5-2013

(In)formal Distinction in Urban Istanbul: Evaluating Spatial Performance

Hannah Breshears
University of Arkansas, Fayetteville

Abstract

As globalization continues to draw the cities of the world into closer economic and intellectual dependence, Istanbul stands as bridge between two continents and a city poised for urban transformation. Massive tracts of informally designed communities are being cleared to accommodate the structure of the modern, tourism driven city. The attempt to purge the city of its squatter heritage is startling and raises questions of cultural and architectural integrity in urban development. Istanbul's desire for expanded global investment and tourism is particularly apparent in the industrial district of Kartal, whose blended development is the subject of this study.

Jane Jacobs and Kevin Lynch, both well-respected advocates of micro-level urbanism, champion form analysis as a viable method of study. Together, their theories form an analytical base by which quality and performance can be studied, if not measured. Though a handful of data-driven systems have emerged post-Kevin Lynch, his methods continue to have considerable authority in the fields of urban design and theory and thus form the basis of this study's methodology. An attempt has been made to combine the two dominant forms of investigation, micro-level and macro-level, to provide a comprehensive analysis of formal and informal design performance in Kartal. As such, this study has not only produced a more rigorous tool for remote analysis, but one that can be applied to other urban settlements in the future.

By synthesizing the theories of Lynch and Jacobs into a single, stratified method, this study moves beyond the singular phenomenon of informal development to analyze the relationships formed by density, grain, and access in the urban context so that the relative performance of formal and informal spaces might be compared and judged through a series of performance ratings. The following analysis is a substantive-descriptive study concerned primarily with the dimensions of performance that can be observed in the district of Kartal, with no formal attempt to draw normative-prescriptive conclusions.

(IN)FORMAL DISTINCTION IN URBAN ISTANBUL: EVALUATING SPATIAL PERFORMANCE

A thesis submitted in partial fulfillment of the requirements of the
Honors Program of the Department of Architecture
in the Fay Jones School of Architecture, University of Arkansas.

Hannah A. Breshears

Thesis Committee:
Dr. Noah Billig
Dr. Lynda Coon
Frank Jacobus

Spring 2013

Table of Contents

List of Figures, Tables, and Appendices

Figures

Tables

Introduction

As globalization continues to draw the cities of the world into closer economic and intellectual dependence, Istanbul stands as a bridge between two continents and a city on the brink of a total urban transformation. International planning theory has become increasingly influential in Istanbul's governmental agenda since the fall of the Ottoman Empire, and as a result the city has renewed its push for large-scale redevelopment of its districts.[1] Massive tracts of informally designed communities are being cleared to accommodate the structure of the modern, tourism driven city. This attempt to purge some areas of Istanbul of its squatter heritage is startling and raises questions of cultural and architectural integrity in urban development. What benefits do user-generated design and construction bring to Istanbul, if any, and how do the spaces produced by informal, formal, and blended development compare?

Turkish *gecekondu* provide an environment for study unfettered by traditional design standards and regulations, and as such garner further scholarly inquiry. This study focuses on the public spaces of the blended district of Kartal (kahr-tahl), where formally and informally designed areas reside and merge, and attempts to determine the performance or quality of the urban fabric in each type of settlement, as well as the district as a whole (Figure 1). Well documented in urban planning literature, Kartal is a coastal settlement located on the Asian side of the city, just below its former administrative boundary, the area under the jurisdiction of the local *belediyesi* government, effective until 2004.[2]

[1] Wende, Wolfgang,. 2005. *City Development and Green Space System : Berlin and Istanbul*. Berlin: Mensch & Buch Verlag. 27
[2] Urban Age. 2009. *Istanbul, City of Intersections*. London: London School of Economics and Political Science. 26

Figure 1: Aerial imagery of Istanbul and Kartal. Source: Google Earth.

The study area is limited to this district, where the physical configurations of public space in informal neighborhoods are extracted from available aerial imagery and compared to the analogous configurations of formally designed public space within the district. The data analyzed has been limited to imagery from the last 50 years, and representative sites have been selected which demonstrate potentially fruitful integrations of local and global norms for study. Special attention has been paid to the formal planning schemes made and executed for this area of the city within the allocated time period, with the intent to determine how the developmental patterns identified in informal, formal, and blended areas compare.

Chapter 1: Understanding Istanbul & Urban Performance

Today's squatter communities are, at least from an architectural point of view, almost indistinguishable from the legal neighborhoods of the city." - Robert Neuwirth, Shadow Cities

Planning History of Istanbul

The earliest known plans of Istanbul, drawn by Giovanni Vavassore in 1520, are filled with irregular street patterns and numerous green spaces surrounding the major monuments.[3] Large fortification walls enclose the city and smaller versions isolate many of the great mosque complexes from the convoluted residential districts. In some neighborhoods, the streets were so "crooked and narrow… that houses on either side almost touched each other."[4] The chaos of these wooden houses, built with upper stories projecting into the streets and lattice covering the windows, was broken only by the austerity of the mosque complexes.[5] The historically acclaimed architect Sinan, active in Istanbul in the 1500s, was challenged to rework the twisting lanes and crowded neighborhoods of the city without turning the environment upside down and uprooting people from their homes, as was the fashion for European planners like Bouvard and Haussmann in later years.[6] During his lifetime, Sinan, who first served as a Janissary and an engineer in the Ottoman Empire, built and restored more than three hundred buildings in the city, including the Süleymaniye Mosque, Sokollu Mehmet Pasha Mosque, and Mihrimah Sultan Mosque.[7]

An engineer named F. Kauffer drew the first map of Istanbul utilizing modern

[3] Goodwin, Godfrey. "Sinan and City Planning." *Environmental Design: Journal of the Islamic Environmental Design Research Centre* 1-2 (1987): 11
[4] Mansel, Phllip. Constantinople: City of the World's Desire, 1453-1924. London: John Murray Publishers, Ltd., 1995. 36
[5] Gül, Murat. The emergence of modern Istanbul: Transformation and Modernisation of a City. London: I. B. Tauris & Company, 2009. 27
[6] Goodwin 10
[7] Mansel 34

methods between 1776 and 1778.[8] Foreign and local planners alike were invited to make renovation recommendations for the city after major fires, leading to great European influence driven mainly by aesthetic concerns. The largest application of European ideals came with the implementation of a new public transportation system, which boasted widened and radiating streets like those of Paris and localized grid patterns completely foreign to the complicated texture of the city.[9] Designer Mustafa Resit Pasa applied this type of geometric regularization in 1836, convinced that his "architectural science" would improve communication in the city and help control the fires that had ravaged it for decades. Pasa's ideas about physical planning would influence all future design decisions for the city.[10]

More than 650 buildings were burned to the ground in the Aksaray fire of 1856, clearing the way for a massive reorganization of the city's residential districts. Italian engineer Luigi Storari was commissioned to modernize the urban scheme in accordance with the Turks' European counterparts.[11] Catering to the desires of the Sultan, Storari's new plan regularized and aligned city streets to rid Aksaray of its maze-like complexity and numerous dead-ends. The revitalized neighborhood embodied the European planning principles admired by the Sultan and has been compared to Baron Haussmann's Paris. The scheme for Aksaray set in motion an irreversible wave of transformation that privileged the grid over more "organic" development patterns. This brought heavy criticism from local architects, who claimed that Western ideas disregarded local heritage and were completely unrecognizable by the Turkish

[8] Ayataç, Hatice. 2007. "The International Diffusion of Planning Ideas: The Case of Istanbul, Turkey." *Journal of Planning History* 6 (2): 3
[9] Ibid 3
[10] Celik, Zeynep. "The Italian Contribution to the Remaking of Istanbul." *Environmental Design: Journal of the Islamic Environmental Design Research Centre* (1990): 128
[11] Ibid 129

citizens.[12]

Istanbul was again influenced by Parisian principles in 1902, when Joseph Antoine Bouvard, a well-known architect from the Beaux-Arts school, was asked to improve Istanbul's "urban image," just as the "City Beautiful" plans were being implemented in the United States.[13] Though the Ottoman Sultan officially hired Bouvard for the job, the French government considered the project a "gift" and paid all of Bouvard's expenses. His goal was not to integrate what the royals considered European "improvements" into the rich fabric of the ancient city, but to create a "modern, clean, and embellished" city, unconscious of the existing fabric.[14] Bouvard used regularization, symmetry, and isolation to achieve these goals, though his project drawings consisted largely of impressionistic watercolor perspectives drawn so that connections between major city nodes were overlooked. The complex topography of the city and it deep rooted architectural traditions were similarly ignored. Though the Ottoman bureaucracy praised Bouvard's recommendations, the plan was abandoned when the Empire itself began to decline.[15]

When the new Turkish Republic took control of the country in 1923, the capital city was moved from Istanbul to Ankara. Population figures waned and the city's development stopped dead in its tracks. It was not until 1930 that Istanbul began to regain its importance as an international city and foreign experts like Herman Elgotz, Alfred Agache and Henri Prost were once again consulted to modernize the urban system. Prost's based his plan on the topography of Istanbul, recommending the

[12] Celik, "The Italian Contribution" 130
[13] Celik, Zeynep. "Bouvard's Boulevards: Beaux-Arts Planning in Istanbul." *Journal of the Society of Architectural Historians*. 43.4 (1984): 341
[14] Ibid 343
[15] Ibid 354

construction of tunnels, bridges, and viaducts to reduce congestion in the streets. These efforts to improve circulation and resource distribution in the city were realized in 1936 through the efforts of Lutfi Kirdar, the mayor of Istanbul at the time.[16]

In 1950 the city's population measured 975,000: by 1965 it had increased to nearly 2.2 million.[17] New building styles, like the illegal multistory apartment blocks of the *gecekondular*, became increasingly accepted as a solution to limited housing availability in the face of rapidly increasing urban populations.[18] These self-constructed apartments sprang up in industrial districts everywhere, uneasily sanctioned by the government as a means of passing the costs of urbanization on to the millions of immigrants flooding the city. Barren sites along the waterfront, Ankara and London Road motorways, and historical Buyukdere were transformed into "blossoming garden cities" where rural migrants could plant and maintain small garden plots.[19]

By the time Adnan Menderes accepted the office of prime minister in 1950, the European influence so prevalent in the early planning history of the city had returned. Menderes' had two goals: to solve traffic problems and beautify the city. He again sought Paris as a model, bringing with him a desire for large, handsome squares and wide avenues.[20] His opposition claims that Menderes was unable to understand, much less cope with the city's problems, and that he used the urban development scheme to hide his government's own inadequacies.[21] Though Menderes' has been heavily criticized for his large-scale changes to the city structure, his "improvements" were not unprecedented. Much of Menderes' road system, namely the wide avenues

[16] Ayatac 4
[17] Ibid 5
[17] Esen, Orhan. "Istanbul's *Gecekondu*s." Istanbul City of Intersections. Urban Age Nov. 2009: 1
[19] Ibid 3
[20] Ayatac 6
[21] Gul 4

implemented along the Bosphorus, was foreshadowed in the earlier plans for the city drawn by Andre Auric and Henri Prost.[22]

Istanbul's population increased again in 1980 from 4.5 million to a near 7.3 million in 1990.[23] A rapid increase in car-ownership linked to this population explosion and increased economic prosperity has severely taxed Istanbul's road system and amplified its air pollution.[24] While public transit systems like the new Marmaray Tunnel and the Bus Rapid Transit line attempt to combat Istanbul's overwhelming and increasing traffic congestion. Though city officials recognize that adequate public transportation systems are the only solution to escalating mobility problems, their plans for new and widened street systems could destroy the city's delicate neighborhood structure.[25]

The city government's response to the growing mass consumer society in Istanbul since the 1980s a series of "mega projects" designed to revitalize specific districts like the Halic (Golden Horn) and Tarlabasi Boulevard, as well as the construction of a third intercontinental bridge.[26] The first bridge built to span the Bosphorus Strait, called the Bogazici Bridge, was erected in 1973 between the Ortakoy and Beylerbeyi regions of Istanbul. A single 1,510-meter suspension bridge was not enough to cope with the population's daily commute, however, so an additional Bosphorus bridge called the Fatih Sultan Mehmet Bridge was built in 1988 to connect Hisarustu on the European side with Kavacik on the Asian side of the city.[27] A third suspension bridge is planned for the northern part of the Bosphorus strait, near the

[22] Ibid 173
[23] Ayatac 7
[24] Esen, Orhan. "Istanbul's *Gecekondu*s." Istanbul City of Intersections. Urban Age Nov. 2009: 1
[25] Ibid 2
[26] Ayatac 7
[27] Cihan. Turkey. "Turkey Unveils Route for Istanbul's Third Bridge." Ankara: Anadolu Agency, 2010. Web. 11 Jul 2011. 1

Black Sea. Nearly six billion dollars have been set aside for the construction of the 1,275-meter bridge that will connect with the Trans European Motorway, or TEM, from Garipçe (on the European side) to Poyrazköy (on the Asian side) and ease the overwhelming flow of commuter traffic on the current bridges.[28]

The core problem of urban transport in the city remains and a coalition called the Istanbul Metropolitan Planning and Urban Design Centre (IMP) has taken up the task, commissioning projects like the new urban centers of Kartal-Pendik and Silivri to establish a more polycentric Istanbul.[29] In late 2007, forty-eight areas of the city were named as "regeneration projects," projects that would involve the destruction of one million buildings and repairs on more than 200,000 others.[30] World-renowned architects like Zaha Hadid are taking up these "urban transformation projects" and aim to renew entire districts, specifically those with a history of *gecekondu* architecture that have been deemed incompatible with the government's modernist plans for the city.

Gecekondu

Istanbul's population has quadrupled since 1980, and more than 50 percent of the 13 million people living in the city today reside in informal houses and neighborhoods.[31] Called *gecekondular* (geh-jay-kondoo-lahr), a term literally translated as, "landed in the night," these self-made cities were a response to an intense urban housing shortage starting in the 1950s as more than 500,000 migrant workers flooded into Istanbul each year to meet the demands of rising industrialization.[32] Now considered a hallmark of Turkish housing, these ramshackle buildings became

[28] Ibid 1
[29] Ayatac 8
[30] Christiaanse 2
[31] Sudjic, Urban Age. 2009. *Istanbul, City of Intersections*. London: London School of Economics and Political Science. 4.
[32] Tekeli, Ilhan. "Cities in Modern Turkey." Istanbul City of Intersections. Urban Age Nov. 2009: 16

increasingly accepted as a solution to the limited availability of land in the face of rapidly increasing urban populations.[33] Though this type of construction has been increasingly prohibited over the last two decades, the influence in the city remains.[34]

When the Republic of Turkey was created in 1923, more than 80% of the population lived in rural areas.[35] Istanbul was the only city acknowledged by the Republic as structurally prepared to sustain industry, commerce, higher education, and healthcare, and thus became the site of targeted urbanization within the country. Anatolian peasants from the eastern half of the country began migrating to the new urban center in huge numbers after World War II in response to a number of "push" and "pull" factors.[36] Drawn by increased income, services, and opportunities for social interaction, rural migrants left agricultural jobs threatened by the introduction of mechanized farm equipment and poor land conditions to take up new residence in the city. The first major "push" of migrants came in the 1950s, as 40,000 tractors introduced to the agricultural system supplanted nearly a million Turkish farmers.[37] In his study of modern Turkey, Utku Balaban contends that squatter settlements fueled by rural migration have been the dominant form of land commoditization in the country since the 1960s. The urban population skyrocketed from 8.8 million to 26.8 million in just fifteen years, generating what he calls a "structural need for squatter settlements" that justified the prevalence of *gecekondular*.[38]

---

[33] Esen 1
[34] Keyder, Caglar. 1999. *Istanbul: between the global and the local*. Lanham, MD: Rowman & Littlefield. 49.
[35] Tas, H. I. and D. R. Lightfoot. 2005. "Gecekondu Settlements in Turkey: Rural—Urban Migration in the Developing European Periphery." *Journal of Geography* 104 (6): 263-271.
[36] Ibid 265
[37] Ibid 266
[38] Balaban, Utku. 2011. "The Enclosure of Urban Space and Consolidation of the Capitalist Land Regime in Turkish Cities." *Urban Studies (Sage Publications, Ltd.)* 48 (10): 2164.

Gecekondu neighborhoods gave rural immigrants a means of adapting to their new urban environment while preserving their cultural values, namely their primarily agricultural lifestyle.[39] The newly industrialized Istanbul sought unskilled workers to provide labor for factories, leading to the influx of rural workers to the city after increased mechanization of agricultural labor left them without jobs in the countryside. While the majority of these immigrants were employed by the manufacturing industry, those unable to find work were forced to participate in the informal trade system that had become prevalent in *gecekondu* districts.[40]

Illegal because of their construction on government land or private property without appropriate permits, nearly 60% of *gecekondular* were built in areas underserved or un-served by traditional urban infrastructure and services.[41] In his 1968 study, John F. Turner argued that user-initiated settlements (i.e., self-help housing) were a more efficient strategy for housing the exploding population than centralized housing projects. Turner's self-help housing theories were recognized by the government and paved the way for small-scale improvements to squatter settlements.[42] The gradual extension of water and electrical services, even access roads, followed loyalty to political candidates seeking to tap the voting power of the *gecekondular* population.

These amnesties did not, however, provide regulations for dwelling construction.

---

[39] Yalcintan, Murat Cemal and Adem Erdem Erbas. 2003. "Impacts of "*Gecekondu*" on the Electoral Geography of Istanbul." *International Labor and Working Class History*. (64): 92

[40] Ibid 93

[41] Baharoglu, Deniz and Josef Leitmann . 1998. "Coping Strategies for Infrastructure : How Turkey's Spontaneous Settlements Operate in the Absence of Formal Rules." *Habitat International* 22 (2): 116.

[42] Balaban 2170

A 1994 survey of informal settlements in the city revealed that none of the hundreds of investigated dwellings had been designed by architects.[43] Cihan Tugal, a writer for the *New Left Review*, claims that *gecekondular*, "provided a vast vote bank for an Islamism that proclaimed itself totally opposed to the architectural pretensions of global capital and demanded an environmentally sustainable form of urban development, in harmony with nature."[44] K.H. Karpat, a leading *gecekondu* scholar and well respected Turkish historian is less antagonistic, however, and suggests that the dearth of professional planning expertise in the expanding *gecekondular* of Istanbul instead enabled patterns of development based on empirical observation and localized intervention.[45] This type of urbanization symbolized a marriage of rural tradition and new urban influence in which folk ideals were slowly integrated with the physical and social culture of the city through occupational change and increased exposure to shared resources for the migrant population.

Formal and Informal Design

Asu Aksoy's article, "Istanbul's Worldliness," describes the relationship of informal municipality called Esenyurt, a traditional *gecekondu* area, and its formally designed counterparts, Esenkent and Bogazkoy. Motivated by modernist ideals, Esenyurt's mayor championed the "safe and antiseptic social spaces" of these satellite towns as the answer to the perceived chaos of informal development.[46] By relocating its immigrant population to more "orderly" climes, Istanbul hopes to purge the city of its squatter heritage and to gentrify space and culture as per the international model.

[43] Baharoglu 129
[44] Tugal C. 2008. "The Greening of Istanbul." *New Left Rev. New Left Review* (51): 65.
[45] Karpat, K. H. 1976. *The Gecekondu: Rural Migration and Urbanization* Cambridge University Press.
[46] Aksoy, Asu, "Istanbul's Worldliness.", *Public Istanbul: Spaces and Spheres of the Urban* , ed. F. Eckhardt and K. Wildner, Transcript Verlag, Bielefeld, 2008: 216

Representatives from the Prime Ministry's Housing Development Association claim that more than half of the city's housing stock will have to be replaced in the next twenty years, an initiative the government has taken on whole-heartedly in an attempt to transform its global image and attract lucrative investors.[47]

The city's renewed desire for expanded global investment and tourism is particularly apparent in the industrial district of Kartal. Stretching from the hills of the Omerli Reserve down into the Sea of Marmara, Kartal and its neighboring district of Pendik serve as the industrial center for the Asian side of Istanbul. Kartal is bounded by the Trans-European Motorway (TEM) to the north and is home to nearly 550,000 white-collar workers, small-scale tradesmen, and their families.[48] A quarter of the population is still living in traditional *gecekondular*, while another 65% are housed in concrete *apartkondular* (a play on the words *gecekondu* and *apartnam*, the Turkish term for middle class apartments). These former shanty houses have been cheaply upgraded into taller apartment-style towers of 3 to 5 stories.[49]

The Istanbul Buyuksehir Belediyesi, or Metropolitian Municipality, has targeted Kartal as a key point for its large-scale revitalization schemes. The planning commission hopes to create a more multi-nodal city by leveling more than 100 factories and supporting residential neighborhoods to accommodate new recreational complexes and hotels. These buildings are designed to support the growing number of international businesses building headquarters in the city. Nearly six square kilometers will be remade as part of the Kartal-Pendik Masterplan proposed by Zaha Hadid, winner of the

[47] Ibid 219
[48] Cavusoglu, Omer. "Kartal." Urban Age. 2009. *Istanbul, City of Intersections*. London: London School of Economics and Political Science. 1-2
[49] Tugal 69

city's design competition for the project.[50]

Aksoy argues that this wave of urban transformation is not merely structural, but cultural, as the public experience is subjugated to pre-designed consumption. He claims that, "as public spaces fall one by one within the ambit of design and management businesses, which are invariably extensions of global property development projects, the city's public space becomes a business proposition."[51] In this idealized Istanbul, squatter culture has been completely eradicated to make way for the new, modern, and "profitable," with little hesitation. The mass eviction of the urban poor from these districts will only further the collapse of the informal means of social integration into the city that is the pride of the *gecekondu* system. Aksoy writes that where such exclusionary measures are taken, the dynamic between global and local, formal and informal, is exacerbated to the point of destruction --an architectural phenomenon with extreme social and cultural implications.[52]

Defining Public Space

In his study of the "overlapping economic, social, cultural, and political dimensions of public and private space," Ali Madanipour gives a chronological account of urbanism and the evolution of the use of public space in cities across the globe. He postulates that the distinction between the private space of the home and the public realm of the street found in modern cities existed in developments as early as Mesopotamian Ur, and proposes an analysis of public space as a product of the internal

[50] Ayataç, Hatice. 2007. "The International Diffusion of Planning Ideas: The Case of Istanbul, Turkey." *Journal of Planning History* 6 (2): 114.
[51] Aksoy, Asu. "Istanbul's Choice: Openess." *Istanbul, City of Intersections*. Urban Age. 2009. London: London School of Economics and Political Science. 49.
[52] Ibid. 48

dynamics of its actors, as well as physical form.[53] According to Madanipour, "space is produced through a dialectic relationship between action and context," and can be divided into several genres based on use.[54] His broad categories are named "interpersonal" and "impersonal," the first a designation of smaller scale public space designed for familiar interaction, namely in neighborhoods, while the second denotes grander openings primarily used by commercial and governmental institutions.[55] In his reading of "impersonal space" in the city, Madanipour contends that measure of civic life is found in the quality and richness of its "impersonal space" and that each spatial node functions as a negotiator of social and cultural prosperity in the city.[56]

According to urban theorist Kevin Lynch, public spaces are, "all those regions in the environment which are open to the freely chosen and spontaneous activities of people," a definition which encompasses not only the designated fields and parks traditionally identified as "green space" in a city, but also unfenced vacant lots, streets, alleys, and abandoned waterfronts.[57] On these terms, public space is asked to satisfy the whims of the user, to extend his or her knowledge of self and the environment, and to provide space for growth and change, not merely exhibit aesthetic charms. Lynch even champions the role of "derelict and waste lands" in the public space system for their ability to provide satisfactions distinct from those afforded by "ordered" space.[58] He argues that, "where open space is not highly manicured, and the social investment is low, the individual has a chance to demonstrate mastery, to meet challenges, and

[53] Madanipour, Ali. 2003. *Public and Private Spaces of the City*. London; New York: Routledge. 2.
[54] Ibid 4
[55] Ibid 140
[56] Ibid 215
[57] Lynch, Kevin, Tridib Banerjee, and Michael Southworth.1990. *City Sense and City Design: Writings and Projects of Kevin Lynch*. Cambridge, Mass.: MIT Press. 396
[58] Ibid 400

participate actively in a way usually denied him in the protected and expansive city environment."[59]

Lynch's position does not pigeonhole informal space and its use as a detriment to a city, but acknowledges the potential benefits such development could bring to urban design and urban experiences. Hulya Ertas similarly advocates the use of "unprogrammed space" in the city as purveyor of urban success or failure.[60] In her research, Ertas identifies three characteristics deemed most responsible for the success of informal, unregulated space relative to other formal space: openness to transformation and change, encouragement for heterogeneous use, and the propensity for privatization.[61] *Gecekondu* citizens attempt to beautify the streets and gardens close to their homes, adopting public spaces as their own. According to Ertas, this lends a life and vibrancy to the public spaces of informal settlements that is not seen in mass housing projects. Mobile vendors similarly transform space by claiming their place in open forums and along streets, and drawing large crowds of people to unregulated areas. Though both Madanipour and Ertas recognize the influence that urban planners and managers have on the collective domain of the city, they also understand the role of citizen-architects in spatial design and use.

This need for a renewed focus on the micro-situations of urban life is similarly apparent in the studies of Kathrin Wildner, an urban anthropologist who defines public space as an "ongoing and dynamic process of social and cultural construction."[62] For Wildner, this process presents itself as a series of physical sites and analogous

[59] Lynch, *City Sense and City Design* 397
[60] Ertas, Hülya. 2010. "The Potential of Istanbul's Unprogrammed Public Spaces." *Architectural Design: A.D.* 80 (1): 57
[61] Ibid 53
[62] Wildner, Kathrin and Frank Eckhardt. 2008. *Public Istanbul: Spaces and Spheres of the Urban*. Bielefeld; Piscataway, NJ: Transcript ; Distributed in North America by Transaction Publishers. 210

narratives, and that only by acknowledging the layers of cultural and ideological imagery can one begin to analyze spatial quality. Wildner has produced a number of international case studies, including anthropological analyses of urban form in Istanbul, New York, and Mexico City. She believes that the improvised utilizations of public space found in such cities are the social and economic glue of urban existence, that what is, "chaotic, spontaneous, and temporary prevents the city from devouring itself."[63]

The work of Carr, Francis, Rivlin, and Stone, focuses more particularly on the human perspective in its analysis of public space, an element that is often ignored in the traditional design process. While Carr and his associates include a handful of international examples in their case studies, the text is focused predominantly on American spaces and would benefit from a more global perspective. This group does not limit its study to the commercial function or physical qualities of a site, but expands the usual assessment criteria to address the physical, social, and emotional needs of human interaction in space. In their assessment of open space in American cities, the group also identified a number of spatial typologies present at the various scales of urban context. The major categories outlined are as follows: public parks, squares and plazas, memorials, markets, streets, playgrounds, community open spaces, greenways, and urban wilderness.[64] These typologies have a number of subcategories and the historical evolution of each is described in the text.

In her research on urban form, Helen Woolley delineated between domestic open spaces, those privately owned and maintained, neighborhood urban open spaces, those collectively maintained within a specific community, and civic urban open spaces, a

[63] Wildner 2
[64] Carr, Stephen, et al.1992. *Public Space*. Caiimbridge [England]; New York, NY, USA: Cambridge University Press. 79.

separate group with less personal connection to its users, though still collectively maintained. She argued that neighborhood open urban spaces and civic open spaces are ones used by choice and as such are communal amenities. Though Woolley prescribed a more user-centered definition of spatial typologies, her own research aligns closely with the categories defined by Carr, et al.[65] While a number of methodological precedents can be identified for urban analysis, there are few theories that provide usable criteria for determining spatial quality or value. Even fewer systems have been widely recognized and applied, though the theories of Jane Jacobs and Kevin Lynch seem to have had the most influence in the last 50 years. While a handful of data-driven systems have emerged post-Lynch, his methods continue to have considerable authority in the fields of urban design and theory and will thus form the basis of my own methodology.

"Good" Urbanism

According to Jane Jacobs, intense zoning laws and use-legislation that strictly limit the style and pattern of development in urban areas have an enormous impact on contemporary design and renewal schemes. In her seminal book, *The Death and Life of Great American Cities*, Jacobs heavily criticizes such policies for creating unnatural, and as such, unused urban space.[66] She outlines four conditions necessary to create "healthy" spaces and promotes the chaos and innovation demonstrated in unregulated communities over the order and efficiency upheld by modern planners. Jacobs calls for mixed-use neighborhoods, short blocks to allow high pedestrian permeability,

[65] Woolley, Helen. 2003. *Urban Open Spaces*. London; New York: Spoon Press. 55-56.
[66] Jacobs, Jane. 1961. *Death and life of great American cities*. [New York]: Random House. 151.

population and structural density, and provision for buildings of various levels of age and repair.[67] These characteristics, deemed "generators of diversity," by Jacobs, are inherent to *gecekondu* design, though the success of such neighborhoods has not been adequately assessed. This study proposes an analysis of the informally designed public space of *gecekondular* that will not only contribute to our knowledge of user-generated spaces, but will form a basis for comparison with formal space that can begin to evaluate a number of Jacobs' criteria as measures of good urban space.

Though Lynch disagrees with Jacobs' understanding of diversity, convinced that it could not be measured, "until one knows how people perceive difference, and in which features variety is important," his spatial dimensions align with Jacobs' own theories.[68] Together, the theories of Jacobs and Lynch form an analytical base by which quality and performance can be studied, if not measured. In his "Theory of Good City Form," Kevin Lynch identifies the notions of perceived vitality, spatial sense, environmental fit, access, and control as "dimensions of performance," that create good urban form.[69] In Lynch's system, vitality refers to the capacity of a place to support biological functions – to provide food, water, energy, air, and waste disposal for human inhabitants.[70] A vital city not only shelters from hazard and disease, but also regulates external stimuli to the satisfaction of its citizens.

Spatial sense and access refer to the resident's perception of urban form and its ability to accommodate desired action. The access dimension is measured in a more quantitative way, for it depends heavily on the rate of occupation and use of city streets, sidewalks, and alleys. It is important to note, however, that social barriers can limit

[67] Jacobs, *Death and life of great American cities*. 151.
[68] Lynch, Kevin. 1981. *Theory of Good City Form*. Cambridge, Mass.: MIT Press. 192
[69] Ibid 193
[70] Ibid 122

access as effectively as physical barriers.[71] Spatial sense is a measure of the city's formal structure and the perceived coherence of its linkages. Lynch's system lends itself to quantifiable measurement, even remote analysis in the case of vitality, access, and possibly spatial sense, though the nature of fit and control in the city requires close interaction with its structures and residents. The fit dimension is tied to the cultural norms of a population and the alignment of the city's physical form with those expectations. Determined by user-interaction with city space and infrastructure, fit is a highly variable relationship. Control is similarly dependent on user-modification and management of spatial resources, relationships that are nearly impossible to study without an intimate knowledge of city residents.

These measures of urban form were at least partially derived from Lynch's graphic method, described in, *The Image of the City*.[72] Lynch devised and defined five elements in this text with which he was able to distill the key features of virtually any urban area into a legible diagram. A series of paths, edges, districts, nodes, and landmarks were identified for each case study city and used to compare and contrast form as a measurable entity, without auxiliary influences. Though Lynch recognized the city as a, "multi purpose, shifting organization…raised by many hands," his method is limited to the physical appearance and structure of a given area and can only measure social or cultural meaning abstractly.[73]

These elements, though useful in their own right, are incorporated into the notion of grain mentioned in Lynch's *Theory of Good City Form*.[74] Grain seems to function as a

[71] Lynch, *City Sense and City Design* 401
[72] Lynch, Kevin. 1960. *The Image of the City*. Cambridge, Mass.: MIT Press.
[73] Lynch, *Image of the City* 91
[74] Lynch, *Theory of Good City Form*

more comprehensive analytical device that acknowledges Jane Jacobs' cry for diversity in urban space and is deemed, "critical to the goodness of a place."[75] In these later writings, Lynch determined that density, grain, and access form the internal texture of a city, and that by measuring these characteristics, its performance might be judged. Density and access have been addressed in various forms already, but grain requires further elaboration. For Lynch, grain refers to the, "way in which the various elements of a settlement are mixed together in space," and has multiple strengths or ratings.[76] These ratings will be discussed further in the methodology section of this paper, but are briefly explained in Table 1.1:

Table 1.1: Performance dimensions

Element	*Definition*	*Types*
Density	Quantity of something per unit of measure, typically per unit of land	Structural - built vs. unbuilt upon land Dwelling or resident - traditional, mass housing Use - industrial, residential, green
Grain	Way in which the various elements of a settlement are mixed together in space	Sharp or blurred - shift in urban texture Coarse or fine - presence of single or multiple elements, in dense or sparse concentration
Access	ability of a resident or visitor to move freely toward desired people, goods, or settings within an urban area, particularly the number or quality of paths, edges, or intersections	Pedestrian - sidewalks and alleys Vehicular - streets, highways Transit - bus routes/stops

Beyond Lynch

In his description of the modern "infosphere," Kaveh Fattahi claims that Lynchian methods of city imaging are outdated, unequipped for the nuances of the "data-driven

[75] Lynch, *Theory of Good City Form* 266
[76] Ibid 265

infoscape" that has emerged in response to improved and expanded global technologies.[77] He attempts to address the relationship of virtual and physical public space by expanding on Lynch's five elements of the cognitive map. Fattahi writes that human evolution, space evolution, and definition evolution have transformed Lynch's landmarks into "link marks," in an effort to improve our collective sense of time and place.[78] From his perspective, Lynch's static landmarks neglect the powerful relationship human beings have developed with technology, from cell phones and GPS to Google, which has shifted our understanding of space from visual to digital. For Fahatti, and countless data-driven professionals, architecture and infrastructure have a responsibility to coordinate three distinct environments: mind, world, and network.[79]

Another data-driven method of analysis that has emerged in the past decade is "space syntax," a system described by its creator Bill Hillier as a concept of intelligibility, the idea that an urban environment can be better understood through its spatial configuration, as opposed to Lynch's legibility.[80] The system is designed to translate spatial relationships into series of integration values that can be depicted graphically as a network of colored lines (Figure 3). These networks are derived from Lynch's original system of paths, nodes, edges, districts, and landmarks, but seek to measure the topological distance between the elements, rather than user perception of space. Intelligibility is defined as, "the degree to which what can be seen and experienced locally…allows the large-scale system to be learnt without conscious efforts."[81] Such measurements are an intriguing attempt to bridge the gap between the literal and

[77] Fattahi, Kaveh and Hidetsugu Kobayashi. 2009. ""City Imaging After Kevin Lynch.""IEEE Computer Society. 286
[78] Ibid 283
[79] Fattahi 286
[80] Mohamed, Abdelbaseer. "Evaluating Way-finding Ability Within Urban Environment." Paper presented at the Eighth International Space Syntax Symposium, Santiago, Chile, January 3-6, 2012. 1
[81] Ibid 2

perceived environment in the city, but have not yet been widely accepted or applied by the design community.

Figure 1.1: Space Syntax diagram of Brasilia. Source: Kevin Fahatti.

Despite the evolution of technologically advanced systems such as these, novice and professional researchers continue to study and employ Lynch's method of imaging. The technique remains relevant in modern urban analysis for its ability to create intuitive maps that capture the way cities "feel" according to land use blogger Roger Valdez.[82] Lynch's method is widely accepted as one that can be applied at the micro- and macro-levels of urban analysis, and is useful for this study in the sense that it can be easily produced for the analysis of multiple sampled areas, and allows for extremely complex spatial data to be distilled into concise graphic representation.

Conclusion

In her essay, "A catholic approach to what designers should know," theorist Anne Vernez Moudon draws a distinction between *normative-prescriptive* research and

[82] Valdez, Roger. April 25, 2011. *Reading Cities: Why Kevin Lynch is Still Important*. Seattle's land use Code. Seattle, Washington: Wordpress.

substantive-descriptive research in urban design that is also relevant to this study. According to Moudon, *substantive-descriptive* research is a process designed to accumulate "critically descriptive knowledge, emphasizing 'what is' and perhaps also the 'why' of a particular phenomenon," while normative-prescriptive research is more concerned with "what should be."[83] In simplest terms, it is the difference in understanding a city and designing it, ideas that Moudon believe lie on a continuum.

Kevin Lynch's work illustrates Moudon's theory, for his substantive analysis conducted in *The Image of the City* moves toward prescriptive conclusions in *Theory of Good City Form,* though he wisely assumes no holistic authority on the subject. Moudon further writes that in order for the field of urban design to progress, designers and researchers, "will need to separate conceptually the art of description from that of prescription, to devise clear and honest ways of evaluating existing or past situations."[84] On this premise, the following analysis remains a substantive-descriptive study concerned primarily with the dimensions of performance that can be observed in the district of Kartal, with no formal attempt to draw normative-prescriptive conclusions.

[83] Moudon, Anne Vernez. "A catholic approach to what designers should know." *Designing cities: critical readings in urban design*. 2003. Malden, MA: Blackwell Pub.363
[84] Moudon 364

Chapter 2: Measuring Urban Performance

"There are a few residential areas of moderate scale that are comfortable, workable, and handsome. There is an equally small number of well-designed urban centers… but planned, ugly and inhuman places, formless suburbs, gray city districts, and industrial wastelands are endless." - Kevin Lynch, City Sense and City Design (511)

Research Framework

Though Ali Madanipour hinted at the benefits of form analysis in his *Public and Private Spaces of the City,* the method is somewhat controversial in the field urban design. Critics of form analysis, like Hulya Ertas and Kathrin Wildner, call for urban studies at the "micro level," in which a singular space, street, or resident is asked to represent the entire district or city.[85] Such micro-studies preference user-interaction and satisfaction above all other performance criteria and cannot easily be extrapolated to the macro-scale of the city as a whole. Though Wildner does not believe that form analysis can provide a comprehensive understanding of spatial performance, she does not discount the value of the method altogether, but simply asks that the social and cultural data available at the micro-level of the city be included in any holistic study. This study recognizes the desire for micro-level data and as such incorporates user-generated imagery in its preliminary level of urban analysis.

Jane Jacobs and Kevin Lynch, both well-respected advocates of micro-level urbanism, champion form analysis as a viable method of study. Jacobs dismisses the solitary application of use-by-use analysis of cities as studies that yield overall pictures, "about as useful as the picture assembled by the blind men who felt the elephant and pooled their findings."[86] For Jacobs, spatial and architectural diversity are the keys to "good" urbanism. In her *Death and Life of Great American Cities*, she writes that to

[85] Wildner 210
[86] Jacobs, Jane. 1961. *The death and life of great American cities.* [New York]: Random House. 143

understand the life-giving complexity of a thriving city, “we have to deal outright with combinations as essential phenomena.”[87] Though micro-level studies are important to Jacobs work, she advocates the method as a means of comprehending and creating “good” urbanism only when used in conjunction with macro-level in analysis in a manner similar to Wildner.

Kevin Lynch makes a case for form analysis in his text *City Sense and City Design*, where he moves away from the basic units of city form described in *Image of the City* and begins to postulate about the method itself. According to Lynch, good urbanism cannot be achieved by a collection of small, but “handsomely designed” areas, for “every physical whole is affected not only by the quality of its parts, but also by their total organization and arrangement.”[88] In response to critiques of form analysis, Kevin Lynch developed five criteria by which a viable study of urban form may be constructed. The criteria are as follows:

> 1) Must have significance at the citywide scale, that is, be controllable and describable at that level.
>
> 2) Must involve either the physical shape of the city or the activity distribution and not confuse the two.
>
> 3) Must be applicable to all types of urban settlement, used by any human culture.
>
> 4) Must be capable of being recorded, communicated, and tested.
>
> 5) Must have significance for their effect on the achievement of human objectives and include all physical features that are significant.[89]

Using Lynch’s criteria as the basis for a viable form analysis, this study combines the two dominant forms of investigation, micro-level and macro-level, to provide a

[87] Ibid 144
[88] Lynch, *City Sense and City Design* 358
[89] Lynch, *City Sense and City Design* 360

comprehensive analysis of formal and informal design performance in Kartal. It should be noted that the following methodology is based on the work of predominantly western theories of analysis and that certain biases in that respect can be assumed. However, as Anne Vernez Moudon notes in her catalogue of design theory, these methods have been applied in research and planning endeavors across the globe and are readily accepted in the diverse disciplines of planning, architecture, and geography as viable means of analysis.[90]

Methodology

This study is an explanatory single-case study with three embedded units. Singleton and Straits outline three major categories of study that are relevant to the design of this project: exploratory, descriptive, and explanatory research.[91] While exploratory studies simply investigate a phenomenon about which little is known, descriptive and explanatory research are considerably more structured. According to Singleton, descriptive research is normally a, "fact-finding enterprise… focused on relatively few dimensions of a well-defined entity."[92] This study moves beyond the singular phenomenon of informal development to analyze the relationships *density*, *grain*, and *access* form in the urban context so that the relative *performance* of formal, informal, and blended spaces might be compared and judged.

Research of this type requires rigorous analysis of each variable and an understanding of their impact on the formation of good urban space that cannot be dismissed as mere description. Data is analyzed within each embedded unit and

[90] Moudon 363
[91] Singleton, Royce, Bruce C. Straits, and Margaret Miller Straits. 1993. *Approaches to social research*. New York: Oxford University Press.
[92] Singleton, Straits 68

between them in order to draw conclusions about the main unit.[93] The purpose of this study is to answer the following research questions, understood as stages of analysis conducted chronologically:

1) Can informally and formally designed regions of Kartal be identified and mapped?
2) What spatial typologies can be identified in the fabric of each? (as defined by Lynch)
3) What structural and spatial *densities* can be observed in the formal and informal regions?[94]
4) How do the spatial and architectural *grains* of these regions compare? (according to elements defined by Lynch[95])
5) What degrees of pedestrian, vehicular, and transit-oriented *access* can be observed in the informal and formal regions of Kartal?[96]

The objects of study are analyzed through the operationalization of the study's three constructs: 1) *density*, 2) *grain*, and 3) *access*. These constructs are combined through data and methods triangulation to assess the larger construct of *performance* in selectively sampled regions of Kartal.

Units of Analysis

There is one main unit of analysis defined for this study, with three embedded units. The singular district of Kartal in Istanbul, Turkey, has been selected as the main unit of analysis and is bound geographically by the Omerli Reserve to the north and the Sea of Marmara to the south. The districts of Pendik and Maltepe form Kartal's political boundaries to the east and west, respectively (Figure 2.1). Kartal is divided into four

[93] Yin, Robert K. 1994. *Case study research: design and methods*. Thousand Oaks: Sage Publications.
[94] Jacobs, Allan B. 1993. *Great streets*. Cambridge, Mass: MIT Press.
Jacobs, *Death and Life of Great American Cities*
[95] Lynch, Kevin. 1960. *The Image of the City*. Cambridge, Mass.: MIT Press. 265-266
[96] Jacobs, *Death and Life of Great American Cities* 150-151

quadrants by the D-100 and Samandıra Kartal Bağlantısı highways and has been targeted by the Istanbul Municipality Planning Commission as the site of an urban revitalization scheme submitted by architect Zaha Hadid.[97] Kartal's history as an informally designed district has been amended by government intervention of this type and the area can now be considered a blended district where formally and informally designed areas co-exist. This blended status provides the conditions necessary for a single researcher to analyze each type of development within a short period of time and was thus chosen as the basis of this study.

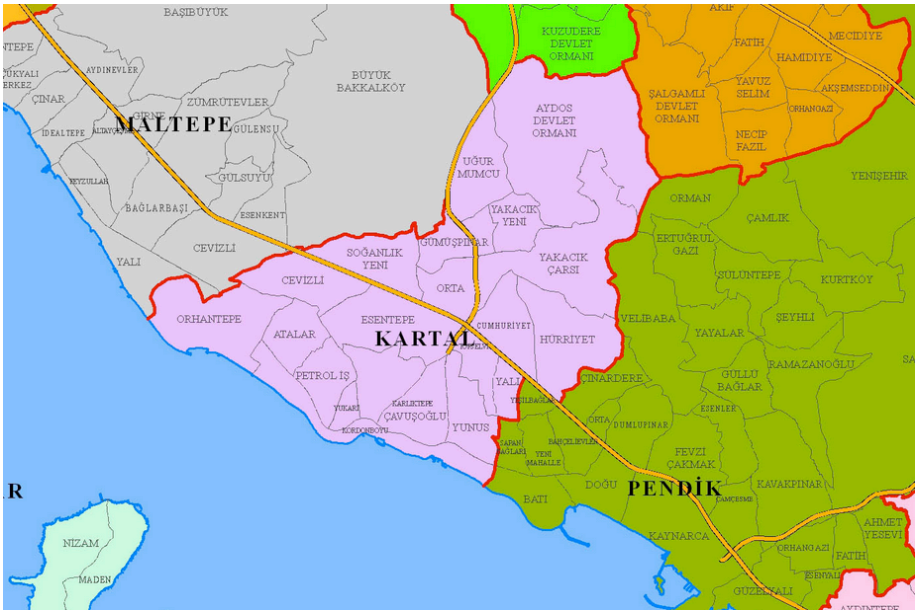


Figure 2.1: Administrative boundaries of Kartal. Source: Istanbul Municipality.

Embedded/subunits of analysis

The three embedded units of analysis identified for this study are the formal, informal, and blended regions of Kartal, which can be understood as distinct units within the greater district, but also as characteristics representative of the district as a whole. As such, the embedded units have an interdependent relationship that contributes to the

[97] Ayatac 8

spatial and architectural performance of the main unit, the blended district of Kartal. Developmental divisions within the main unit of analysis were inferred and mapped through a critical reading of planning and housing legislation effective in the area since 1950, as well as the analytical reports of environmental studies made in the area since that time (Figure 2.2).[98] Formal and informal regions of the same district were selected to ensure that the legal and cultural factors involved in each area's development were analogous.

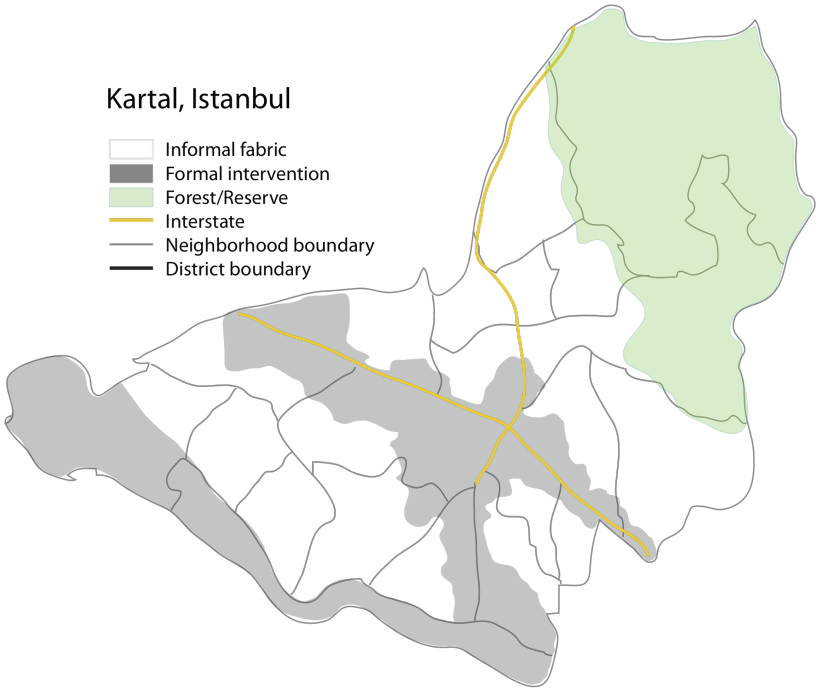


Figure 2.2: Informal and formal areas of Kartal. Source: Author.

The first embedded unit of analysis is the informally designed region(s) of Kartal, located most heavily in the inland east and west sectors of the district. In contrast to formal space, "informal" spaces and settlements are those that contain user-generated spaces and structures constructed without professional or governmental input, often

[98] Unsal, Fatma. 2009. "Critical Evaluation of Legal and Institutional Context of Urban Planning in Turkey: The Case of Istanbul." Aalborg, Denmark, International Academic Association on Planning, Law and Property Rights, February 11-13, 2009. 1-21.

requiring the conscious circumvention of building codes and regulations.[99] In his article "Informal/Peripheral Production," Louis Rice defined informal spaces as ones "occupied by informal societies or actions… transient, temporary, fluxive conditions which stand in contradiction to the static zoning laws and land-use plans of institutional control."[100]

The second embedded unit of analysis is the formally designed region(s) of Kartal, seen most clearly near the Samandıra highway and along the Marmara Coast. "Formal" spaces and settlements are those sanctioned by the government and undertaken by professional architects and planners. Construction and planning of this type is "institutionalized" according to architect Gizem Akdogan, and often implies more ordered spatial patterning and development.[101] The inclusion of formally designed regions of analysis in this study allowed the author to observe recursive and dissonant spatial figures and patterns, thus providing a more comprehensive understanding of the district as a whole.

The third embedded unit of analysis is that of blended space. "Blended" areas are those in which tracts of formal and informal space co-exist and merge. For the purpose of this study, blended areas are restricted to those that exhibit roughly equal amounts of formal and informal fabric. Areas of this type are found predominantly in the southern portion of Kartal, between the D-100 highway and the Marmara Coast.

Constructs

The overarching construct measured by this study is that of *performance*, or *quality* as it is called by Jane Jacobs, of formal and informal fabric in the urban

[99] Akdogan, Gizem, "Dealing with rapid development: Creation of the informal urban economy and gecekondu housing in Istanbul" (2009). Graduate Theses and Dissertations. Paper 10809. 4
[100] Rice, L. (2011) Informal/peripheral production. In: Architectural Humanities Research Conference, Belfast, UK, October, 2011.
[101] Akdogan 4

environment of Kartal. Both Jacobs and Lynch recognize that the quality of a place is determined not simply by its physical form, but by the behavior and intent of the society which occupies it. Lynch writes quite extensively about this interdependence in chapter 12 of his *Theory of Good City Form,* though he contends that a certain degree of goodness can be measured solely by reference to spatial form through the application of *performance dimensions*.

According to Lynch, a city with satisfactory performance is one that is "vital, sensible, well fitted, accessible, and well controlled," such that all characteristics are "achieved with just and internal efficiency."[102] As a number of these dimensions have been discussed in detail already, in more general terms, good urbanism is found places that are "continuous, well-connected, open, and conducive to development."[103] Jacobs agrees that there is no single element or "kingpin" in a city that serves to clarify all, but that "the mixture [of elements] itself is the kingpin, and its mutual support is order."[104] She writes that, "only intricacy and vitality of use give, to the parts of the city, appropriate structure and shape," and has defined measurable characteristics of diversity to that end in a way much similar to Lynch.[105] Jacobs calls for mixed-use districts, pedestrian access, varied structural age, and dense concentrations of streets and intersections to ensure diversity, all of which were discussed previously in this text.

The *performance* element is broken into three sub-constructs by Kevin Lynch, who declares that, "density, grain, and the access system –the internal texture of a city—are the principal features by which we may judge its performance."[106] As mixed-

[102] Lynch, *Theory of Good City Form* 235
[103] Ibid 235
[104] Jacobs, *Death and Life of Great American Cities* 376
[105] Ibid 377
[106] Lynch, *Theory of Good City Form* 274

use and structural age fall easily under the construct of grain, and pedestrian access and density are even more obviously accounted for, Jacobs' criteria can be analytically subsumed by Lynch's constructs. The sub-constructs of *density*, *grain*, and *access*, as defined below, thus form the analytical base of this study by which the main construct of *performance* is judged.

1) Density

Density, called concentration by Jane Jacobs, refers to the quantity of something per unit of measure, particularly a unit of land. As such, several types of density can be observed in a given area, reflective only of the characteristic being measured. Jane Jacobs defined three of these types in her description of urban diversity, each of which play a role in the "goodness" of an urban area and can be quantified for study: structural or built density, dwelling density, and use density, of which use refers to the type and number of amenities available in a given area.[107]

2) Grain

The construct of *grain* refers to the "typical local interrelations between similar or dissimilar elements, without reference to total pattern" described by Kevin Lynch.[108] A more accessible definition from Lynch found in *A Theory of Good City Form* reveals that grain is, "the way in which the various elements of a settlement are mixed together in space…be they activities, building types, persons, or other features."[109] Lynch has identified four types of grain in an attempt to quantify the relationships between disparate or clustered elements in the urban fabric. These types have been used to

[107] Jacobs, *Death and Life of Great American Cities* 200-221
[108] Lynch, *City Sense and Design* 362
[109] Lynch, *Theory of Good City Form* 265

describe the relative "goodness" of the sampled *mahalleler* in the remainder of this study and are defined in Table 2.1 below:

Table 2.1: Grain definitions

Type of grain	*Definition*	*Advantage/Disadvantage*
Sharp	Abrupt shift in texture of urban fabric	- creates harsh edges and barriers between districts
Blurred	Gradual shift in texture of urban fabric	- allows for shared resources and interaction between districts
Coarse	Fabric is dominated by a single use or building type, often in large or repeated quantities; characterized by large open spaces, "pure" districts	- decreased access to other kinds of people/life - creates long commutes to work and amenities - increased privacy - potential for more efficient transportation systems
Fine	Fabric is comprised of multiple and varied uses or building types, often in small clusters or quantities; characterized by small open spaces, "mixed-use" districts	- increased access to amenities - structures are more directly fitted to user activity - perceived level of control is increased

3) Access

The construct of *access* is described as the ability of a resident or visitor to move freely toward desired people, goods, or settings within an urban area, and speaks particularly to the number and quality of paths, edges, and intersections in a given place. Though multiple levels of access can be identified in the city, Jane Jacobs and Allan Jacobs wrote most extensively about the dimensions of pedestrian and vehicular access in their respective works.[110] According to Allan Jacobs, *access* not only privileges open-space design over structural form, but also begins to measure the comfort of open-space in dimension and movement, elements necessary to the design of "good" urban fabric.[111]

[110] Jacobs, Jane. *Death and Life of Great American Cities.*
Jacobs, Allan B. 1993. *Great streets*. Cambridge, Mass: MIT Press.
[111] Jacobs, *Great Streets* 302

Operational Definitions

Table 2.2 shows the study's constructs, means of operationalization, and units of analysis studied in the measurement of each construct.

Table 2.2: Constructs

Nominal construct	*Operationalization*	*Units of analysis*
Density -built -dwelling -use	Analyzed through figure ground diagrams and square mile maps from *Great Streets,* grid units coded by development type and concentration, summarized as a percentage for comparison	Embedded
Grain	Evaluated using Lynch's diagramming and photo-grid techniques, identified using Google Earth photos, 2- and 3-D Geodata	Embedded
Access -transit -vehicular -pedestrian	Analyzed using characteristics of diversity from Jacobs, documented and compared using path network diagrams similar to those found in *Urban Age*	Embedded

The construct of *density* is operationalized through the construction of figure-ground diagrams and square-mile studies described in Allan Jacobs' *Great Streets*.[112] Figure-ground diagrams are used to create a visual register of occupancy that can be qualitatively described or quantified as a percentage for comparison. The square-mile studies advocated by Allan Jacobs are the limiting framework for these diagrams, designed to showcase street and block patterns that, "permit some dimensioning and measuring of differences and similarities and of how those seem to change over time and distance."[113] This type of measurement is applied to the embedded units of analysis (i.e., formal, informal, and blended regions), in order to draw conclusions about the main unit of analysis (i.e., the district as a whole).

[112] Ibid 302
[113] Ibid 268

The construct of *grain* is operationalized using Lynch's diagramming and photo-grid techniques, created from aerial- and street-level imagery.[114] Though a traditional photo-grid, as described by Lynch in *City Sense and City Design,* would have required extensive photographing of the sampled area by a single researcher, a modified form of this method has been used in this study due to time and financial constraints. Once a visual database is established, iconographic diagrams are drawn utilizing the five elements of urban fabric (paths, edges, districts, nodes, and landmarks) designed by Lynch to create an "image" of the region for analysis and comparison.[115] This type of measurement is applied at a small scale to the embedded units of analysis (i.e. sampled formal and informal regions), in order to understand the main unit of analysis (i.e. the entire district of Kartal).

The construct of *access* is operationalized using Jane Jacobs' four *characteristics of diversity* as a guide for quantitative measurements of the pedestrian and vehicular path networks observed in each sampled area.[116] Once calculated, these measurements are reproduced as a series of path diagrams that can be used to interpret the strengths and weaknesses of the *access* system in each sampled region. This type of measurement is applied to the embedded units of analysis (i.e., formal, informal, and blended regions), as well as the main unit of analysis (i.e., the district as a whole). All analyses are combined in a cross-case synthesis at the main unit of analysis, Kartal.

[114] Lynch, *City Sense and City Design* 266
[115] Lynch, *Theory of Good City Form* 47
[116] Jacobs, *Death and Life of Great American Cities* 150-151

Data Sources

In his *Applications of Case Study Research,* Yin identifies six data sources that can be used for case study research: documents, archival records, interviews, direct observation, participant observation, and physical artifacts.[117] This study relies on published literature and open-source *documents*, including GIS and Geodata files. *Archival records* consulted include historic planning laws, physical and political maps of the district, and user-generated photographs collected from Google Earth that reveal the urban nature of Kartal (Table 2.3). Data and methods triangulation were applied this study and the convergence of evidence from the measurement of constructs in the two embedded units was used to comprehend the main unit of analysis. According to Yin, convergence "adds strength to the findings as the various strands of data are braided together to promote a greater understanding of the case," and contributes to the formation of a robust analysis of a given unit.[118] While this type of data collection is recognized for it's methodological rigor, one of the drawbacks of this method is the overwhelming amount of data that it can produce.[119]

Table 2.3: Data Sources

Data Source	*Specific Source*
Documents	- Administrative documents - Demographic data - Observations made from GIS and Geodata files - District maps and analytical diagrams produced by the author
Archival Records	- Historic and current aerial photos (from Istanbul Municipality) - Historic and current maps of the district - Historic and current planning laws (Unsal) - User-generated photographs (Google Earth)

[117] Yin, Robert K. 1994. *Case study research: design and methods*. Thousand Oaks: Sage Publications. 85-97
[118] Ibid 85
[119] Ibid 94

Documents

The *documents* (i.e. published literature about the study's main unit of analysis, the district of Kartal) used in this study include administrative documents produced by the district government and greater Istanbul Municipality, demographic data, scholarly articles and conference papers devoted to the nature of informal settlements and formal revitalization schemes. These documents are used to inform the selection of sampling areas and to provide information about the *gecekondu* past of Kartal and future plans for its development. The low availability of this type of data, and even smaller quantity of such documents published in the English language, is a limiting factor on published literature as a data source. Other limitations defined by Yin are the low retrievability of such documents, reporting bias of the document's author, and lack of access to the full breadth of available records.[120]

Additional documents consulted during the study include maps, diagrams, and observations made by the author from GIS and Geodata files produced by the Ministry of Forestry and Water Affairs Network of Istanbul for the district of Kartal. These files were used to identify spatial and structural patterns necessary for comprehending the levels of access, grain, and density at play in each embedded unit of analysis and allowed phenomena observed within the embedded units to be tested in the main unit, the district as a whole. Limitations of this data source are the possibility of author bias in selective observation, the tedious nature of producing analytical graphics needed to document observed phenomena, and the constraints of the GIS and Geodata available for remote analysis. Yin states that author bias and production time could be minimized

[120] Yin 86

if multiple researchers were used, though the financial resources allotted for this research prevent such measures.[121]

Archival Records

The *archival records* used in this study include historic aerial photographs, maps, demographic data, and planning legislation produced by the Istanbul Municipality and independent researchers for the district of Kartal. These records are used to inform case-study design and the selection of sampling areas, but more importantly provide the information necessary to chart the growth and change of the informally and formally designed areas of the district over time. Though some private collections of maps and photos exist for the district of Kartal, large time-gaps between open-source maps and imagery are limitations of this data type.

User-generated photos submitted to Google Earth were also examined and selected for use in the construction of a photo-grid for Kartal. The edges, nodes, and landmarks observed through the photos, when combined with the patterns observed from aerial imagery of the district, form the basis of the iconographic diagrams described by Lynch. These diagrams are used to document and measure the *grain* of each embedded unit as well as the main unit of analysis. Though this data source is used to verify urban phenomena perceived at the macro-level by the author and to limit researcher bias, the limitations of this data source include the limited availability of images, the reporting bias of the photo author, and the selective bias of the researcher.[122] As with the previous data source, the usefulness of archival records is

[121] Ibid 86
[122] Yin 86

limited by low retrieveability, reporting bias of the archive's author, biased selectivity if the collection is small, and simple lack of access to available collections.[123]

Conclusion

These multiple methods and data sources are combined to form a comprehensive body of data used to analyze the constructs of density, grain, and access, which contribute to the overarching construct of performance, the analysis of which drives this study. The ability to balance and converge data from multiple sources increases construct validity according to Yin and stands as a major strength of case study research.[124]

Data Analysis for Main Unit of Analysis

The main unit of analysis is evaluated for the construct of grain at the scale of the entire district. This is achieved by creating a photo-grid of the entire area, from which observations informed by Kevin Lynch's five elements are made and "imaged" through a series of iconographic diagrams. The process of creating each of these tools is described below.

1) Photo-grid: To create an urban photo-grid in the style of Lynch, a grid is laid over the base map of the study area, at a scale analogous to the fabric of the region (Figure 2.3). Once this grid has been established, the nearest accessible point to each grid intersection is found and documented to produce a "complete sampling of the visual character of the area" that can be used in further analysis.[125] A visual database of this

[123] Yin 86
[124] Ibid 97
[125] Lynch, *City Sense and City Design* 266

sort was created for the sampled regions of Kartal using street-level imagery drawn from geo-tagged photos available on Google Earth. Though the accurate positioning of such photos could be questioned, the images selected for inclusion in the visual register of the region were verified as much as possible using available GIS data. One benefit of this type of methodological modification is that by utilizing imagery collected by a large network of external photographers, the perspectival bias created by the imagery of a single, internal researcher is diminished. In this sense, the visual database of the district has been imaged by its users and can thus provide a more organic representation of the place.

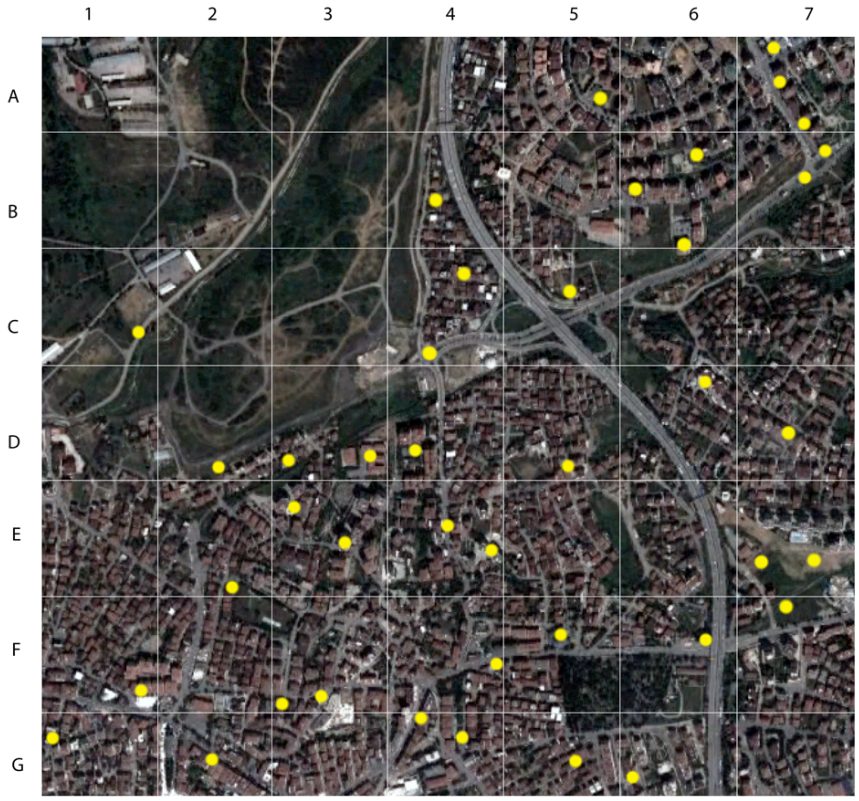


Figure 2.3: Example photo grid, Gumuspinar. Source: Author.

***2) Iconographic diagrams**:* Using the spatial characteristics observed in the imagery of the photo-grid, the five elements of urban fabric described and defined by Kevin Lynch

in his *Image of the City* are catalogued as observed in the sampled area. Once the elements are coded for diagrammatic reproduction using Lynch's iconographic key, they are re-applied to the map of the area of study to create a symbolic "image" of the urban form. This method of analysis is used to distill complex spatial data into a diagram that can be used to identify and compare form qualities within the city or district fabric and illuminate the role of physical form in spatial *performance*. The form qualities identified by Lynch are as follows: singularity, form simplicity, continuity, dominance, clarity of joint, directional difference, visual scope, motion awareness, time series, and meanings.[126]

3) Cross-case synthesis: A written case-description of the phenomena observed during this portion of the study is combined with the results of the embedded units analyses to create a cross-case synthesis of the dimensions of urban performance. This synthesis summarizes how formal and informal development patterns and spatial characteristics are similar and different as evidenced by the measurement of the *density*, *grain*, and *access* constructs. The results of the studies of the embedded units are used to inform the understanding of the main unit of analysis, such that the smaller scale of the informal and formal regions are understood to represent the blended nature of the greater district.

[126] Lynch, *Image of the City* 105

Data Analysis for Embedded Units of Analysis

The embedded units of analysis are evaluated for the constructs of density, grain, and access at the scale of the sampled region. This is achieved using the previously described iconographic diagrams of Lynch, as well as the figure ground method of analysis proposed by Allan Jacobs and measurements guided by the diversity criteria proposed by Jane Jacobs. The sampled areas addressed in this study have been limited to one square mile in accordance with Allan Jacobs' method. This limitation was adopted to ensure that multiple units could be documented and analyzed under the time constraints of the study. The process of creating each of these tools is described below.

1) Figure ground

Figure ground studies are simple diagrams that give order to the complicated relationship of structure and space in an urban area (Figure 2.4). As demonstrated in the city data for Istanbul published by *Urban Age*, figure ground images "help [the user] visualize the microstructure of urban neighborhoods, how buildings (in black) and open spaces (in white) come together to create an integrated urban whole."[127] Allan Jacobs writes in his book *Great Streets* that while physical scale is certainly a factor in the social organization and communication networks of a place, urban form and patterning are, "rarely taken into account as integral, important information for comparative, nonphysical studies."[128]

Figure ground diagrams are useful for their ability to clarify the relationship between density and visual form, and the square-mile versions adopted by Jacobs

[127] Urban Age 36
[128] Jacobs, *Great Streets* 268

ensure that the data gleaned is of comparable scale and quality. According to him, the square-mile maps "permit quantifiable comparisons of some two-dimensional aspects of urban scale, such as the numbers of public intersections and blocks in those areas," thus providing a measure of density with a visual component for publication.[129]

Figure 2.4: Square-mile figure ground study for Nenehatun settlement of Istanbul. Source: Urban Age.

2) Path network diagrams

To create a path network diagram like the ones used to show the rail systems of global cities in *Urban Age,* lines of varying thickness and hue are laid over a map of the sampled area to represent the size, direction, and density of accessible paths (Figure 2.5). Though this method is employed at a considerably larger scale in *Urban Age* than the ones produced for this study, the concept is similarly used to distill the complex network of transportation and mobility into a simple graphic representation that can be compared across and between sampled areas.[130] The paths analyzed in this study reflect the levels of pedestrian and vehicular access available to the residents and visitors of Kartal in the embedded units of analysis, as well as the main unit.

[129] Jacobs, *Great Streets* 260
[130] Urban Age 30

Figure 2.5: Sample rail network diagrams. Source: Urban Age

Concluding Data Analysis

A conclusion addresses the implications of this study for urban planning theory and the future of blended settlements in the city of Istanbul and Turkey at large. Performance ratings are made for each settlement, by construct, on the basis of data analysis results. The limitations of this study and potential for further research are also discussed.

Sampling Method

The sampling frame is a map of the district of Kartal, Istanbul, as defined by the administrative boundaries created in 2004. The sampling design uses stratified random sampling to select sample sites for the embedded units of analysis, as well as the main unit, Kartal, for the singular construct of grain.[131] The administrative boundaries of the district's individual neighborhoods, called *mahalleler*, divide the area of study into 21 representative units. These administrative divisions are a more efficient means of

[131] Singleton, Straits 124

understanding the district than conventional sampling techniques and have been used to select representative samples of the area in the place of a traditional polygonal grid.

For the embedded units of analysis, the sampling size is limited to a single neighborhood, or *mahalle*. Three spatial strata were identified during preliminary analyses of the district: *formal*, *informal*, and *blended* space. A single *mahalle* was selected for each stratum, of which 75% of the land area within the *mahalle* conforms to the stratum identity (Table 2.4). Purposive sampling strategies were employed to ensure analogous conditions were present in each of the sample units, particularly in the study of housing types/densities and access to major highways.[132]

Table 2.4: Sampling strata

Stratum	*Definition*	*Mahalle*
Formal	Exhibits no less than 75% land area modified by formal planning and/or construction	Esentepe
Informal	Exhibits no less than 75% land area generated without formal planning and/or construction	Gumuspinar
Blended	Exhibits both formal and informal planning in land areas of comparable measure and prominence (approx. 50/50)	Cevizli

Each sampled unit was restricted to a square mile of land in accordance with the analytical technique defined by Allen Jacobs (Figure 2.7).[133] Observation sites were again selected using stratified random sampling of selected grid units from within the square mile sample in order to measure the *pedestrian* strata of analysis for the construct of *access*. Purposive techniques, as defined by Dixon, were used to ensure that grid units representative of the urban fabric were chosen for analysis.[134]

[132] Singleton, Straits 133
[133] Jacobs, *Great Streets* 260
[134] Dixon, C. J., and Bridget Leach. 1976. *Sampling methods for geographical research*. Norwich, Eng: Geo Abstracts. 33

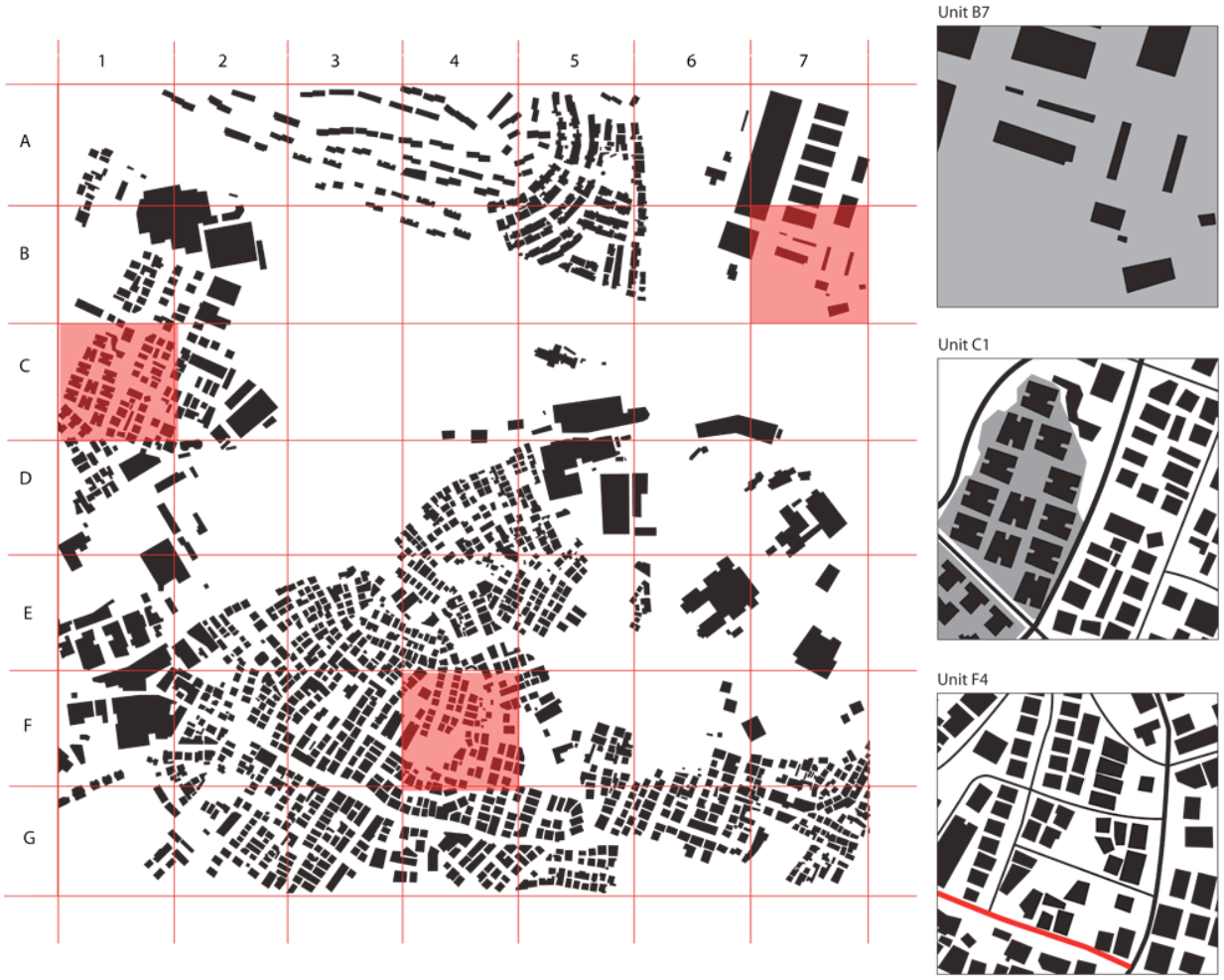


Figure 2.6: Square mile diagram with selected pedestrian units, Cevizli. Source: Author.

Methods Summary

The stratified method of analysis utilized in this study is summarized graphically in Figure 2.7 to clarify the diagramming techniques employed throughout the study, and is included below for reference. Though each *mahalle* was subjected to the full range of analysis and documentation described previously in this chapter, only the blended unit of Cevizli is represented in Stages 3 through 5 of the figure.

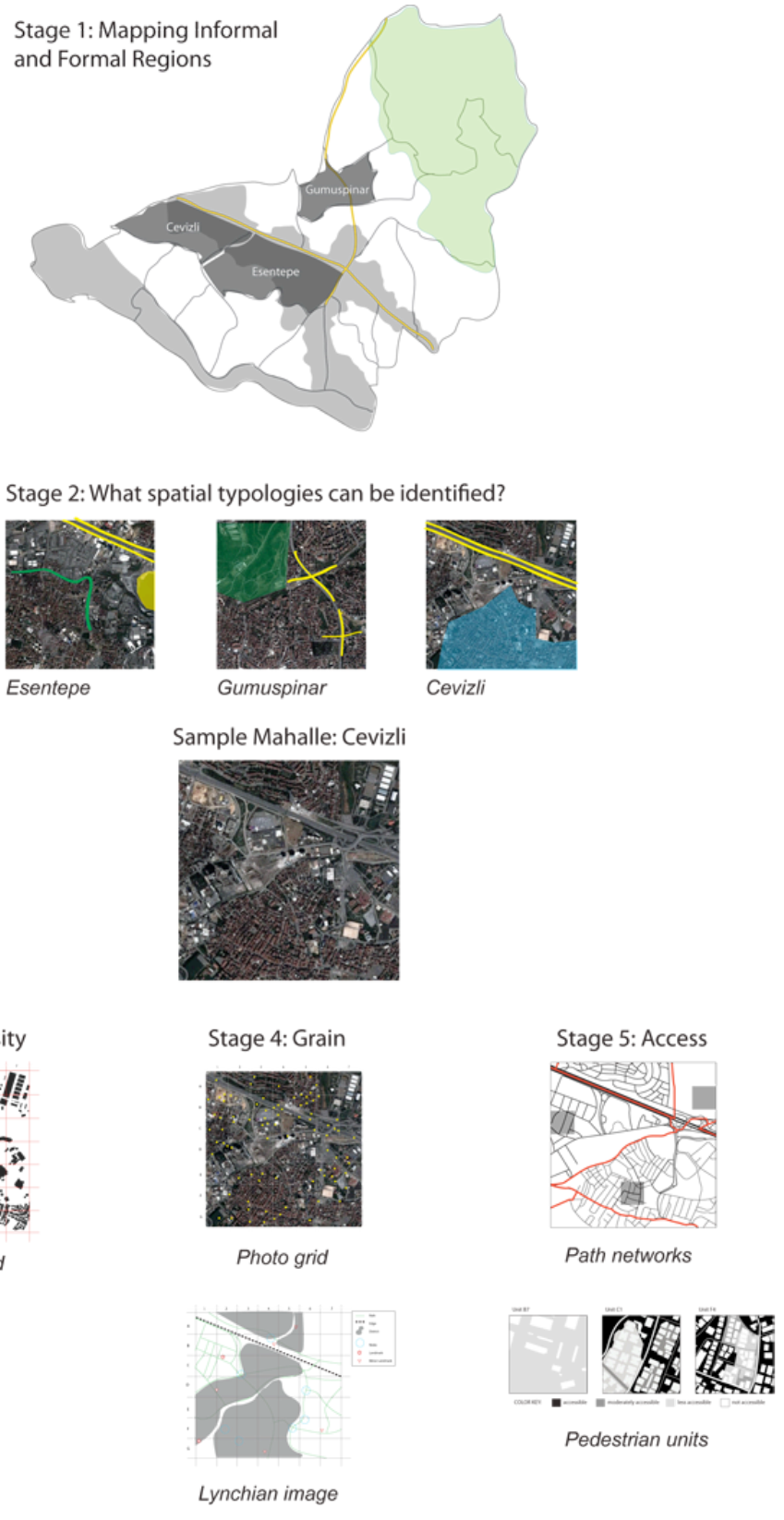


Figure 2.7: Methods summary and graphic techniques. Source: Author.

Chapter 3: Defining Urban Performance

"The study of languages has no powerful basic language of its own. It borrows the devices of geography and architecture, but they are only partly useful. If a language particular to cities develops, it is likely that it will be a graphical one…" –Jane Jacobs, The Death and Life of Great American Cities (351)

(In)formal distinction

Distinctions between formal and informally generated fabric in the district of Kartal were made by synthesizing data collected for the analytical report of Istanbul's Environmental Plan for 2007 with planning laws for the city in effect since 1985.[135] This combination of formal legislation and field analysis allowed for a more accurate depiction of formal and informal fabric when cross-referenced with time-lapse satellite imagery of the district taken in 1966, 1982, and as late as 2012.[136] The results of this identification process are included below in Figure 3.1. The formal, informal and blended *mahalleler* used in the remainder of this study were selected for analysis on the basis of these findings.

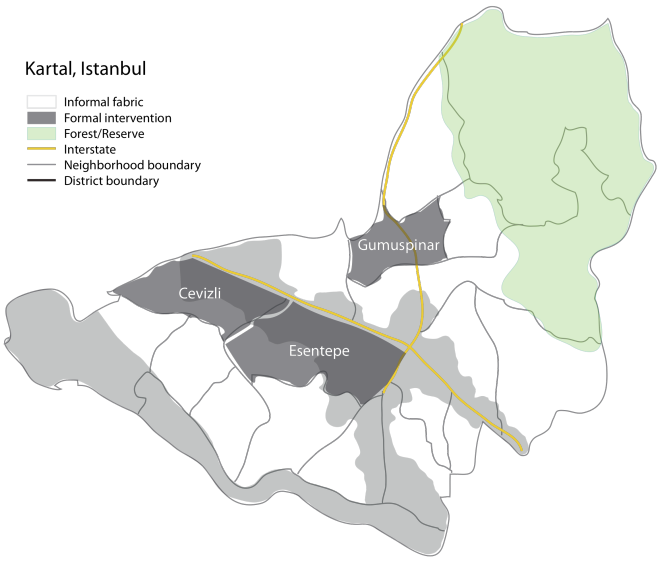


Figure 3.1: Sample mahalleler, Kartal. Source: Author.

[135] Unsal, Fatma. 2009. "Critical Evaluation of Legal and Institutional Context of Urban Planning in Turkey: The Case of Istanbul." Aalborg, Denmark, International Academic Association on Planning, Law and Property Rights, February 11-13, 2009. 1-21.
[136] İstanbul Büyükşehir Belediyesi. *Istanbul Sehir Rehberi* [map]. December 2012. Scale undetermined. Geographic Information System. <http://sehirrehberi.ibb.gov.tr/map.aspx> (01/15/2013).

Preliminary analysis – Identifying form typologies

Once the *mahalleler* of Esentepe, Gumuspinar, and Cevizli were identified for sampling, a preliminary analysis of each *mahalle* was conducted to identify the form typologies described by Lynch. Direct observations from satellite imagery were recorded using hand sketching techniques and can be referenced in Appendix 3. Of the form types listed in Chapter 2, relatively few typologies were visible from aerial imagery. No more than four types were identified in any one *mahalle*, and only the characteristic of *dominance* was present in each.

In the formally designed *mahalle* of Esentepe, the dominance and singularity types were observed. The D-100 inter-district highway and a large industrial pond on the east side of the sample area dominant figures in the landscape of the *mahalle*, forming natural barriers to user movement between districts. A sharp singularity, or contrast, between the small-scale residential fabric and large industrial park spanning the north end of *mahalle* was also observed.

The informal *mahalle* of Gumuspinar was clearly dominated by small-scale residential fabric, though a large area of open farmland in the northeast corner of the sample area formed a singularity clearly far removed from the dense housing blocks. Two major intersections puncture the residential fabric as well, creating a clarity of joint that divides the *mahalle* into several defined districts.

The blended *mahalle* of Cevizli exhibited only the characteristics of dominance and continuity. Again, the D-100 inter-district highway dominated the landscape, creating a natural barrier between the northern and southern districts of the sample area. A large swath of small-scale residential fabric was observed in the center of the

mahalle, provided some continuity for users and residents. An abridged list of observations is found in Table 3.1.

Table 3.1: Lynchian characteristics

Fabric Type	*Mahalle*	*Observation*
Formal	Esentepe	dominance, singularity
Informal	Gumuspinar	dominance, singularity, clarity of joint, continuity
Blended	Cevizli	dominance, continuity

Section 3.1 – Density Analysis

Square mile maps and figure ground diagrams were used in the first stage of analysis to distill complex housing and land use data. These diagrams were constructed for each *mahalle* using area maps and building information supplied by the Istanbul Buyuksehir Belediyesi and the Istanbul Electricity, Tramway, and Tunnel General Management Department. This data was cross-referenced with satellite imagery from Google Earth taken as late as December 2012 to produce square mile diagrams of each sample area using AutoCad 2012 software. The resulting images are included below in Figures 3.3-3.5 for reference, but can be examined in greater detail in Appendix 1. The gridded system developed for photo documentation was employed in each analysis to divide the sample area into describable units. As such, specific units have been referenced by their grid designation in the remainder of this chapter (A1, B2, etc.).

The built density, dwelling density, and use density, as described by Jane Jacobs, were evaluated in each sample and are included in Table 3.2 as percentages for easy comparison between cases.[137] For the purposes of this analysis, built density

[137] Jacobs, *Death and Life of Great American Cities* 200-220

refers to the percentage of land covered by buildings, regardless of use. Sample units are said to exhibit low development (1-49% coverage), high development (50-100% coverage), or no development (0% coverage), based on the percentage of land area covered by buildings in each unit. These percentages are determined through an aggregation process in which areas containing structures and paths are delineated from untouched areas by grid unit for comparison.

Dwelling density is more selective, referring specifically to the percentage of land covered by residential buildings, regardless of scale, though an attempt to differentiate between mass housing and low-density housing was made (see Table 3.2). Use density refers to the percentage of land employed as industrial, residential, and blended space, each represented as a percentage of the total land area. Units with no structural presence to speak of were labeled open space, and thus included as a fourth category of use. All density types were evaluated on a unit-by-unit basis and calculated as a percentage of the total number of units observed in the sample grid. Only the final percentages for each density type are included in Table 3.2. Grid unit classifications for each type of density measurement are included in Appendix 3 for reference purposes.

Table 3.2: Density measurements

Mahalle	*Built density*	*Dwelling Density*	*Use Density*
Esentepe	Low: 34.7% High: 63.3% None: 2.0%	Mass housing: 4.1% Low-density: 38.8% Combined: 16.3% Total housing units: 59.2%	Industrial: 38.8% Residential: 30.6% Blended: 28.6% Open: 2.0%
Gumuspinar	Low: 30.6% High: 57.1% None: 8.2%	Mass housing: 6.1% Low-density: 38.8% Combined: 36.7% Total housing units: 81.6%	Industrial: 8.2% Residential: 83.7% Blended: 0.0% Open: 8.2%
Cevizli	Low: 38.8% High: 59.2% None: 2.0%	Mass housing: 8.2% Low-density: 51.0% Combined: 12.2% Total housing units: 71.4%	Industrial: 20.4% Residential: 44.9% Blended: 32.7% Open: 2.0%

3.1.1 Density: Esentepe, formal sample

The formally designed *mahalle* of Esentepe exhibited a high built density overall, with few undeveloped units in the sample area. The largest undeveloped area occurs in column 7, where the industrial pond noted in the preliminary analysis enters the grid. Low development areas occur along the edges of the industrial districts and near the pond as well, creating wide gaps between residential and industrial fabric. The largest buildings seen in this sample occur near the inter-district highway in the north, where the industrial fabric is most prevalent (Figure 3.2).

Figure 3.2: Figure ground diagram and satellite imagery, Esentepe. Source: Google Earth, Author.

Units with purely industrial fabric are most prevalent in the formally designed *mahalle*, forming nearly forty percent of the total land area. Residential and blended units, those exhibiting both residential and industrial fabric, comprise thirty percent and twenty-eight percent of the settlement respectively. Only one unit was determined to be open space, exhibiting no structural development whatsoever. This unit, D7, aligns with the previously noted industrial pond.

Though industrial fabric is visually dominant throughout the *mahalle*, nearly sixty percent of the total land area contained some type of housing. Mass housing and low-density housing exist in the area, and both are present in certain grid units. Multiple mass housing blocks were observed in the sample area, occurring most prominently in rows F and G, though units with only low density housing form nearly forty percent of the total. These low-density housing units occur in rows C, D, and E, below the highway, and in units A7 and A8 above the highway (Figure 3.2).

3.1.2 Density: Gumuspinar, informal sample

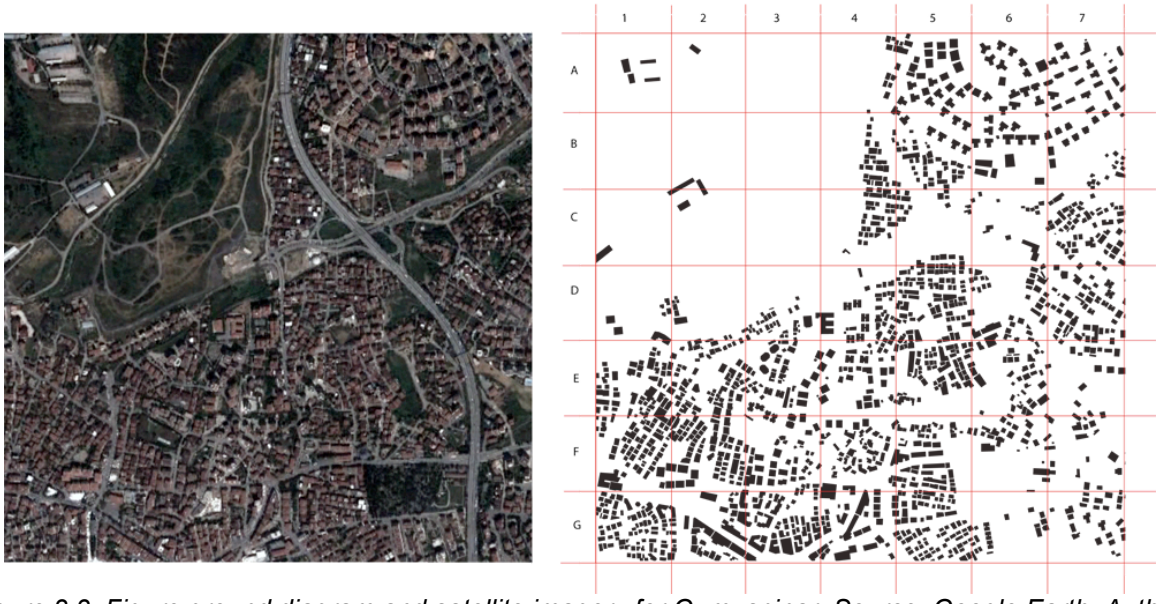


Figure 3.3: Figure ground diagram and satellite imagery for Gumuspinar. Source: Google Earth, Author.

The informally designed *mahalle* of Gumuspinar also exhibited a fairly high built density, though a larger number of grid units had not been developed at all. These undeveloped units are found in the northwest corner of the sample area, in rows A, B, and C (Figure 3.3). Low development areas are found along the edges of this large undeveloped area and in the grid units nearest to the major highways. Highly developed units dominate the sample, comprising fifty-percent of the total land area.

Both mass housing and low-density housing are present in this *mahalle* as well, though units with only low-density housing outnumber the units with both types by only two percent. The percentage of units with only mass housing was slightly higher in this sample area, though all the units of this type occur in the northeast corner of the sample. More than eighty percent of the units in the *mahalle* contained some type of housing.

As indicated by the dwelling density results, residential units dominate the landscape of the informal settlement, again comprising more than eighty percent of the total land area of the sample. Just over eight percent of the units exhibiting some type of industrial development, though the figure ground diagram reveals that of these units, only a very small land area is actually covered by buildings. This minimal industrial presence was surrounded by the sample's only open space units and thus created no blended units.

3.1.3 Density: Cevizli, blended sample

The percentage of highly developed areas in the blended settlement of Cevizli was similar to that of the other two settlements, at fifty-nine percent. Low development areas comprised thirty-nine percent of the sample area and were most concentrated in the industrial areas near the D-100 highway. Only unit C3 showed no structural development whatsoever, though the satellite imagery of the area revealed that it had in fact been paved over as part of the central industrial park.

Just over seventy percent of the settlement contained some type of housing, with more than fifty percent of the units devoted to low-density housing alone. Eight percent of the units contained only mass housing. Though the blended settlement had

considerably more housing overall than the formally designed Esentepe, it had the lowest number of blended units, at just under twelve percent of the total land area. The majority of these blended units occur in column 1. Units with mass housing alone are restricted to rows A and B (Figure 3.4).

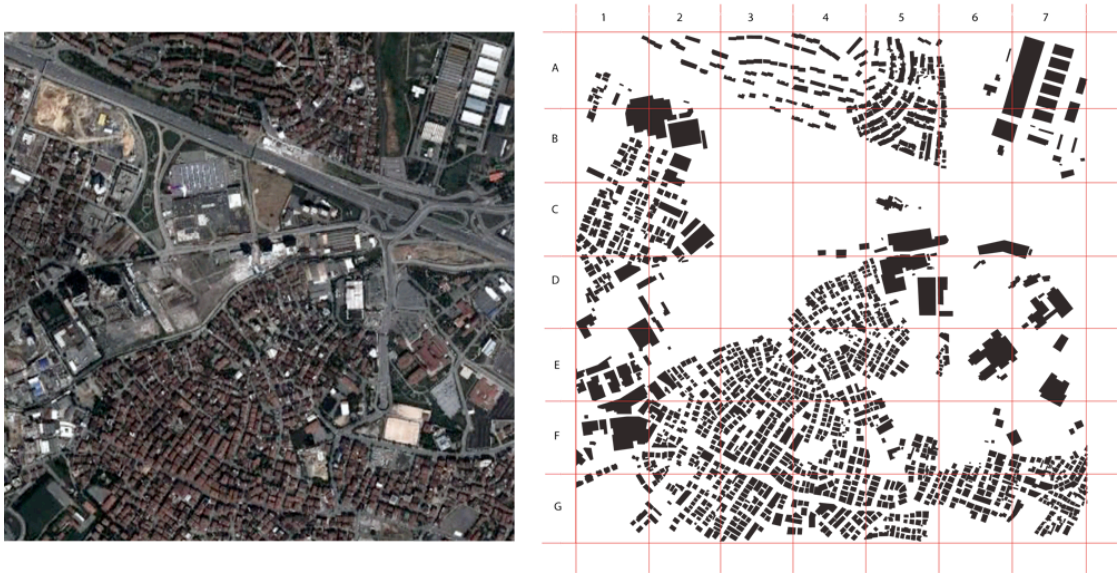


Figure 3.4: Figure ground diagram and satellite imagery, Cevizli. Source: Google Earth, Author.

Residential fabric was most prevalent in the blended settlement, with nearly forty-five percent of the land area consumed by low-density housing. Industrial units were scattered throughout the sample area, with buildings generally much larger than the surrounding residential buildings. Industrial and residential buildings coexisted at a higher rate in the blended settlement than either of the other sample areas, with thirty-three percent of the units demonstrating at least some integration. As with the other settlements, however, this integration occurred only at the edges of clearly industrial or residential districts.

Section 3.2 – Grain Analysis

Photo grid construction

Photo grids were constructed for each sampled *mahalleler* using the user-generated Panoramio™ photos available on Google Earth.[138] Each *mahalle* was restricted to a square mile sample, which was then divided into a 49-square grid. From the available imagery, photos were selected from within each square for inclusion in the photo grid (Appendix 2). An effort was made to verify the location of each geo-tagged photo using satellite imagery, street maps of the area, and building websites to eliminate redundancies and unusable data. This process generally produced 2 to 3 viable images per gridded square.

Gaps in the data available vary amongst sample areas, but generally occurred in less populated areas, sparse industrial districts, and along major highways. These areas would benefit from further documentation, but could not be accessed due to travel constraints. All images used in the construction of the three photo grids can be referenced in Appendix 2. Banks of photos amassed from each grid were used in conjunction with satellite imagery to create the following Lynchian images (Figures 3.6-3.8). Paths, edges, districts, nodes, and landmarks (major and minor) were identified for each sample area using Lynch's method for analysis and comparison.[139]

3.2.1 Grain: Esentepe, formal settlement

As suggested by the preliminary analysis of the area, the formal settlement of Esentepe contained two dominant edges, the inter-district highway in the north and the

[138] Google (Firm). 2005. *Google earth*. [Mountain View, CA]: Google. http://earth.google.com/
[139] Lynch, *Image of the City*

industrial pond on the east side of the sample area. The settlement's users heavily documented both edges and their images confirm the high visibility of each in the landscape (Figure 3.5). Five large districts were identified from user photos as well, one above the highway and four below it. The most expansive of these districts are industrial in nature, with urban fabric of a considerably larger scale than the surrounding residential areas. The residential districts identified are smaller in nature and differ in height or street pattern from the surrounding fabric, suggesting that a formal intervention was made.

Figure 3.5: Documented highway and pond edges, Esentepe. Source: Google Earth Panoramio.

Though paths certainly exist above the highway edge in the north, only paths below the highway have been documented extensively. As the image of the *mahalle* seen in Figure 3.6 demonstrates, these paths rarely intersect the districts perceived by the users. Identified paths cross the open areas between districts instead, often forming a natural barrier between them. Only three substantial nodes were indentified, each found in the center of the sample area. Each node occurs at an intersection of

significant paths and thus serves as an entry point for vehicles and pedestrians into the neighboring district.

Several minor landmarks were identified in this area as well, of which mosques and parks are most notable. A pair of contemporary skyscrapers found in unit B5 was the only significant landmark documented in the *mahalle*, clearly visible from the inter-district highway and surrounding neighborhoods. The sharp contrast between the industrial and residential fabrics observed in the preliminary analysis of the *mahalle* was somewhat upheld by the imaging process, though it seems that the low-density housing is understood more as a series of channels or paths than a district itself.

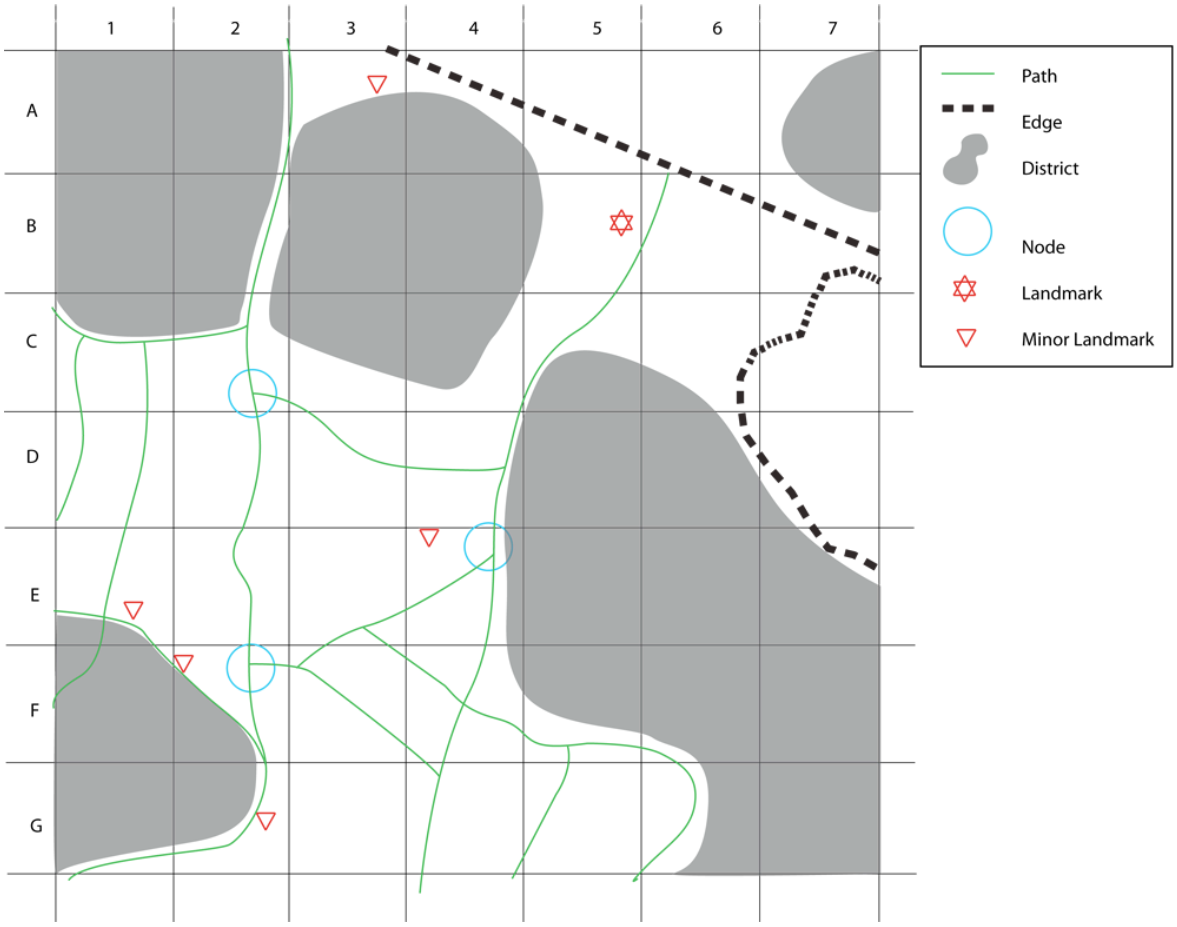


Figure 3.6: Lynchian image, Esentepe. Source: Author.

3.2.2 Grain: Gumuspinar, informal settlement

The image of the informal settlement of Gumuspinar contained two distinct edges, though both originate in unit A4 (Figure 3.7). The first edge separates the open farmland in the northwest corner of the sample area from the residential area below the D-100 highway. The second edge splits the sample area into east and west sectors, forming a natural barrier between residential districts in the north. A larger number of paths were documented in this *mahalle* as well. Unlike the previous settlement, these paths intersect the edges present in the sample area, diminishing their potential as barriers to movement.

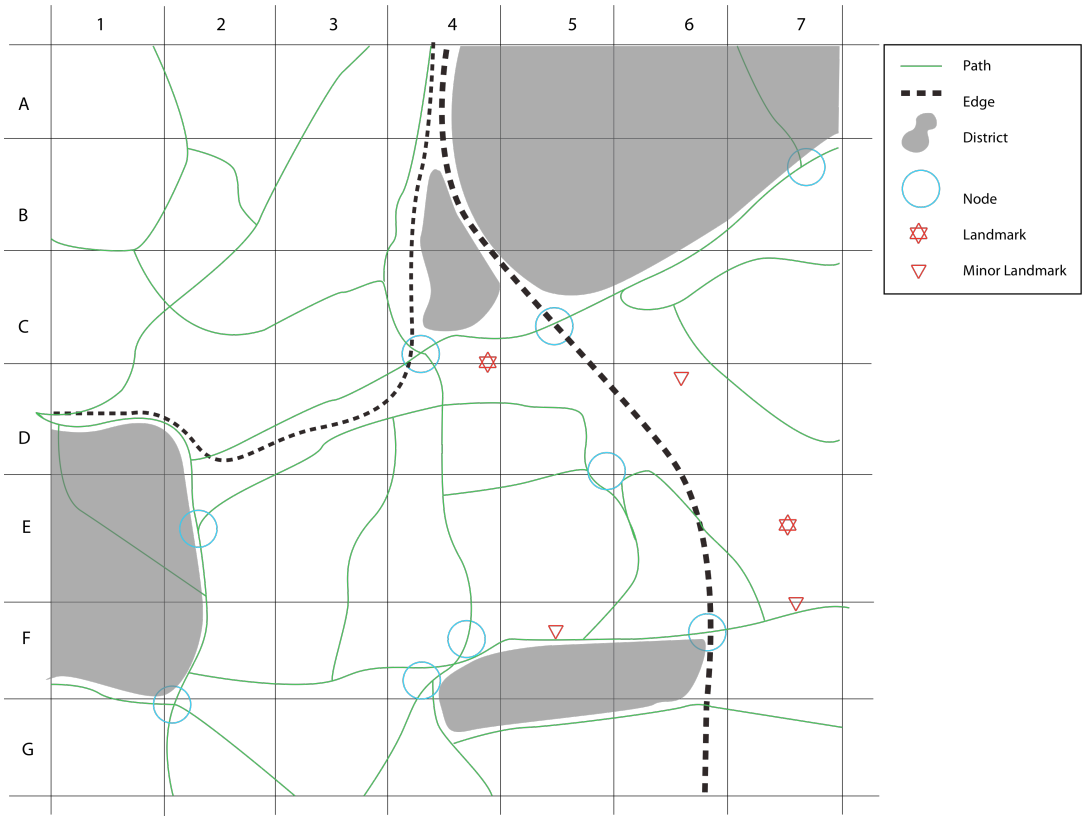


Figure 3.7: Lynchian image, Gumuspinar. Source: Author.

Nine nodes were observed in the informal settlement, again forming significant entry points to their adjacent districts. Four such districts were documented in

Gumuspinar, all exhibiting predominantly residential fabric. Of these districts, only one occurs on the east side of the central highway. It appears to have been formally planned, as it is considerably larger than the others, with radial streets and repeated building footprints. The other districts are much smaller and irregular in nature.

A large mosque found in unit C4 and a series of housing towers in unit E7 form major landmarks in this *mahalle*. Both landmarks are clearly visible from the adjacent highway and surrounding residential areas and were heavily documented. Two smaller mosques and a children's park were minor landmarks, clearly visible in satellite imagery, though less frequent documentation suggests that they did not create as powerful an image on the ground.

3.2.3 Grain: Cevizli, blended settlement

The image of the blended settlement of Cevizli also contained four districts, though these were of significantly larger scale than those observed in the other *mahalleler*. The inter-district highway in the north formed the most distinct edge in the settlement. Its position on the grid not only partitioned the formal housing districts from the rest of the *mahalle*, but severely limited movement from north to south overall. The large industrial district beneath the highway could also be considered an edge if not for the visual penetration allowed by stretches of open pavement (Figure 3.8).

Only one path was documented above the highway edge, which seems to echo the trajectory of the highway at a scale more conducive to residential movement. Paths between the two lower districts help to solidify the change in fabric from industrial to residential, though a larger number of paths cross between districts in this settlement the others. More than half of the nodes observed in the *mahalle* occur at path

intersections. The two pedestrian nodes found in units F2 and G3, in the southern tip of the sample area. These nodes seem to signal a particularly walk-able segment of the blended settlement not seen in other *mahalleler*.

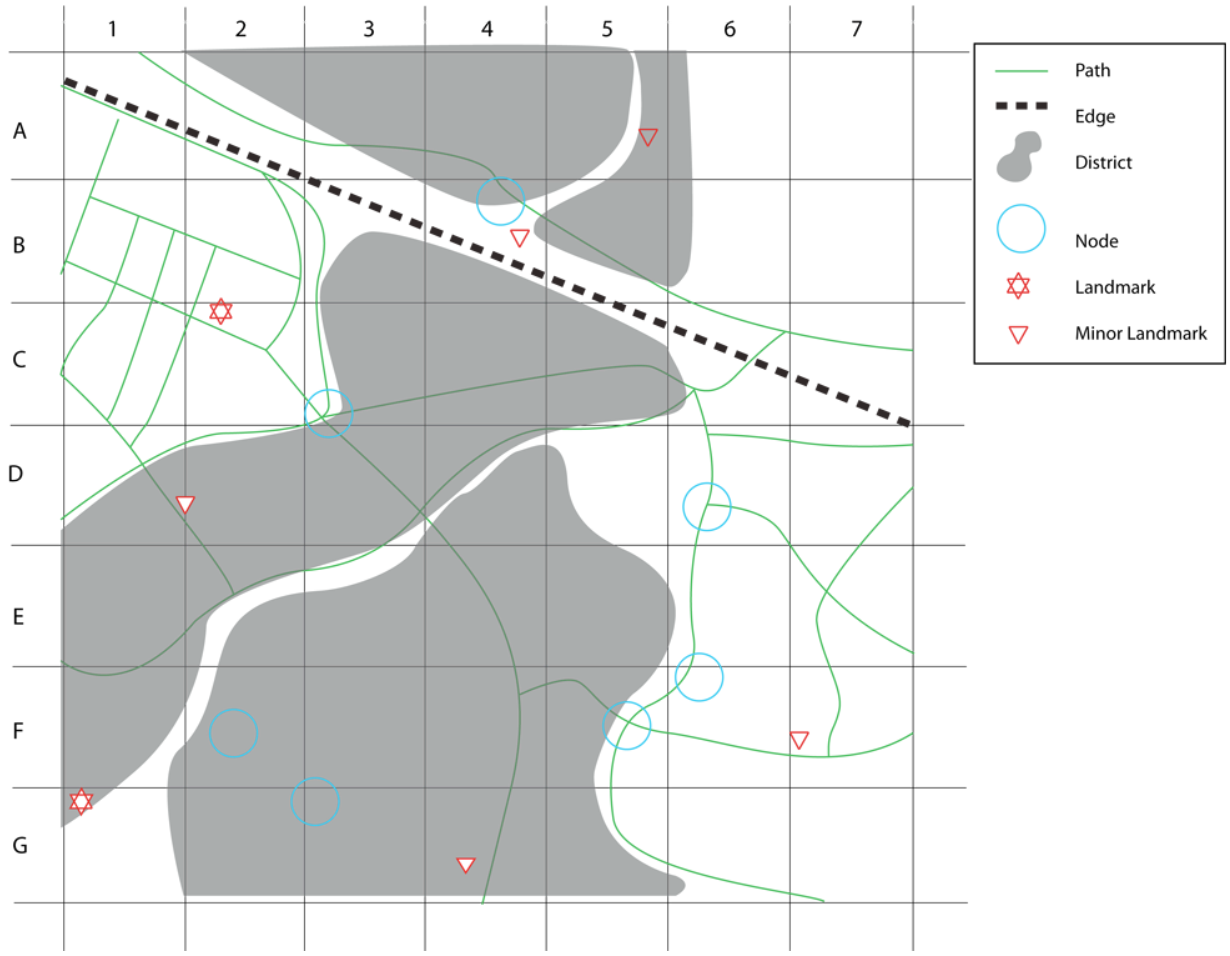


Figure 3.8: Lynchian image, Cevizli. Source: Author.

More landmarks, major and minor, were identified in the blended settlement as well, with greater variety. Both of the major landmarks were office towers located near the industrial district, taller than the surrounding fabric, though not of considerable height. Minor landmarks were more scattered in the landscape, including several mosques and parks, as well a large fountain in unit G4. Only the office tower in G1 and mosque in A5 were of notable distance from a documented path, though the

surrounding height of the surrounding fabric suggests that they would be visible nonetheless.

Section 3.3 – Access analysis

Path networks

Path network diagrams were constructed for each settlement in two stages. The first diagram aggregated the transit network and vehicular path data collected from Google Earth, the Istanbul Electric, Tramway and Tunnel Department, and the IBB into a single square mile map, in accordance with the Allen Jacobs' method.[140] Though several transit systems exist in Istanbul, public buses called *otobüsler* had a significant presence in the sample *mahalleler*. A distinction was made between the transit, highway, street, and road systems, with bus routes receiving the highest position in the visual hierarchy (shown in red). Transit and highway networks are given preference as "higher order" path systems in the remainder of this analysis, with street and road networks designated as "lower order" systems by comparison.

When pedestrian path networks proved too difficult to assess at the scale of the square mile diagram, a second round of stratified sampling was applied to each *mahalle*. Purposive techniques were again employed, and three grid units were selected from each *mahalle* to ensure an analogous sampling. The figure ground and higher order paths were reassessed in these samples and combined with pavement data available at the scale of the grid unit. Pedestrian-accessible areas are thus defined in black and gray tones, limited to areas not covered by industrial buildings, residences or higher order paths (i.e. highways or streets). As such, all of the following inferences

[140] Jacobs, *Great Streets*

about pedestrian access within the sampled *mahalleler* are based on the author's direct observations of satellite imagery, user-generated photos, and previous diagrams.

3.3.1 Access: Esentepe, formal settlement

The transit network in the formal settlement of Esentepe was composed of two significant routes, one in the northern half of the sample area and one in the south. The northern route seems to supply the industrial districts on either side of the highway, dipping only as far as the upper edge of the residential area before returning to its dominant east-west axis. The southern route, however, weaves through several residential districts to avoid the industrial fabric, skirting the industrial pond area altogether before exiting the sample area. Approximately seventy percent of the *mahalle* is within walking distance of the bus route, though specific bus stops could not be determined at this scale (Figure 3.9).

Vehicular paths were more widely distributed in this settlement and seem to be the most viable means of accessing specific districts. Highways, streets, and roads were observed in both the industrial and residential districts, though access to the industrial fabric is more limited. Despite its proximity to the D-100 highway, the large industrial pond on the east side of the sample area can only be approached from the south bank, via a single one-lane road. Stretches of pavement observed in satellite imagery of the area may provide additional access to industrial buildings, though movement there would be less regulated. Two lane streets form clear barriers between the industrial and residential fabric in the north, diminishing the blended status of the units observed in row C of the figure ground analysis. The bus route similarly divides the

districts in the southeast corner of the sample area, though in this instance, housing is present on either side of the route, negating the barrier somewhat.

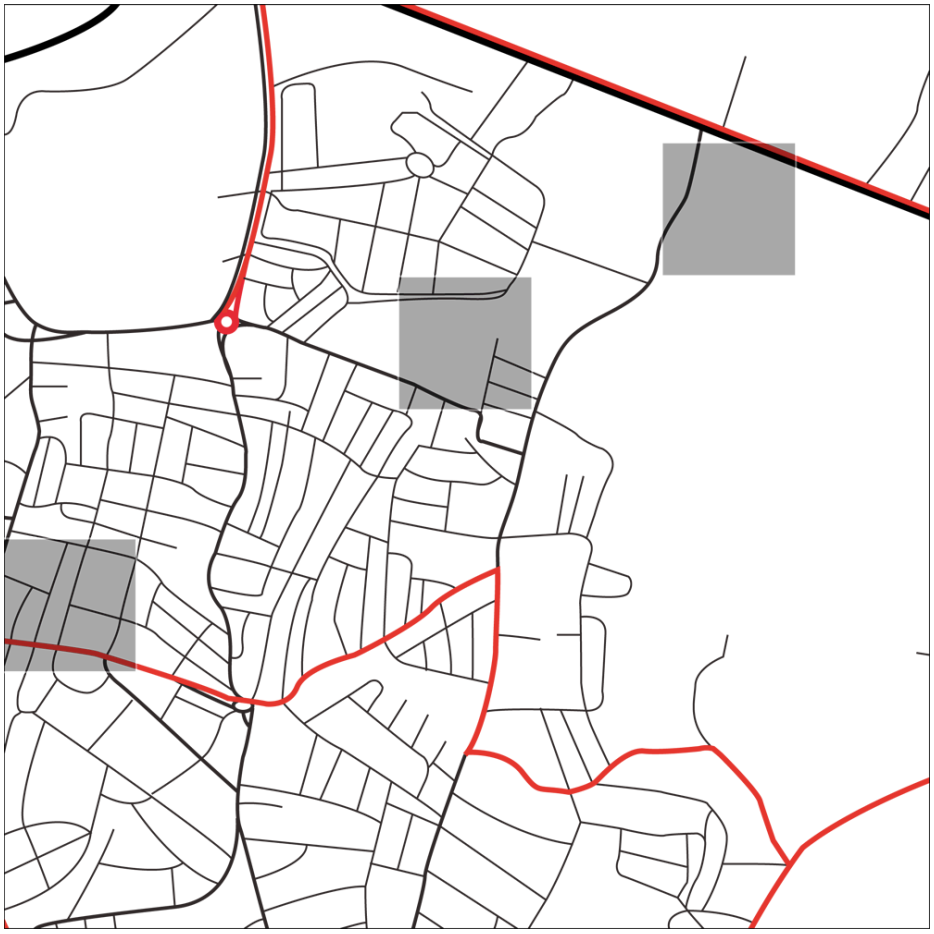


Figure 3.9: Path networks with selected samples, Esentepe. Source: Author.

Vehicular path networks observed in the residential areas were much more complex, with two lane streets and single lane roads providing vehicular access to nearly every home in the sample. While paths are more intertwined and curvilinear in the residential areas overall, more than ten dead end roads were observed that break from this pattern. Higher order street patterns partition the residential district into five smaller neighborhoods that at least visually contest the large divisions proposed by the previous Lynchian images. The industrial district is similarly broken into three areas, though the imaging process anticipated only one.

Pedestrian access in the formal settlement varied widely by district, as demonstrated by the sampled units in Figure 3.10. Industrial areas utilized a great deal of pavement, implying a significantly different landscape for its pedestrian users than the residential areas. Relatively little white space (implying undeveloped or “green” space) was present in industrial districts, though the open spaces between such buildings were certainly large enough to sustain vegetation. White space dominated even dense residential areas, though user movement through neighborhood alleys and gardens could not be measured remotely for comparison with the gray pavement spaces of industrial areas.

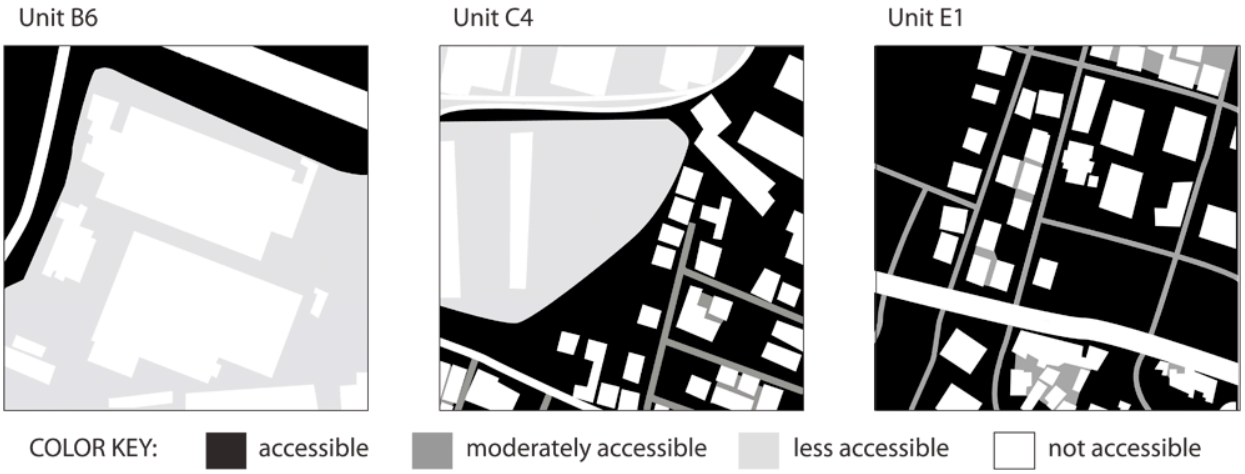


Figure 3.10: Sample pedestrian units, Esentepe. Source: Author.

3.3.2 Access: Gumuspinar, informal settlement

Transit networks in the informal settlement of Gumuspinar were most concentrated near the inter-district highways in the north, though a single route gave access to the residential districts along the west edge of the *mahalle*. This route does not follow the dominant paths residential fabric, but seems to cut across multiple streets to reconnect with a larger highway outside the sample area (Figure 3.11). Though formally planned housing is given precedent by this system, less than fifty percent of the

residential districts of Gumuspinar are accessible by public transit. While very little industrial fabric was observed in the informal settlement, with smaller buildings overall, a higher proportion of path networks exist in these areas than in the obviously more complex industrial districts of Esentepe. The small-scale industrial buildings along the southern edge of the sample were thoroughly integrated with the residential fabric and thus utilized the same paths as the surrounding homes.

Figure 3.11: Path networks with selected samples, Gumuspinar. Source: Author.

Vehicular path networks were observed in this sample area as well, providing access to more than seventy-five percent of the *mahalle*. A significant number of lower order paths were required to service the dense residential districts of the informal settlement, resulting in extremely irregular patterns and connections in this sample area

compared to the others. More than twenty-five dead end roads were observed, in both formal and informal housing situations, of which the highest concentration occurred in the radially planned district in the northeast. Street and road intersections were more frequent in the informal housing districts, where the paths were most concentrated.

Pedestrian path networks were more consistent in the informal settlement, with few noticeable shifts in access observed away from the major highways. As the sampled units demonstrate, small areas of pavement were utilized throughout the residential fabric to distinguish formal housing and industrial buildings from the more pervasive informal housing (Figure 3.12). Though a significantly higher proportion of housing exists in this settlement than the others, more white space was observed between individual residences, leaving few large open areas outside of the northern farmland.

Figure 3.12: Sample pedestrian units, Gumuspinar. Source: Author.

3.3.3 Access: Cevizli, blended settlement

More transit networks were observed in the blended settlement of Cevilzi than either of the other sample areas. Though the most direct route through the settlement following the path of the D-100 highway, three other distinct routes diverged from this path, allowing access to both the northern and southern districts. The central bus route helps to solidify the shift from industrial to residential fabric, confirming the large districts observed in the imaging process. Approximately seventy-five percent of the sample area can be reached by bus according to Figure 3.13, making Cevizli the most accessible of the sampled *mahalleler* by public transit.

Figure 3.13: Path networks with selected samples, Cevizli. Source: Author.

Vehicular access varied widely in the blended settlement, though all levels of path were present in the sample area. Higher order paths were more prevalent in the formal housing and industrial districts near the D-100 highway, where radial and rectilinear street patterns were more often observed. Access to the open areas of the central industrial district seemed fairly restricted, however, with few direct approaches available to motorists from the north and none from the residential area in the south. No paths providing direct access to the warehouses in the northeast corner of the sample area were observed, though large paved areas may allow unregulated movement. Lower order paths dominate the informal housing district in the center of the sample area, providing vehicular access to more than eighty percent of homes above the southern bus route. These homes are more densely concentrated than those of the other residential districts sampled, however, with fewer significant open spaces.

Figure 3.14: Sample pedestrian units, Cevizli. Source: Author.

Pedestrian path networks in Cevizli varied predictably by district, where access loosely correlated to amount of formal interventions. In areas where formal housing or industrial fabric dominated the landscape, higher proportions of pavement were employed. The grid units sampled in Figure 3.14 show that while more open space

exists in industrial areas, this fabric is completely gray, offering no undeveloped or green space to its users. Blended residential areas similar to unit C1 provide both paved and unpaved open space to its users, though actual movement through each type of space cannot be measured with available data.

Section 3.4 – Performance ratings

On the basis of these findings, a series of performance ratings were made for each construct and have been included in Tables 3.3-3.5 for reference below. The terms *high, moderate,* and *low* were used in lieu of a numeric rating system to better represent the level of performance exhibited by each settlement for the identified constructs. Though the sub-construct of pedestrian access was less thoroughly documented than other constructs, ratings for each settlement on this point are included for reference (Table 3.5). Determinations were made for each construct through comparative analysis within the confines of the study. As such, the rank of each settlement is reasonable only in relation to other sampled areas and cannot be used for comparison with sites not subjected to the methodology.

For the construct of *density*, three sub-constructs were analyzed: built, dwelling, and use density. For the sub-construct of built density, though the level of development observed in each settlement, high and low, were very similar, the informal settlement of Gumuspinar exhibited the highest percentage of undeveloped units. This settlement was given a “moderate” rating. The formal settlement of Esentepe and blended settlement of Cevizli exhibited a similarly high percentage of developed units, of high and low designation, and received “high” ratings.

For the sub-construct of dwelling density, Gumuspinar exhibited the highest percentage of housing overall, with an even mix of low-density and combined units. Esentepe exhibited a much lower percentage of housing than Cevizli, but was more adequately mixed. Cevizli exhibited the highest percentage of low-density housing overall, with fewer mass combined housing units than the other two units. As such, Esentepe received a “moderate” rating in comparison to Cevizli’s “low” rating.

For the sub-construct of use density, the most even distribution of industrial, residential, and blended units were observed in the formal settlement of Esentepe. The informal settlement of Gumuspinar was completely dominated by residential units and thus received the lowest rating. Cevizli exhibited a more even use mixture than Gumuspinar, but was not of the quality of Esentepe, and thus received a “moderate” rating. The performance ratings for the construct of density have been summarized below in Table 3.3.

Table 3.3: Performance ratings, density

Settlement	*Built*	*Dwelling*	*Use*
Esentepe	high	moderate	high
Gumuspinar	moderate	high	low
Cevizli	high	low	moderate

For the construct of *grain*, the blended settlement of Cevizli received the lowest rating. Though only one edge was documented in Cevizli, fewer paths were observed in this sample than the others and a higher number of landmarks were needed to define the settlement. Sharp transitions between residential and industrial areas minimized visual links, contributing to the perception of large, single use districts. The formal settlement of Esentepe exhibited a much finer *grain* than Cevizli, with more documented paths. Though only three nodes were documented in Esentepe, more gradual

transitions were observed overall and fewer landmarks were required to define the settlement. The informal settlement of Gumuspinar exhibited a higher number of nodes and paths that either of the other settlements, with much smaller districts. The documented edges were significantly more permeable than the others as well, as paths and nodes frequently intersected them. Though the fewest number of landmarks were required to define Gumuspinar, the settlement consisted almost entirely of housing. Without a substantial mixture of uses, neither settlement was of a sufficient quality to earn a “high” performance rating. Each has been labeled “moderate” instead. Though the *grain* of each settlement is discussed in more detail in Chapter 4, the performance ratings for the construct of *grain* have been summarized below in Table 3.4.

Table 3.4: Performance ratings, grain

Settlement	*Rating*
Esentepe	moderate
Gumuspinar	moderate
Cevizli	low

For the construct of *access,* three sub-constructs were analyzed: transit, vehicular, and pedestrian access. The transit routes observed in the blended settlement of Cevizli were the most numerous and expansive of the sample areas, and thus received a “high” performance rating. The informal settlement of Gumuspinar was least accessible by public transit, with only a single route available to users beneath the inter-district highway. A “moderate” rating was given to the formal settlement of Esentepe, whose transit routes where restricted to major highways. Though adequate for use in some districts, these routes did not service sample area as comprehensively as those observed in the blended settlement.

Vehicular paths were most expansive in the informal settlement of Gumuspinar, where the highest numbers of residential units were observed. Though the blended settlement of Cevizli exhibited a similarly high number of vehicular paths, the proportion of streets and roads were not consistent from district to district. An extremely small number of roads were observed in the formal housing and industrial areas and despite formal intervention the district received a “moderate” rating. The formal settlement of Esentepe exhibited even larger gaps in vehicular access. Entire districts in the north were devoid of streets and paths, and the settlement received a “low” performance rating for this sub-construct as a result.

For the sub-construct of pedestrian access, the informal settlement of Gumuspinar seemed most promising. Paved and unpaved paths were more consistent throughout the settlement, with few inhospitable streets and highways to limit access. Though the formal settlement of Esentepe exhibited a much higher percentage of paved paths than Gumuspinar, enough accessible open spaces and paths were observed in each sample unit to secure a “moderate” performance rating. The blended settlement of Cevizli was deemed least accessible, for it not only contained the highest proportion of inhospitable pavement and paths, but also contained the highest number of fenced private spaces. The performance ratings for each sub-construct of *access* have been summarized below in Table 3.5.

Table 3.5: Performance ratings, access

Settlement	*Transit*	*Vehicular*	*Pedestrian*
Esentepe	moderate	low	moderate
Gumuspinar	low	high	high
Cevizli	high	moderate	low

Conclusion

A synthesis of the ratings recorded in Table 3.3 suggests that of the three sample areas observed, the formal settlement of Esentepe was the most satisfactorily *dense,* having received moderate to high ratings in each sub-construct analysis. As recorded in Table 3.4, the informal and formal settlements each received a satisfactory rating for the *grain* construct, though neither Gumuspinar nor Esentepe were exemplary on this point. A synthesis of the ratings recorded in Table 3.5 suggests that the informal settlement of Gumuspinar was the most *accessible* of the sampled areas, receiving high ratings in two of the three sub-constructs. Performance ratings of this type, though rudimentary, are a useful means of distilling the complex phenomena observed during the analysis. These ratings additionally lend themselves to a hierarchical system that could be reinterpreted for use in GIS mapping of each settlement in the future.

Chapter 4: Translating Urban Performance

"For the design and planning professions to mature properly, time must be taken to focus on substantive information…the gap between knowledge and action is not an easy one to bridge. It requires careful synthesis." – Anne Vernez Moudon, Designing Cities (365)

Introduction

Once individual analyses of the sample areas for each construct were complete, a cross-case synthesis was conducted using the criteria defined by Kevin Lynch and Jane Jacobs so that more formal conclusions could be drawn about the performance of urban fabric in each settlement. The qualities of formal, informal, and blended fabric have been coarsely divided in previous discussion, though such divisions are much more difficult to identify at the pedestrian level. In light of this, the following narrative attempts to aggregate and synthesize the data collected from each sample area into more comprehensive statements about the variable levels of density, grain, and access found in the district of Kartal.

Cross-case synthesis

1) Density

Lynch makes it clear in his *Theory of Good City Form* that there is no generally optimum density that can be applied to urban fabric, for desired concentrations vary widely by use, age, societal expectations, and countless other considerations.[141] Despite this tangible ambiguity, density is one of the most primary and influential factors in urban design of any type and its presence or absence in the district of Kartal merits further discussion. Jacobs writes extensively about the myths of density and over-crowding in, *The Death and Life of Great American Cities*. She concludes that despite

[141] Lynch, *Theory of Good City Form* 262

the warnings of planning literature against high-density settlements, low-density areas are often dull and lifeless, unable to sustain a diverse population or amenities.[142] Jacobs draws sharp lines between dwelling and use density however, claiming that a dense concentration of people, not structures necessarily, are required for vibrant urbanism.

Of the *mahalleler* sampled in this analysis, the informal and blended settlements had the highest concentrations of housing, though the composition, or grain, of the two sectors were very different. Gumuspinar was completely dominated by residential use, with nearly equal amount of low density and combination housing observed. In contrast, Cevilzi had a much higher proportion of low-density housing, with less than fifty percent of the settlement devoted to residential use. The formal settlement of Esentepe had a much lower concentration of housing, due in part to its even use distribution. This sample area had the largest percentage of highly developed units however, leaving little undeveloped land for green space or expansion.

The need for open, green, and derelict spaces is addressed more directly in Lynch's text. He writes that open space is the "negative, extensive, loose, and uncommitted complement to the [built] system," that is necessary for the "freely chosen and spontaneous activity" required to sustain city residents.[143] The informal settlement of Gumuspinar had the highest percentage of low-development and undeveloped land, units most likely to exhibit spaces of this type. This percentage was not significantly higher than that of the other two samples, however. Though dedicated parks were much easier to identify from photos and satellite imagery of each *mahalle* than derelict and

[142] Jacobs, *Death and Life of Great American Cities* 204
[143] Lynch, *Theory of Good City Form* 396

waste areas, the blended settlement of Cevizli seemed to contain the highest proportion of derelict space.

The farmland observed in the northwest corner of Gumuspinar was the highest single concentration of green space in the sampled areas. This settlement also contained the largest number of residential parks and fields overall. The formal settlement of Esentepe exhibited a much smaller percentage of open and derelict space by comparison, though the industrial pond on the east side of the sample area created a significant figure in the landscape. The open spaces that did exist were more distributed more evenly throughout the *mahalle,* however, and may provide greater benefits to the population than more dense concentrations.

2) Grain

In Jacobs' defense of urban diversity, she preys on the master plan mentality, commenting that, "large swatches of construction built at one time are inherently inefficient for sheltering wide ranges of cultural, population, and business diversity."[144] Both Jacobs and Lynch describe the ideal urban situation as one containing multiple functions, textures, and amenities, though their terms for this quality vary. Though construct of *grain* was defined previously in the first chapter of this text, the types of grain defined by Lynch are not mutually exclusive.[145] The majority of planning professionals agree, for example that the ideal grain composition for residential areas, would be fine and blurred, so that "each small area [of urban fabric] should be a microcosm of the whole."[146]

[144] Jacobs, *Death and Life of Great American Cities* 191
[145] Lynch, *Theory of Good City Form*
[146] Ibid 267

Of the *mahalleler* examined in this analysis, the informal settlement of Gumuspinar exhibited the highest proportion of finely grained fabric, though relatively little industrial fabric was observed. The formal housing district in the northern portion of the sample area presents the sharpest departure from the mixed residential fabric dominant in the rest of the settlement, though the presence of the inter-district highway negates the shift. Regardless, the formal buildings are only slightly larger and more widely spaced than the informal buildings and do not create an obvious shift in texture.

Transitions between industrial and residential fabric in the blended settlement of Cevizli are much more pronounced, however, and constitute a coarser grain in the settlement overall. Large industrial buildings and waste areas were often separated from low-density residential areas by a single street or path, eliminating the physical and visual transition time Lynch suggests is most desirable in urban fabric. The residential grain in Cevizli was much more fragmented as well. Mass and formal housing was relegated to the north and west areas of the settlement, with few units exhibiting a mixture of high and low-density housing overall.

Though the highest proportion of coarse industrial fabric was observed in the formal settlement of Esentepe, a high number of finely grained residential units were also present in the *mahalle.* Mass and low-density housing were mixed throughout the residential area with a surprising number of small-scale industrial buildings as well. The presence of multiple grains within single settlement seemed to suggest a discontinuity between districts, but transitions between the industrial and residential areas of Esentepe were sufficiently gradual to be considered blurred.

3) Access

Jacobs' notion of diversity surfaces again in Lynch's discussion of *access*, who calls for it alongside equity and control to create a pleasing system. Both theorists agree that access cannot be measured by the sheer number of options or amenities available in a place, for "to have everything instantly available is no more desirable than to live in an infinitely adaptable world."[147] Lynch concedes however that a good environment is one which "affords obvious and easy access to a moderate variety of people, goods, settings," with the potential that these choices could be expanded at will.[148] To this end, various types of paths and access networks are necessary, "in sufficient number," to ensure vital urban space.[149] Jacobs elaborates on this in her text, where she lists short blocks and numerous intersections as additional requirements.

A full range of paths was observed in each of the sampled *mahalleler*, though the types (transit, highway, street, road and pedestrian) presented at varying strengths in each. The transit network of Cevizli was the most expansive of the three samples, able to serve residential areas (formal and informal) and industrial areas equally. The settlement's lower order paths were not so evenly distributed. Though larger streets dominated in the formal housing districts of the north, fewer numbers of them were present in the informal housing districts of the south. Small walk-able roads were most prevalent in the central residential area of the blended settlement where pedestrians were more likely to travel and congregate. Unpaved paths were less likely in the industrial areas of the settlement at the pedestrian level, though both paved and unpaved paths were observed in the formal and informal housing districts.

[147] Lynch, *Theory of Good City Form* 191
[148] Ibid192
[149] Ibid 272

Higher order paths (transit and highways) were more widely distributed in the informal settlement of Gumuspinar, despite having relatively little industrial fabric. Small roads were observed throughout the settlement, facilitating vehicular access even in the most densely concentrated residential areas. A greater number of street and road intersections were observed in this *mahalle* than the other sample areas combined, which suggests that more path choices exist for the user at this level. Paved and unpaved pedestrian paths were identified throughout the informal settlement as well, due in part to the fine residential grain discussed previously. Walk-able streets and roads were identified in every pedestrian unit, with no visibly restricted areas.

The formal settlement of Esentepe exhibited the least expansive path network of the sampled areas. Street and road systems were extremely limited in the industrial areas above and below the inter-district highway, though large paved areas may provide additional access. The road system is much more dense and complex in the residential districts, however, allowing greater vehicular access to these areas than the rest of the settlement. Though massive industrial structures dominate the settlement visually, the concentration of lower order paths suggests in the south suggests more consistent movement and use in the residential areas. A similar conclusion has been drawn from the shape and positioning of transit networks in the *mahalle*. Of the two routes observed, the winding nature of the southern route seems to provide more flexibility to its users than the highway-centric routes in the north, signaling a greater need for transit access in this area. Pedestrian paths were much more consistent. Paved and unpaved paths existed in each of the sampled units, with fewer paved areas observed in the informal residential fabric.

Conclusion

Each of the initial research questions was addressed in the course of this study, beginning with the identification of the informally and formally designed regions of Kartal seen in Figure 2.2. From this map, the blended regions of the district were also observed and incorporated into the remainder of the analysis as a third embedded unit. The spatial typologies defined by Kevin Lynch were addressed in the second stage of analysis. Though certain characteristics were identified in each of the sampled *mahalleler*, more typologies were exhibited by the blended settlement of Gumuspinar than either of the other sample areas.

In the next stage of analysis, three types of structural and spatial densities were observed in the sample regions: built, dwelling, and use density. The built densities of the sampled *mahalleler* were generally consistent, though the dwelling and use densities varied widely by development pattern. Gumuspinar had an extremely high proportion of residential fabric in comparison to the formal and blended settlements, with other uses each accounting for less than 10% of the total land area. In a similar manner, low-density housing existed in much higher quantities in the blended settlement of Cevizli, though he distribution of industrial and blended areas seemed to suggest a more even mixture of uses.

The spatial and architectural grain types defined by Lynch were observed in the fourth stage of analysis and have been analyzed in great detail already. Though none of the sampled *mahalleler* conformed to the planning ideal of a fine and blurred grain, the blended settlement of Cevizli seemed least amenable. The informal settlement of Gumuspinar exhibited the finest grain overall, but did not contain a sufficient number of

large industrial buildings to justify comparison with the other *mahalleler* on this point. The formal settlement of Esentepe exhibited a fine and blurred grain in certain instances, but as previously mentioned, this was not a widespread phenomenon.

In the final stage, variable levels of pedestrian, vehicular, and transit-oriented a*ccess* were observed in the sampled *mahalleler*. Of the three settlements, the most comprehensive transit network was observed in the blended *mahalle* of Cevizli, though the formal *mahalle* of Esentepe was moderately well served. The informal *mahalle* of Gumuspinar exhibited the most comprehensive vehicular network, and seems to have the highest level of pedestrian access as well, though no conclusive determination on this point could be made from the available data.

Chapter 5: Conclusion & Discussion

"True city design never begins with a virgin situation, never forsees a completed work. Properly, it thinks in terms of process, prototype, guidance, incentive, and control and is able to conceive broad fluid consequences along with concrete, homely details. It is a scarcely developed art ---a new kind of design and a new view of its subject matter." – Kevin Lynch, Theory of Good City Form (291)

Introduction

The performance construct, though only one of many measurements considered in the field of urban design, remains critical to the analysis and refinement of cities. This study, from its inception, was an attempt to address the complex phenomena involved in the formation of vital and diverse urban fabric through a stratified, descriptive method of analysis, and to determine, to a lesser degree, the benefits and limitations of remote form analysis. The study stands as a substantive-descriptive analysis of selected *mahalleler* within the district of Kartal, a single *vilayet* within the greater city of Istanbul.

Contributions*:* By synthesizing the theories of Jane Jacobs and Kevin Lynch into a single, stratified method, this study has not only produced a more rigorous tool for remote analysis, but one that can be applied to numerous other urban settlements in the future. This new methodology has been implemented using the latest geographic and graphic technologies, including but not limited to Google Earth, GIS software, AutoCAD, and Adobe Creative Suite 6, and as such provides useful information of the strengths and weaknesses of each. This study additionally expands the body of data publicly available for analysis in Kartal, a district of Istanbul of considerable interest to the country of Turkey, and the world, as globalization brings increased social and economic attention to the area.

Implications: The implications of this study for the district of Kartal are numerous, as

it provides a comprehensive picture of three different types of settlements within its administrative boundaries. The analytical maps produced by the study revealed issues with the access networks in each settlement, as well as certain inconsistencies in the grain and density measurements of each. This information, and the cursory maps, could prove extremely useful as development and revitalization schemes are formed and implemented in the district in the future.

The study has the potential to serve as an analytical base for further research in the city of Istanbul as questions about the risks and benefits of mixed-use and development arise. As was previously mentioned, the method relies on western planning theory, not Turkish development patterns and culture. Though certain biases exist, the use of dominant theories in this study ensure that the method is not confined to the borders of Turkish development and culture and can thus be applied to a much larger range of blended settlements.

Limitations and refinements: Data collected for the analysis was restricted to documents, maps, drawings and photos available remotely, due to travel constraints, and to this end, certain refinements must be considered if the method is to be applied to future settlements, within Istanbul or without. A brief listing of those recommendations are as follows:

1) Utilize multiple-case studies.

Though time constraints placed on the project limited the analysis to a single case study, the results of the study would have benefitted from multiple-case synthesis and comparison. If multiple cases were observed, the implications of the analysis might

have been more conclusive at the level of the city of Istanbul, not simply the district of Kartal.

2) Expand photo grid.

Gaps in the data acquired from the user-generated photos of Kartal might have been amended by the author had travel to the city been possible in the scope of the project. The data as it stands only gives a basic understanding of ground-level phenomena in each sampled *mahalle* that, though extremely useful in the context of remote analysis, would prove even more valuable as a completed reference grid.

3) Conduct more extensive pedestrian path analysis.

The pedestrian path diagrams included in this analysis were rudimentary analyses at best, for the levels of access and movement afforded to users at that scale could not adequately be addressed with remote data. A more extensive series of observations and diagrams might have been constructed had travel to the city been possible.

Recommendations for further study: On the basis of these recommendations, there is enormous potential for further study in the district of Kartal and the city at large. Ground-level analyses conducted in Istanbul would allow more comprehensive conclusions about the constructs defined in this study to be drawn, through direct observation, physical mapping, and user interviews. This type of data is necessary to incorporate additional constructs, namely *sense, efficiency,* and *fit* as defined by Lynch into the methodology. As such, the next stage of data analysis must incorporate user perceptions and observations made from within the settlement and cannot rely solely on remote analysis.

The *substantive-descriptive* data produced for the sampled *mahalleler* of Kartal, though quite rigorous in its own regard, has the potential to provide an even richer base for additional research and planning endeavors once it is restructured to accommodate this ground-level data. The stratified nature of the method and hierarchical rating system it produces is well suited to Geographic Information System (GIS) analysis, and could be used to create a modeling base for such programs in the future. A model of this type would allow intricate maps of performance criteria to be constructed and interpreted by researchers quickly and accurately, to the benefit of planning professionals across the globe.

Conclusion

For any urban analysis to be considered viable it must produce an intimate understanding of the multiple and complex phenomena at work in a city's growth and development. As demonstrated by this study, no aspect of urbanism can be evaluated on its own, but must be measured in concert with a host of other variables. Repeated analysis ensures that the elements of "good" urbanism are nourished and cultivated over time, while detriments are identified and removed, like weeds in a garden. Performance ratings are crucial in this sense because they beg for iteration; a city's performance, on any level, must be assessed again and again as development continues.

Descriptive-substantive measurements facilitate the method by providing the most comprehensive knowledge of an urban condition without defaulting to prescriptive generalizations, as demonstrated by this study. Though user-generated settlements have been romanticized and condemned at regular intervals by users and professional

planners alike, a critical evaluation of performance avoids such biases altogether. This study not only illuminates the successes and failures of the traditional formal and informal fabric found in the district of Kartal, but also begins to identify what has been gained and lost when the two are merged in blended areas. Such determinations are particularly poignant for the city of Istanbul, and other cities, whose cultural heritage is closely tied to the simultaneous chaos and wonder of informal settlements.

References

Akdogan, Gizem, "Dealing with rapid development: Creation of the informal urban economy and gecekondu housing in Istanbul" (2009). Graduate Theses and Dissertations. Paper 10809.

Aksoy, Asu. “Istanbul’s Choice: Openess.” *Istanbul, City of Intersections*. Urban Age. 2009. London: London School of Economics and Political Science. 48-49.

Aksoy, Asu, "Istanbul's Worldliness.", *Public Istanbul: Spaces and Spheres of the Urban*, ed. F. Eckhardt and K. Wildner, Transcript Verlag, Bielefeld, 2008: 216

Ayataç, Hatice. 2007. "The International Diffusion of Planning Ideas: The Case of Istanbul, Turkey." *Journal of Planning History* 6 (2): 114-137.

Baharoglu, Deniz and Josef Leitmann. 1998. "Coping Strategies for Infrastructure: How Turkey's Spontaneous Settlements Operate in the Absence of Formal Rules." *Habitat International* 22 (2): 115-135.

Balaban, Utku. 2011. "The Enclosure of Urban Space and Consolidation of the Capitalist Land Regime in Turkish Cities." *Urban Studies (Sage Publications, Ltd.)* 48 (10): 2162-2179.

Carr, Stephen, Mark Francis, Leanne G. Rivlin, Andrew M. Stone. 1992. *Public Space*. Cambridge [England]; New York, NY, USA: Cambridge University Press.

Cavusoglu, Omer. “Kartal.” Urban Age. 2009. *Istanbul, City of Intersections*. London: London School of Economics and Political Science. 1-2

Celik, Zeynep. "Bouvard's Boulevards: Beaux-Arts Planning in Istanbul." *Journal of the Society of Architectural Historians*. 43.4 (1984): 331-355. Print.

Celik, Zeynep. “The Italian Contribution to the Remaking of Istanbul.” *Environmental Design: Journal of the Islamic Environmental Design Research Centre* (1990): 128-133. Print.

Cihan. Turkey. “Turkey Unveils Route for Istanbul's Third Bridge.” Ankara: Anadolu Agency, 2010. Web. 11 Jul 2011.

Christiaanse, Kees, Mark Michaeli, and Tim Rieniets. "Istanbul's Spatial Dynamics." *Urban Age* Nov. 2009: 1-3. Print.

Despina, Lampada. "Walls of Constantine." Encyclopaedia of the Hellenic World. Constantinople. Athens, Greece: Foundation of the Hellenic World, 2008. <http://www.ehw.gr/l.aspx?id=11742>. Web.

Dixon, C. J., and Bridget Leach. 1976. *Sampling methods for geographical research*. Norwich, Eng: Geo Abstracts.

Ertas, Hülya. 2010. "The Potential of Istanbul's Unprogrammed Public Spaces." *Architectural Design: A.D.* 80 (1): 52-57.

Esen, Orhan. "Istanbul's *Gecekondu*s." Istanbul City of Intersections. Urban Age Nov. 2009: 1-3. Print.

Fattahi, Kaveh and Hidetsugu Kobayashi. 2009. "City Imaging After Kevin Lynch." IEEE Computer Society.

General Management IETT. *YOLCU BİLGİLENDİRME SİSTEMİ | Oraya Nasıl Giderim?* [map]. Scale undetermined; "Istanbul Electricity, Tramway and Tunnel General Management." <http://harita.iett.gov.tr/yeni/> (03-25-2013).

Goodwin, Godfrey. "Sinan and City Planning." *Environmental Design: Journal of the Islamic Environmental Design Research Centre* 1-2 (1987): 10-19. Print.

Google (Firm). 2005. *Google earth*. [Mountain View, CA]: Google. <http://earth.google.com/.

Gül, Murat. The emergence of modern Istanbul: Transformation and Modernisation of a City. London: I. B. Tauris & Company, 2009. Print.

Iossifidis, Miranda. "A Study of the *Gecekondu* in Istanbul, Turkey: Innovative Urbanism for the West and the Global Urban Poor." 2010: 5-18.

İstanbul Büyükşehir Belediyesi. *Istanbul Sehir Rehberi* [map]. December 2012. Scale undetermined. Geographic Information System. <http://sehirrehberi.ibb.gov.tr/map.aspx> (01/15/2013).

Jacobs, Allan B. 1993. *Great streets*. Cambridge, Mass: MIT Press.

Jacobs, Jane. 1961. *The death and life of great American cities*. [New York]: Random House.

Karpat, K. H. 1976. *The Gecekondu: Rural Migration and Urbanization* Cambridge University Press.

Keyder, Caglar. 1999. *Istanbul: between the global and the local*. Lanham, MD: Rowman & Littlefield. 49.

Lynch, Kevin. 1960. *The Image of the City*. Cambridge, Mass.: MIT Press.

Lynch, Kevin. 1981. *A Theory of Good City Form*. Cambridge, Mass.: MIT Press.

Lynch, Kevin, Tridib Banerjee, and Michael Southworth. 1990. *City Sense and City Design: Writings and Projects of Kevin Lynch*. Cambridge, Mass.: MIT Press.

Madanipour, Ali. 2003. *Public and Private Spaces of the City*. London, New York: Routledge.

Mansel, Phllip. Constantinople: City of the World's Desire, 1453-1924. London: John Murray Publishers, Ltd., 1995. Print.

Mohamed, Abdelbaseer. “Evaluating Way-finding Ability Within Urban Environment.” Paper presented at the Eighth International Space Syntax Symposium, Santiago, Chile, January 3-6, 2012. 1-36.

Neuwirth, Robert. 2005. *Shadow Cities: A Billion Squatters, a New Urban World*. New York: Routledge.

Singleton, Royce, Bruce C. Straits, and Margaret Miller Straits. 1993. *Approaches to social research*. New York: Oxford University Press.

Tas, H. I. and D. R. Lightfoot. 2005. "*Gecekondu* Settlements in Turkey: Rural—Urban Migration in the Developing European Periphery." *Journal of Geography* 104 (6): 263-271.

Tekeli, Ilhan. “Cities in Modern Turkey.” Istanbul City of Intersections. Urban Age Nov. 2009: 16-18. Print.

Tugal C. 2008. "The Greening of Istanbul." *New Left Rev. New Left Review* (51): 65-80.

Tekeli, Ilhan. “Cities in Modern Turkey.” Istanbul City of Intersections. Urban Age Nov. 2009: 16-18. Print.

Unsal, Fatma. 2009. "Critical Evaluation of Legal and Institutional Context of Urban Planning in Turkey: The Case of Istanbul." Aalborg, Denmark, International Academic Association on Planning, Law and Property Rights, February 11-13, 2009. 1-21.

Urban Age. 2009. *Istanbul, City of Intersections*. London: London School of Economics and Political Science.

Valdez, Roger. 2011. *Reading Cities: Why Kevin Lynch is Still Important*. Seattle's Land use Code. Seattle, Washington: Wordpress.

Wende, Wolfgang. 2005. *City Development and Green Space System: Berlin and Istanbul*. Berlin: Mensch & Buch Verlag.

Wildner, Kathrin and Frank Eckhardt. 2008. *Public Istanbul: Spaces and Spheres of the Urban*. Bielefeld; Piscataway, NJ: Transcript; Distributed in North America by Transaction Publishers.

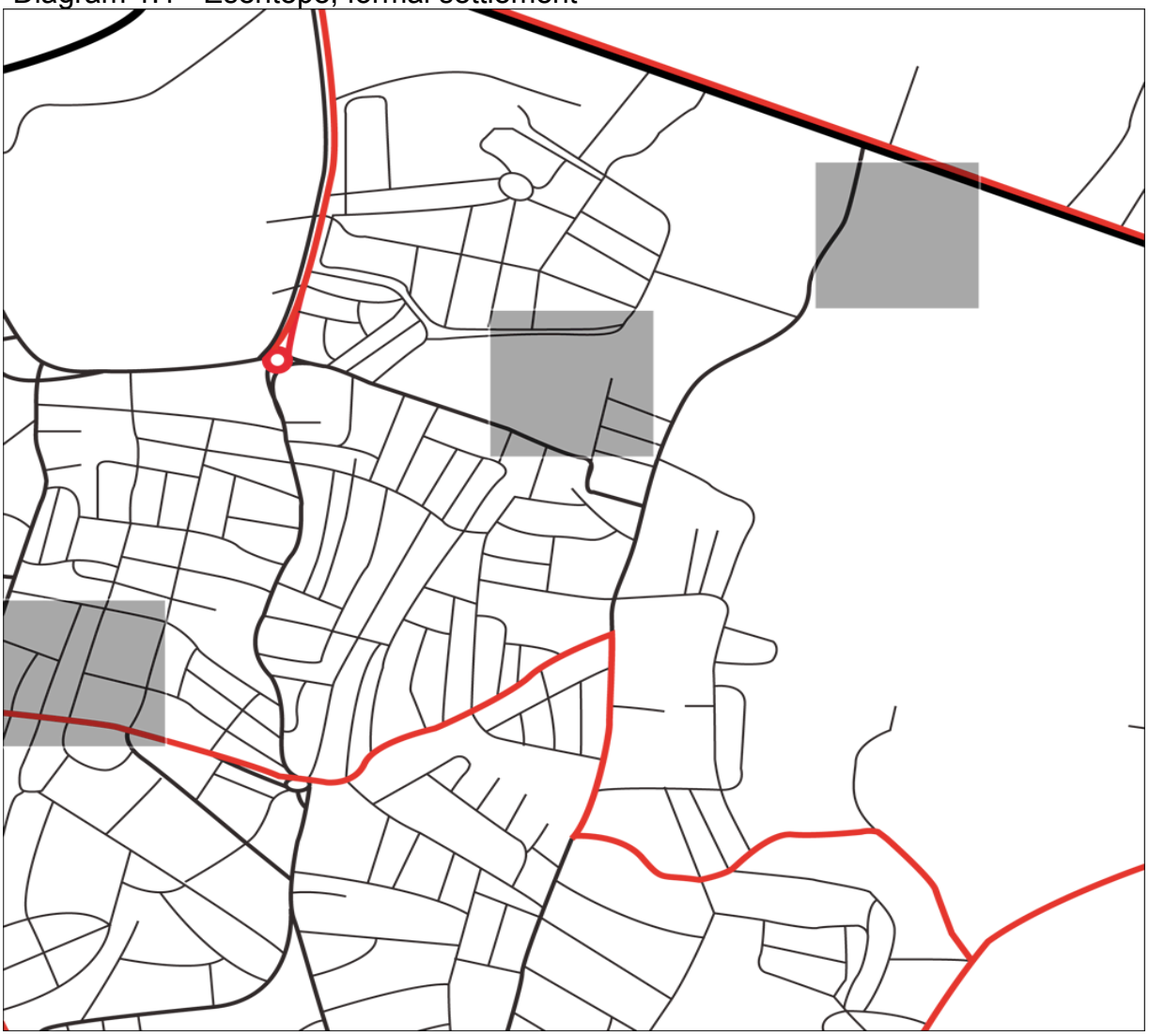
Woolley, Helen. 2003. *Urban Open Spaces*. London; New York: Spon Press.

Yalcintan, Murat Cemal and Adem Erdem Erbas. 2003. "Impacts of "*Gecekondu*" on the Electoral Geography of Istanbul." *International Labor and Working Class History.* (64): 91-93.

Yin, Robert K. 1994. *Case study research: design and methods*. Thousand Oaks: Sage Publications.

Appendix 1 - Square mile diagrams and pedestrian sample units

Diagram 1.1 - Esentepe, formal settlement



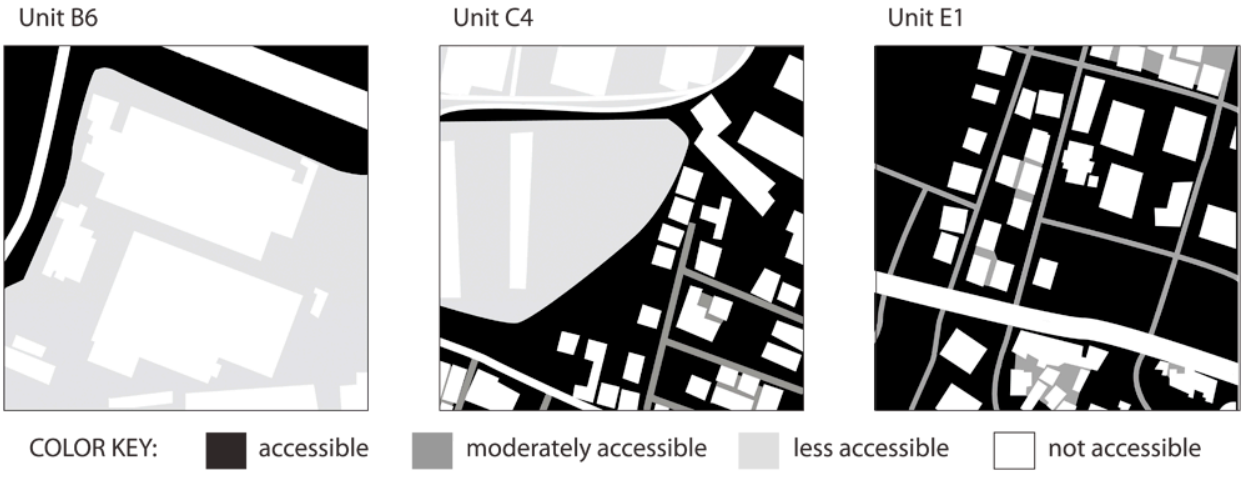


Diagram 1.2 - Gumuspinar, informal settlement

Diagram 1.3 - Cevizli, blended settlement

Appendix 2 – Figure ground diagrams and density measurements

Diagram 2.1: Figure ground, Esentepe

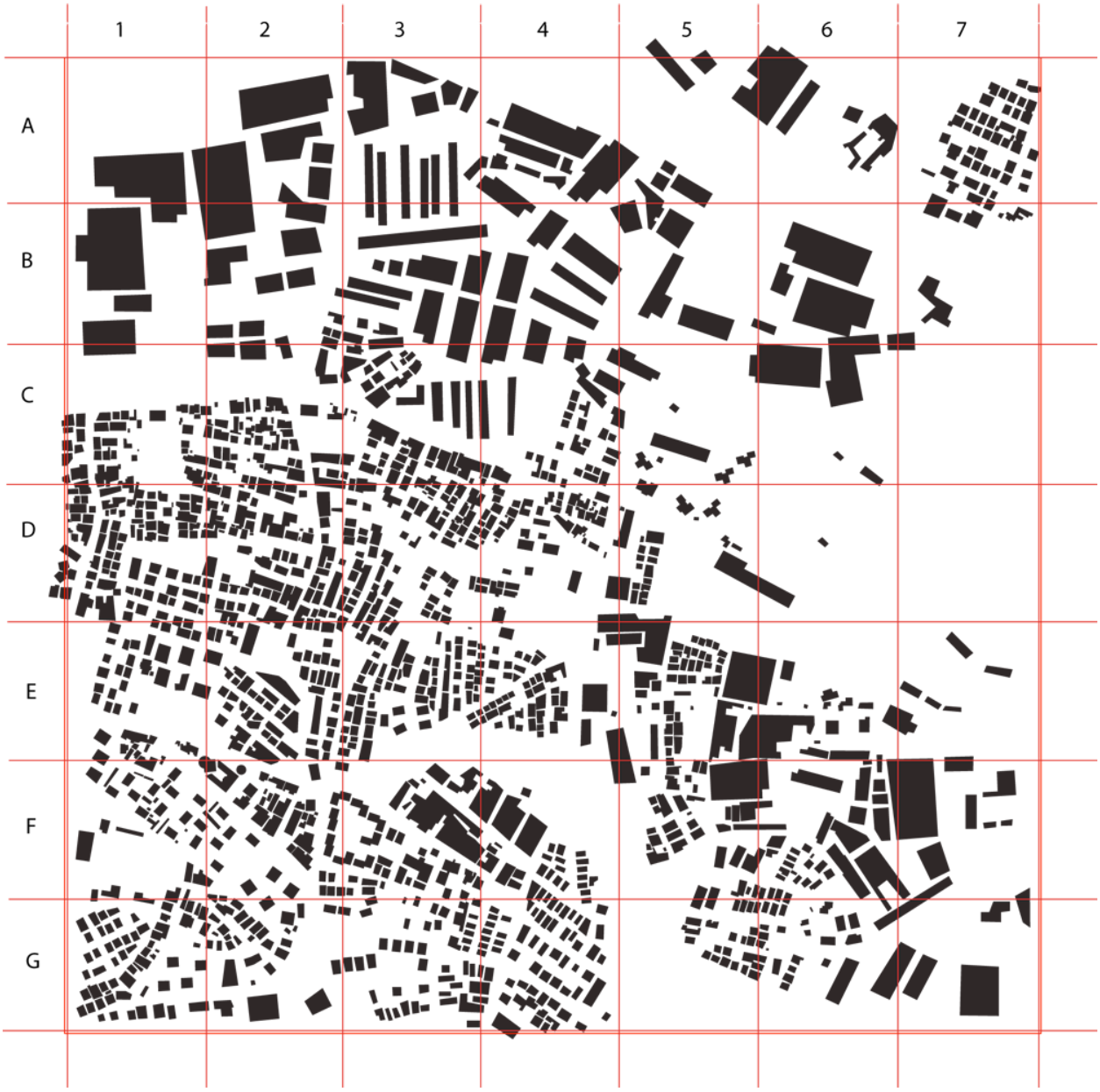


Diagram 2.2: Figure ground, Gumupsinar

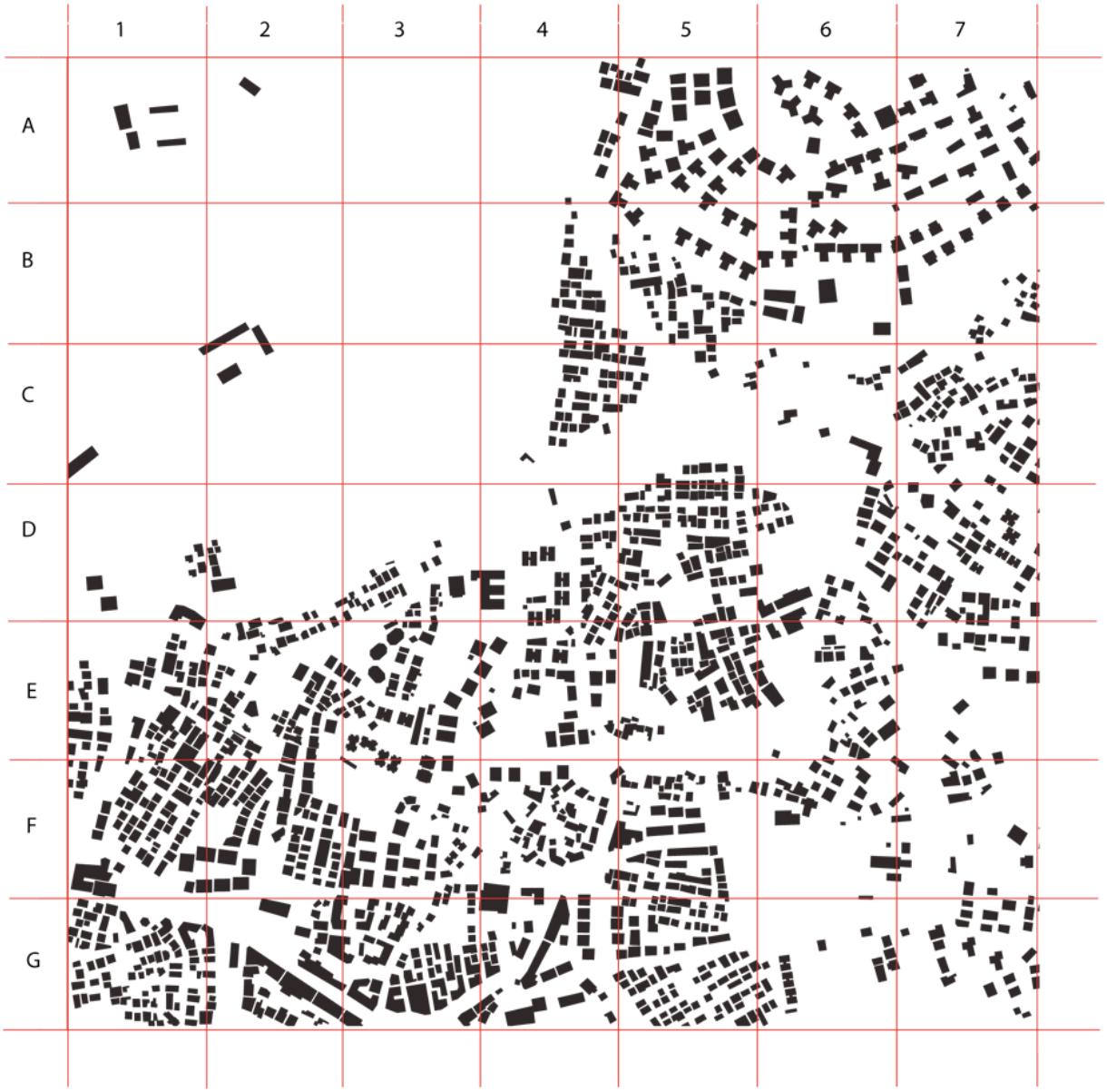


Diagram 2.3: Figure ground, Cevizli

The following density measurements have been summarized in Table 3.2.

Measurement 2.1: Built density

2.1.1 Esentepe, formal settlement

a. Grid units exhibiting low development (1-49% coverage)

	1	2	3	4	5	6	7
A	X			X	X	X	
B	X				X		X
C					X	X	X
D					X	X	
E						X	X
F				X			
G					X		X

LD Units: 17
Total Units: 49
Percentage: 34.7%

b. Grid units exhibiting high development (50-100% coverage)

	1	2	3	4	5	6	7
A		X	X				X
B		X	X	X		X	
C	X	X	X	X			
D	X	X	X	X			
E	X	X	X	X	X		
F	X	X	X		X	X	X
G	X	X	X	X		X	

HD Units: 31
Total Units: 49
Percentage: 63.3%

c. Grid units exhibiting no development (0% coverage)

	1	2	3	4	5	6	7
A							
B							
C							
D							X
E							
F							
G							

ND Units: 1
Total Units: 49
Percentage: 2.0%

2.1.2 Gumuspinar, informal settlement

a. Grid units exhibiting low development (1-49% coverage)

	1	2	3	4	5	6	7
A	X	X		X			
B		X		X			
C	X	X		X	X	X	
D	X	X	X			X	
E							X
F						X	X
G						X	

LD Units: 17
Total Units: 49
Percentage: 30.6%

b. Grid units exhibiting high development (50-100% coverage)

	1	2	3	4	5	6	7
A					X	X	X
B					X	X	X
C							X
D				X	X		X
E	X	X	X	X	X	X	
F	X	X	X	X	X		
G	X	X	X	X	X		X

HD Units: 28
Total Units: 49
Percentage: 57.1%

c. Grid units exhibiting no development (0% coverage)

	1	2	3	4	5	6	7
A			X				
B	X		X				
C			X				
D							
E							
F							
G							

ND Units: 4
Total Units: 49
Percentage: 8.2%

2.1.3 Cevizli, blended settlement

a. Grid units exhibiting low development (1-49% coverage)

	1	2	3	4	5	6	7
A	X	X				X	
B			X	X		X	
C				X	X	X	X
D		X	X			X	X
E						X	X
F						X	X
G	X						

LD Units: 19
Total Units: 49
Percentage: 38.8%

b. Grid units exhibiting high development (50-100% coverage)

	1	2	3	4	5	6	7
A			X	X	X		X
B	X	X			X		X
C	X	X					
D	X			X	X		
E	X	X	X	X	X		
F	X	X	X	X	X		
G		X	X	X	X	X	X

HD Units: 29
Total Units: 49
Percentage: 59.2%

c. Grid units exhibiting no development (0% coverage)

	1	2	3	4	5	6	7
A							
B							
C			X				
D							
E							
F							
G							

ND Units: 1
Total Units: 49
Percentage: 2.0%

Measurement 2.2: Dwelling density

1. Esentepe, formal settlement

	1	2	3	4	5	6	7
A							+
B							+
C	+	+	+	+	O		
D	+	+	+	+	O		
E	+	+	+	+	+		
F	X	X	X	X	+	+	
G	X	X	X	X	+	+	

(O) = Units with mass housing only: 2 (4.1%)
(+) = Units with low-density housing only: 19 (38.8%)
(X) = Units with both: 8 (16.3%)

Total units with housing: 29 (59.2%)

2. Gumuspinar, informal settlement

	1	2	3	4	5	6	7
A				+	X	O	O
B				+	X	O	X
C				+	+	+	+
D	+	+	+	X	+	+	X
E	+	+	X	X	+	+	X
F	X	X	X	X	X	+	+
G	+	X	X	X	X	X	+

(O) = Units with mass housing only: 3 (6.1%)
(+) = Units with low-density housing only: 19 (38.8%)
(X) = Units with both: 18 (36.7%)

Total units with housing: 40 (81.6%)

3. Cevizli, blended settlement

	1	2	3	4	5	6	7
A	X	O	O	O	X	+	
B	+	+	O	X	+	+	
C	X	+					
D	+			+	+		
E		+	+	+	+		
F	X	+	+	+	+	+	+
G	X	+	+	+	+	+	+

(O) = Units with mass housing only: 4 (8.2%)
(+) = Units with low-density housing only: 25 (51.0%)
(X) =Units with both: 6 (12.2%)

Total units with housing: 35 (71.4%)

Measurement 2.3: Use density

1. **Esentepe, formal settlement**

	1	2	3	4	5	6	7
A	O	O	O	O	O	O	+
B	O	O	O	O	O	O	X
C	X	X	X	X	X	O	O
D	+	+	+	X	X	O	
E	+	+	+	X	X	O	O
F	+	+	+	X	X	X	O
G	+	+	+	+	+	X	O

(O) = Industrial units: 19 (38.8%)
(+) = Residential units: 15 (30.6%)
(X) = Blended units: 14 (28.6%)

Open space units (no designation): 1 (2.0%)

2. **Gumuspinar, informal settlement**

	1	2	3	4	5	6	7
A	O	O		+	+	+	+
B		O		+	+	+	+
C	O	O		+	+	+	+
D	+	+	+	+	+	+	+
E	+	+	+	+	+	+	+
F	+	+	+	+	+	+	+
G	+	+	+	+	+	+	+

(O) = Industrial units: 4 (8.2%)
(+) = Residential units: 41 (83.7%)
(X) = Blended units: 0 (0.0%)

Open space units (no designation): 4 (8.2%)

3. **Cevizli, blended settlement**

	1	2	3	4	5	6	7
A	X	X	+	+	+	X	O
B	X	X	+	+	+	X	O
C	+	X		X	O	O	O
D	X	O	+	+	X	O	O
E	O	X	+	+	+	X	O
F	X	X	+	+	+	X	X
G	+	+	+	+	+	+	+

(O) = Industrial units: 10 (20.4%)
(+) = Residential units: 22 (44.9%)
(X) = Blended units: 16 (32.7%)

Open space units (no designation): 1 (2.0%)

Appendix 3 – Photo grids and reference photos

The user-generated photos collected from each settlement for analysis have been organized by grid unit and are included with appropriate photo credits below for reference.

Preliminary analysis 1: Esentepe, formal settlement

Photo grid 1: Esentepe, formal settlement

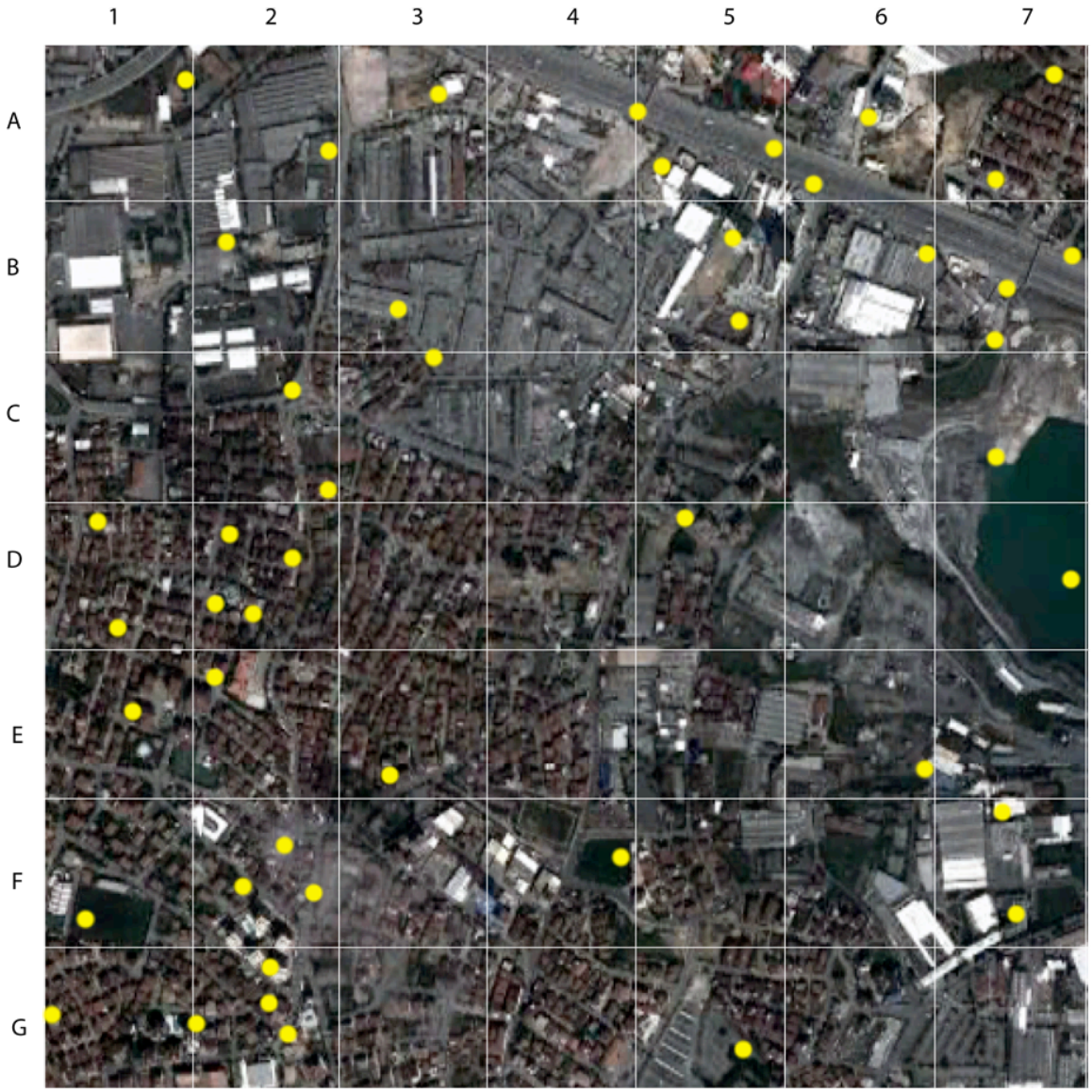
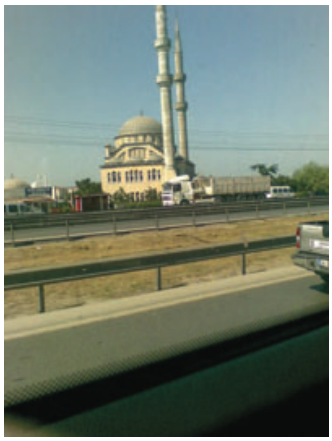
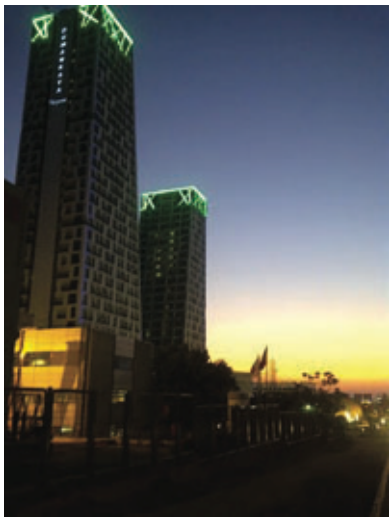
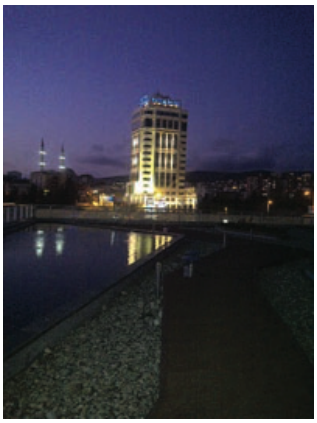


Photo references 1: Esentepe, formal settlement

A1	  By Özgür Kaplan, By www.istanbulfatih.com
A2	 By Salih Ozkan
A3	 By ortaklarotomotiv

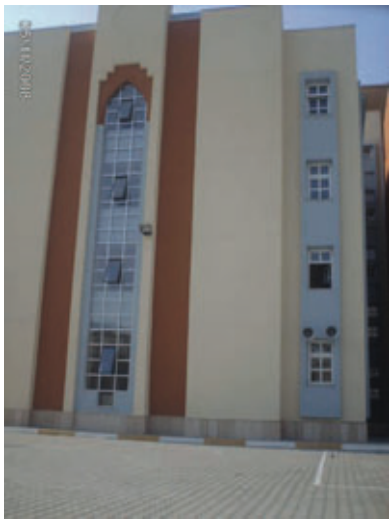
A4	 By ertan.karakas
A5	  By UGUR KILINC, By yildiz86  By UGUR KILINC

A6	  By UGUR KILINC, By Saim Günaydın
A7	N/A
B1	N/A
B2	N/A
B3	 By ramazantuna
B4	N/A
B5	  By ARGENA, By Şenol KARA

B6	 By www.istanbulfatih.com
B7	 By Hakan OZEL
C1	N/A
C2	  By mtokal, By mtokal

C3	 By sedat_198408
C4	N/A
C5	  By canbaz, By canbaz
C6	N/A
C7	 By Abdullah BAHAR

D1	  By AZIZ_SARI, By by fatih
D2	  By SonKoz, By SonKoz
D3	N/A
D4	N/A
D5	 By ömerari

D6	N/A
D7	 By www.istanbulfatih.com
E1	 By cLuBmErT
E2	 By mertcan3

E3	 By zeistu
E4	N/A
E5	N/A
E6	N/A
E7	 By uralkaraca
F1	 By efecemelci

F2	  By levendtezcan, By Hakan OZEL
F3	 By Hakan OZEL
F4	N/A
F5	N/A
F6	N/A
F7	  By Mehmet Ali İnegöl, By mehmet56

G1	 By levendtezcan
G2	  By Hakan OZEL, By Şenol KARA
G3	 By ozlem89
G4	N/A

G5	 By gurselvi25
G6	 By Vedat Bektaş
G7	N/A

Preliminary analysis 2: Gumuspinar, informal settlement

Gumuspinar

- dominance (106)
Open farmland in the northwest corner is sharp departure from dense residential fabric

- clarity of joint (106)
Two major intersections puncture the informal fabric

- continuity (106)
Small scale residential fabric is consistent throughout the mahalle

Photo grid 2: Gumuspinar, informal settlement

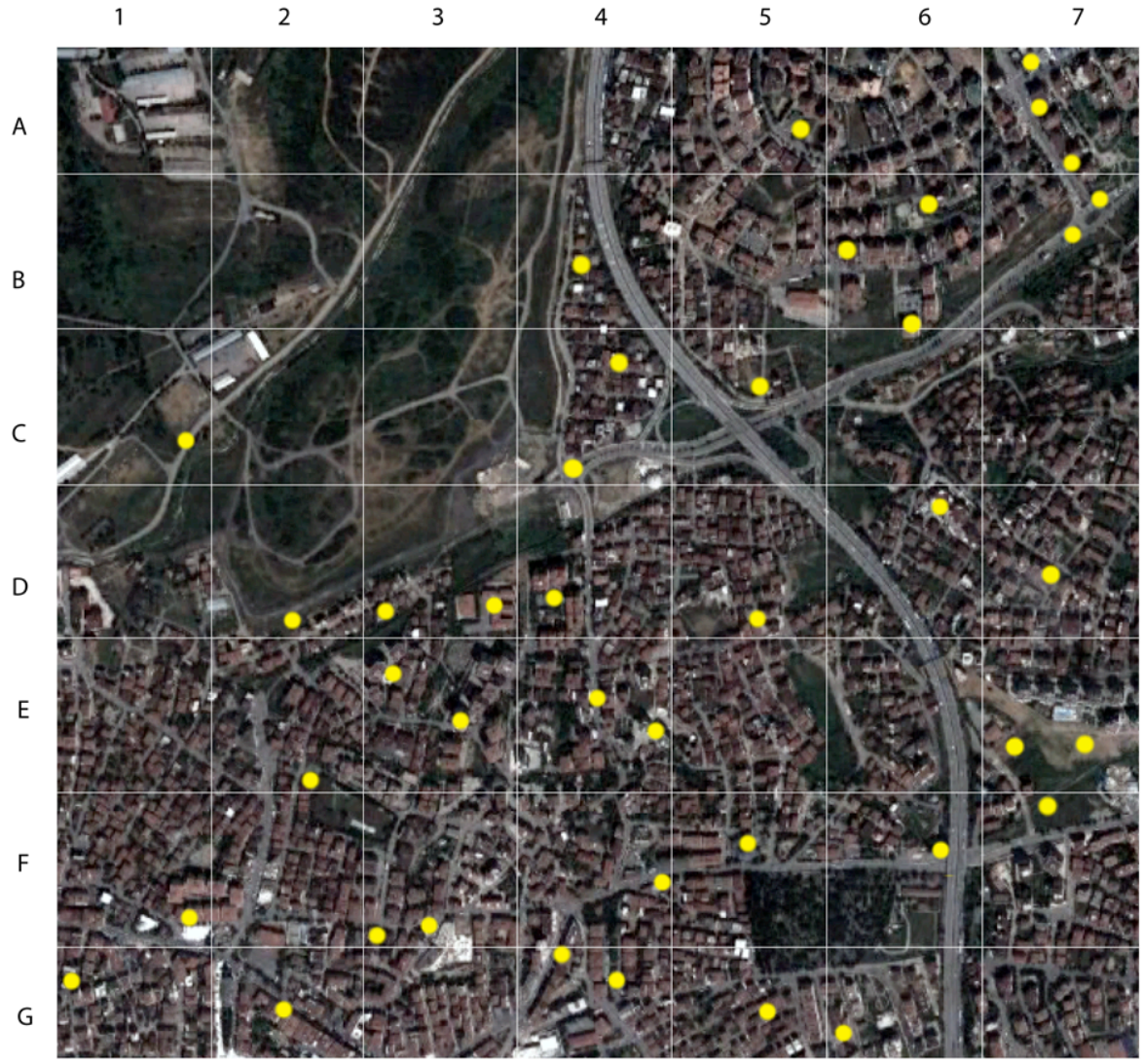


Photo references 2: Gumuspinar, informal settlement

A1	N/A
A2	N/A
A3	N/A
A4	N/A
A5	 By malipetek
A6	 By VaJaKKuRT
A7	  By www.istanbulfatih.com, By nbalsview

B1	N/A
B2	N/A
B3	N/A
B4	 By hamodi.akko
B5	 By bayramates46
B6	N/A
B7	 By Sadık by BYKOZ

C1	N/A
C2	 By atas.umit
C3	  By megakentli, By megakentli
C4	 By kayhan5450

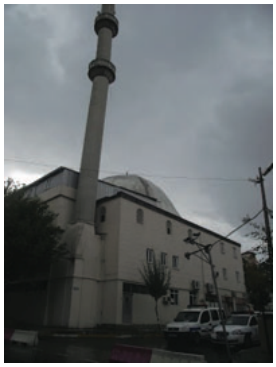
C5	 By Kasım OKTAY
C6	N/A
C7	N/A
D1	 By avni parlak
D2	N/A
D3	 By yunus_kaplan

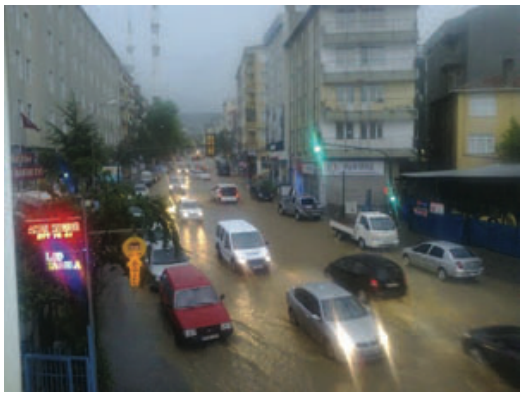
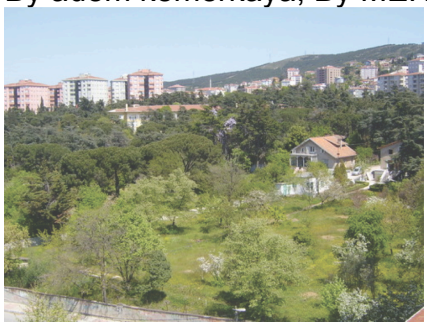
D4	  By zevzekman, By sercan cebecioğlu
D5	 By www.istanbulfatih.com
D6	 By beyhankayali

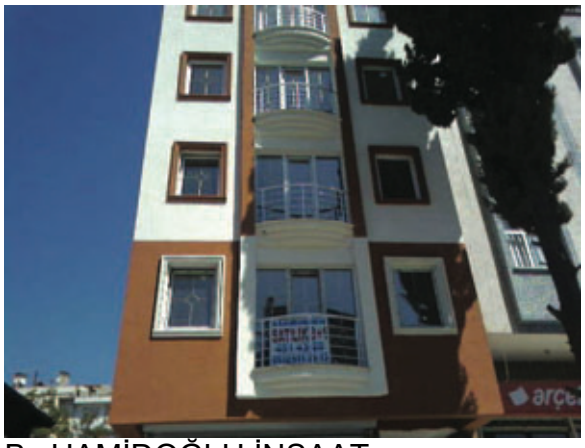
D7	  By metinerdogan, By bora00

E1	N/A
E2	  By selahattin beler, By selahattin beler
E3	 By Hikmet Gümüş
E4	N/A
E5	N/A
E6	N/A

E7	  By 55berat, By ukaraot  By ukaraot

F1	  By Kasım OKTAY, By snatch_56
F2	N/A
F3	 By morpc

F4	  By By:israfil_kapucu, By mevlut hoca
F5	N/A
F6	 By www.istanbulfatih.com
F7	  By adem kemerkaya, By MEHMET AYHAN ALPAR  By serdarozdil

G1	 By elyasa
G2	 By Erkan Pehlivan
G3	 By HAMİDOĞLU İNŞAAT

G4	 By ensar_69
G5	 By www.istanbulfatih.com
G6	 By Şenol KARA

G7	 By MEHMET AYHAN ALPAR

Preliminary analysis 3: Cevizli, blended settlement

Cevizli

- dominance (106)
Interstate dominates the landscape in northern portion of mahalle

- continuity (106)

Residential fabric has a fine, continous grain in southern portion of mahalle

Photo grid 3: Cevizli, blended settlement

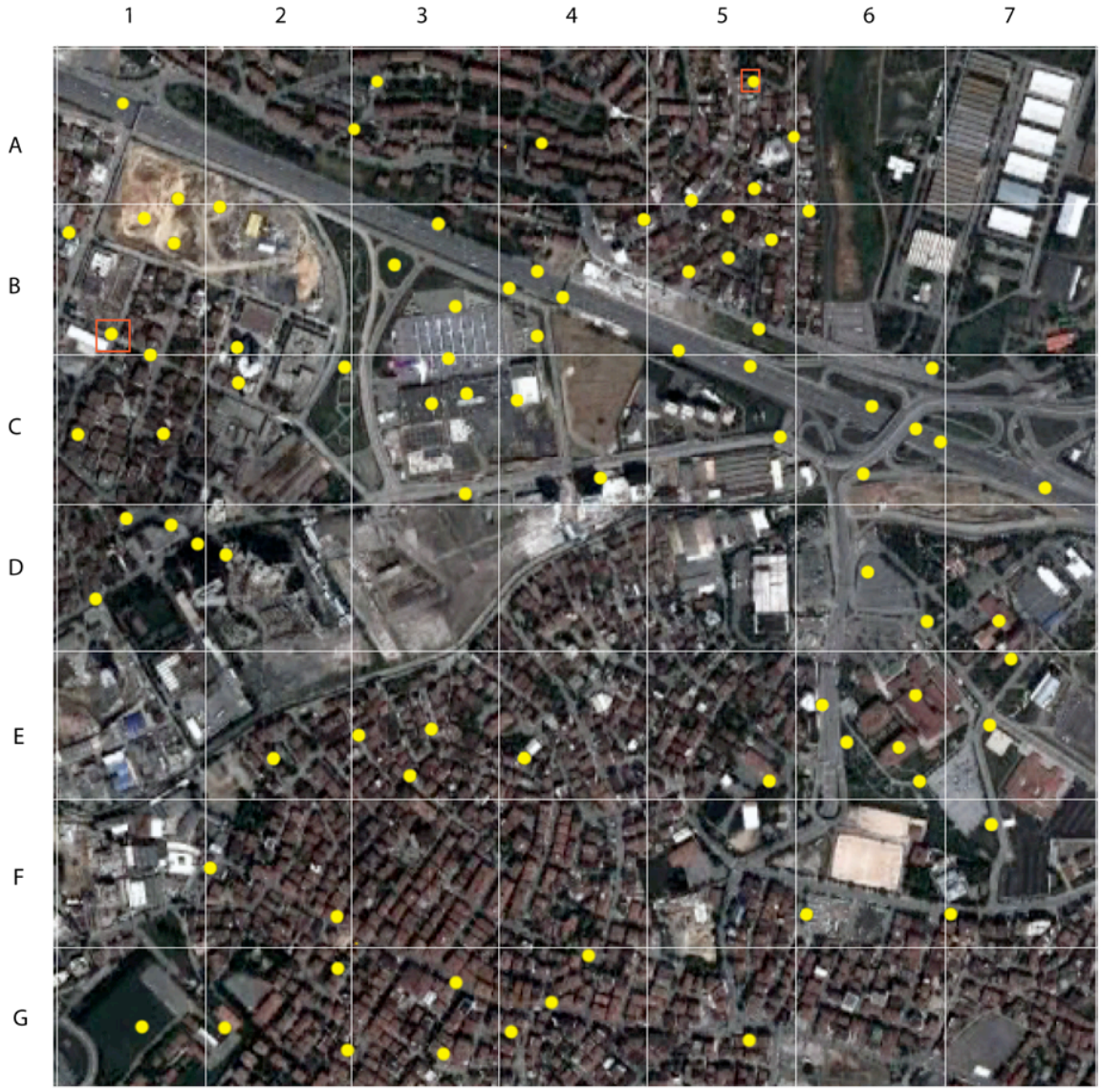
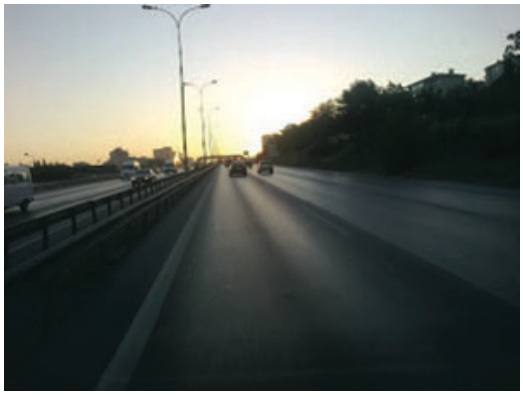


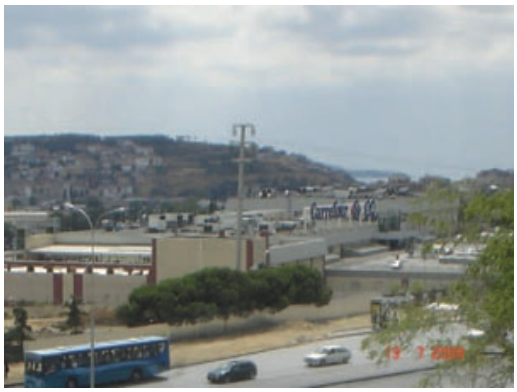
Photo references 3: Cevizli, blended settlement

A1	  By Abdullah BAHAR, By baltacıoğlu
A2	N/A
A3	 By Abdullah BAHAR
A4	  By kod53, By vaydogdu

A5	  By Abdullah BAHAR, By Abdullah BAHAR   By Abdullah BAHAR, By Abdullah BAHAR
A6	N/A
A7	N/A
B1	 By Şenol KARA

B2	 By baltacıoğlu
B3	  By onurcelik, By Abdullah BAHAR
B4	  By Abdullah BAHAR, By Abdullah BAHAR  By Abdullah BAHAR

B5	  By Abdullah BAHAR, By Abdullah BAHAR  By Abdullah BAHAR
B6	 By Abdullah BAHAR
B7	N/A

C1	  By Ali Nadir Dönmez, By baltacıoğlu
C2	 By umranyapi
C3	  By Abdullah BAHAR, By Abdullah BAHAR

C4	  By ilhan parcali, By idiopathic  By Abdullah BAHAR
C5	 By Saim Günaydın

C6	 By Biem Bilgisayar
C7	 By Saim Günaydın
D1	 By HÜSEYİN ENGİN BLT

D2	 By orkuntuzel
D3	 By dogruyol
D4	 By Tiffosi
D5	N/A

D6	 By OZAN CiN - TR-07
D7	N/A
E1	N/A
E2	 By Salih Ozkan
E3	 By Mehmet Bayraktar

E4	N/A
E5	  By Ramazan.Serif.Cetin, By Adem Goekmen
E6	 By idiopathic
E7	 By onurcelik
F1	N/A

F2	 By murat3448

F3	N/A
F4	N/A
F5	N/A
F6	 By oerdonmez_26
F7	 By idiopathic

G1	 By Şenol KARA

G2	  By © Burak Gündüz, By Enesciqo
G3	 By ugurakyuz123

G4	 By TANJU KORAY UCAR
G5	N/A

G6	 By idiopathic
G7	 By batuu