

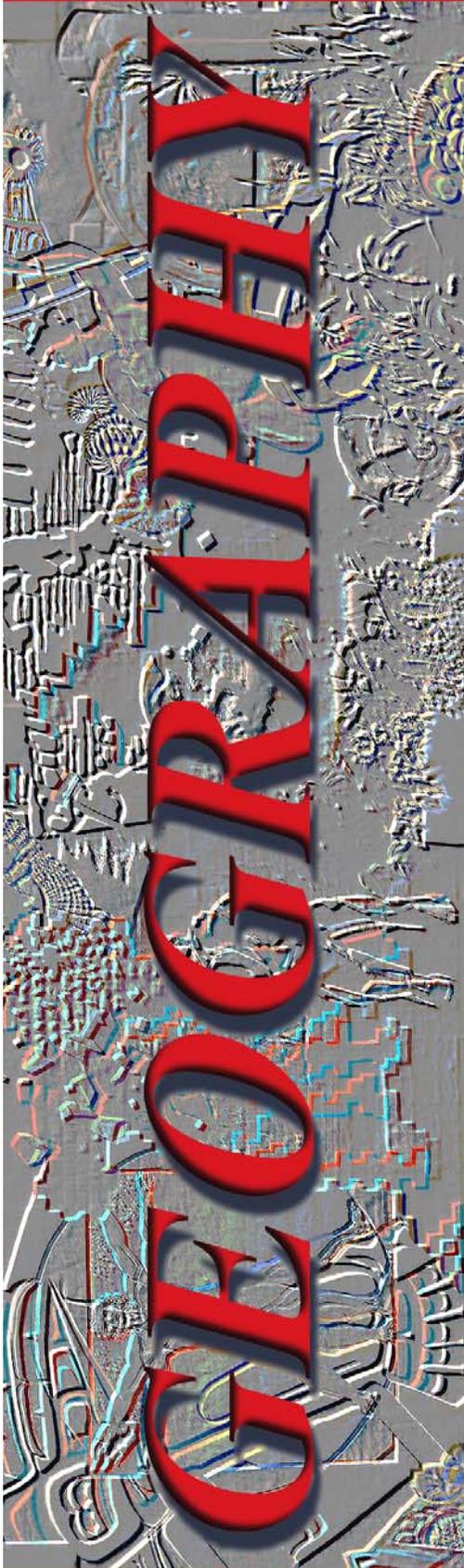
An Introduction to the Urban Geography of Amman, Jordan

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Introduction

Amman, the capital city of the Hashemite Kingdom of Jordan (Figure 1) currently has a population in excess of 2 million, but in 1924, it consisted of little more than a handful of dwellings. This overview sets out to document and explain the phenomenal expansion of this fast growing Arab city. The physical geography of the urban region and the early growth of the city are considered at the outset and this leads directly to a consideration of the highly polarised social structuring that characterises contemporary Amman. This examination is facilitated by new data derived from the Greater Amman Municipality's Geographical Information System. These data exemplify the essential modernity of the city of Amman. The employment and industrial bases of the contemporary city and a range of pressing contemporary issues are then considered, including transport and congestion, the provision of urban water under conditions of water stress and privatisation, and urban and regional development planning. The paper concludes by emphasizing the growing regional and international geopolitical importance of the city of Amman at the present time.

The growth of Amman from the 1920s to the present has been phenomenal; in terms of its population, physical extent and regional geopolitical importance. Al-Asad (2005) has referred to what he describes as “ever-growing Amman”. What was in the early 1920s a small town of little more than 2000-3000 people is today a major regional city with a recorded population of 2.17 million (Hashemite Kingdom of Jordan 2006). The phenomenal growth of the urban area in both size and significance has occurred in “drastic growth spurts that have transformed the look and feel of the city...and its connections with the outside world” (al-Asad 2005).

Such growth spurts have also meant that although geopolitically Amman currently stands as one of the most important cities in the modern Arab world, one of its major characteristics is that it is, for the most part, a contemporary metropolis. Thus, Ham and Greenway (2003: 98) comment that “Amman is a modern Arab city rather than a great, ancient metropolis of the Orient: it has never rivalled Damascus or Cairo as a grand Islamic city of antiquity.”

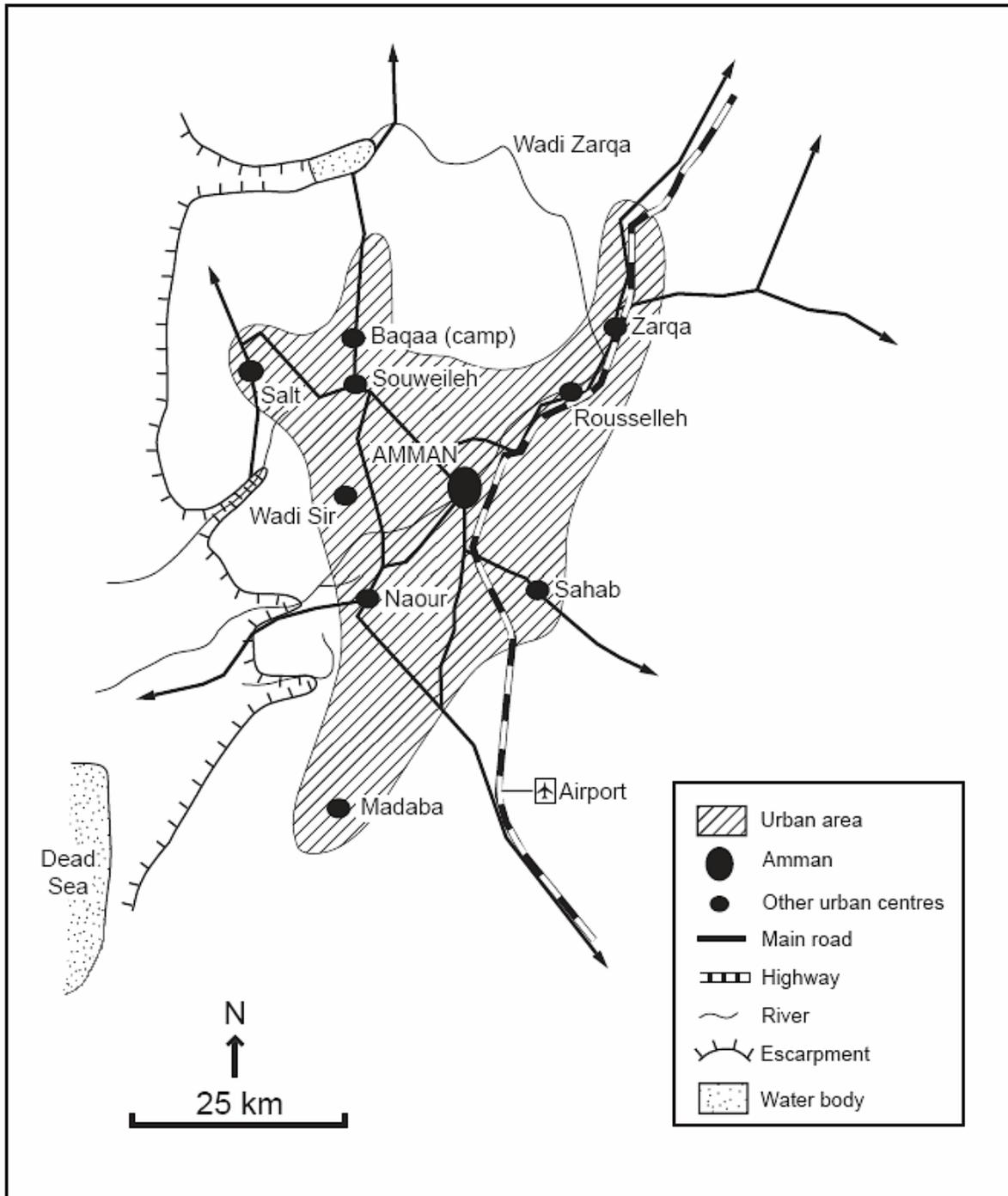


Figure 1: Amman: general location map (adapted and revised from Lavergne, 2004)

Similarly, Teller (2002: 75-76) observes how “the weight of history that is a constant presence in the heart of most Middle Eastern cities is manifestly lacking, replaced instead by a quick-witted, self-reliant dynamism...today there are parts of West Amman (that are) indistinguishable from upscale neighbourhoods of American or

European cities, with broad leafy avenues lined with mansions, and fast multi-lane freeways swishing past strip malls and black-glass office buildings”.

The social transformation of the city over the last sixty years has been no less spectacular. Abu-Dayyeh (2004a) reports that at the time of the 1952 Census, when the population of Amman stood at ca 250,000, some 29 per cent of the population were living in tents, and a further 8 per cent were dwelling in natural caves (Photograph 1). By 2006 there were few inhabitants of what can be referred to as temporary or makeshift settlements. Moreover, modern-day Amman now shows marked socio-spatial polarisation between its wealthy neighbourhoods on the one hand and its poorer socio-economic quarters on the other. In this respect again, Amman appears as a thoroughly ‘modern’ urban area, albeit one that also shows distinct traditional and informal characteristics at the local or micro-level (Abu-Dayyeh, 2004b).



Photograph 1: A view over part of central Amman from the west of the urban core

The Physical Geography of the City

Amman is located on the undulating plateau that makes up the north-west of Jordan (see [Figure 1](#) for a general location map). The original site of the city occupied seven hills or 'jabals' around the Wadi 'Ras el Ain which flows north-east from the plateau towards the River Zarqa basin. The original central part of the city was at an altitude of between 725 and 800 metres. Expansion of the city in the past twenty-five years has resulted in the occupation of some nineteen hills in total with an altitudinal extension to above 875 metres. The topography of the city consists of a series of steep hills and deep and sometimes narrow valleys. Most of the districts of Amman take their names from the jabals on which they are situated. Whilst initially development was principally on the upper slopes and crests and the lower slopes of this hill-valley system, the upsurge in urban development over the last sixty years has involved extensive development on the frequently steeper mid-slope locations.

Geologically, much of Amman is underlain by the Late Cretaceous Amman Silicified Limestone formation which is approximately 85m thick and consists of thin- to medium-bedded heterogeneous lithologies, with alternating limestone, dolomitic chalky marls, white and brown cherts, chalk and silicified limestone, which is locally crystalline. The expansion of the city to the north has occurred over the older Late Cretaceous rocks of the Wadi As Sir Limestone, which is approximately 75m thick and consists of medium-bedded dolomitic limestones inter-bedded with calcareous mudstones and siltstones and marls, and which frequently form a white to grey escarpment, with very steep slopes, where building requires terracing and revetments.

Climatically, like much of northern Jordan, Amman shows a distinct contrast between a relatively wet rainy season between November and April and the rest of the year, which is relatively dry. Climatic data for Amman are summarised in [Table 1](#). This broad two-fold seasonal contrast can be further subdivided into the customary four seasons in the case of the city, because of Amman's location on the upland Jordan Plateau. Spring and autumn are of a relatively short duration, but are locally recognised as the most pleasant times of the year. Summer, extending from late May through to much of September, is a rainless period with average

temperatures ranging from 28°C to 32 °C, and characteristically low humidity and frequent breezes. The spring (parts of April and May) and autumn (parts of September and October) have temperatures ranging from 23 °C to 27 °C. The winter period (from November through to early April) has night-time temperatures close or below zero, and snow occurs on occasion, particularly in December and January. Day-time temperatures during this period average between 12 °C and 21 °C. Winter rainfall is in the region of 300mm annually, normally with the highest amounts in January and February. In recent years, however, these patterns have been less reliable, and in 2006, for example, over 150mm of rain fell in April and May, while substantial snow fell in Amman on 14 March 2007.

Table 1: Summary of climatic conditions for Amman, Jordan (1975-2006)

Month	Average Minimum Daily Temp °C	Average Maximum Daily Temp °C	Relative Humidity am	Relative Humidity pm	Average Precipitation mm	Average Wet Days (+0.25m m)
January	4	12	80	56	69	8
February	4	13	78	52	74	8
March	6	16	57	44	31	4
April	9	23	53	34	15	3
May	14	28	39	28	5	0.8
June	16	31	40	28	0	0
July	18	32	41	30	0	0
August	18	32	45	30	0	0
September	17	31	53	31	0	0
October	14	27	53	31	5	1
November	10	21	66	40	33	4
December	6	15	77	53	46	5

The Development of Amman and the Growth of its Population

Amman was named after the Ammonites who originally ruled the area which makes up the present-day city. Kadhim and Rajjal (1988) argue that the year 1200 BC marks the origins of Amman as an urban settlement, this was when the Ammonites captured the hill that dominates the present-day city center for the site of their capital, Rabbat Ammoun. There followed a series of occupations, by the Assyrians, Babylonians, Persians, Greeks, Romans and Moslems (Kadhim and Rajjal, 1988).

In the 1860s, under the rule of the Ottomans, Circassian tribes, Moslems escaping religious prosecution from Russia, settled on the ancient site of Amman, especially around the seasonal stream that flows in an east to west direction. Their livelihood depended on cultivation on both sides of the stream. The next major development came with the construction of the Hijaz Railway in 1902. This linked Amman directly with Damascus in the north and Medina in the south. The first Municipal Council of Amman was established in 1907, at which time the settlement consisted of little more than 300 families. Photographs of the early modern urban area around 1924 show a small settlement in the locality of the present-day downtown area, with open land extending to the north and east of the Roman Amphitheatre (Chatelard and de Tarragon, 2006).

In 1921, Ammir Abdullah declared Amman the capital of the new state of Trans-Jordan and from then onwards, the city became the administrative and economic hub of the country. Indeed, it has been observed that the development of the city “was carried out in parallel with the construction of the state” (Lavergne, 1996). Unlike most cities that grow due to their economic functions, both Findlay (1986) and Biegel (1996) observe how the growth of Amman since 1907 has largely reflected wider political and geo-political circumstances. Thus, the area continued to attract migrants and its political stability led to successive waves of migrants joining the city from Syria, Palestine, Lebanon and the newly formed Iraq. Other religious and ethnic minorities, such as the Kurds and Armenians also came to live in the city.

Throughout this period, Amman was also the focus of domestic migration. The main factor promoting migration to Amman city has been its status as the seat of government. People looking for a job in the public sector moved to Amman creating a

“rent seeking mentality” which still dominates the behaviour of the political economy of the country. Thus, through the period from 1921 to 1947 Amman experienced a gradual spatial expansion. Its population was estimated at 10,500 in 1930 and 45,000 in the early 1940s, with the city extending over an area of some 2.5 sq km by 1947 (Kadhim and Rajjal, 1988).

However, it is Palestinians, displaced as a result of the foundation of the State of Israel in 1948 that have formed the main wave of migrants to Jordan in general, and to Amman in particular. The population of Amman abruptly increased soon after 1948, due to the huge influx of Palestinian refugees (Khadim and Rajjal, 1988). They were mainly accommodated in five hastily prepared camps. Two of these were sited in Amman, namely Al Hussein camp in the north of the city and Al Wehdat camp in the south. The camps lacked even the most basic of amenities and services.

As a consequence of such migration, plus the strong internal rural-urban movement, the population growth rate of Amman has always been higher than that recorded for Jordan as a whole, standing at 9.6 per cent in the 1950s, although reducing to ca 5 per cent in the 1970s (see Findlay and Samha, 1985). At the national level, the rate of population increase has never exceeded 4 per cent. As noted in the section on the physical environment, the spatial expansion of Amman during the 1950s took the form of “climbing the hills and mountains” which surrounded the urban core.

The second major wave of refugees arrived in Amman after the so-called “Six Day War”, which occurred in 1967 between Israel and the three Arab states of Egypt, Syria and Jordan. Khadim and Rajjal (1988: 319) note that this conflict sent the city into “another spiral of uncontrolled growth”, which served to increase its population from 330,000 to around 500,000 though no further refugee camps were constructed in Amman. Instead, nine refugee camps were established in the central and northern parts of the country (Biegel, 1996:104). The largest of these was Baqa (see [Figure 1](#)). Although this is located some 12 km north-west of the city centre, it now forms part of the extended metropolitan area. The immense spatial expansion of Amman between 1956 and 1967 is shown in [Figure 2](#). During the late 1960s and 1970s, Amman continued to experience rapid suburban expansion, as is evident from [Figure 2](#). Such suburbanisation occurred in all sectors of the city, but in the north-west of the

city it was particularly associated with more affluent residents. In the case of the north-western tracts of the city, the slightly higher lands were characterised by a cooler micro-climate.

The next phase of expansion, from 1973 to 1983 is often referred to as the 'boom years'; it was stimulated by the large contingent of migrants from Jordan who worked in the oil-rich states of the region (Khadim and Rajal (1988), many of whom sent back substantial remittances. Throughout this period, the population of Amman continued to be boosted due to internal rural-urban migration, the settlement of nomadic tribes and the wars and crises that affected the region. The 1979 Census stressed that many families arrived in Amman via a process of chain migration, moving initially to smaller settlements before migrating to Amman. In addition, the settlement policies adopted by the state since the 1930s toward the major nomadic tribes, contributed substantially to the growth of Amman and other urban areas (Lavergne, 1996; Bocco, 1986). The Civil War in Lebanon in 1975, the First Gulf War of 1991 and the Invasion of Iraq in 2003 all led to dramatic population influxes into Jordan. The burgeoning spatial extent of the city and its rapid growth in all directions, including towards the north-eastern industrial town of Zarqa is apparent in [Figure 2](#) (see also [Figure 1](#) for a guide to areas).

By 1979 the population of Amman had reached 777,855 inhabitants, representing 52.6 per cent that of Amman Governorate and virtually 30 per cent of nation. By the time of the *Population and Housing Census*, conducted in 1994, the population had reached some 1,307,017, representing an increase of 54.6 per cent since 1979. The last Census to be held in Jordan took place in 2004 after the creation of the geographically wider Greater Amman Municipality area, and by this date, the population of Amman Governorate had increased to some 1,726,713 inhabitants. Amman's population amounted to approximately 33.8 per cent of the Kingdom's total of 5,100,981.

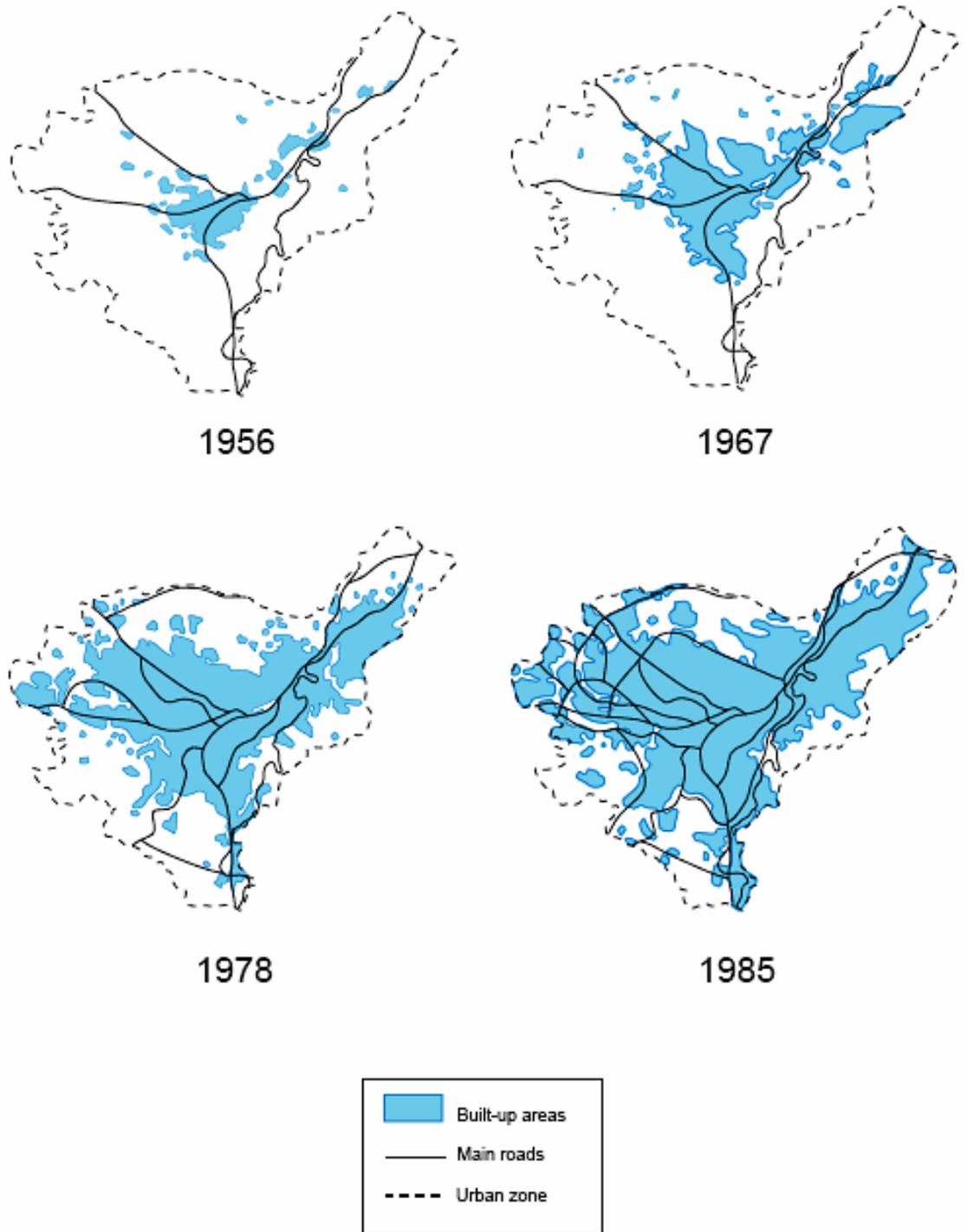


Figure 2: The physical expansion of Amman 1956-1985 (adapted from Amman Municipality, 1987 and Abu-Dayyeh, 2004)

However, due to the war in Iraq, the population is currently continuing to grow at a phenomenal rate and at the time of writing in Spring 2007 the Department of Statistics was giving the population of Amman as 2.17 m of 5.47 m for Jordan as a whole, which equals almost 40 per cent of the national population (see also al Rawashdeh and Saleh, 2006).

Moreover, thousands of construction workers, primarily from Egypt and Syria, currently reside in the city. Unfortunately, there are no reliable statistics concerning the number of such migrant workers as many of them reside in the city only temporarily, leaving to return to their places of origin as and when circumstances change. The city is currently experiencing rapid land price and rental increases caused by the settlement of Iraqis displaced by the war. According to the United Nations Refugee Agency, UNHCR, around 750,000 Iraqis have found refuge in Jordan.

The Social Structure of Contemporary Amman

This history of rapid growth has been paralleled by marked social polarisation of the residential quarters of present-day Amman. Contemporary guides to Jordan comment on the phenomenon. For example, Ham and Greenway, (2003:98) describe how “residents talk openly of two Ammans, although in truth there are many. Eastern Amman (which includes Downtown) is home to the urbanised poor: it’s conservative, more Islamic in its sympathies, and has vast Palestinian refugee camps on its fringe. Western Amman is a world apart, with leafy residential districts, trendy cafes and bars, impressive art galleries, and young men and women walking openly arm in arm”. The same authors note how “(t)he upmarket district of Shmeisani is referred to by locals as ‘Shiny Amman’ while the Abdoun area sometimes, and not without a little irony, goes by the label of ‘Paris’ (Ham and Greenway, 2003:98).

This picture of ‘two Ammans’ broadly reflects the concentration of relatively wealthy socio-economic groups to the west and, to a lesser extent, the north of the city (Razzaz, 1996; Hannover and Shami, 1996). This overall pattern is associated with the early growth of Jabal Amman to the immediate west of the downtown as the wealthy quarter. With the growth of the city, the high-status sector has extended

westwards from the city centre. The direction of movement has been toward the relatively high land to the north-west of the city where, as already noted, land rises to around 1,000 metres asl.

Consequently, higher land prices have always characterised this sector of the city and the high-income districts of Amman have shown a quintessentially Hoytian-style tendency through space and time, growing outwards to the north-west in a sectoral wedge-shaped pattern (Hoyt, 1939). Thus, today the western part of the city exhibits relatively low population densities, in the region of 2,500 – 6,000 person per sq km. In contrast, eastern Amman has remained the habitat of relatively poorer groups and as the reception areas for recent arrivals, particularly refugees. Thus, the older residential areas of the eastern inner city which originated in the early 1900s, and which surround the present-day downtown (eg Basman, Al Yarmouk and ras El Ain – see [Figure 1](#)) are characterised by low-income residents living at high population densities, which vary from 14,000 to 30,000 inhabitants per square km ([Photograph 2](#)). These areas include the Palestinian refugee camps of Al Hussein and Al Wehdat, referred to above.



Photograph 2: High-density inner city residential areas

This ‘two Ammans’ conceptualisation of the social structuring of the city is, of course, a very broad picture of its contemporary socio-economic zonation. For planning and building purposes, residential land within Amman is divided into four categories. These categories are based on the criteria of minimum plot size, the maximum percentage of the plot that can be built upon, and the distance between residential buildings and the boundary of the plot. The categories are summarised by the notation A to D from the largest to the smallest. As is shown below, these categories can be used as surrogates of the distribution of relative wealth within contemporary Amman.

Plots designated as Category A have an area of at least 900 sq metres and the distance between the house and the boundary of the property must be at least 5m at the front, 7m at the back and 5 m from either side. The built-up area should be no more than 39 per cent of the plot, leaving space for ‘green’ areas. As shown in **Figure 3**, Category A residential land is almost exclusively located to the west of the Madeenah or city centre.

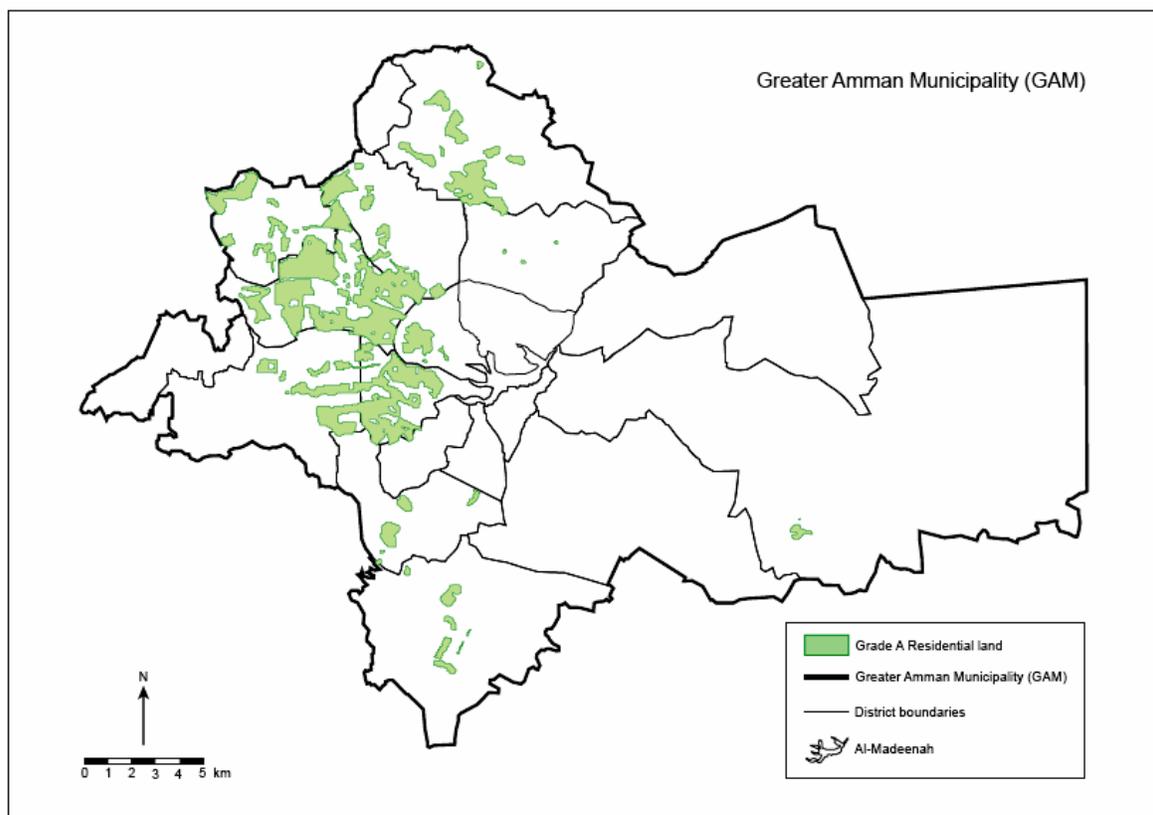


Figure 3: ‘Category A’ residential land in Amman (adapted from original GIS data supplied to the authors by the GIS Department of the Greater Amman Municipality, 2006)

The area forms a clear sectoral zone extending from around 1.5 km west of the city centre, out to the boundary of the Greater Amman Municipality (GAM). There is a secondary cluster to the north of the city and a few plots to the south of the city. The Hoytian-sectoral nature of this high-status residential zone is clearly revealed in **Figure 3**. **Photograph 3** shows an opulent new build typical of the residential area of Abdoun to the west of the city centre.



Photograph 3: An opulent newly-built house in Abdoun

Category B residential plots are between 750 and 900 sq m, with the house being more than 4m from the front, 6m from the back and 4 m from the sides. The built-up area of the plot can be up to 45 per cent. Although overall category B residential plots are more dispersed than category A plots, their remarkable concentration to the west of the city centre testifies to just how marked the divide is between the west and east of Amman (**Figure 4**).

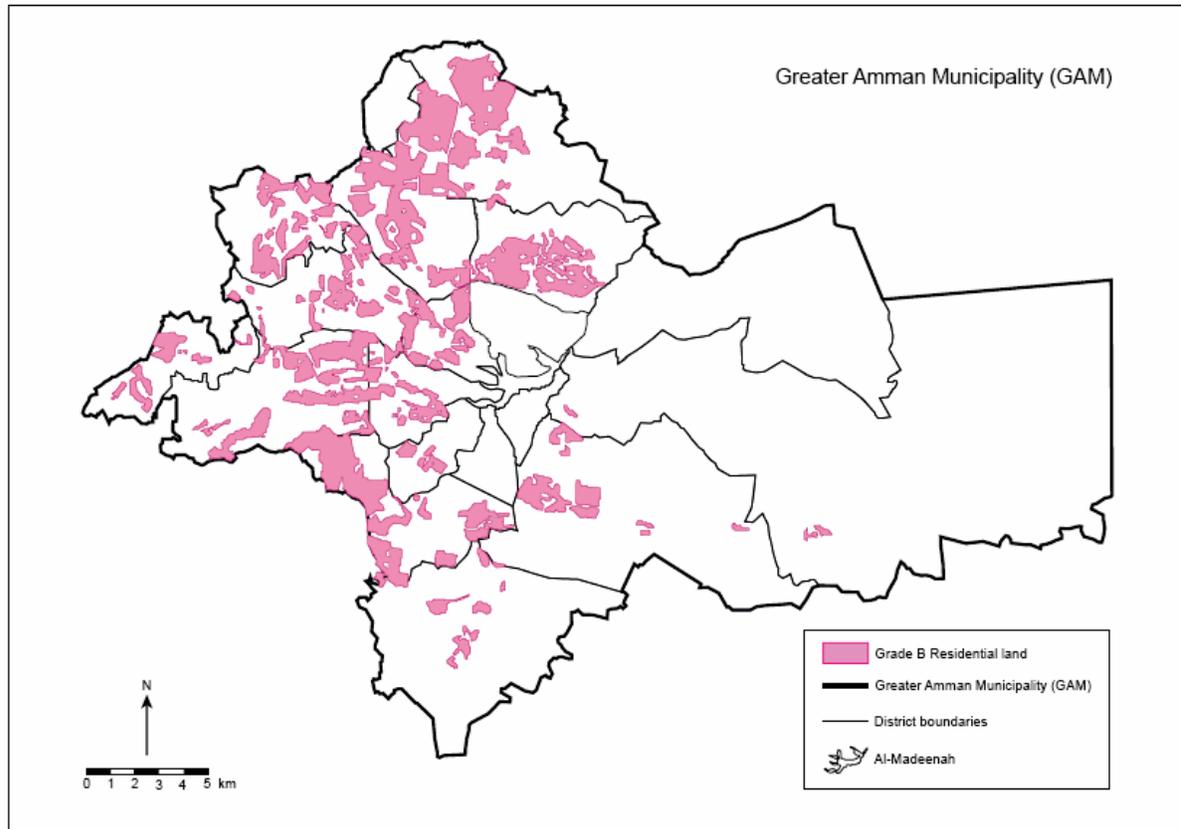


Figure 4: ‘Category B’ residential land in Amman (adapted from original GIS data supplied to the authors by the GIS Department of the Greater Amman Municipality, 2006)

Taken together, category A and B residential lands occupy the entire western and northern parts of the city, reflecting larger residential plot sizes, more substantial buildings and higher overall levels of wealth and social status. In category A and B lands, residential taxes are higher, and urban services such as street cleaning and water supply are more regular than elsewhere.

In contrast, category C land denotes plots of around 400 sq m, with residential buildings occupying up to 51 per cent of the plot. Houses must be no nearer than 4m of the front and back of the plot and 3m from the sides. It is noticeable that such residential plots are located throughout the city, including both the southern and eastern portion of the urban area (Figure 5). If the pattern is examined in detail, there is a broad zone of category C residential land encircling the Madeenah or central city, plus two broad sectoral wedges extending to the south and a cluster toward the western edge of the GAM.

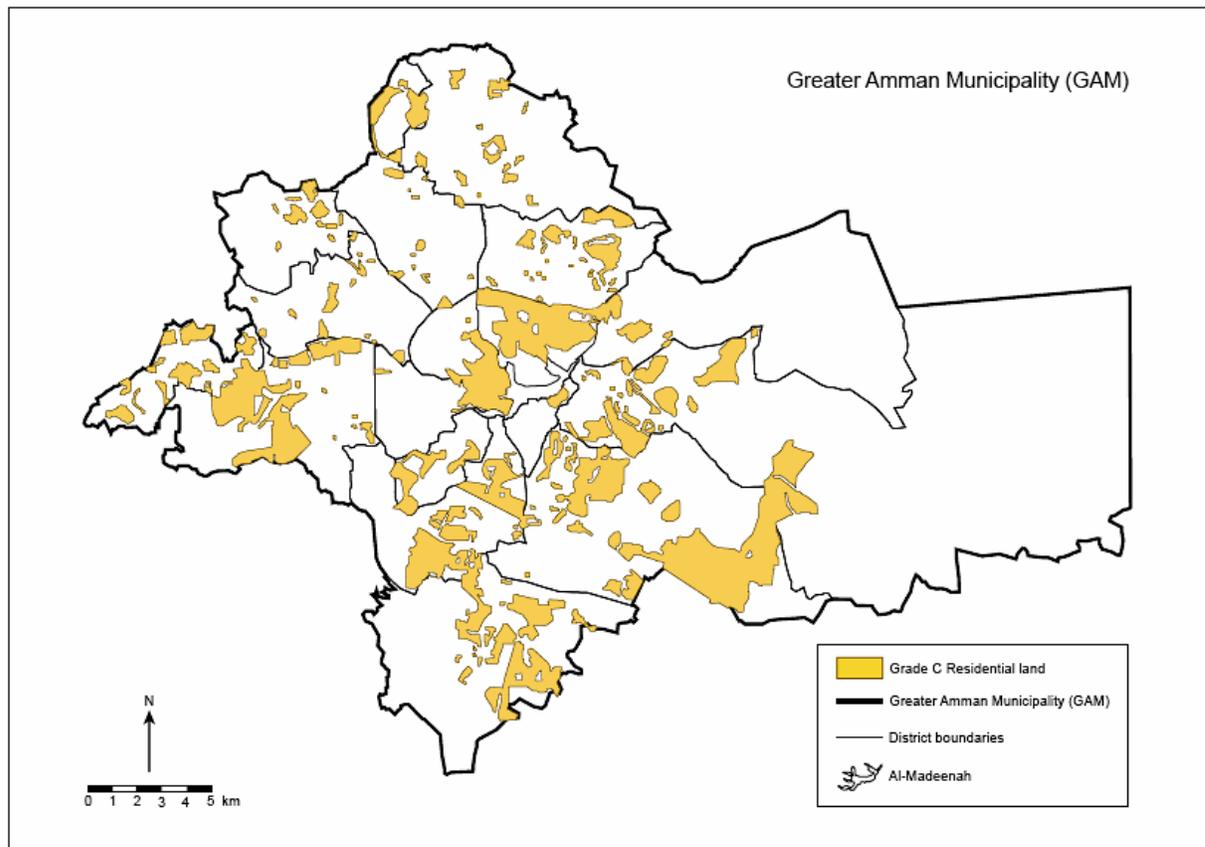


Figure 5: 'Category C' residential land in Amman (adapted from original GIS data supplied to the authors by the GIS Department of the Greater Amman Municipality, 2006)

Finally, category D describes smaller residential plots of up to 200 sq m, with a maximum permitted built-up area of 55 per cent. The residential building should be no nearer than 3m, 2.5m and 2.5m of the front, back and sides of the plot respectively. It is noticeable that category D residential lands characterise the inner city, extending in a broad belt around al-Madeenah (Figure 6). Particular concentrations are noticeable to the south and east of the downtown area, as shown in Figure 6. This also shows two large areas to the southeast of the city centre in the district of Al Qwaismeh, and these include the Palestinian camp of Al-Whedat just to the south-east of the urban core.

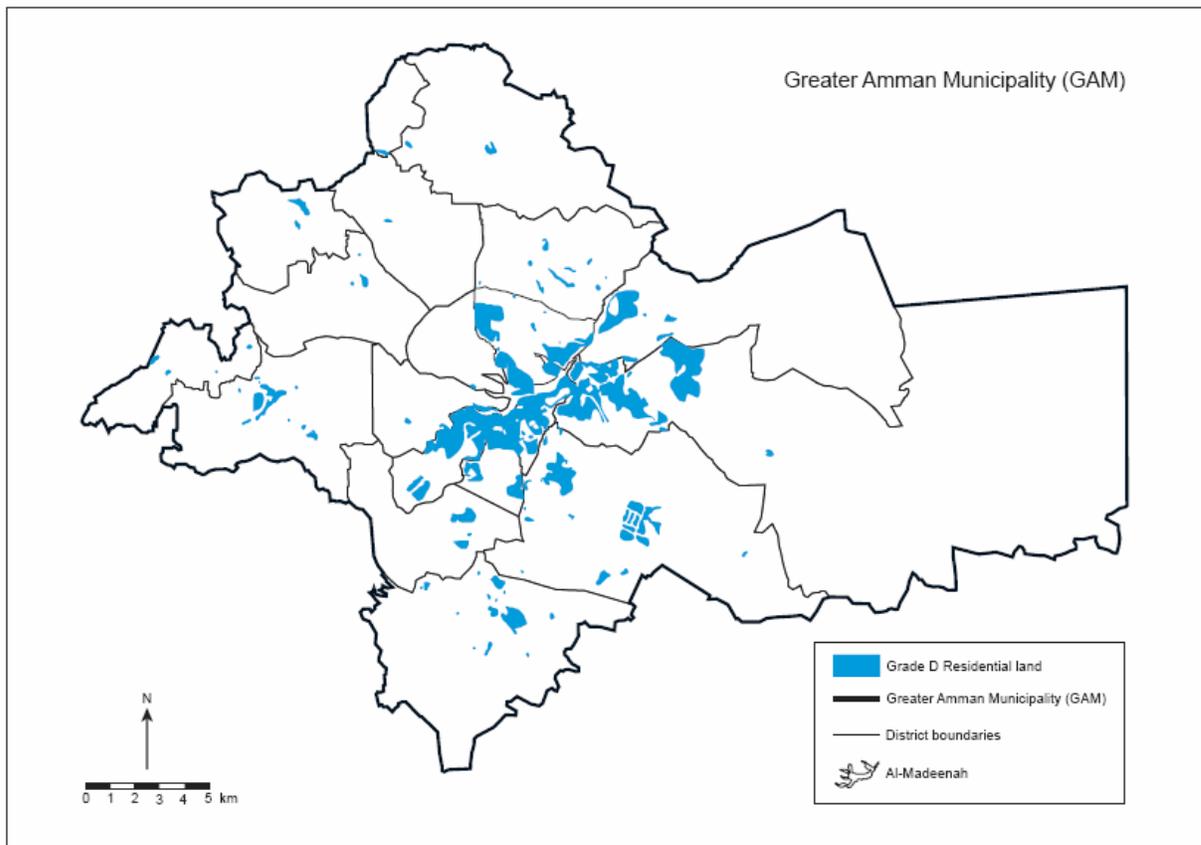


Figure 6: ‘Category D’ residential land in Amman (adapted from original GIS data supplied to the authors by the GIS Department of the Greater Amman Municipality, 2006)

The analysis demonstrates that the contemporary social zonation of the city of Amman shows a strong ‘modern’ pattern, attesting to its dynamic development during the era of the automobile. The city is principally characterised by a Hoytian north-western sector of relatively high social status and land prices.

At a broader level, there is a marked and well-recognised differentiation between the west and east of the city, which is best recognised in the context of Category B residential lands (Figure 4). On the other hand, the distribution of smaller residential plots shows a strong element of concentricity; one that in pattern, if not in terms of the details of the processes involved, is reminiscent of Burgess’ (1925) concentric residential zonation.

The Industrial and Employment Structure of Amman

Notwithstanding government efforts to decentralize economic activities, Amman remains the main economic center of the Kingdom. Over 80 per cent of all industrial and service activities are located in Greater Amman together with the industrial suburbs and peri-urban zone toward Zarqa and the north-east. As might be expected, general levels of prosperity and incomes are higher in the capital than elsewhere in Jordan. According to the *2002/2003 Household Expenditure and Income Survey* (Hashemite Kingdom of Jordan, no date) the average annual income of Ammani households was 6533 JD, while the national figure was 5590 JD. In comparison, the average annual income for all urban households throughout Jordan in 2002/3 was 5751 JD, while for rural households the equivalent statistic was 4949 JD.

The main employment categories for the Governorate of Amman in 2006 were wholesale and retail trade plus the repair of vehicles and personal and household goods, accounting for 22.3 per cent of total employment, well above the national figure of 17.4 per cent (Hashemite Kingdom of Jordan, 2007). The capital also shows a higher proportion of its workforce in manufacturing activities than the nation as a whole at 13.1 per cent, as opposed to the national figure of 11.2 per cent. The next two employment categories are slightly below the national total at 10.3 per cent for education and 10.1 per cent for public administration and defence. The next three employment categories, construction (7 per cent), real estate, renting and business activities (5.8 per cent), and other services (5.8 per cent), are all above the national level. Amman is dominant in terms of the national tourism sector, with 75.2 per cent of all direct employment in the sector being located in Amman. Likewise, over two-thirds of all hotel beds in Jordan are to be found located in the capital. In 2006, the official unemployment level in Amman was 12.1 per cent, and as might be expected, was lower than the national level of 14.0 per cent (Kingdom of Jordan, 2007). However, female unemployment was as high as 22.5 per cent.

In terms of the intra-urban location of jobs within the city, a number of spatial nodes stand out. These include the combined Abdali area, plus the old bus and taxi depot and the western entrance to the city with 8,154 enterprises,

Al-Qwaismeh (7258 enterprises), Wadi es Sir (7256), the downtown area (7095) and Tla' Ali (7019) to the northwest. Once again a generalized west-east split emerges, with the western parts of the city housing the city's most modern shopping centers, universities, hotels, sports stadia and other amenities.

Contemporary Amman: Key Urban Issues

(i) Urban Transport and the City

If there is a single word that characterises the urban transport system of Amman it is 'congestion'. Al-Asad (2005) has lamented that since the 1990s Amman has "become a more congested city in which it is increasingly difficult to drive, and through which it is almost impossible to walk". Reflecting its uncontrolled and uncoordinated growth, the city does not have an integrated public transport system, although the government has recently established a network of yellow city buses. However, it is estimated that only 30 per cent of Jordanians use public transport, and these are generally the relatively poor. As al-Asad (2004a) observes, if people have the money they buy a car or use taxis. Thus, transport in the city is as socially polarised as the structure of the city itself. The same author argues that what is needed is an efficient bus system, using priority bus lanes. At present, the city is almost totally dominated by the automobile. Thus, long-established 'serveeces', or white shared taxis ply their trade on fixed routes radiating from the downtown, charging a flat fare. These are outnumbered by the near ubiquitous yellow taxis and it is estimated that around a quarter of all vehicles in Amman are taxis. Their metered fares are relatively inexpensive and around town trips generally cost little more than 1 JD.

The dominance of the automobile is also reflected in the city's network of major roads and tunnels, which grew phenomenally from the late 1960s into the 1980s, as the city expanded. This is clear from [Figure 2](#). Notwithstanding such investment, the city suffers from considerable traffic congestion at peak hours, especially during the summer months when affluent vacationers from the Gulf region and Jordanian returnees flood into the city. Al-Asad (2004a) has bemoaned the fact that the city is noticeably pedestrian unfriendly, with broken, interrupted or non-existent pavements

and parking, dominating all areas of the city. In 2003, 46.5 per cent of households in Amman had a private car, compared to 35.9 per cent for Jordan. In 2005, there were 679,700 licenced vehicles in Jordan, of which it is reported that 154,500, or 22.73 per cent were involved in accidents. Also in 2005, there were 790 road casualties, ie over 2 deaths per day (Hashemite Kingdom of Jordan, 2006)

Two new urban transport projects, the Abdoun Bridge and the Amman-Zarqua light railway project attest to the growing need to tackle the urban transport problem and at the same time support Greater Amman's growing role as a regional centre for trade and services. The Abdoun Bridge, located in inner-urban west Amman, opened in December 2006, at a reported cost of JD 10.8 million, provided by Japanese funding. The ultra-modern 45 m high and 425 m long bridge forms part of Amman's beltway or ring road (see [Photograph 4](#)).



Photograph 4: A section of the newly-constructed Abdoun bridge at night

The proposed Amman-Zarqa 28 km light track railway will extend from the centre of the city at Swaileh to the industrial suburb of Zarqa to the north west of the city centre. The tender for the project was floated on 10 December 2006 and the project, which will cost \$140 million, will be offered on a build, operate and transfer basis. Both of these projects are key elements in the modernisation of the urban fabric of Amman and an attempt to bolster its regional significance.

(ii) The Provision of Urban Water: water stress, privatisation and de-privatisation

Reflecting the physical geography of the region and the rapid growth of the city itself, a major issue for Amman is the supply of potable water. In 2004, the total consumption for the city area was 105 million cubic metres (LEMA 2004) and local resources are insufficient to meet this. In its *National Water Master Plan (GTZ and MWI 2004)* the Government has stressed that the first priority is to meet the basic needs of the population. Indeed, as the population of the city has grown, various strategies have been implemented, notably the transfer of waters from the Jordan Valley, distant reservoirs and aquifers, and the recycling of wastewater (Darmame, 2006). Today, Amman receives around 50 per cent of its water from the Jordan Valley. Water is pumped from –225 m in the Jordan Valley to a modern treatment plant at Zai to the north-west of the city at an altitude of 1035 m. The remaining water demands of Amman are met from the Al-Mafraq well, the Azraq aquifer (some 70 km east of Amman), as well as from Qatrana, Swaqa and Wala to the south of the city.

Unlike many cities in the developing world, 98 per cent of households in Amman are connected to the water supply network. However, since 1987, the supply of water to households has been rationed. Up until 2004, for most parts of the city, water was supplied on just one or two days of the week, and the problem for households has been that of storage. Wealthy families have been able to invest in large underground storage tanks or cisterns, whilst less wealthy families have been dependent on the ubiquitous 2 cubic metre roof-top storage tank.

The rationing of the urban water supply reflects not just the relative scarcity of water, but also the deplorable physical state of the distribution network. Until 1999,

54 per cent of the water entering the city's distribution system was classified as "unaccounted for", with half of this being lost through leakage. This reflects that extensions to the network have not generally been planned and have consisted of small diameter pipes. Over the years, operators have often responded to problems of water pressure by increasing pump size rather than by reinforcing the network, thereby increasing overall pressures within the system (LEMA 2004). The remaining 'unaccounted for water' has been due to inadequate billing, lax payment collection and the illegal use of water, which in 2004 amounted to over 30,000 instances. The water Authority of Jordan calculates that on average an illegal non-paying user of water consumes two to three times more water than a legal subscriber.

In order to meet the demand, especially in the dry summer months, various sub-markets for urban water have developed, such as private water tankers, water bottled from private wells and distilled mineral water derived from small reverse osmosis machines. In this context, household income and family size are vitally important variables. The cost of purchased water, storage tanks, pipe work and filters are prohibitive for poor households in the eastern and southern areas of Amman. This is one of the reasons for the low average domestic water consumption of 94 litres per head per day in the city (GTZ and MWI 2004). Not surprisingly, the social polarity that characterises Amman is also reflected in patterns of water consumption.

For the future, the provision of adequate water is a priority of the Government. One of the major proposals to achieve this is the Disi Project. This involves the proposed construction of a 325 km pipeline from the Disi aquifer which lies on Jordan's border with Saudi Arabia. This would provide the city with around 100 million cubic metres per year at an estimated base capital cost of \$US 600 million.

In respect of management, Amman's water supply system was placed with the private sector in February 1999, when a four year contract was granted to ONDEO, the commercial arm of Suez Environmental, of which Lyonnaise des Eaux, France, is a leading subsidiary. A local company known as LEMA was created, owned 75 per cent by Suez Environmental and 25 per cent by Arabtech Jardaneh (Jordan) and Montgomery Watson (UK). LEMA operated with an operational investment fund of US \$ 25 million for urgent maintenance and repairs. The contract was extended twice and continued through to December 2006.

LEMA operated over an area of 3,000 sq km, supplying 2 million people and managing 350,000 accounts. It is generally acknowledged that LEMA's major contribution has been in improved billing and debt collection, customer service in general, and in the regulation of rationing. For instance, in winter 2006, continuous supply was introduced to 15.8 per cent of LEMA's customers, and it is clear that some technical sources feel that the entire system should move toward continuous supply both for technical and supply reasons. However, it seems equally clear that currently, Government does not feel this is a step in the right direction.

After much debate during the period 2005-2006, the era of privatisation ended in January 2007, with management of Amman's water being given to a new 'public company' *Meyahona* ('Our Water'). This is owned by the Water Authority of Jordan (WAJ), but will be run on the lines of a private company. This is exactly the model that has been in operation in Jordan's second city Aqaba since 2004 and is being presented by the Ministry of Water and Irrigation as a successful alternative to private sector involvement in the water sector. Sources in the Ministry stress that while the water system of Amman is no longer privatised, it will remain commercialised.

(iii) Urban and Regional Planning for Amman

Contemporary physical development planning for Amman commenced in 1938 when the then British Mayor proposed a land use plan for the city (Department of Land and Surveying, Amman 1938; Kadhim and Rajjal, 1988; see also Malkawi and Abu Dayyeh, 2004; Malkawi, 1996). However, the most comprehensive plan came with *Amman Municipality's Greater Amman Comprehensive Development Plan 1985-2005* (GACDP), which was funded by USAID (Amman Municipality, 1987; see also Abu-Dayyeh, 2004a, 2004b). The aim of the Plan was to control and shape the growth of the city to accommodate an estimated population of 2 million by 2005, ie the level now reached.

Abu-Dayyeh (2004a) argues that the plan's recommendations were based on the British planning ideology, focussing on the prevention of peri-urban and suburban growth, the establishment of Green Belts and the channelling of new growth into satellite towns. In setting out the preferred settlement pattern for Greater Amman for

the year 2005, the intention was to develop two satellite towns to the south and east of the Greater Amman area, a limited satellite located to the immediate south of Queen Alia Airport, and the second more substantial area lying to the south-east of the city on the Ring Road joining Zaqua to Queen Alia Airport, as shown in [Figure 7](#).

Such intentions are now referred to as the *Amman Development Corridor Project (ADCP)*, which is a priority operation presented by the Government of Jordan for World Bank assistance as part of its Country Assistance Strategy. The intention is to develop the southeast section of the planned Amman Ring Road as an industrial development corridor. This will link the Zarqa industrial area to the northeast of Amman with the Desert Highway to the south of Amman, along which lies the Queen Alia International Airport. This expressway continues southwards to the Aqaba Special Economic Zone (ASEZA) and sole port for the nation.

The proposal for the Amman Development Corridor has to be seen in the context of the objectives of the Kingdom as a whole, namely to decentralise away from the capital. With 80 per cent of the economic activity and 70 per cent of the population, much needs to be achieved in this respect (al-Asad, 2005). The details for the Amman Development Corridor puts the combined population of Amman and Zarqa as over 50 per cent of Jordan's total and over 80 per cent its industrial sector. At the national level, the other direction of expansion is toward Irbid. However, as a concomitant of this, urban sprawl is occurring along the highways, noticeably toward the airport (al-Asad, 2005) and toward Salt and Madaba (see [Figures 1, 2 and 7](#)).

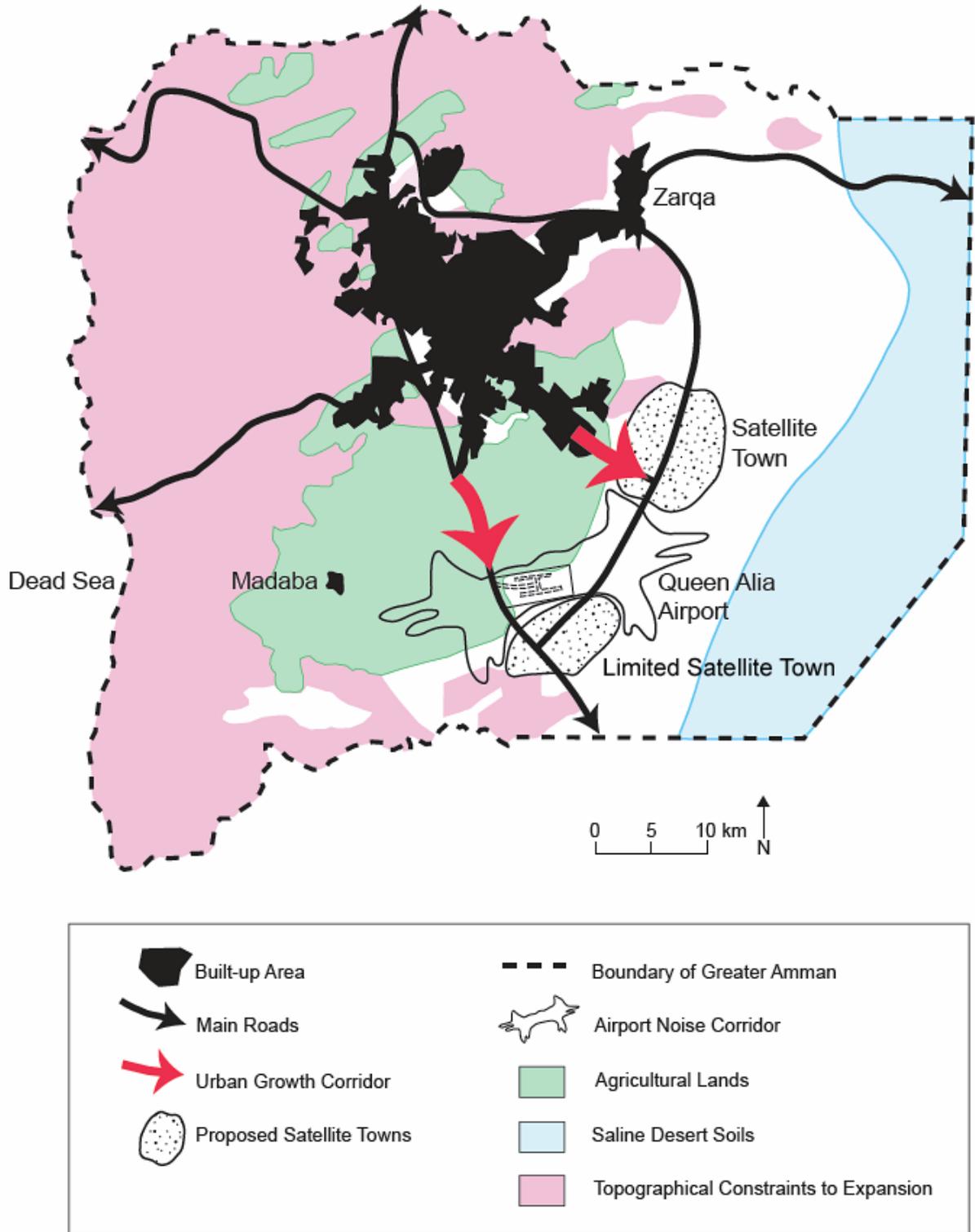


Figure 7: Planned regional settlement pattern for Amman, including the Amman Development Corridor (adapted from Amman Municipality, 1987)

Conclusion: the Growing Geopolitical Importance of Contemporary Amman

The state of Jordan is playing an increasingly pivotal role both in the Middle East region and on the world stage, as part of the new geo-political order born of the invasion of Iraq and the 'Second Gulf War'. On the one hand, Jordan has traditionally followed a pro-western foreign policy and has maintained close relations with both the United States of America and the United Kingdom. On the other hand, Jordan's peaceful and non-confrontational approach in respect of its neighbours, in combination with its overall stability, means that it has become a magnet for Palestinians, Lebanese, Iraqis and indeed, those from all parts of the Middle East who are looking for a new 'home'. Both of these geopolitical approaches were exemplified by the fact that on ascending to power in February 1999, following the death of his father King Hussein, King Abdullah II moved swiftly to reaffirm both Jordan's peace treaty with Israel and its history of close relations with the USA.

Reflecting these strategic realities, as the capital of the Kingdom, the geopolitical and symbolic significance of Amman is increasing. Writing of the recent history of Amman, al-Asad (2004b), has recorded how the city "became a sort of "lung" that has provided much needed breathing space for populations in the region suffering from political displacement – Palestinians since 1948, Lebanese and Iraqis since 1990", so that today, Amman "is playing an increasingly important role in the life of the region". This increasing regional and geopolitical importance is reflected in the continuing rapid growth of the city and various ongoing urban redevelopment projects, some of which (eg the Amman light railway, the Abdoun Bridge and Amman Development Corridor), have been reviewed in this profile.

Less positively, however, Jordan's geo-political position has recently made it vulnerable to terrorist attacks, most notably on 9 November 2005 when suicide bombers simultaneously attacked three major central Amman hotels, killing 57 and injuring 115. '*Al-Qaeda in Iraq*', led by the now-deceased Jordanian national Abu Musab al-Zarqawi, claimed responsibility for these bombings. In a further incident in Amman, on 4 September 2006, a lone gunman shot at a group of escorted tourists at the Roman Amphitheatre, killing a British man and wounding five other people. Reflecting the strategic vulnerability of Amman and Jordan, notably, in November 2005, following the three suicide bombs, King Abdullah II called for a "war on

extremism". At the start of the twenty-first century, it is clear that as well as its role as a modern Arab metropolis, Amman increasingly stands at the geo-political heart of the Middle East region.

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