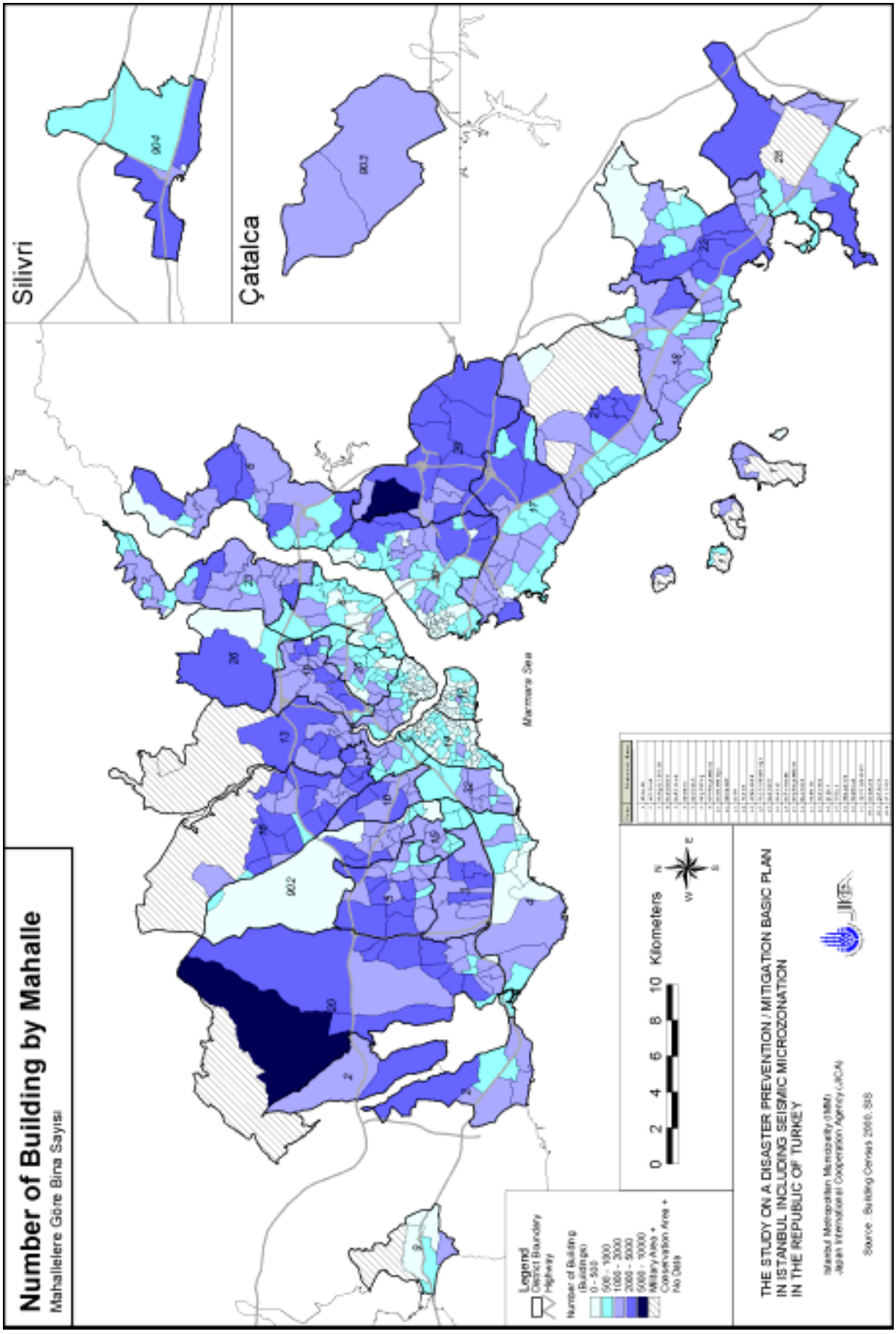

Figure 6.2.3 Building Distribution by Mahalle

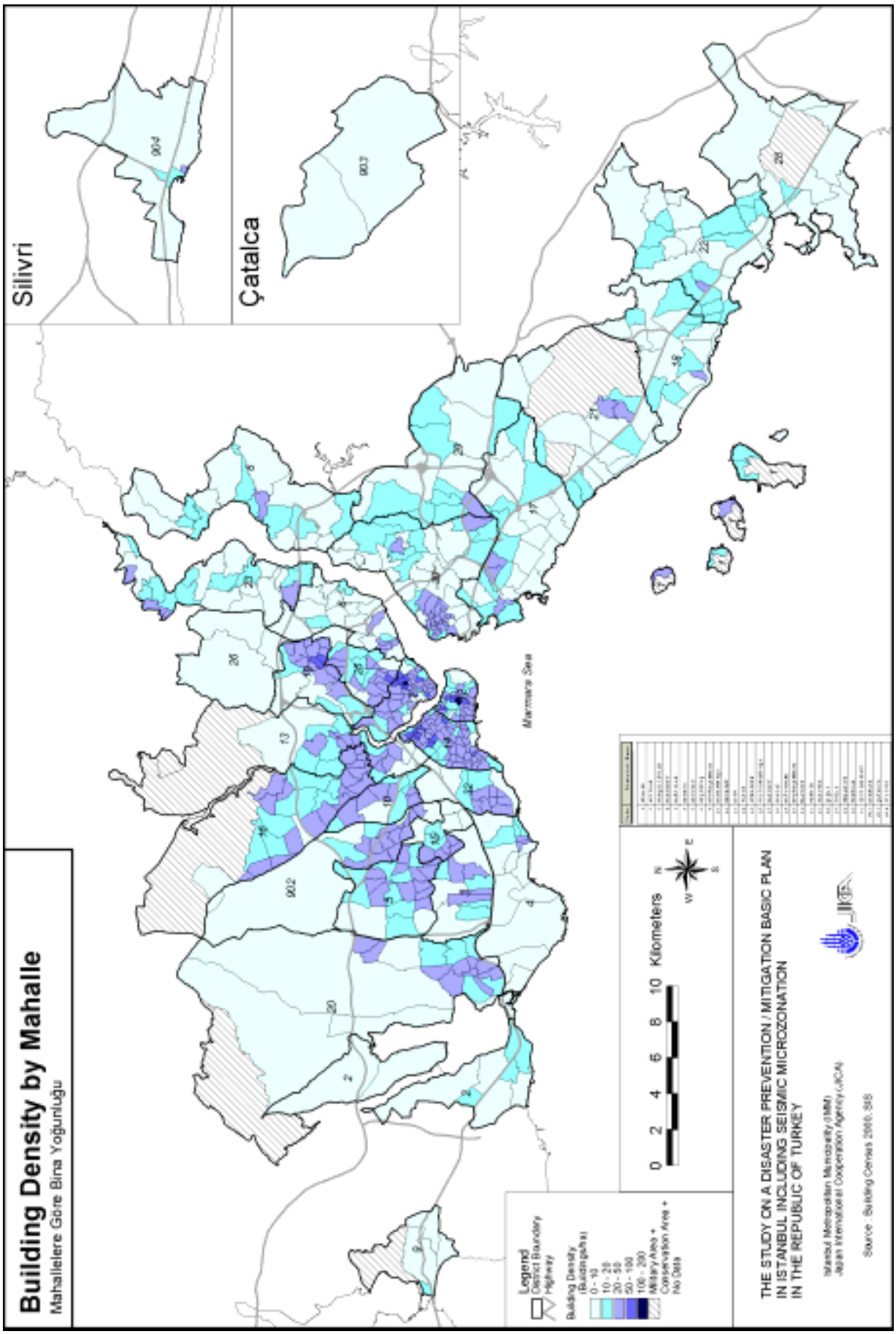

Figure 6.2.4 Building Density by Mahalle

(1) Structure Types

In the 2000 Building Census, building structures were divided into several types. For framed structures, two parts are recognised. One pertains to the framing of the building (i.e., 1: steel frame, 2: RC frame, 3: wood frame, and 4: other frame) and the other pertains to infill wall materials (1: steel plate, 2: concrete block, 3: briquette, 4: brick, 5: wood, 6: stone, and 7: sun dried brick). Combinations of these parts can exist and they form a variety of building structure types. According to discussions with Dr. Professor Nuray Aydonoglu, the difference of infill wall material cannot be used to classify the difference in building strength; therefore, the infill wall material was not taken into consideration in this project and data are aggregated using the frame, or skeleton, type. Another type of structure is masonry. For masonry structures, materials are classified into six (6) categories: 1) briquette, 2) brick, 3) wood, 4) stone, 5) sun dried brick, and 6) others. Due to the questionable nature of wood masonry, the number of buildings in this category is merged into the "wood frame" category.

Table 6.2.4 shows the breakdown of type of structure by district. In fact, within the Study Area, the ratio of RC frame structures is 74.4% and of briquette/brick masonry is 21.7%; therefore, 96.1% of structures are made up of these two types. Newly developed areas in the last three decades that are mainly made up of RC structuresare Avcilar, Bahçelievler, Bağcilar, Büyükçekmece, Gaziosmanpaşa, and Esenler, with 90% of its building stock made up of RC structures. On the contrary, the building stock in old towns such as Adalar, Beyoğlu, Eminönü and Fatih is more than 30% masonry structures. Most masonry structures are made of briquette and brick, and it is remarkable that in Eminönü, 19% of the bulding stock is comprised of stone masonry buildings.

Figure 6.2.5 hows the building distribution ratio of RC structures by mahalle and Figure 6.2.6 shows the building distribution ratio of masonry structures (briquette and brick) by mahalle.

Table 6.2.4 Structure Type by District

District Code	District Name	Structure (No of Buildings)										Structure (Percentage)									
		FS (Steel)	FS (RC)	FS (Wood)	FS (Other)	MS (Briquette, Brick)	MS (Stone)	MS (Sun dried brick)	MS (Other)	Other (Full shear wall)	Other (Prefabric)	FS (Steel)	FS (RC)	FS (Wood)	FS (Other)	MS (Briquette, Brick)	MS (Stone)	MS (Sun dried brick)	MS (Other)	Other (Full shear wall)	Other (Prefabric)
1	ADALAR	8	2,767	1,021	9	2,606	59	11	9	0	13	0.1	42.5	15.7	0.1	40.1	0.9	0.2	0.1	0.0	0.2
2	AVCILAR	13	13,165	22	1	759	26	6	2	1	20	0.1	93.9	0.2	0.0	5.4	0.2	0.0	0.0	0.0	0.1
3	BAHÇELİEVLER	13	18,957	17	1	543	11	1	2	20	55	0.1	96.6	0.1	0.0	2.8	0.1	0.0	0.0	0.1	0.3
4	BAKIRKÖY	20	8,851	235	1	731	35	1	1	1	50	0.2	89.2	2.4	0.0	7.4	0.4	0.0	0.0	0.0	0.5
5	BAĞCILAR	20	34,116	13	2	1,710	15	33	5	0	17	0.1	94.9	0.0	0.0	4.8	0.0	0.1	0.0	0.0	0.0
6	BEYKOZ	106	17,034	559	3	10,153	133	3	46	0	6	0.4	60.7	2.0	0.0	36.2	0.5	0.0	0.2	0.0	0.0
7	BEYOĞLU	75	13,762	1,018	11	10,354	922	53	7	1	12	0.3	52.5	3.9	0.0	39.5	3.5	0.2	0.0	0.0	0.0
8	BEŞİKTAŞ	11	9,985	707	43	3,204	276	9	12	3	20	0.1	70.0	5.0	0.3	22.5	1.9	0.1	0.1	0.0	0.1
9	BÜYÜKÇEKMECE	1	3,127	19	1	146	15	0	0	0	8	0.0	94.3	0.6	0.0	4.4	0.5	0.0	0.0	0.0	0.2
10	BAYRAMPAŞA	9	15,324	17	4	4,548	35	10	0	0	25	0.0	76.7	0.1	0.0	22.8	0.2	0.1	0.0	0.0	0.1
12	EMİNÖNÜ	25	7,397	792	19	3,040	2,655	5	14	1	35	0.2	52.9	5.7	0.1	21.7	19.0	0.0	0.1	0.0	0.3
13	EYÜP	20	15,225	459	1	9,190	246	17	2	3	71	0.1	60.3	1.8	0.0	36.4	1.0	0.1	0.0	0.0	0.3
14	FATİH	32	19,336	1,815	3	9,573	662	38	20	2	54	0.1	61.3	5.8	0.0	30.4	2.1	0.1	0.1	0.0	0.2
15	GÜNGÖREN	10	10,058	7	2	471	4	0	6	0	5	0.1	95.2	0.1	0.0	4.5	0.0	0.0	0.1	0.0	0.0
16	GAZİOSMANPAŞA	25	40,486	37	3	15,615	54	39	3	0	14	0.0	71.9	0.1	0.0	27.7	0.1	0.1	0.0	0.0	0.0
17	KADIKÖY	58	30,730	537	13	6,237	223	63	18	302	30	0.2	80.4	1.4	0.0	16.3	0.6	0.2	0.0	0.8	0.1
18	KARTAL	38	17,594	410	2	5,864	191	10	7	1	68	0.2	72.7	1.7	0.0	24.2	0.8	0.0	0.0	0.0	0.3
19	KAĞITHANE	42	19,187	19	3	9,251	11	9	1	56	8	0.1	67.1	0.1	0.0	32.4	0.0	0.0	0.0	0.2	0.0
20	KÜÇÜKÇEKMECE	40	38,452	148	3	6,239	146	14	82	140	18	0.1	84.9	0.3	0.0	13.8	0.3	0.0	0.2	0.3	0.0
21	MALTEPE	73	19,708	57	0	4,953	81	17	5	9	59	0.3	79.0	0.2	0.0	19.8	0.3	0.1	0.0	0.0	0.2
22	PENDİK	102	28,027	153	5	10,855	93	26	31	95	70	0.3	71.0	0.4	0.0	27.5	0.2	0.1	0.1	0.2	0.2
23	SARIYER	20	19,270	884	19	9,661	288	41	10	2	13	0.1	63.8	2.9	0.1	32.0	1.0	0.1	0.0	0.0	0.0
26	ŞİŞLİ	24	16,240	392	5	5,456	148	107	3	4	9	0.1	72.5	1.8	0.0	24.4	0.7	0.5	0.0	0.0	0.0
28	TUZLA	139	11,302	109	73	2,849	50	11	28	1	61	1.0	77.3	0.7	0.5	19.5	0.3	0.1	0.2	0.0	0.4
29	ÜMRANİYE	24	32,029	129	6	10,823	73	11	2	100	25	0.1	74.1	0.3	0.0	25.0	0.2	0.0	0.0	0.2	0.1
30	ÜSKÜDAR	38	33,748	1,172	30	7,096	348	54	70	3	53	0.1	79.2	2.8	0.1	16.7	0.8	0.1	0.2	0.0	0.1
32	ZEYTİNBURNU	21	13,736	18	2	1,583	51	11	3	15	20	0.1	88.8	0.1	0.0	10.2	0.3	0.1	0.0	0.1	0.1
902	ESENLER	21	21,051	48	2	1,425	32	22	3	0	2	0.1	93.1	0.2	0.0	6.3	0.1	0.1	0.0	0.0	0.0
903	ÇATALCA	2	1,434	102	1	823	118	13	1	0	6	0.1	57.4	4.1	0.0	32.9	4.7	0.5	0.0	0.0	0.2
904	SİLİVRİ	7	6,879	75	1	1,292	67	124	5	0	40	0.1	81.0	0.9	0.0	15.2	0.8	1.5	0.1	0.0	0.5
Total		1,037	538,977	10,991	269	157,050	7,068	759	398	760	887	0.1	74.4	1.5	0.0	21.7	1.0	0.1	0.1	0.1	0.1

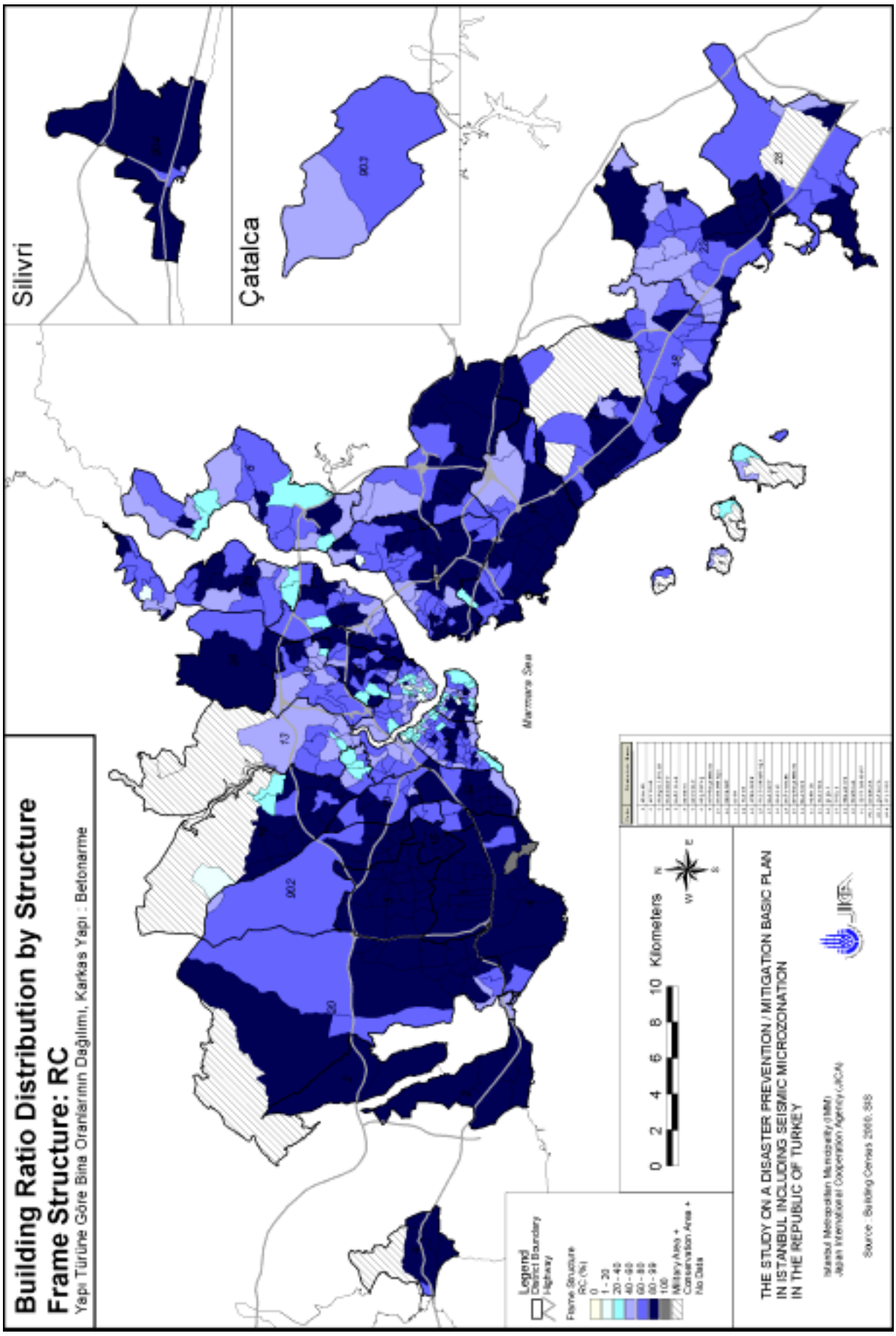

Figure 6.2.5 Building Distribution by Structure Type (Frame Structure: RC)

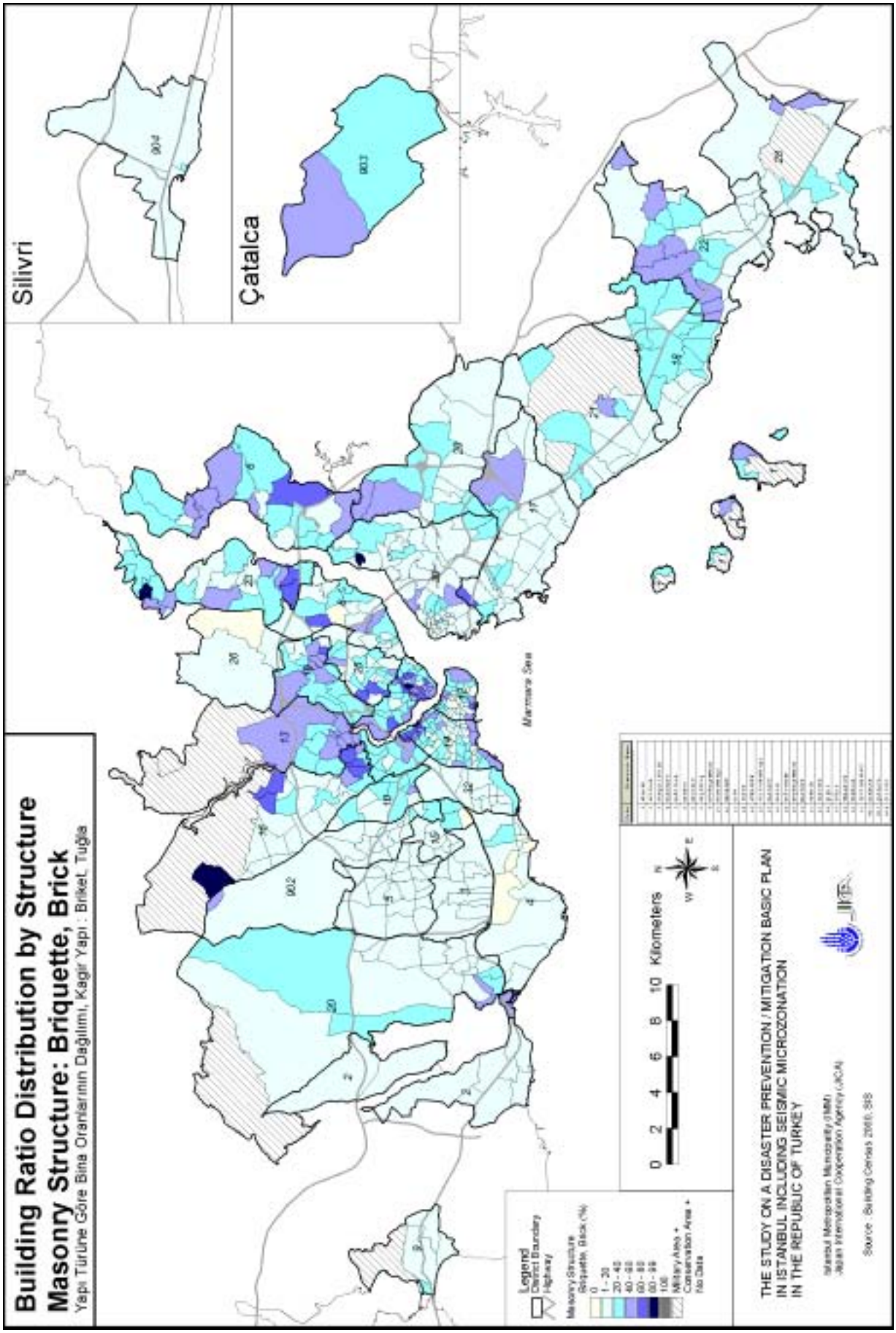

Figure 6.2.6 Building Distribution by Structure Type (Masonry Structure: Briquette, Brick)

(2) Building Construction Year Data

In the 2000 Building Census, the construction year data is divided into fourteen categories: 1) 1923 and before, 2) 1924-1929, 3) 1930-1939, 4) 1950-1959, 5) 1960-1969, 6) 1970-1979, 7) 1980-1989, 8) 1980-1989, 9) 1990-1995, 10) 1996, 11) 1997, 12) 1998, 13) 1999, and 14) 2000. The original data was aggregated into 6 categories: 1) 1949 and before, 2) 1950-1959, 3) 1960-1969, 4) 1970-1979, 5) 1980-1989, and 6) 1990 and after. Table 6.2.5 summarises construction year data of buildings by district.

Table 6.2.5 Building Construction Year by District

District Code	District Name	Construction Year (No. of Buildings)						Construction Year (Percentage)					
		1949 and before	1950-1959	1960-1969	1970-1979	1980-1989	1990 and after	1949 and before	1950-1959	1960-1969	1970-1979	1980-1989	1990 and after
1	ADALAR	1,910	719	845	969	1,185	813	29.7	11.2	13.1	15.0	18.4	12.6
2	AVCILAR	24	71	197	1,105	3,928	8,690	0.2	0.5	1.4	7.9	28.0	62.0
3	BAHÇELİEVLER	15	51	468	3,398	7,453	8,096	0.1	0.3	2.4	17.4	38.3	41.6
4	BAKIRKÖY	359	439	1,292	2,886	2,740	2,166	3.6	4.4	13.1	29.2	27.7	21.9
5	BAĞCILAR	26	50	321	4,826	15,604	14,982	0.1	0.1	0.9	13.5	43.6	41.8
6	BEYKOZ	1,170	755	2,727	7,150	11,063	4,982	4.2	2.7	9.8	25.7	39.7	17.9
7	BEYOĞLU	8,113	2,679	3,576	4,084	3,709	4,052	31.0	10.2	13.6	15.6	14.1	15.5
8	BEŞİKTAŞ	1,783	1,842	1,792	3,509	3,068	2,247	12.5	12.9	12.6	24.6	21.5	15.8
9	BÜYÜKÇEKMECE	22	55	113	301	1,552	1,269	0.7	1.7	3.4	9.1	46.9	38.3
10	BAYRAMPAŞA	27	341	2,977	5,721	6,302	4,538	0.1	1.7	15.0	28.7	31.7	22.8
12	EMİNÖNÜ	6,016	1,369	1,949	2,554	1,389	615	43.3	9.9	14.0	18.4	10.0	4.4
13	EYÜP	1,474	2,353	4,860	6,074	5,937	4,670	5.8	9.3	19.2	23.9	23.4	18.4
14	FATİH	7,067	3,303	5,589	8,785	4,187	2,323	22.6	10.6	17.9	28.1	13.4	7.4
15	GÜNGÖREN	6	51	426	2,216	4,275	3,556	0.1	0.5	4.0	21.0	40.6	33.8
16	GAZİOSMANPAŞA	307	2,810	4,222	9,582	14,897	24,383	0.5	5.0	7.5	17.0	26.5	43.4
17	KADIKÖY	1,140	1,459	4,250	11,735	11,885	7,657	3.0	3.8	11.1	30.8	31.2	20.1
18	KARTAL	205	405	2,053	5,873	9,385	6,251	0.8	1.7	8.5	24.3	38.8	25.9
19	KAĞITHANE	57	704	5,481	8,316	6,934	6,911	0.2	2.5	19.3	29.3	24.4	24.3
20	KÜÇÜKÇEKMECE	149	396	2,528	6,801	12,613	22,133	0.3	0.9	5.7	15.2	28.3	49.6
21	MALTEPE	158	284	1,645	4,900	9,027	9,068	0.6	1.1	6.6	19.5	36.0	36.2
22	PENDİK	197	394	1,792	5,167	14,174	17,748	0.5	1.0	4.5	13.1	35.9	45.0
23	SARIYER	1,783	1,418	2,635	6,575	10,746	7,250	5.9	4.7	8.7	21.6	35.3	23.8
26	ŞİŞLİ	2,379	2,639	4,111	4,656	3,939	4,550	10.7	11.8	18.5	20.9	17.7	20.4
28	TUZLA	183	141	389	1,582	4,605	7,588	1.3	1.0	2.7	10.9	31.8	52.4
29	ÜMRANİYE	64	183	962	4,894	13,279	23,203	0.2	0.4	2.3	11.5	31.2	54.5
30	ÜSKÜDAR	2,094	1,273	3,559	9,525	12,334	13,692	4.9	3.0	8.4	22.4	29.0	32.2
32	ZEYTİNBURNU	208	513	1,148	2,443	4,815	6,254	1.4	3.3	7.5	15.9	31.3	40.7
902	ESENLER	27	83	919	4,409	8,901	8,221	0.1	0.4	4.1	19.5	39.5	36.4
903	ÇATALCA	211	94	234	551	705	728	8.4	3.7	9.3	21.8	27.9	28.9
904	SİLİVRİ	270	102	275	1,201	2,589	4,063	3.2	1.2	3.2	14.1	30.5	47.8
Total		37,444	26,976	63,335	141,788	213,220	232,699	5.2	3.8	8.9	19.8	29.8	32.5

Source: Building Census 2000, SIS

According to the data, up to 1969, the number of buildings in Istanbul was only 127,755 (17.9 % of the total number of buildings in the year 2000). Also, development in Istanbul rapidly increased after 1970, with the construction of mostly RC frame structures. It can be

considered that this wave of construction contributed to the construction of rather low quality buildings, especially residential buildings.

In the Study, construction year data is used to visualise the urban development pattern in Istanbul (Figure 6.2.7 to Figure 6.2.17). These figures clearly show urban development in Istanbul.

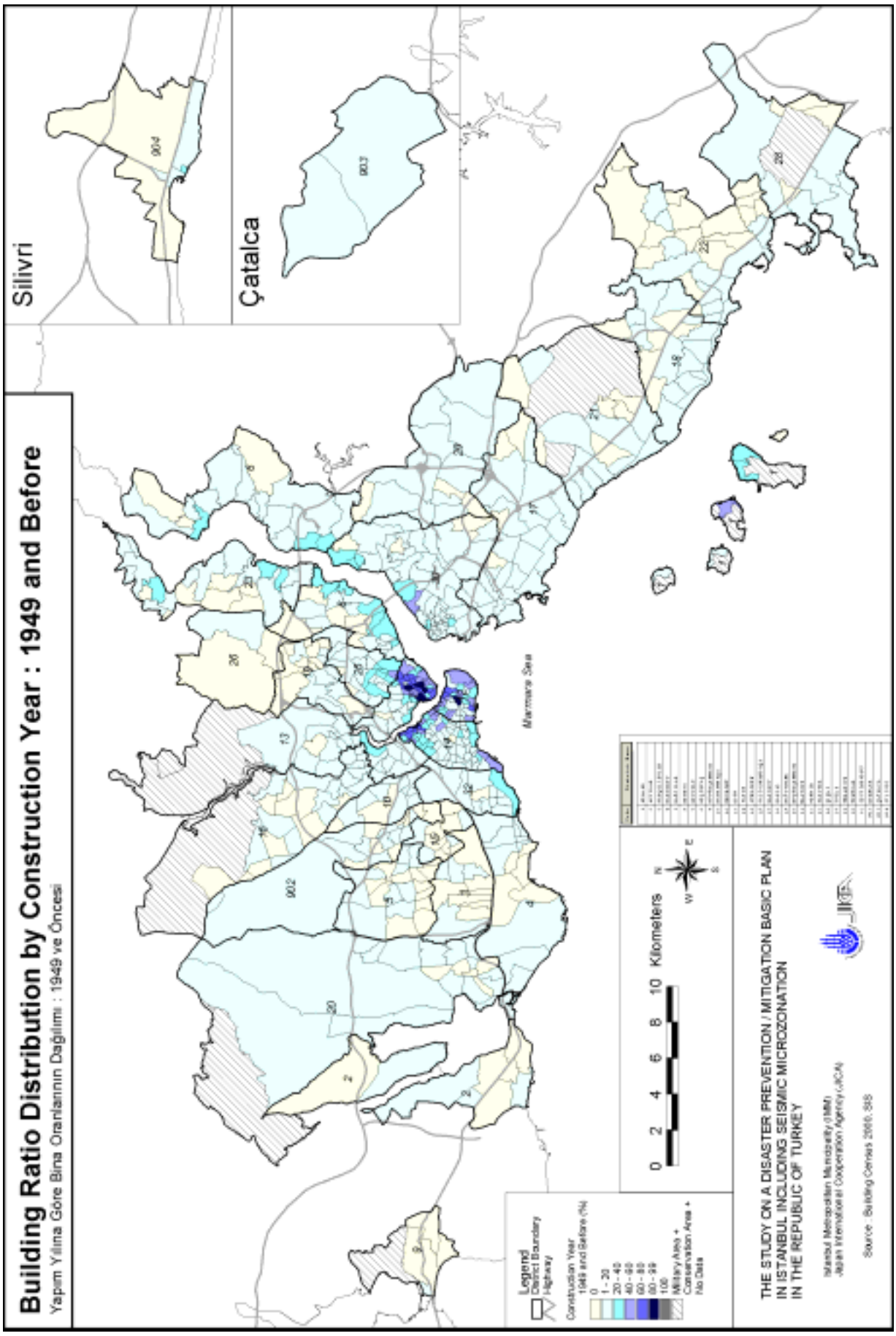

Figure 6.2.7 Building Distribution by Construction Year (1949 and before)

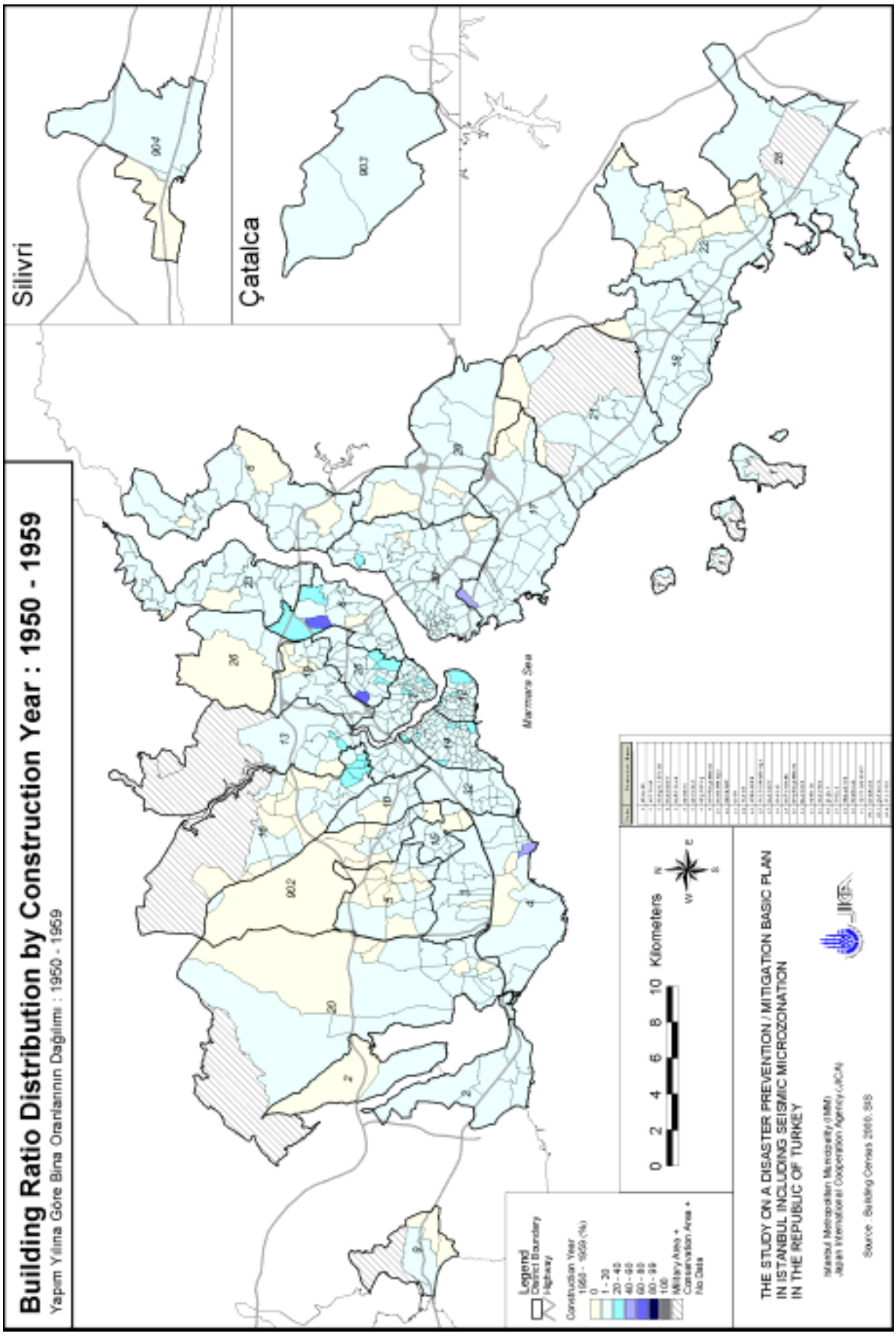

Figure 6.2.8 Building Distribution by Construction Year (1950-1959)

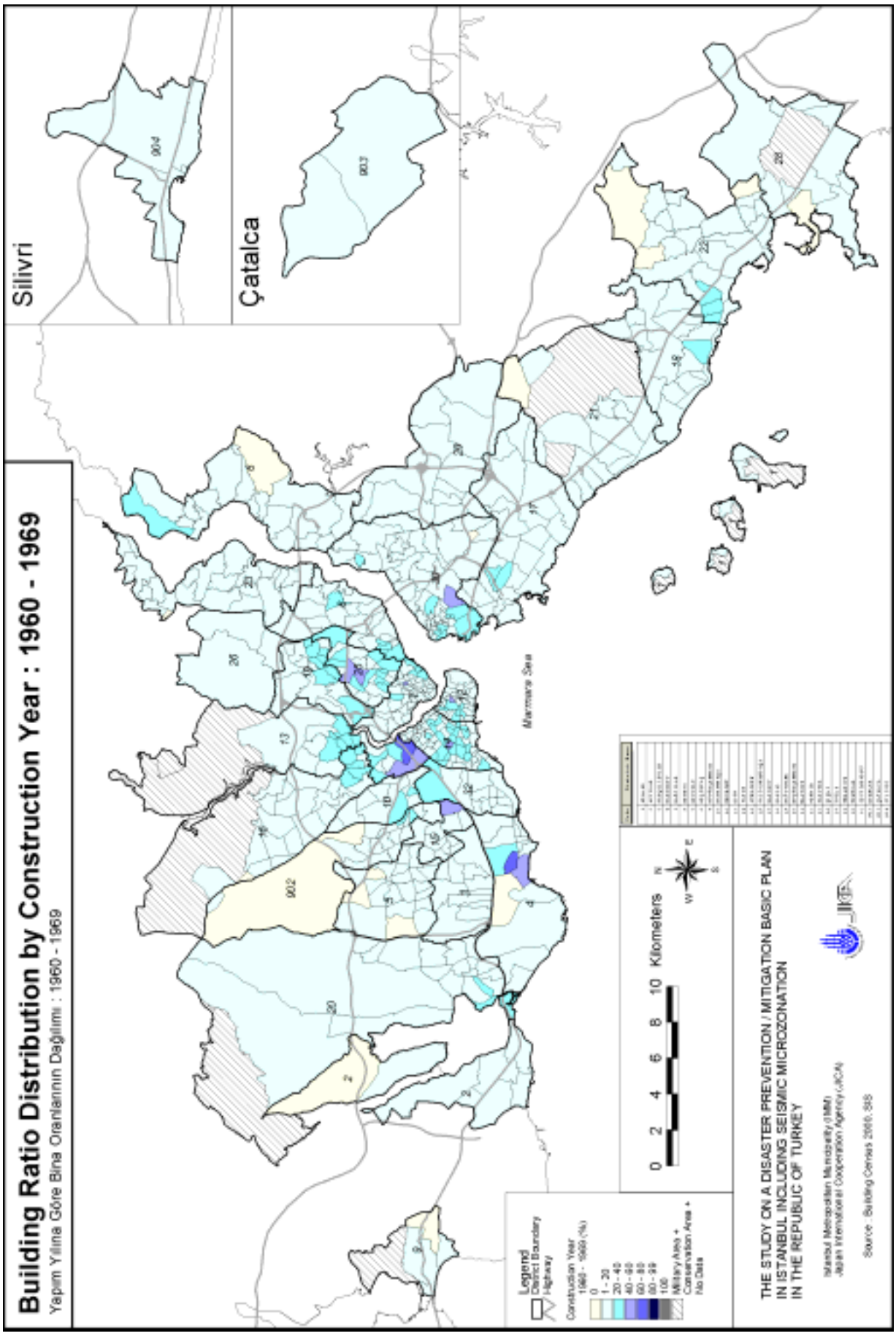

Figure 6.2.9 Building Distribution by Construction Year (1960-1969)

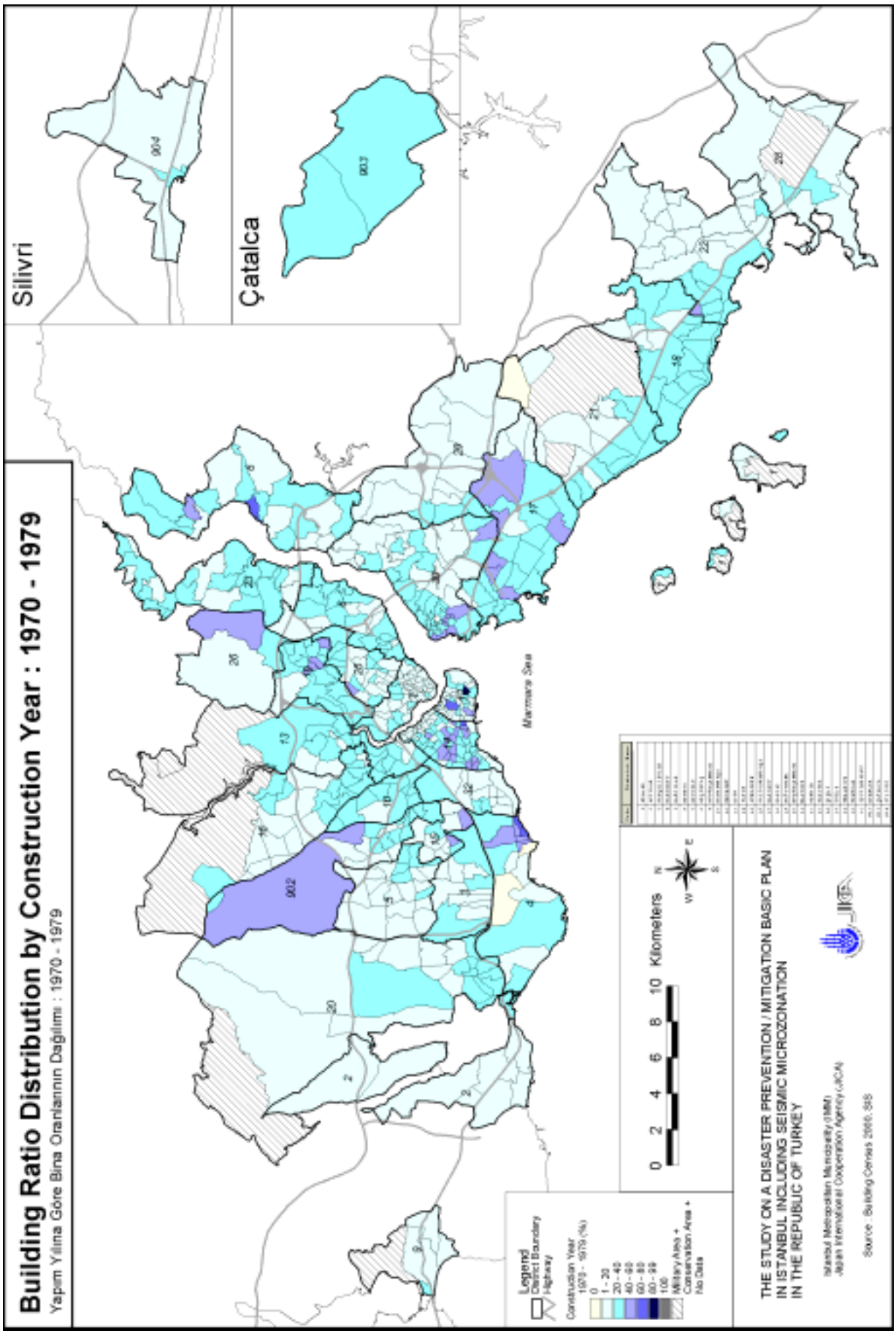

Figure 6.2.10 Building Distribution by Construction Year (1970-1979)

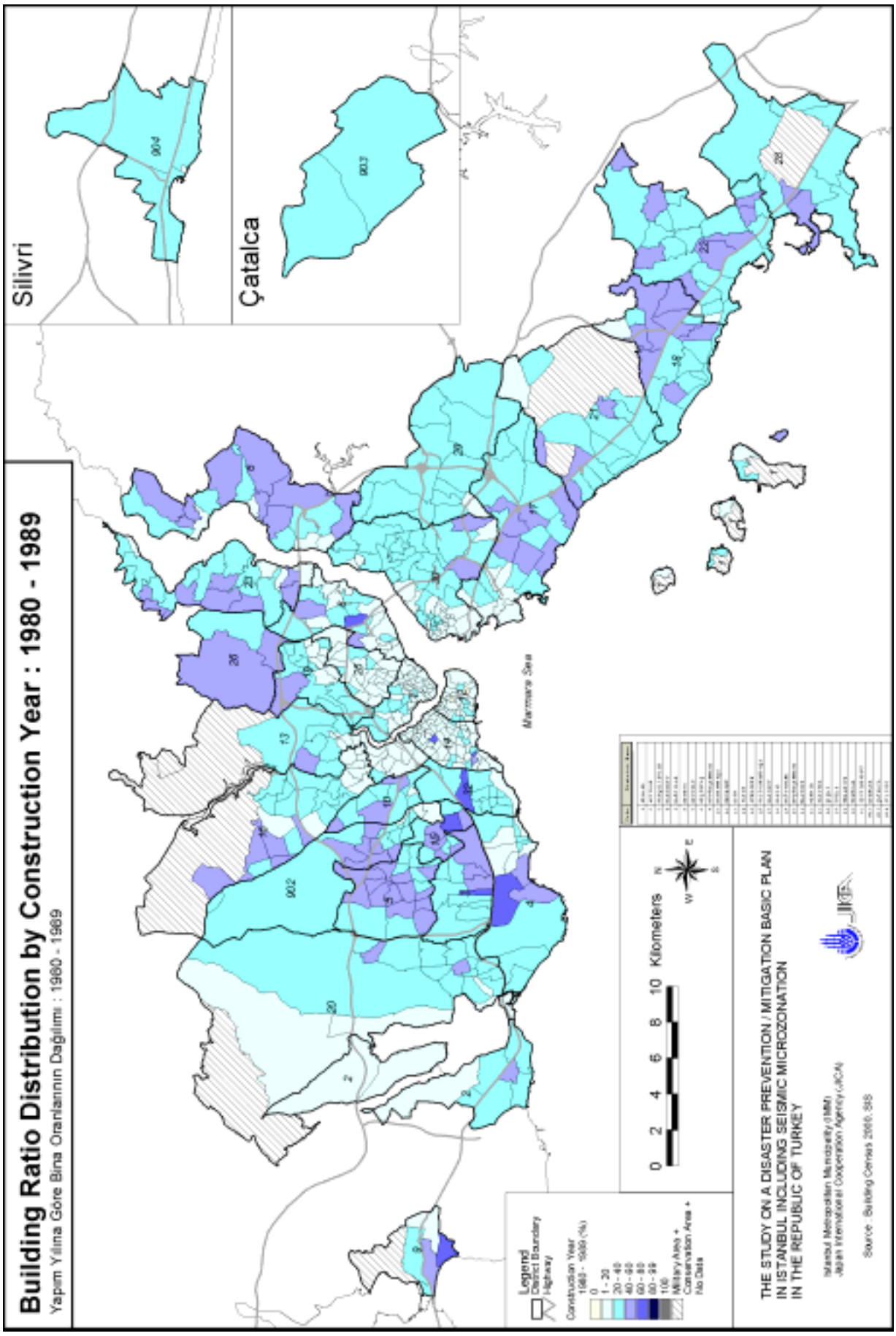

Figure 6.2.11 Building Distribution by Construction Year (1980-1989)

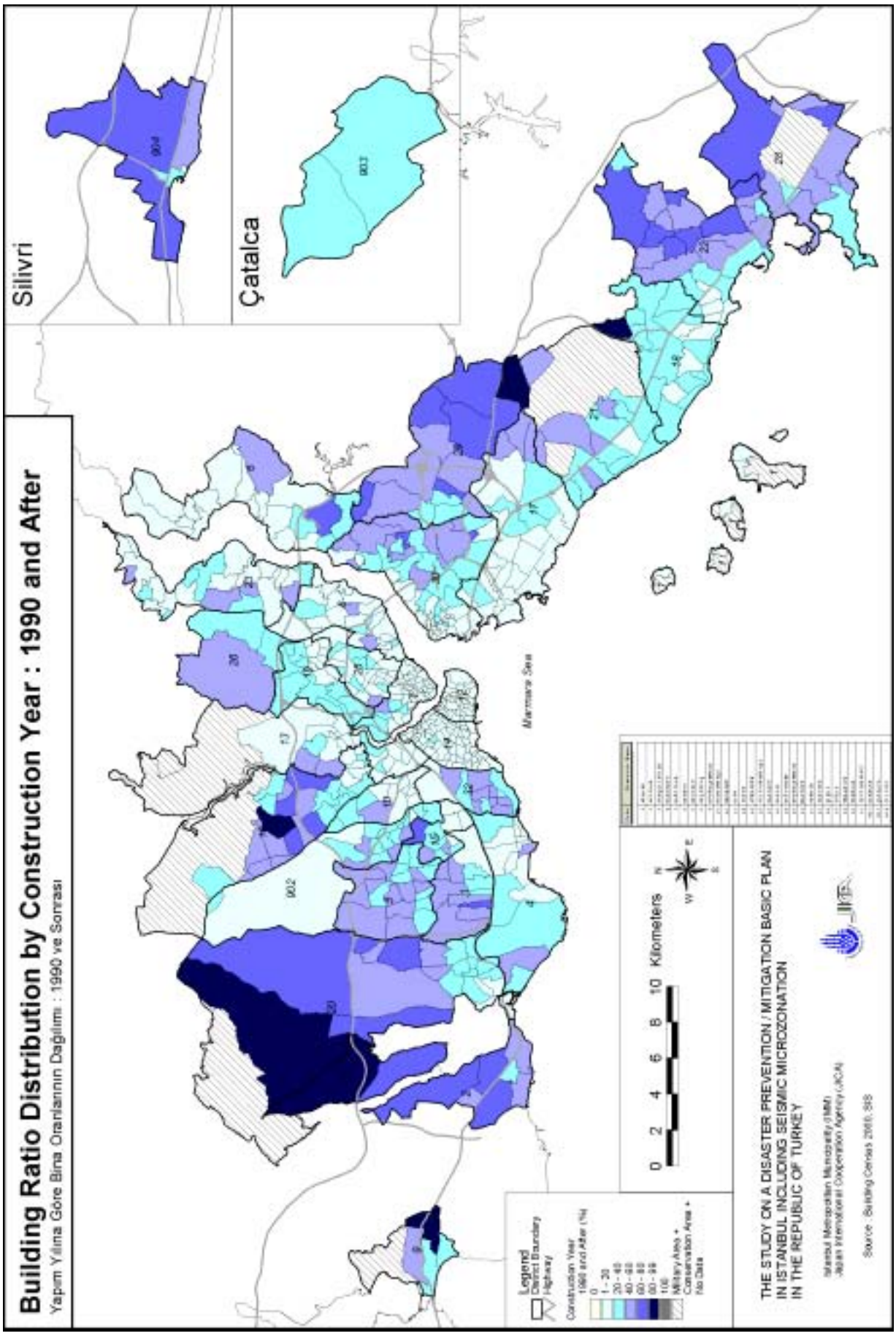

Figure 6.2.12 Building Distribution by Construction Year (1990 and after)

(3) Number of Stories

In the 2000 Building Census, data on the number of stories for buildings is also included. In the questionnaire used, it was indicated that attics and basements had to be included in the assessment of the number of stories for each building; thus, the actual number of storeys above ground is not certain, and this is true especially for office and commercial buildings. However, there was no compelling reason to collect the actual information and, in the study, the existing data was used. In the future, it is recommended that the difference in the actual number of stories above ground and the number collected through the census should be indicated separately, if census data will be used to update data in the future. Table 6.2.6 shows a summary of building height by district. For the damage estimation carried out in this study, data on the number of stories are classified into four (4) categories: 1) 1-3 stories, 2) 4-7 stories, 3) 8-15 stories, and 4) 16 stories and over.

Table 6.2.6 Number of Building Stories by District

District Code	District Name	No. of Stories (No of Buildings)				No. of Stories (Percentage)			
		1-3	4-7	8-15	16 and over	1-3	4-7	8-15	16 and over
1	ADALAR	5,294	1,214	0	0	81.3	18.7	0.0	0.0
2	AVCILAR	4,901	8,745	348	1	35.0	62.5	2.5	0.0
3	BAHÇELİEVLER	3,559	14,027	1,972	0	18.2	71.7	10.1	0.0
4	BAKIRKÖY	3,147	6,514	323	18	31.5	65.1	3.2	0.2
5	BAĞCILAR	13,224	22,222	541	8	36.7	61.7	1.5	0.0
6	BEYKOZ	25,036	2,733	67	0	89.9	9.8	0.2	0.0
7	BEYOĞLU	11,961	13,806	608	7	45.3	52.3	2.3	0.0
8	BEŞİKTAŞ	6,020	7,692	629	23	41.9	53.6	4.4	0.2
9	BÜYÜKÇEKMECE	1,242	2,059	19	0	37.4	62.0	0.6	0.0
10	BAYRAMPAŞA	7,170	12,842	112	0	35.6	63.8	0.6	0.0
12	EMİNÖNÜ	7,886	5,713	486	1	56.0	40.6	3.5	0.0
13	EYÜP	19,380	6,153	44	0	75.8	24.1	0.2	0.0
14	FATİH	11,765	19,655	304	0	37.1	62.0	1.0	0.0
15	GÜNGÖREN	1,383	8,472	733	1	13.1	80.0	6.9	0.0
16	GAZİOSMANPAŞA	30,299	25,754	319	0	53.7	45.7	0.6	0.0
17	KADIKÖY	16,134	17,063	4,961	188	42.1	44.5	12.9	0.5
18	KARTAL	13,980	9,017	1,224	10	57.7	37.2	5.1	0.0
19	KAĞITHANE	14,145	13,883	681	1	49.3	48.4	2.4	0.0
20	KÜÇÜKÇEKMECE	25,527	18,843	1,217	31	56.0	41.3	2.7	0.1
21	MALTEPE	14,318	10,087	779	6	56.8	40.0	3.1	0.0
22	PENDİK	27,614	11,544	557	2	69.5	29.1	1.4	0.0
23	SARIYER	24,245	6,320	106	0	79.0	20.6	0.3	0.0
26	ŞİŞLİ	8,858	11,454	2,106	31	39.5	51.0	9.4	0.1
28	TUZLA	10,922	3,709	40	1	74.4	25.3	0.3	0.0
29	ÜMRANİYE	30,525	12,508	306	29	70.4	28.8	0.7	0.1
30	ÜSKÜDAR	24,113	18,292	369	0	56.4	42.8	0.9	0.0
32	ZEYTİNBURNU	4,471	10,448	558	20	28.9	67.4	3.6	0.1
902	ESENLER	7,509	14,742	401	0	33.1	65.1	1.8	0.0
903	ÇATALCA	2,084	453	2	0	82.1	17.8	0.1	0.0
904	SİLİVRİ	6,363	2,069	81	0	74.7	24.3	1.0	0.0
Total		383,075	318,033	19,893	378	52.9	43.9	2.7	0.1

Source: Building Census 2000, SIS

By observing the building stories data, it is evident that buildings with up to 4 stories account for 52.9% of the total number of buildings within the Study Area. By district, these buildings (1-4 stories) make up 70% of the buildings in the districts of Adalar, Beykoz, Eyüp, Sariyer, Tuzla, Ümraniye, Çatalca, and Silivri. These districts are mostly low-density areas with a population density of less than 100person/ha. On the contrary, Bahçelievler, Kadiköy, and Şişli have a rather large number of high-story buildings. In fact, 9.4% to 12.9% of the buildings in these districts were buildings with more than 16 stories.

Building story information was also input into GIS. Figure 6.2.13 to Figure 6.2.16 show the building distribution by number of stories for each of the classified categories.

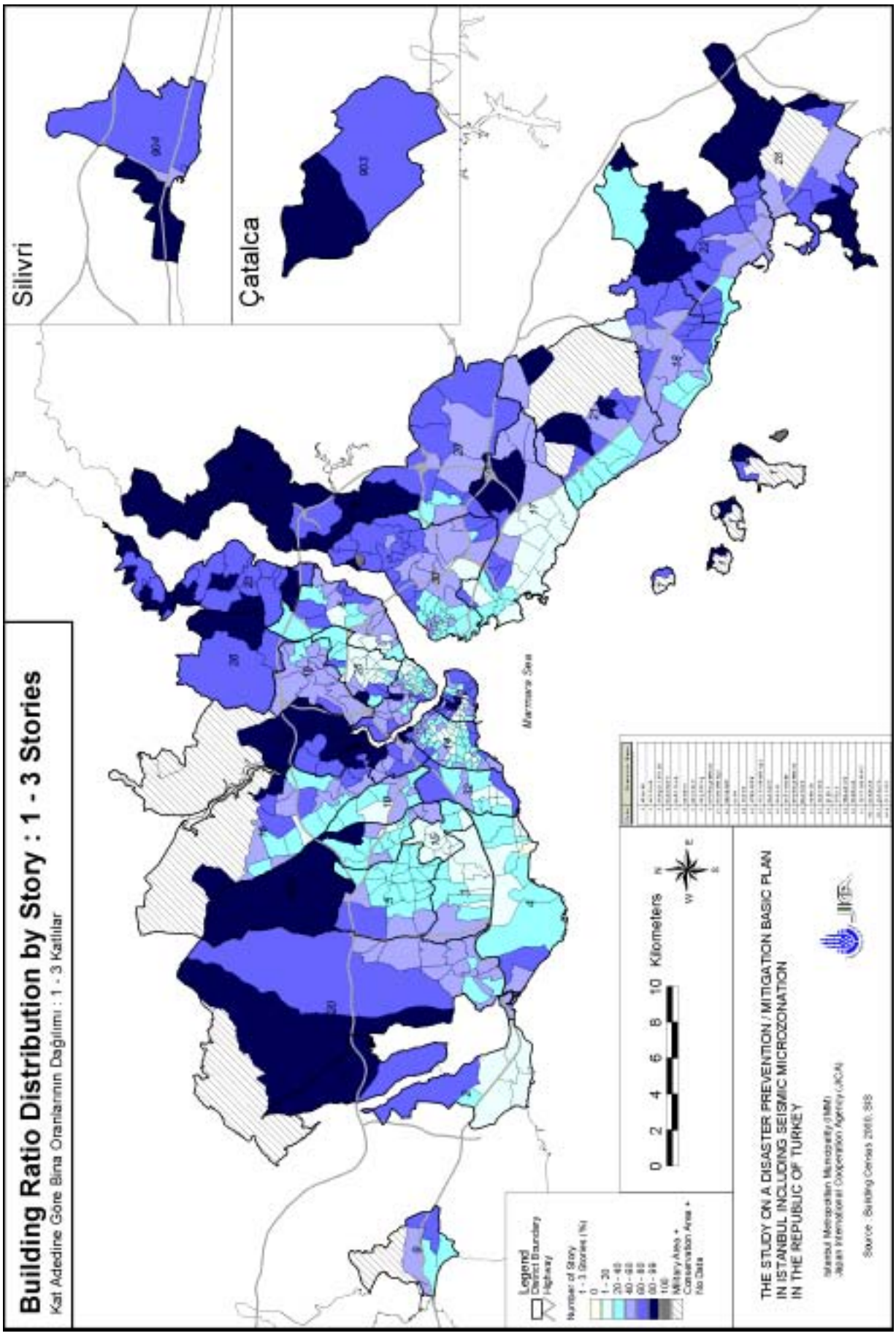

Figure 6.2.13 Building Distribution by Number of Stories (1-3 Stories)

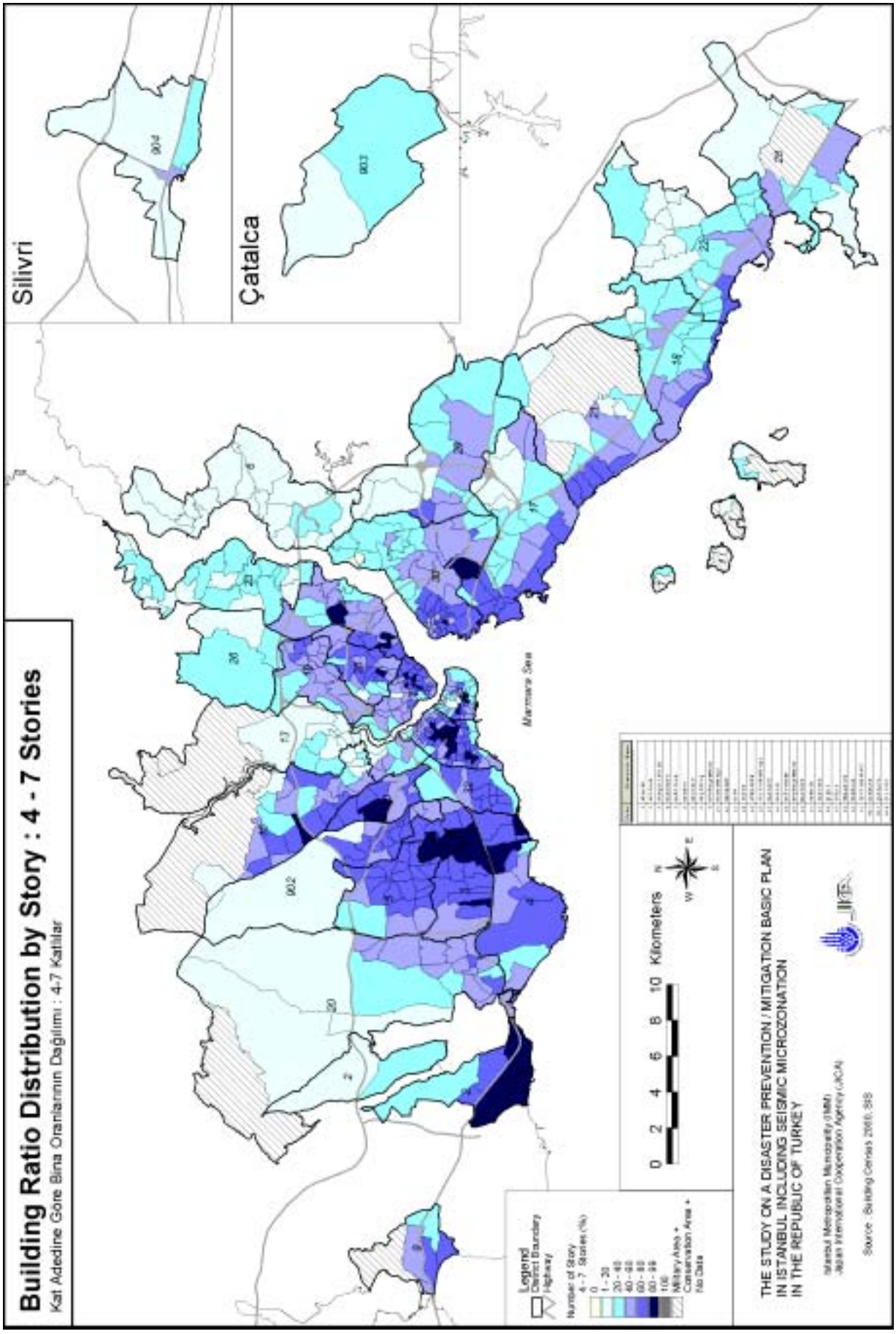

Figure 6.2.14 Building Distribution by Number of Stories (4-7 Stories)

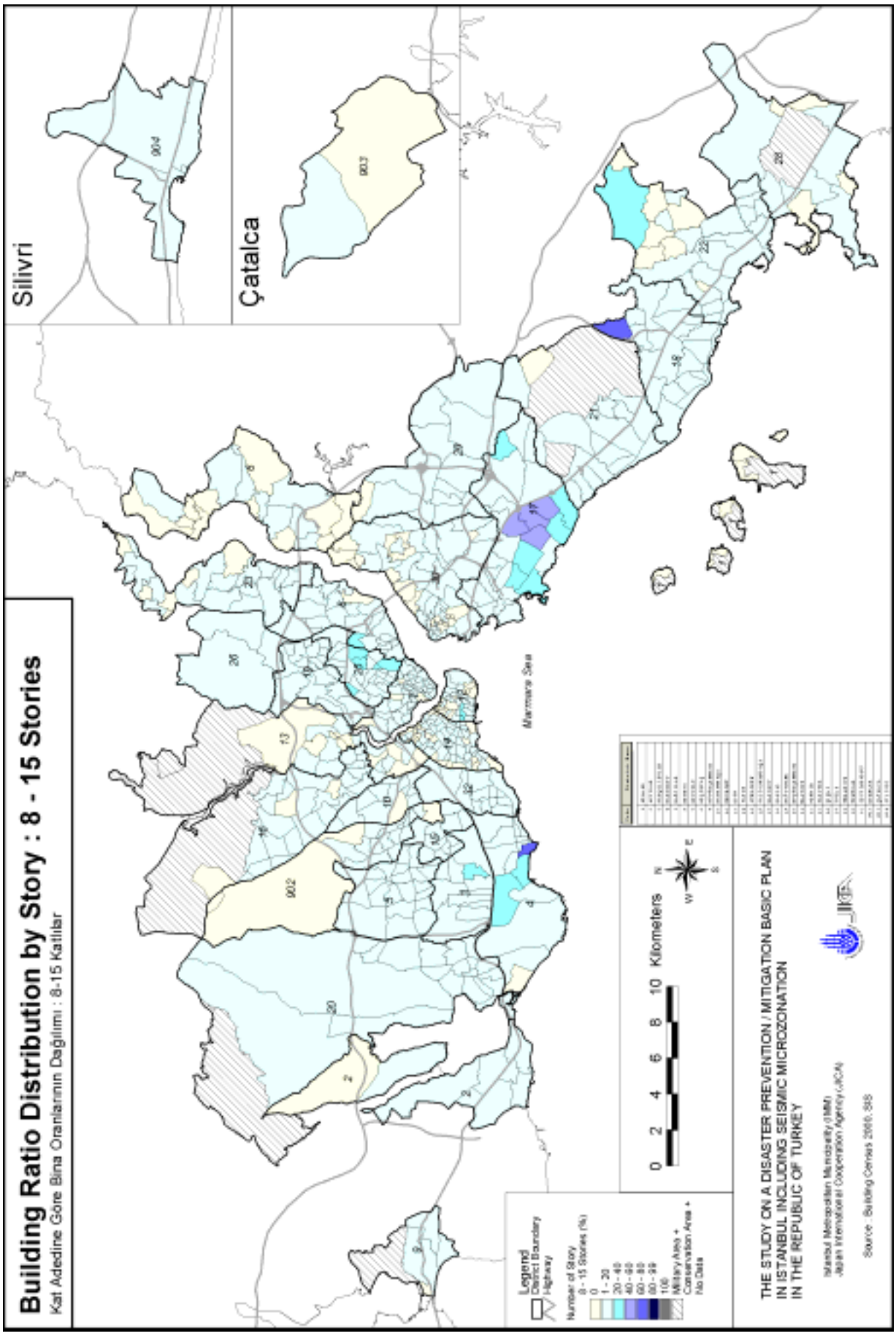

Figure 6.2.15 Building Distribution by Number of Stories (8-15 Stories)

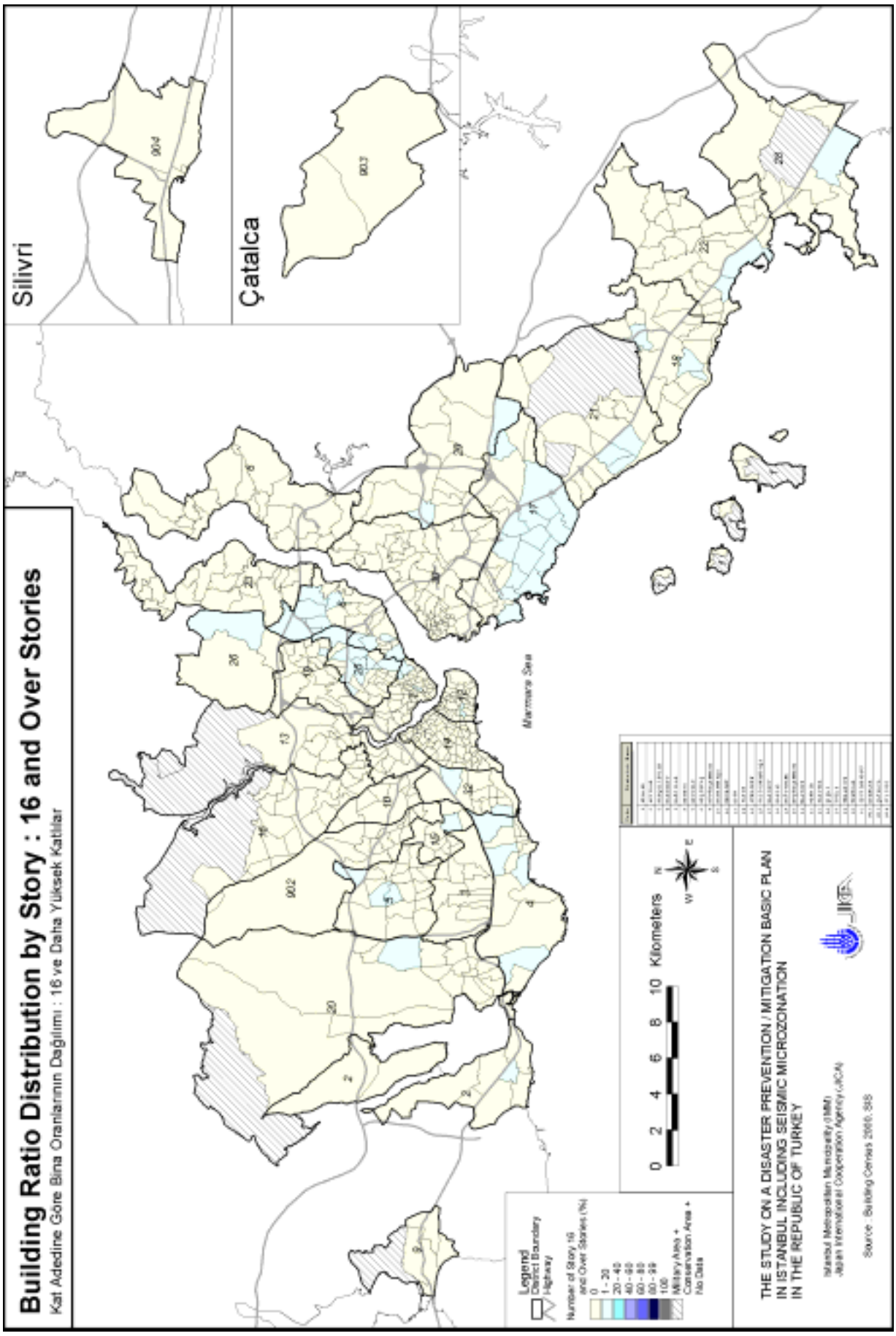

Figure 6.2.16 Building Distribution by Number of Stories (16 Stories and Over)

6.2.3. Road Data

The road network in Istanbul is the most important infrastructure for transportation, which maintains the urban life of the city. The road network also functions as a lifeline and communication system, since lifelines and communication facilities are located underneath roads. Therefore, there are two aspects to consider when it comes to the effects of an earthquake disaster on the road network. One aspect includes the damages on each individual structure, and the other aspect includes the dysfunction of the entire network system due to damage to individual structures. Furthermore, the road network plays an important role in activities of evacuation, fire fighting operation, and medical service, as well as in the transportation of relief supplies and rehabilitation activities.

From this point of view, it is essential to fully grasp the current status and function of the road network in order to carry out earthquake disaster prevention and reconstruction plans. It is also important to attempt to assess potential damages to the road network by an earthquake.

(1) Collected Data

Road data in the Study Area were collected from topographical maps of scale 1/5,000. The collected and compiled data cover a range of wide principal roads to narrow streets. Narrow streets could cause significant difficulties if they are blocked by collapsed buildings. Furthermore, principal wide roads are important not only as potential evacuation routes, but also as routes for the transportation of relief goods and routes used in rehabilitation activities.

(2) Current State of the Road Network in the Study Area

a. Analysis of Road Length and Road Density

Data was collected for approximately 13,700 km of road. Widths of roads are valid in accordance to their characterisitics, such as traffic capacity and area connectivity.

In this study, roads were classified into following three categories:

1) Roads having a width of more than 16 m and functioning as principal roads for an extended area (Figure 6.2.17)

2) Roads having a width of 7-15 m and functioning as a secondary road of the principal network (Figure 6.2.18)

3) Roads having a width of 2-6 m and functioning as a city street (Figure 6.2.19).

Table 6.2.7 shows a summary of road length by width for each district. Table 6.2.8 shows road density per unit area (ha) and road density per person for the three categories of roads in each district.

- The ratio of narrow streets (2-6 m) to total length exceeds the other two categories. The ratio to total length is 64.7 %, the ratio to area is 89.5 m/ha, and the ratio to persons is 1.00 m/person, on average.
- Roads with width of 7-15 m show ratios of 29.9 %, 41.4 m/ha and 0.46 m/person, respectively.
- Roads with widths of more than 16 m show 3.5 %, 4.9 m/ha and 0.05m/person, respectively.

Thus, in the Study Area, the density of narrow streets is extremely high and this narrow road network makes up the transportation system that is very important in the daily lives of citizens. Also, these narrow roads are those to which attention must be given with regards to earthquake disaster prevention, since these narrow streets are the most vulnerable to potential blocking due to building collapses.

Moreover, the density of roads directly correlates to land usage of the area. Figure 6.2.21 shows the density of roads (m/ha) for each district. It shows that the density is rather high in residential areas and, also, that narrow streets are dense in these areas.

b. Road Network in Study Area

In the Study Area, two highways running from east to west form the principal road axis. Highways running from north to south also form a principal road axis, and these connect the two east-west highways. Therefore, the road network system connecting an extended area is almost completed. Both sides of the Straits of Bosphorus are connected by two east-west highways, which play a major role in east-west transportation of people and goods.

Principal roads more than 16m wide, except highways, extend in east-west and north-south directions. These roads function as connector roads to the highways and the principal roads of adjacent areas.

Roads 7-5 m wide are distributed in and around residential areas. These roads function as connector roads to the principal roads. They also work serve as sub-principal roads to the principal roads in their region that do not function as wide area network roads.

Streets 2-6 m wide do not function as principal roads.

Table 6.2.7 Summary of Road Length by Width for Each District

District		Road Length by Width					Road Length Ratio		
		w < 6	7< w < 15	16 < w	N/A	Total	w < 6	6 < w < 15	16 < w
Code	Name	(m)	(m)	(m)	(m)	(m)	(%)	(%)	(%)
1	ADALAR	99,022	23,778	147	0	122,947	80.5	19.3	0.1
2	AVCILAR	269,529	116,037	25,517	20,702	431,785	62.4	26.9	5.9
3	BAHÇELİEVLER	185,643	165,880	16,811	4,430	372,762	49.8	44.5	4.5
4	BAKIRKÖY	168,905	140,382	30,135	10,127	349,549	48.3	40.2	8.6
5	BAĞCILAR	344,580	190,211	11,025	15,830	561,646	61.4	33.9	2.0
6	BEYKOZ	429,220	99,796	6,973	19,675	555,665	77.2	18.0	1.3
7	BEYOĞLU	178,216	47,568	14,339	963	241,087	73.9	19.7	5.9
8	BEŞİKTAŞ	165,920	134,243	15,919	10,336	326,418	50.8	41.1	4.9
9	BÜYÜKÇEKMECE	71,499	45,020	6,361	9,987	132,868	53.8	33.9	4.8
10	BAYRAMPAŞA	119,838	84,005	18,479	12,973	235,296	50.9	35.7	7.9
12	EMİNÖNÜ	71,743	29,207	11,087	5,662	117,699	61.0	24.8	9.4
13	EYÜP	322,735	129,096	20,783	15,748	488,362	66.1	26.4	4.3
14	FATİH	196,096	57,976	13,718	285	268,076	73.1	21.6	5.1
15	GÜNGÖREN	66,512	112,883	5,377	1,143	185,916	35.8	60.7	2.9
16	GAZİOSMANPAŞA	609,456	213,975	27,748	10,381	861,559	70.7	24.8	3.2
17	KADIKÖY	394,559	298,476	30,496	9,517	733,047	53.8	40.7	4.2
18	KARTAL	323,302	255,500	21,912	11,784	612,499	52.8	41.7	3.6
19	KAĞITHANE	216,051	112,712	12,880	2,394	344,036	62.8	32.8	3.7
20	KÜÇÜKÇEKMECE	863,115	354,648	25,025	13,436	1,256,224	68.7	28.2	2.0
21	MALTEPE	464,426	252,413	18,276	5,305	740,421	62.7	34.1	2.5
22	PENDİK	561,643	155,510	14,981	8,876	741,010	75.8	21.0	2.0
23	SARIYER	388,241	92,382	7,991	7,912	496,527	78.2	18.6	1.6
26	ŞİŞLİ	301,116	134,316	24,049	15,081	474,562	63.5	28.3	5.1
28	TUZLA	383,206	141,423	18,657	14,874	558,160	68.7	25.3	3.3
29	ÜMRANİYE	659,072	291,135	27,831	4,374	982,412	67.1	29.6	2.8
30	ÜSKÜDAR	498,332	221,470	27,608	9,423	756,833	65.8	29.3	3.6
32	ZEYTİNBURNU	112,752	98,426	15,591	8,507	235,275	47.9	41.8	6.6
902	ESENLER	395,479	99,421	13,214	8,951	517,065	76.5	19.2	2.6
903	ÇATALCA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
904	SİLİVRİ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	**8,860,208**	**4,097,889**	**482,930**	**248,689**	**13,699,706**	**-**	**-**	**-**
	Average	**-**	**-**	**-**	**-**	**-**	**64.7**	**29.9**	**3.5**

Source: Compiled by the JICA Study Team

Table 6.2.8 Summary of Road Density for Each District

District		Area	Road Density (m/ha)				Population	Road Density (m/person)			
			Road Width (m)			Total		Road Width (m)			Total
			< 6	7 - 15	16 <			< 6	7 - 15	16 <	
Code	Name	(ha)	(m/ha)	(m/ha)	(m/ha)	(m/ha)	(persons)	(m/person)	(m/person)	(m/person)	(m/person)
1	ADALAR	1,100	90.1	21.6	0.1	111.8	17,738	5.58	1.34	0.01	6.93
2	AVCILAR	3,861	69.8	30.1	6.6	111.8	231,799	1.16	0.50	0.11	1.86
3	BAHÇELİEVLER	1,661	111.8	99.9	10.1	224.4	469,844	0.40	0.35	0.04	0.79
4	BAKIRKÖY	2,951	57.2	47.6	10.2	118.5	206,459	0.82	0.68	0.15	1.69
5	BAĞCILAR	2,194	157.1	86.7	5.0	256.0	557,588	0.62	0.34	0.02	1.01
6	BEYKOZ	4,156	103.3	24.0	1.7	133.7	182,864	2.35	0.55	0.04	3.04
7	BEYOĞLU	889	200.4	53.5	16.1	271.1	234,964	0.76	0.20	0.06	1.03
8	BEŞİKTAŞ	1,811	91.6	74.1	8.8	180.3	182,658	0.91	0.73	0.09	1.79
9	BÜYÜKÇEKMECE	1,474	48.5	30.5	4.3	90.1	34,737	2.06	1.30	0.18	3.82
10	BAYRAMPAŞA	958	125.0	87.7	19.3	245.5	237,874	0.50	0.35	0.08	0.99
12	EMİNÖNÜ	508	141.2	57.5	21.8	231.7	54,518	1.32	0.54	0.20	2.16
13	EYÜP	5,050	63.9	25.6	4.1	96.7	232,104	1.39	0.56	0.09	2.10
14	FATİH	1,045	187.6	55.5	13.1	256.4	394,042	0.50	0.15	0.03	0.68
15	GÜNGÖREN	718	92.6	157.1	7.5	258.8	271,874	0.24	0.42	0.02	0.68
16	GAZİOSMANPAŞA	5,676	107.4	37.7	4.9	151.8	667,809	0.91	0.32	0.04	1.29
17	KADIKÖY	4,128	95.6	72.3	7.4	177.6	660,619	0.60	0.45	0.05	1.11
18	KARTAL	3,135	103.1	81.5	7.0	195.4	332,090	0.97	0.77	0.07	1.84
19	KAĞITHANE	1,443	149.7	78.1	8.9	238.5	342,477	0.63	0.33	0.04	1.00
20	KÜÇÜKÇEKMECE	12,173	70.9	29.1	2.1	103.2	589,139	1.47	0.60	0.04	2.13
21	MALTEPE	5,530	84.0	45.6	3.3	133.9	345,662	1.34	0.73	0.05	2.14
22	PENDİK	4,731	118.7	32.9	3.2	156.6	372,553	1.51	0.42	0.04	1.99
23	SARIYER	2,774	140.0	33.3	2.9	179.0	212,996	1.82	0.43	0.04	2.33
26	ŞİŞLİ	3,543	85.0	37.9	6.8	133.9	271,003	1.11	0.50	0.09	1.75
28	TUZLA	4,998	76.7	28.3	3.7	111.7	100,609	3.81	1.41	0.19	5.55
29	ÜMRANİYE	4,561	144.5	63.8	6.1	215.4	443,358	1.49	0.66	0.06	2.22
30	ÜSKÜDAR	3,783	131.7	58.5	7.3	200.1	496,402	1.00	0.45	0.06	1.52
32	ZEYTİNBURNU	1,149	98.1	85.7	13.6	204.8	239,927	0.47	0.41	0.06	0.98
902	ESENLER	3,890	101.7	25.6	3.4	132.9	388,003	1.02	0.26	0.03	1.33
903	ÇATALCA	5,263	N/A	N/A	N/A	N/A	15,624	N/A	N/A	N/A	N/A
904	SİLİVRİ	3,828	N/A	N/A	N/A	N/A	44,432	N/A	N/A	N/A	N/A
	Total	**98,981**	**-**	**-**	**-**	**-**	**8,831,766**	**-**	**-**	**-**	**-**
	Average	**-**	**89.5**	**41.4**	**4.9**	**138.4**	**-**	**1.00**	**0.46**	**0.05**	**1.55**

Source: Compiled by the JICA Study Team

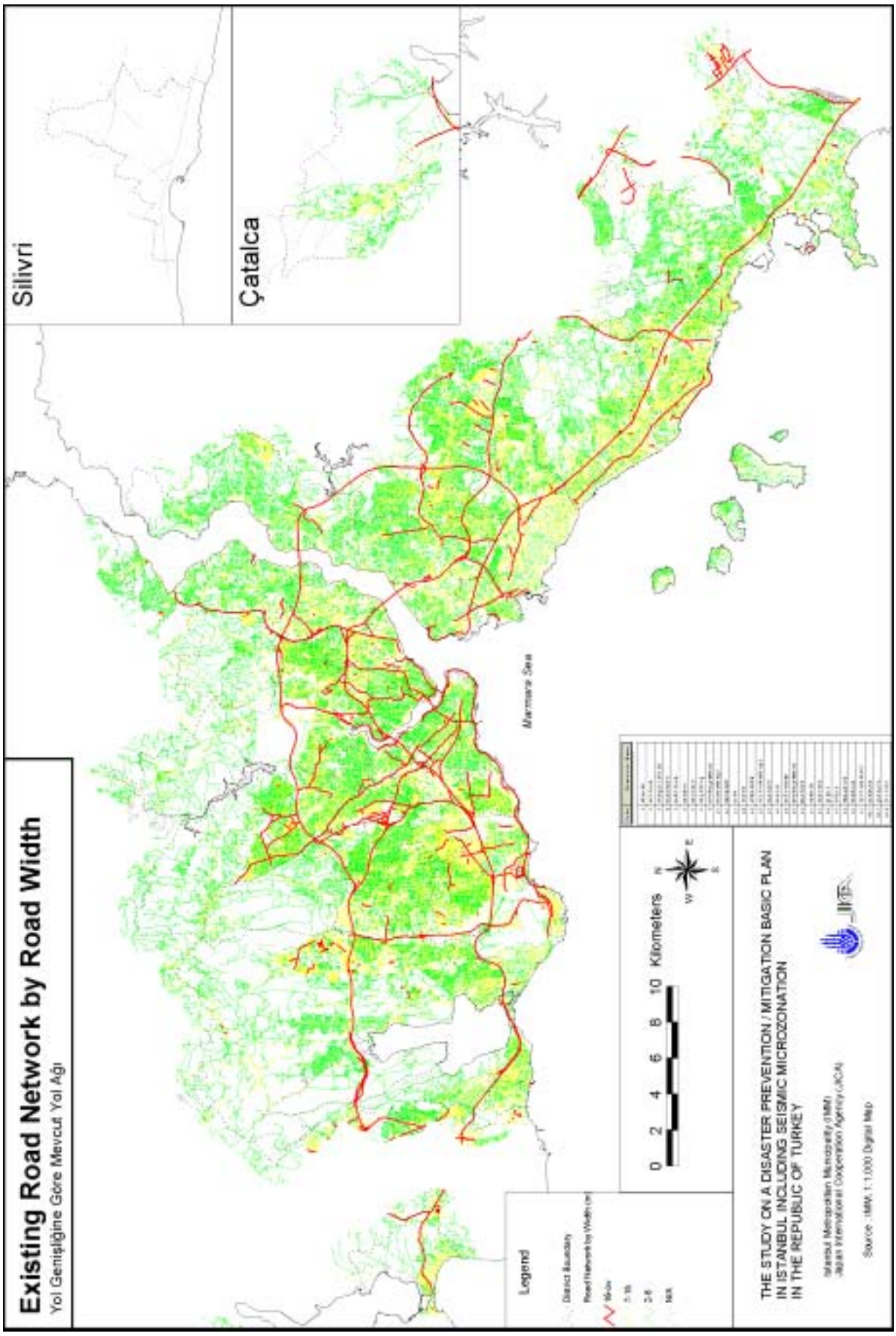

Figure 6.2.17 Existing Road Network by Road Width

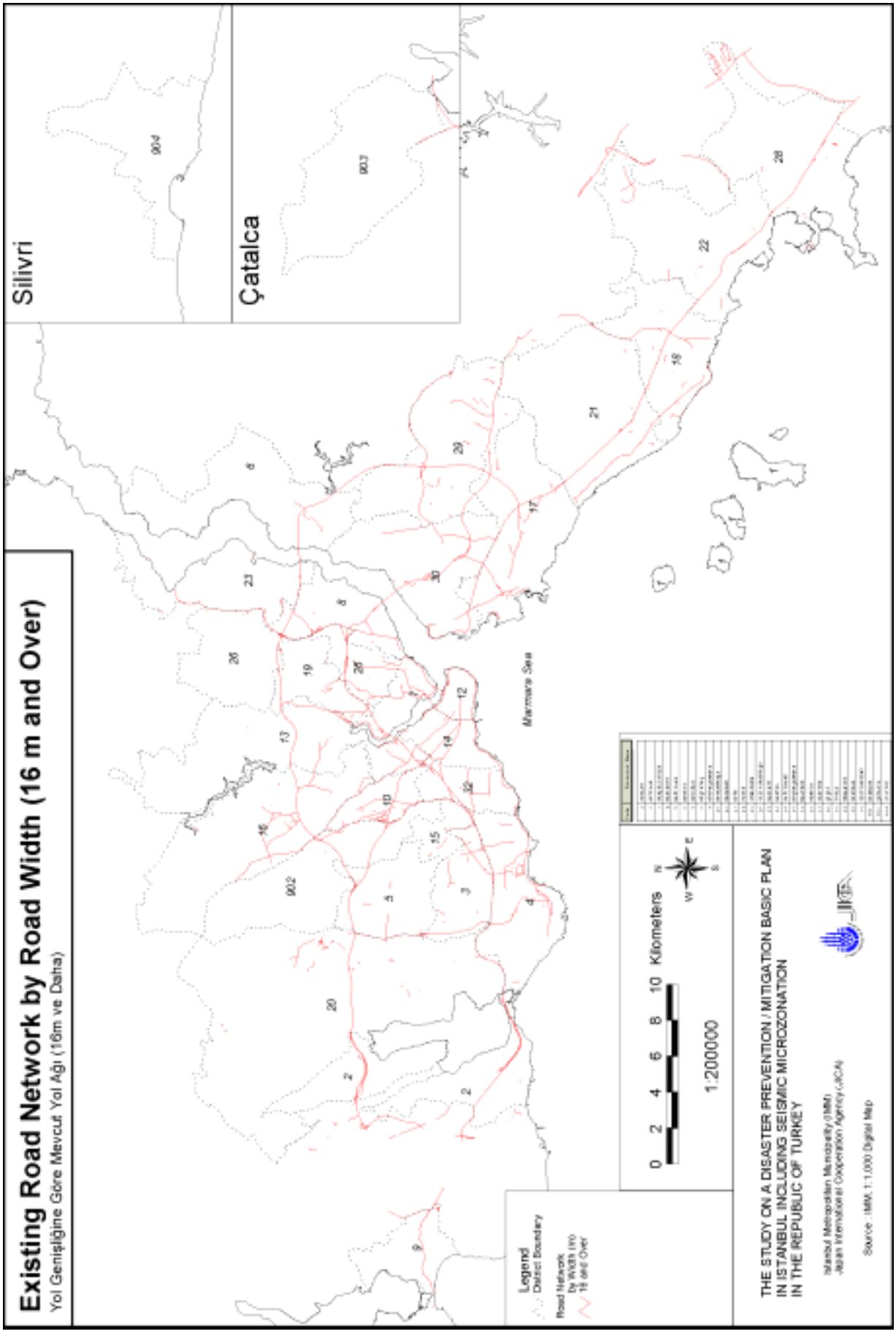

Figure 6.2.18 Existing Road Network by Road Width (16 m and Over)

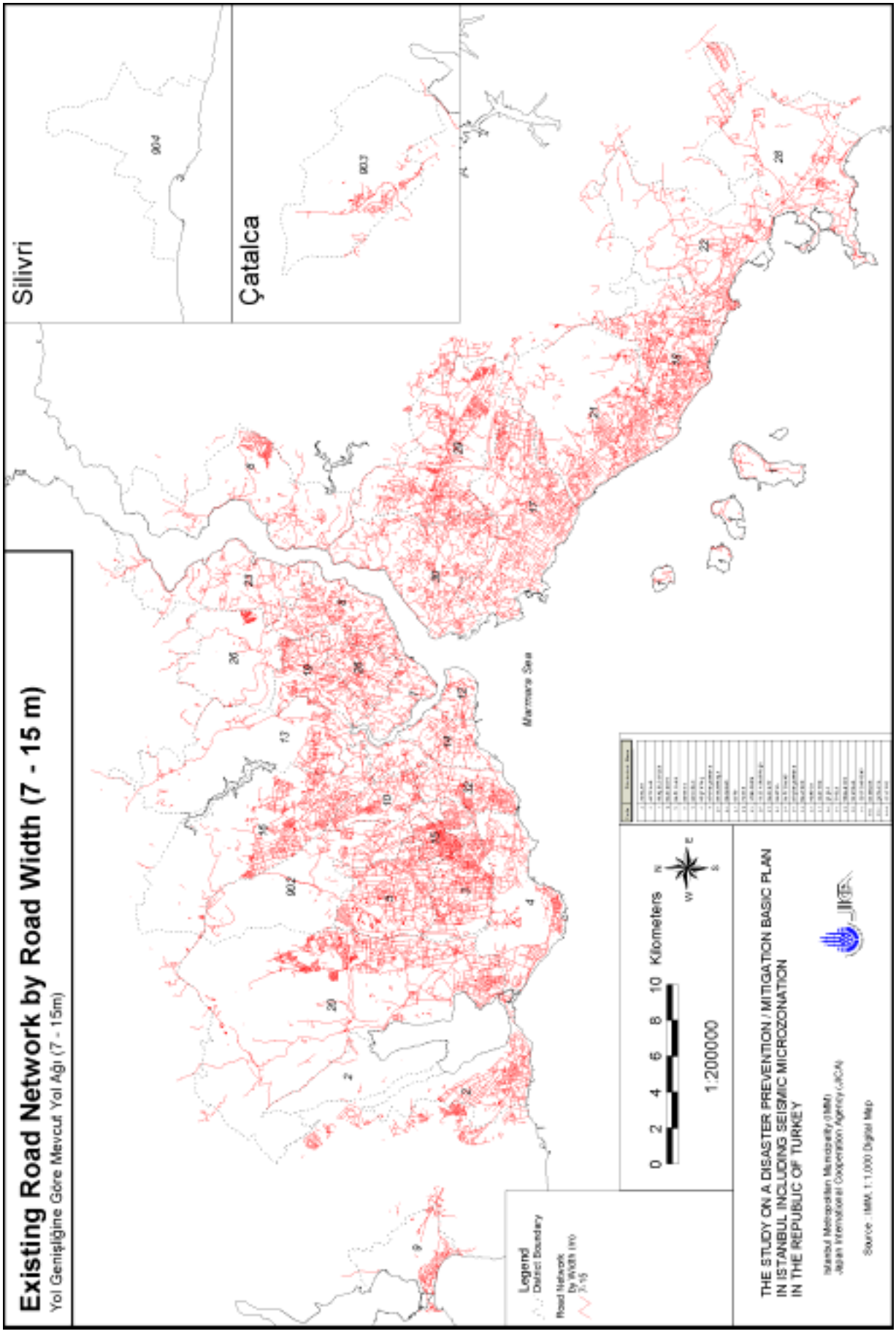

Figure 6.2.19 Existing Road Network by Road Width (7-15 m)

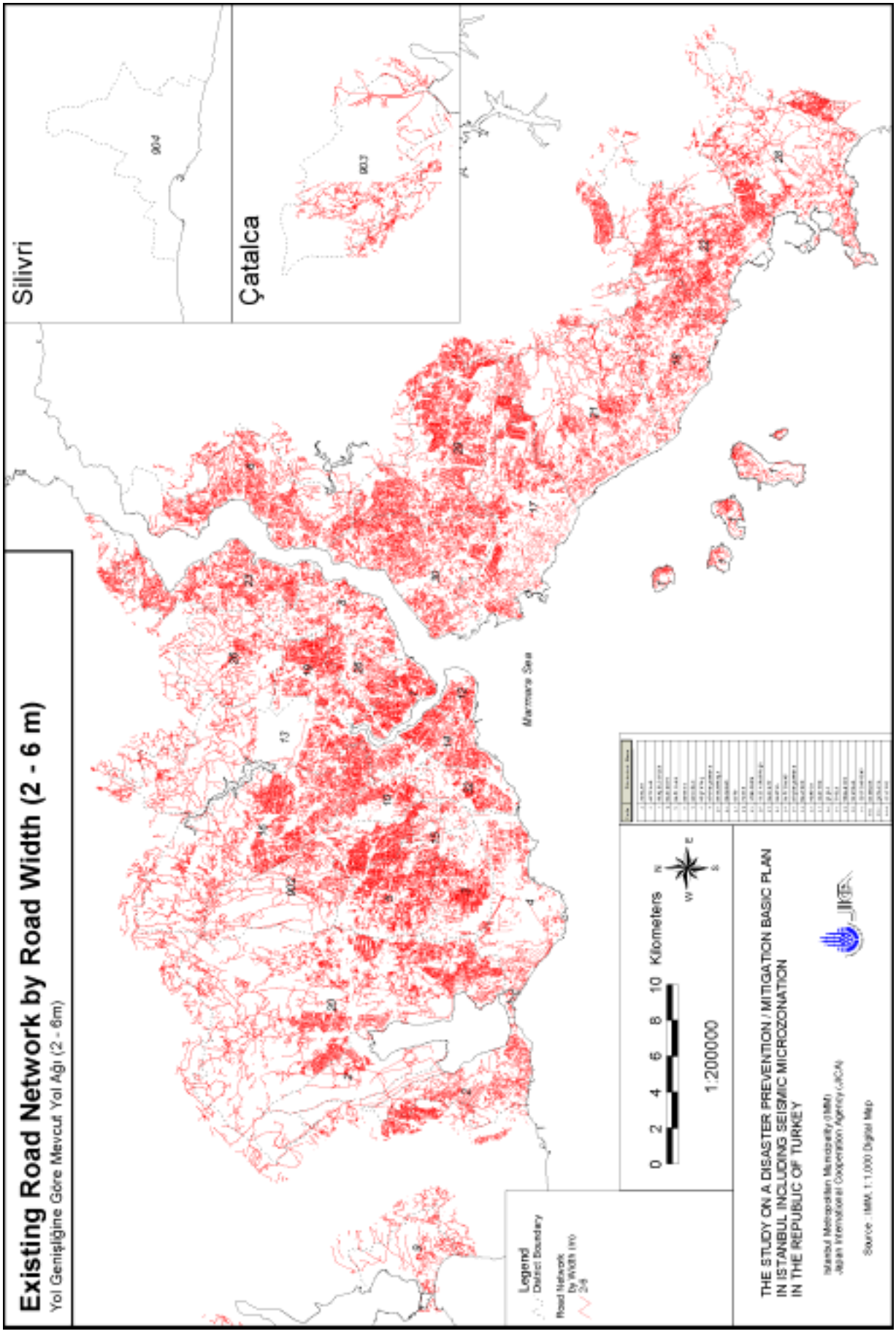

Figure 6.2.20 Existing Road Network by Road Width (2-6 m)

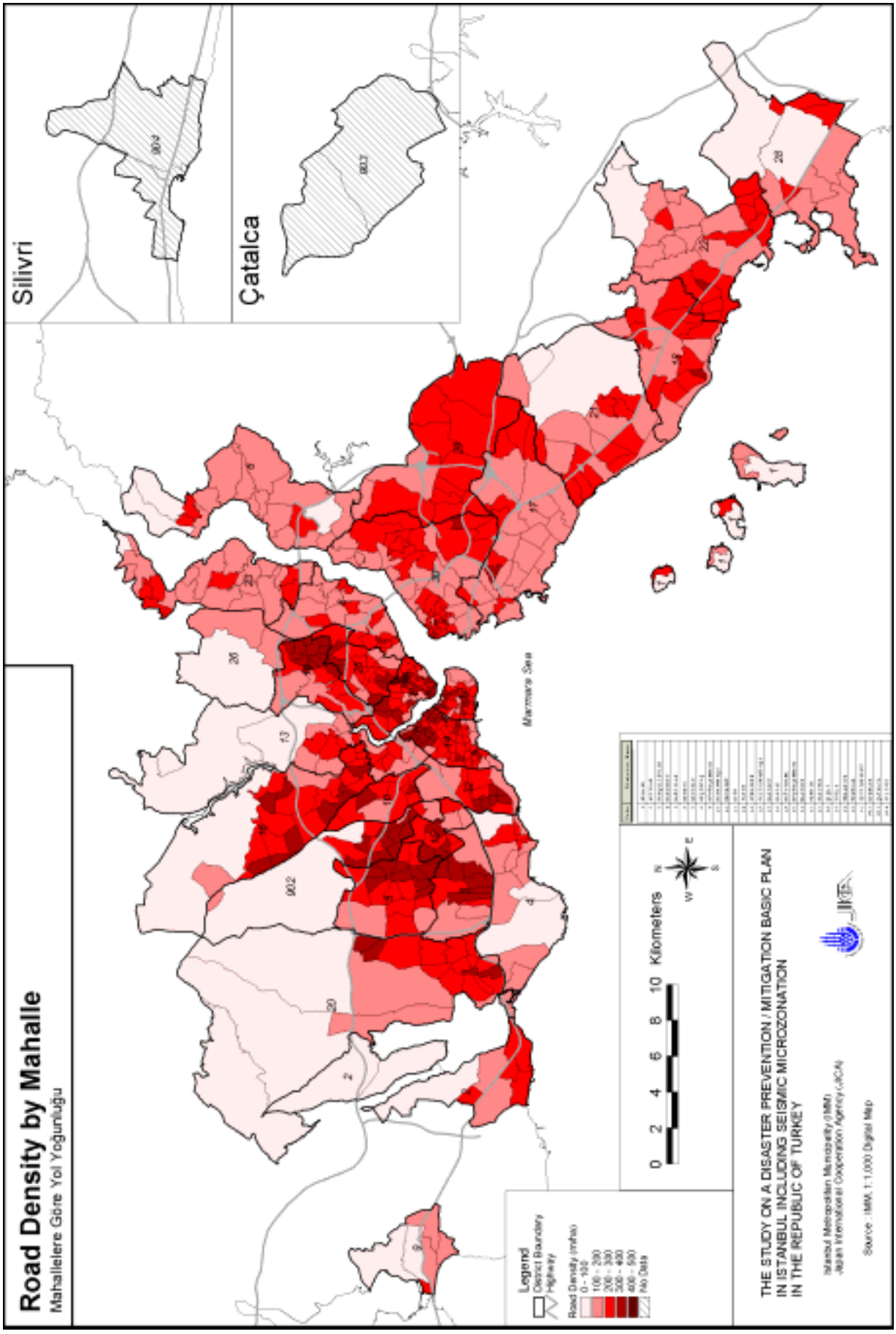

Figure 6.2.21 Road Density by District