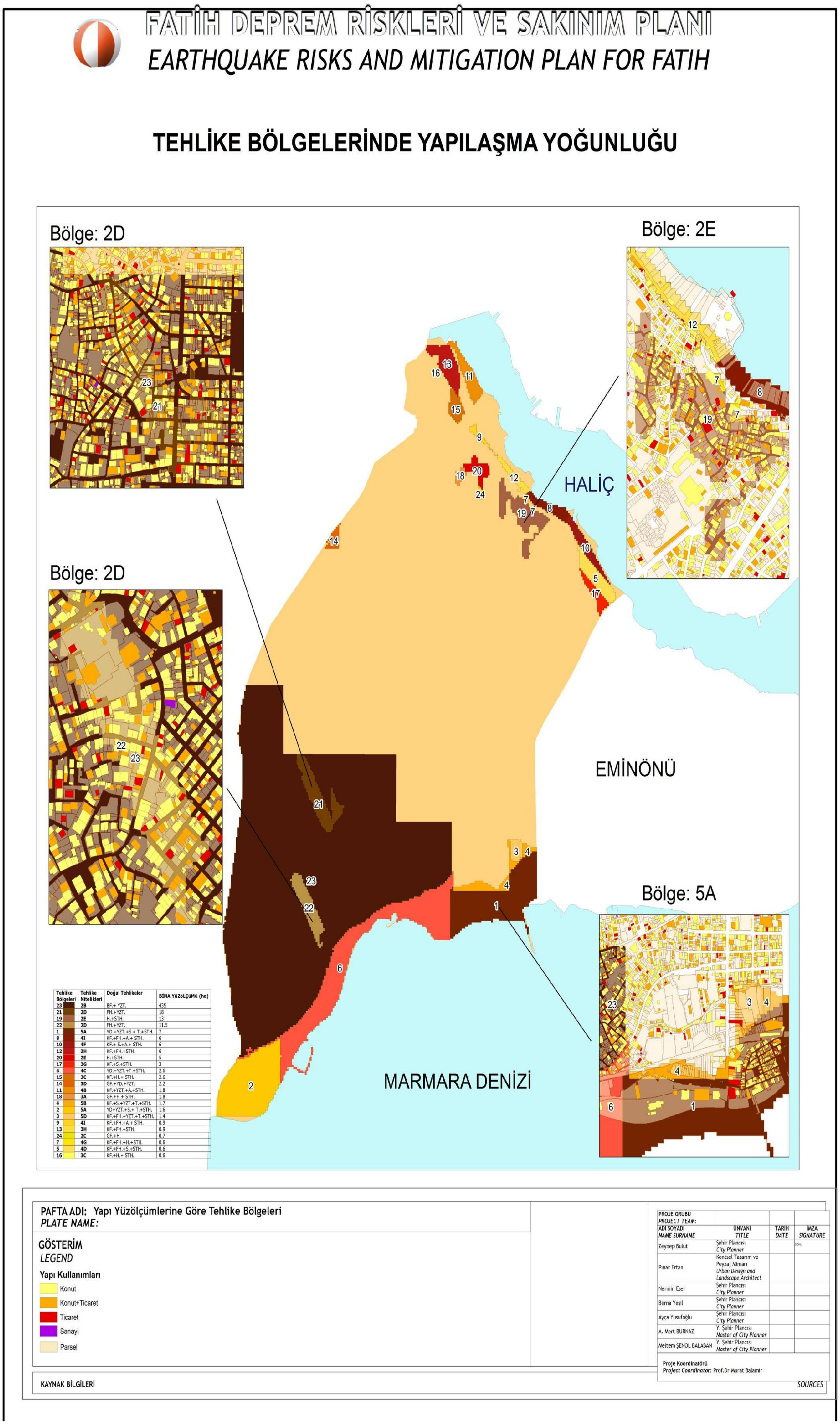

Figure 38. Natural Hazard Areas according to Building Stock

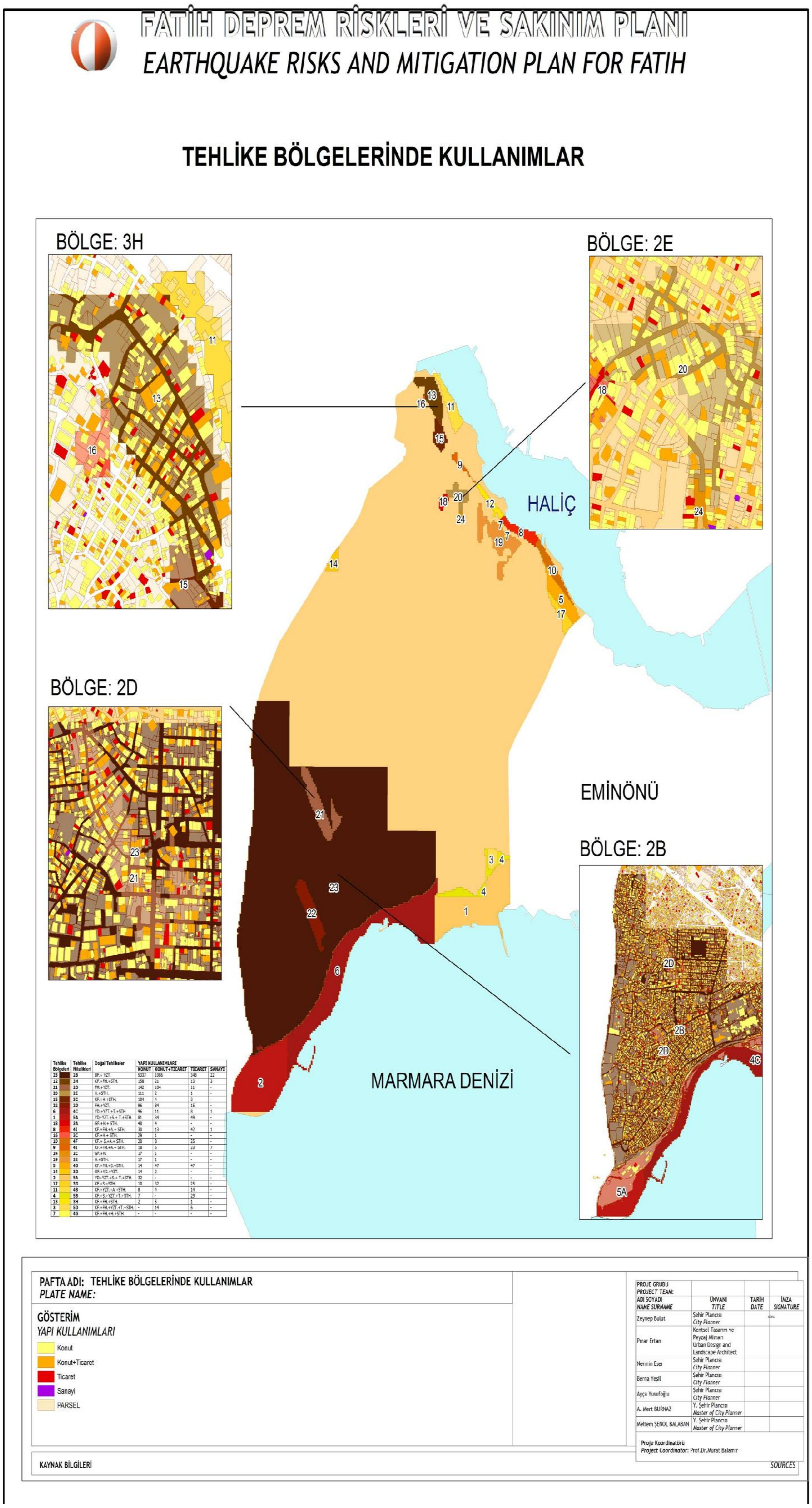

Figure 39. Natural Hazard Areas according to Building Uses

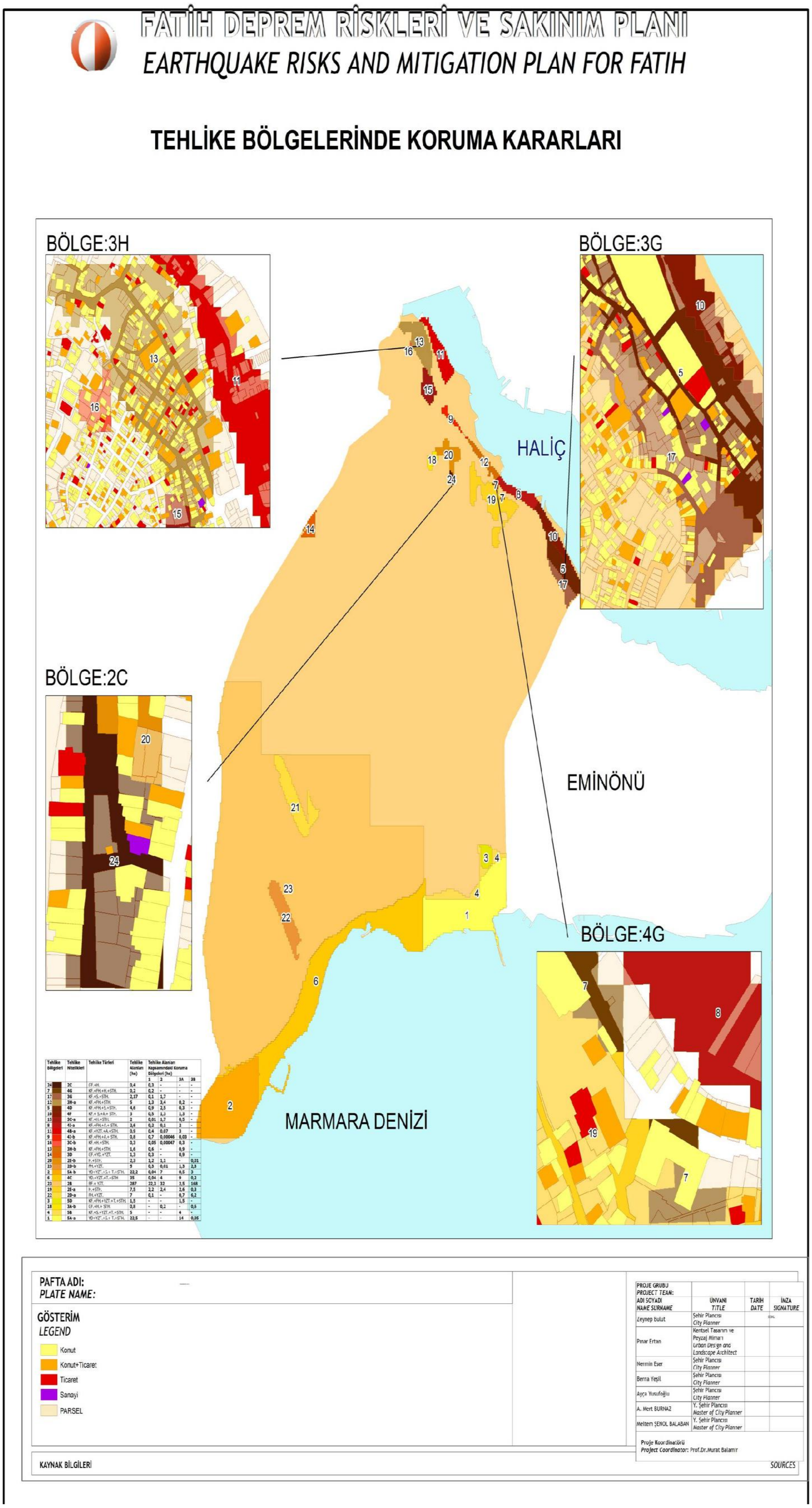

Figure 40. Natural hazard Areas according to Conservation Plan Decisions

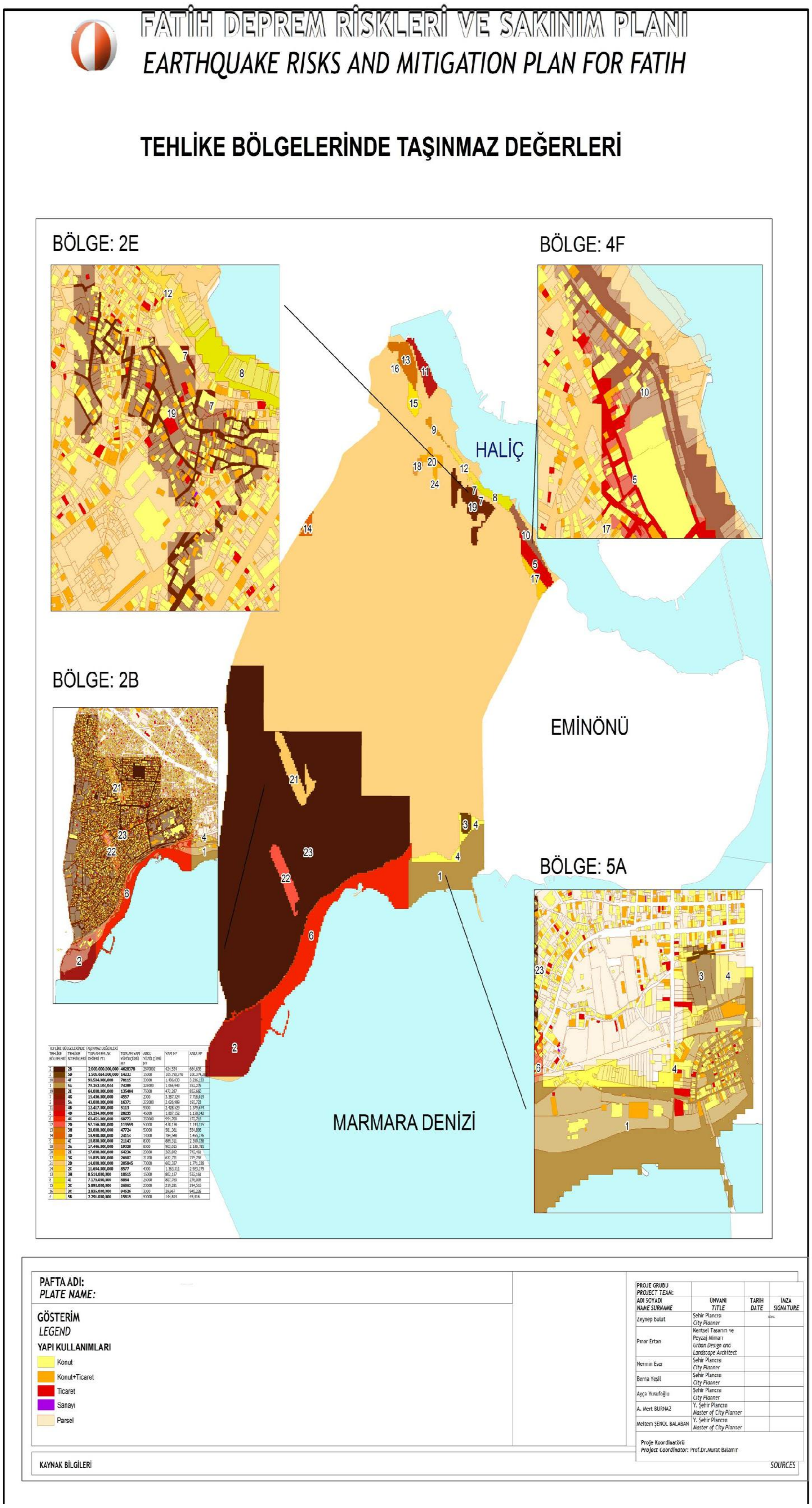

Figure 41. Natural Hazard Areas according to Property Values

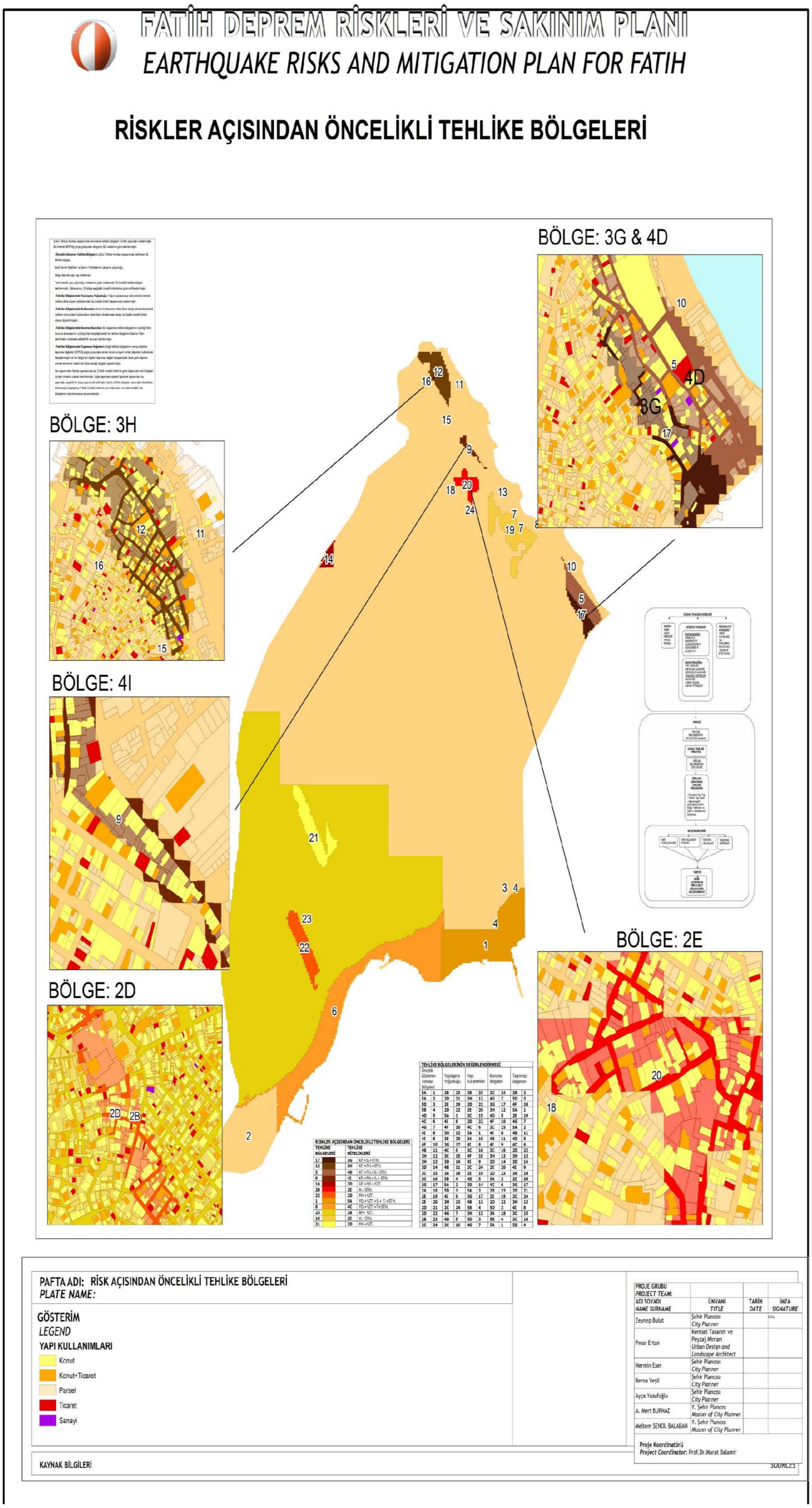

Figure 42. Prioritized Risk Areas

APPENDIX B

FLOWCHART OF THE MITIGATION PLANNING FOR THE CASE OF FATIH DISTRICT IN ISTANBUL

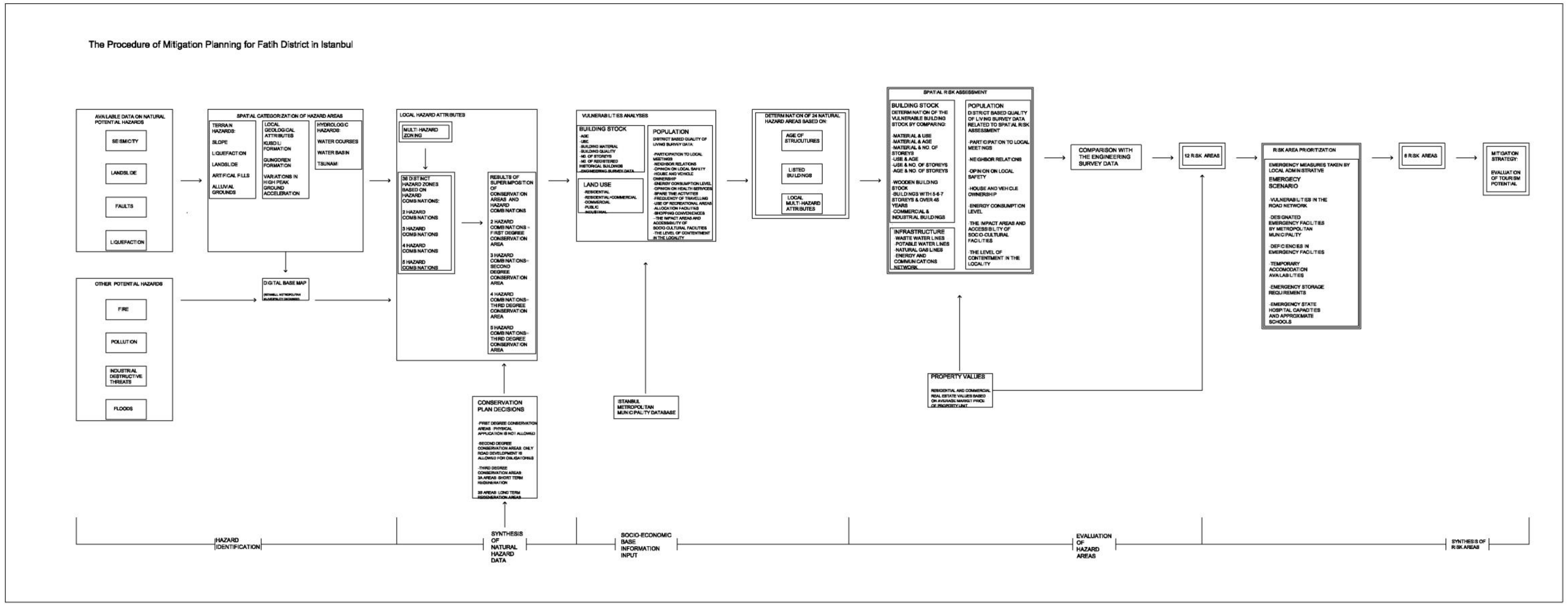

Figure 43. Flowchart of Mitigation Planning for the Case of Fatih District in Istanbul